

Reducing Sexual Assault and Re-Assault on College Campuses

Amanda K. Gilmore

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Reading Committee:

William H. George, Chair

Mary Larimer

Melissa A. Lewis

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Amanda K. Gilmore

University of Washington

Abstract

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Amanda K. Gilmore

Chair of Supervisory Committee

William H. George, Ph.D., Professor, Adult Clinical Psychology

Department of Psychology

Underage college women are at high risk for alcohol use and sexual assault and targeting both alcohol use and sexual assault is needed for this population. The current 3 studies examined the etiology and reduction of sexual assault and re-assault on college campuses among women. Study 1 was a prospective assessment of the use of sexual assault protective behavioral strategies (PBS) on subsequent sexual assault incidence and severity. The use of sexual assault PBS at Time 1 was associated with less sexual assault incidence and severity at Time 2. Study 2 furthered this by examining the relationship between sexual assault PBS, drinking PBS, sexual assault, and re-assault. Both sexual assault PBS and drinking PBS were associated with sexual assault and re-assault in college. Study 3 was a randomized controlled trial assessing the efficacy of a combined intervention targeting both sexual assault risk and alcohol use in college women to reduce sexual assault and re-assault. The combined intervention decreased incapacitated rape, sexual assault incidence and severity, and frequency of heavy-episodic drinking for women with higher incidence and severity of sexual assault at baseline. Taken together, targeting both alcohol use and sexual assault risk in college women may be an effective way to decrease sexual assault and re-assault on college campuses.

Table of Contents

Chapter	Pages
1. Acknowledgements.....	5-8
2. Brief Introduction.....	9-12
3. Study 1: A Prospective Examination of The Effectiveness of Sexual Assault Protective Behavioral Strategies on Sexual Assault Incidence and Severity...	13-25
4. Study 2: Protective Factors Against Sexual Assault Incidence and Severity in College Women The Use of Drinking and Sexual Assault Protective Behavioral Strategies.....	26-41
5. Study 3: A Randomized Controlled Trial Targeting Alcohol Use and Sexual Assault.....	42-64
6. Brief Conclusions.....	65-68
7. References.....	69-78
8. Tables.....	79-85
9. Figures.....	86-89

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Brief Introduction:

Reducing Sexual Assault and Re-Assault on College Campuses

Reducing Sexual Assault and Re-Assault on College Campuses

Sexual assault rates on college campuses have consistently remained high, with up to 75% of college women being assaulted (Abbey, Parkhill, & Koss, 2005), and up to 70% of the time the victim uses alcohol (Reed, Amaro, Matsumoto, & Kaysen, 2009). Sexual assault is defined as nonconsensual sex ranging from sexual touching to physically forced penetration. Prevalence rates for the most severe form, physically forced nonconsensual sex, are 20 – 25% for college women (Fisher et al., 2000) with the highest rates occurring in the first year of college (Humphrey & White, 2000). Additionally, underage drinking is prevalent in college settings and approximately 40% of college students engage in heavy-episodic drinking (HED; Mitka, 2009), defined by as 4 drinks over a 2-hour period for women (NIAAA, 2004). In a longitudinal study from the National Survey on Drug Use and Health examining HED trends from 1979 to 2006, rates of HED in college women increased while no change was observed in college men. In addition, underage HED rates for men have decreased while underage women have reported a rise (Gruca, Norberg, & Bierut, 2009). Given that women under the age of 21 have a higher likelihood of adopting HED as a new behavior in college compared to men (Reifman & Watson, 2003), and due to the high rates of sexual assaults in this same age group, both alcohol and sexual assault risk reduction programs targeted to underage college women are needed.

Sexual assault on college campuses is so prevalent that the White House Council (2014) issued a call to action a committee to address the problem. However, targeting sexual assault without an underpinning scientific understanding is potentially problematic. It is first necessary to identify components that are effective at reducing

sexual assault incidence and severity on college campuses. One component that is often included in sexual assault risk reduction (SARR) programs is the teaching of strategies to reduce the likelihood of being in a sexually assaultive situation (Anderson & Whiston, 2005), or sexual assault protective behavioral strategies (PBS). However, the use of this component is not yet substantiated by research as an effective way to reduce sexual assault incidence and severity. Study 1 began addressing this gap in the literature by substantiating the relationship longitudinally by evaluating the effectiveness of the use of sexual assault PBS as a protective factor against future sexual assault incidence and severity using a longitudinal design (see pages 13-25).

Identifying effective components for SARR is not all that is needed to address the problem of sexual assaults on college campuses. To thoroughly address the issue, alcohol use needs to be considered. Alcohol use is one of the most consistent risk factors for experiencing sexual assault (Reed, Amaro, Matsumoto, & Kaysen, 2009). It has been suggested that targeting alcohol use in itself might be an effective SARR strategy (Testa & Livingston, 2009) and two preliminary studies have supported this (Clinton-Sherrod et al., 2011; Testa, Hoffman, Livingston, & Turrisi, 2010). Given that drinking PBS are strategies that are typically taught in alcohol use interventions for college students to reduce high-risk alcohol use (e.g., Crouce & Larimer, 2011; Lewis et al., 2010; Pearson, 2013; Prince, Carey, & Maisto, 2013), drinking PBS may be a component that could be included in SARR programs to address the need of targeting alcohol use among college students to reduce sexual assault risk. Study 2 examined drinking PBS in a cross-sectional study by examining the associations among sexual assault PBS, drinking PBS, and sexual assault incidence and severity (see pages 26-41).

After identifying research- and theory-based components that have substantiated evidence of reducing sexual assault risk among college women, a web-based SARR personalized feedback program will be developed. This SARR program will be combined with an already existing effective web-based alcohol use reduction personalized feedback program based on BASICS (Brief Alcohol Screening and Intervention for College Students; Dimeff et al., 1999) to create a combined risk reduction program that targets both sexual assault risk and alcohol use in college women. Study 3 was a randomized control trial comparing a SARR only condition, an alcohol use only condition, and a combined sexual assault and alcohol use condition (combined condition), and a minimal assessment only control condition to a full assessment only control condition on alcohol-related sexual assault outcomes, sexual assault outcomes, and alcohol outcomes at a 3-month follow-up (see pages 42-64).

Study 1:

**A Prospective Examination of the Effectiveness of Sexual Assault Protective
Behavioral Strategies on Sexual Assault Incidence and Severity**

A Prospective Examination of the Effectiveness of Sexual Assault Protective Behavioral Strategies on Sexual Assault Incidence and Severity

Sexual assault on college campuses is a widespread problem with up to 75% of college women being assaulted (Abbey, Parkhill, & Koss, 2005). Effective sexual assault risk reduction (SARR) programs are needed. The White House Council (2014) recently began targeting the issue and one key objective was to “Provide educational institutions with best practices for preventing and responding to rape and sexual assault” (p. 26). However, there is scant research supporting effective sexual assault incidence reduction using current SARR programming. It is imperative that the scientific community provides a more comprehensive understanding of the factors and processes that could reduce sexual assault risk in college students at this opportune time when the US government is implementing significant policy changes. The current study presents initial empirical support for protective strategies that may help reduce sexual assault risk for college women.

Sexual assault is defined as a nonconsensual experience ranging from sexual touching to rape, which may be perpetrated by a variety of tactics including verbal coercion, alcohol/drug incapacitation, or force. Sexual re-assault rates are high (for a review, see Messman-Moore & Long, 2003), and women with a CSA (childhood sexual abuse) history are up to 11 times more likely to experience ASA (adolescent/adult sexual assault) than women without a CSA history (Fergusson, Horwood, & Lynskey, 1997). Sexual re-assault may occur because individuals with a sexual assault history use fewer protective strategies and engage in behaviors that increase sexual assault risk (e.g., more sexual partners and more drinking; Messman-Moore & Long, 2000). Sexual re-assault

may also occur at different time points (CSA to ASA) or within the same time frame (multiple ASA experiences), therefore, it is important to consider the frequency of assaults in addition to tactic and contact severity (contact vs. penetration) when discussing ASA incidence and severity. The current study incorporates frequency, time frame, and tactic/contact when assessing for sexual assault incidence and severity.

Despite the efforts to reduce sexual assault in college, sexual assault rates have remained consistently high since first assessed (for a review, see Rozee & Koss, 2001). This may be because SARR programs contain components, including sexual assault protective behavioral strategies (PBS), that do not yet have evidence-based substantiation. Sexual assault PBS may be effective in preventing sexual assault or reducing severity, but the relationship remains unclear in the absence of compelling research evidence. The current study was a prospective analysis of the effect of sexual assault PBS use on future sexual assault incidence and severity. We pose the question: Does a woman's use of sexual assault PBS reduce the incidence of subsequent sexual assault experiences and the severity of said assaults?

Sexual Assault Protective Behavioral Strategies

Several researchers have compiled protective strategies for reducing the risk of sexual assault (e.g., Moore & Waterman, 1999). Examples of sexual assault PBS include meeting a male date or acquaintance in a public place as opposed to a private one and planning for what self-protection strategies to use if a situation progressed aggressively. Much of the research on SARR has focused on sexual assault resistance strategies, which are ways women can resist a sexual assault experience once the experience has begun (Norris, Nurius & Dimeff, 1996; Masters, Norris, Stone, & George, 2006; Norris,

George, Stoner, Masters, Zawacki, & Davis, 2006; Stoner, Norris, George, Davis, Masters, & Hessler, 2007). Sexual assault PBS target behaviors that intend to help reduce the risk that a woman would end up in a sexually assaultive situation. This is an inherently difficult challenge to accomplish when victims are not in control of the initiation and enactment of a sexual assault. However, there are several risk factors for experiencing sexual assault and these PBS target those risk factors. Additionally, SARR programs geared towards women typically include training on sexual assault PBS (for reviews, see Anderson & Whiston, 2006; Vladutiu, Martin, & Macy, 2011). This inclusion presumes that PBS serve as protective functions in sexual assault, however, to our knowledge, no research has examined if sexual assault PBS are actually protective against sexual assault. The current study focuses on sexual assault PBS that were naturally adopted and emitted without formal SARR programming.

There are few studies examining the relationship between untrained sexual assault PBS and sexual assault. Further, the cross-sectional studies examining untrained sexual assault PBS and sexual assault yield inconsistent findings (Breitenbecher, 2008; Moore & Waterman, 1999). Breitenbecher (2008) found that women with a sexual assault history use less sexual assault PBS than those without a sexual assault history. However, Moore and Waterman (1999) and Hickman and Muehlenhard (1997) found no relationship between sexual assault PBS use and sexual assault history. Hickman and Muehlenhard (1997) also found that although women report a higher risk for experiencing acquaintance rape when compared to stranger rape, they are less likely to engage in PBS to protect against acquaintance rape and more likely to engage in PBS to protect against stranger rape. Additionally, no studies to date have examined the relationship between sexual

assault PBS and sexual re-assault. Women with a sexual assault history are less likely to perceive sexual assault risk cues than women without such histories (VanZile-Tamsen, Testa, & Livingston, 2005). Therefore, use of sexual assault PBS may be particularly helpful for this population given that they are preventative and do not rely on risk perception. It is necessary to first understand if these untrained PBS are protective factors for experiencing more severe sexual assault and re-assault before implementing risk reduction programs including trained PBS.

Current Study

The current study is a longitudinal assessment of the effect of the use of sexual assault PBS on sexual assault incidence and severity. We targeted a sample at high risk of sexual assault: college women, individuals under the age of 21 (Hingson & White, 2014; Humphrey & White; Bureau of Justice Statistics, 2006), and heavy-episodic drinkers (George et al., 2014).

Consistent with previous findings (for a review, see Messman-Moore & Long, 2003), it is hypothesized (Hypothesis 1.1) that women with a higher sexual assault incidence and severity at baseline will have higher incidence and severity of sexual assault at a 3-month follow-up. It is also hypothesized (Hypothesis 1.2) that the use of sexual assault PBS at baseline will serve as a protective factor against later sexual assault incidence and severity.

Methods

Participants

A total of 107 participants were eligible to participate in the study after a screening baseline survey. Eligible participants were: (a) female, b) reported consumption

of 4 drinks over a 2 hour period at least once in the past month, and c) were between the ages of 18 and 20.

There were 77 (71.96%) participants who completed the follow-up survey. Participants who did not complete the follow-up survey did not differ from those who did on pre-college ASA severity, since college ASA severity, or average number of drinks consumed weekly.

Participants were 18.83 years old on average ($SD = .74$). The majority (64.0%) of participants had been in college for less than a year, were not a member of a sorority (63.6%), spoke English as a first language (76.6%), and reported living on campus (75.4%). The majority of participants were White (50.6%) or Asian American/Pacific Islander (24.7%) and 13.0% were multiracial, 5.2% were Black/African American, 3.9% identified as “Other”, 1.3% were American Indian/Alaska Native, and 1.3% chose to not identify their race. Additionally, 10.7% of participants identified as Hispanic/Latina.

Procedure

Participants were recruited from introductory psychology courses for a study about “drinking and sexual behaviors” and were given course credit for completing the baseline survey and a \$25 gift card for completing the follow-up survey. Participants first completed the baseline screening survey online and were contacted 3 months later to complete a follow-up survey.

Measures

Sexual Assault Protective Behavioral Strategies. Sexual assault PBS were assessed using a revised version of the Dating Self-protection against Rape Scale (Moore & Waterman, 1999; Breitenbecher, 2008). Participants were asked when they were with a

date how often they performed a number of behaviors in order to protect themselves from possible sexual assault. Sample questions included “speak directly and assertively,” “provide your own transportation,” and “meet in a public place instead of a private place.” Answer choices ranged on a 5-point Likert-type scale (1 = *Never* and 5 = *Always*). Scores were computed by creating an average of all items. The original scale was modified from asking how often they engaged in the behavior with a date to with a date “or someone who is sexually interested in you” to not limit the protective behaviors to “dates.” Items had excellent internal consistency ($\alpha = .88$).

Childhood Sexual Abuse. The revised Childhood Sexual Abuse questionnaire (Finkelhor, 1979) assessed childhood sexual abuse perpetrated by someone who was 5 years or older than them or by someone who was of a similar age. The first was assessed by asking participants whether prior to their 14th birthday, “anyone who was at least 5 years older than you touch or fondle your body in a sexual way or make you touch or fondle their body in a sexual way.” The second was assessed by asking participants whether prior to their 14th birthday, “anyone close to your age touch sexual parts of your body or make you touch sexual parts of their body against your will or without your consent.” Participants were dichotomously categorized into having no CSA history and having a CSA history.

Sexual Experiences Survey. Using the Sexual Experiences Survey (Koss et al., 2007), participants were asked to indicate if they have had coerced sexual experiences at three time points: 1. After their 14th birthday, but before entering college (assessed at baseline), 2. Since entering college (assessed at baseline), and 3. In the past 3 months (assessed at follow-up). The SES is a behaviorally specific assessment of sexual assault

experiences and it includes experiences perpetrated by verbal coercion, incapacitation, threats of physical force, and physical force. Sexual assault experiences include sexual contact, attempted penetration, and completed penetration. Participants were asked to indicate the number of times that a tactic or multiple tactics were used for each of the experiences (0 = 0 times, 1 = 1 time, 2 = 2 times, and 3 = 3 or more times).

Sexual assault incidence and severity was determined using a 63-point scale (Davis, Gilmore, Stappenbeck, Balsan, George, & Norris, under review) for three separate time points, with high scores indicating more severe sexual assault experiences. This scoring procedure takes into account both frequency of experiences and severity of experiences. It was calculated using the procedures outlined in Davis et al. (under review) by multiplying a severity score (6 = *attempted or completed rape by force*, 5 = *attempted or completed rape by incapacitation*, 4 = *attempted or completed rape by verbal coercion*, 3 = *sexual contact by force*, 2 = *sexual contact by incapacitation*, 1 = *sexual contact by verbal coercion*, 0 = *no sexual assault experiences*) by number of times each has been experienced (0 = 0 times, 1 = 1 time, 2 = 2 times, 3 = 3 or more times). Separate severity scores were calculated for before college ASA, since college ASA, and ASA in the past 3 months.

Results

Descriptive Information

A total of 14 (18.18%) participants reported having a CSA history, 30 (38.96%) reported having a pre-college ASA, 33 (42.86%) reported having a since college ASA, and 16 (20.78%) reported having an ASA in the past 3 months at the point of the follow-

up survey. Additionally, participants reported using sexual assault PBS some of the time on average ($M = 2.51, SD = .95$).

Regression Analyses

Using hierarchical regression, we tested if sexual assault PBS at baseline predicted sexual assault incidence and severity at follow-up after controlling for sexual assault history. The first step included CSA history, pre-college ASA severity, and since college ASA severity as predictors of past 3 month ASA incidence and severity. This step was not significant, $F(3,75) = 2.46, p = .07$. In the second step, baseline use of sexual assault PBS was included as a predictor of past 3 month ASA severity and this step was significant, $F(3,75) = 3.68, p < .01$. The R^2 change in the second step was significant, $F_{\text{change}}(1,71) = 6.74, p = .01$. The use of sexual assault PBS was associated with less ASA incidence and severity in the past 3 months at follow-up, $\beta = -.29, t(4) = -2.60, p = .01$. More severe ASA experiences since entering college was also associated with more severe ASA experiences in the past 3 months at follow-up, $\beta = .25, t(4) = 2.31, p = .02$.

Discussion

The hypothesis that women with more severe sexual assault histories at baseline would have more incidence and severity of sexual assault 3 months later (Hypothesis 1.1) was partially supported by the results. Since entering college ASA incidence and severity, the most recent sexual assault history assessed, was associated with ASA incidence and severity 3 months later. However, earlier sexual assault histories were not. The hypothesis that the use of sexual assault PBS would serve as a protective factor against later sexual assault incidence and severity (Hypothesis 1.2) was supported. More use of

sexual assault PBS was associated with less incidence and severity of sexual assault 3 months later.

The finding that the use of sexual assault PBS is in fact associated with subsequent decreased sexual assault risk suggests that the inclusion of these strategies in sexual assault risk reduction programs is warranted. This is an important finding because SARR programs are not currently effective at reducing sexual assault incidence and severity (Anderson & Whiston, 2005; Breitenbecher, 2000; Vladutiu et al., 2011). The components that are typically included in these SARR programs should undergo scientific study to determine if they should continue to be included in future programming. The current study suggests that sexual assault PBS should be included as a key component in future programming.

The current study assessed the association between naturally occurring PBS and later sexual assault incidence and severity, not taught PBS. There may be a difference between these naturally occurring PBS and those that are taught through risk reduction programming. For example, it is possible that some PBS are more socially accepted (like having a designated driver or other safe transportation) compared to others (like alternating alcoholic and nonalcoholic drinks) and individuals may already be using the socially accepted PBS within their friend group. Future research should assess if including components teaching sexual assault PBS in sexual assault risk reduction programs is an effective strategy in increasing one's use of sexual assault PBS.

It is surprising that only the most recent sexual assault history was associated with subsequent sexual assault at a 3-month follow-up. It is possible that this association has to do with the setting of the sexual assault. ASA incidence and severity since entering

college was associated with experiencing ASA in the past 3 months while the participants were presumably still in the college setting. Perhaps there is something unique about experiencing sexual assault in college and if a woman is at a higher risk for experiencing a sexual assault since entering college then she continues to be at risk throughout college. Future research can assess this possibility. Alternatively, it may be possible that sexual re-assault occurs within a shorter time frame and time since assault may be a risk factor for future assaults. It is possible that a woman reported the same sexual assault experience at baseline and at follow-up if time frames were confused. However, the questions clearly indicated in the past 3 months and participants were not invited to complete the follow-up survey until 3 months after completing the baseline survey so it is unlikely.

Strengths, Limitations, and Future Directions

The sample characteristics of the participants in this study are limited by the inclusion criteria of engaging in heavy-episodic drinking and by age. Although these inclusion criteria were chosen because sexual assault is at highest risk in this population, it is possible that non-heavy episodic drinkers have a different relationship between sexual assault PBS and subsequent sexual assault incidence and severity. It may also be possible that the risk and protective factors of sexual assault in college differ by year in college. Thus, future research should examine the association between sexual assault PBS and sexual assault incidence and severity in a broader population of college women including who do not engage in HED.

Although the current study is the first to examine the association between sexual assault PBS and subsequent sexual assault incidence and severity using a prospective

design, it is possible that other factors not examined in the current study were associated with the sexual assault. It is also possible that if a woman engages in sexual assault PBS she may be engaging in other PBS like drinking PBS which could decrease sexual assault risk. Future research should examine multiple PBS as potential factors to decrease sexual assault risk. The current study included only college women and there are other groups of women that are at high risk of experiencing sexual assault. Future research should examine if these sexual assault PBS are also effective in other high-risk groups or if there are specific sexual assault PBS for subgroups of women.

Finally, the results should be interpreted knowing that individuals who use more sexual assault PBS may be the ones who are at higher risk for sexual assault because in order to use these strategies, one has to be actively meeting with men or dating thus having more exposure to potentially assaultive situations. This may help explain why previous findings have been inconsistent. It may be that women who engage in these strategies more are also at higher risk due to higher exposure to at-risk situations. However, despite this potential problem, we did find a protective association between the use of sexual assault PBS and subsequent sexual assault incidence and severity in a prospective design. Also, the outcome measure only examined sexual assault incidence and severity and did not assess “successful” avoidance of getting into sexually assaultive situations. For example, it is possible that a woman who experienced one severe sexual assault in the past 3 months had successfully avoided 5 potentially sexually assaultive situations. Our current method of assessment cannot speak to successful avoidance; however, the ultimate goal is to reduce sexual assault incidence and severity which is what we assessed.

Conclusion

To our knowledge, this is the first study to examine sexual assault PBS in a prospective design and our findings suggest that the use of sexual assault PBS serve as a protective factor. Given that the use of sexual assault PBS are associated with subsequent sexual assault incidence and severity over and above a sexual assault history, it may be possible to provide women with lists of sexual assault PBS before entering college so they are aware of ways in which they can protect themselves. It may also be helpful to help students generate their own PBS because there are many PBS that are not reflected in the questionnaires given in this study. Future research should replicate this finding and examine the effectiveness of teaching sexual assault PBS as a component in sexual assault risk reduction programs on college campuses.

Study 2:

Protective Factors Against Sexual Assault Incidence and Severity in College Women

The Use of Drinking and Sexual Assault Protective Behavioral Strategies

Study 1 outlined the relationship between the use of sexual assault PBS and subsequent sexual assault incidence and severity in college. It was found that the use of sexual assault PBS protects against sexual assault incidence and severity in a 3-month follow-up for college women between the ages of 18 and 20 who engage in HED. Two primary questions arose from the first study: 1. Do drinking PBS also serve as protective factors for sexual assault incidence and severity? and 2. Is there a relationship between the use of sexual assault PBS and sexual assault incidence and severity among a broader sample of college women, not limited only to heavy-episodic drinkers? Study 2 addressed these two questions by examining the relationship between sexual assault PBS, drinking PBS, and sexual assault incidence and severity among college women. Because the literature examining the association between sexual assault PBS and sexual assault has already been reviewed in Study 1, it will only be re-reviewed for Study 2 as needed.

Protective Factors Against Sexual Assault Incidence and Severity in College Women

The Use of Drinking and Sexual Assault Protective Behavioral Strategies

PBS, or strategies that are used to decrease one's risk of experiencing an unwanted consequence, are commonly taught in interventions to reduce health risk behaviors. In regards to sexual assault, the use of sexual assault PBS serves as a protective factor against sexual assault incidence and severity (see Study 1). Additional PBS warrant consideration when assessing protective factors in sexual assault, specifically those related to alcohol use. The majority of sexual assaults involve alcohol use (Reed, Amaro, Matsumoto, & Kaysen, 2009) and women are more likely to experience sexual assault on days of engaging in HED (Parks, Hsieh, Bradizza, & Romosz, 2008) compared to non-drinking days. Intoxicated women may be at risk for

sexual assault for many reasons, including decreased risk perception and decreased likelihood of using effective resistance strategies. Alcohol administration experiments suggest that women perceive sexual assault risk less and resist sexual advances less effectively while intoxicated compared to when they are sober (Norris et al., 2006; Stoner et al., 2007; Testa, Livingston, & Collins, 2000). Thus, using skills to reduce alcohol use may decrease the risk for sexual assault, presumably because lower intoxication – compared to greater intoxication – will be associated with more effective risk perception and resistance.

Reducing alcohol use and incorporating information on alcohol into sexual assault interventions is imperative to reduce sexual assault risk (e.g., Testa & Livingston, 2009). However, it is unclear how to best reduce alcohol use in a way that also reduces sexual assault risk. Sexual assault is not in the control of the victim and it may be that protective factors for sexual assault and re-assault are unrelated to the behaviors of women. The primary objective of investigating sexual assault PBS and drinking PBS is to gauge the potential value of drinking PBS as adjunctive modules for inclusion in existing SARR programs.

Drinking Protective Behavioral Strategies

Drinking PBS are associated with less high-risk alcohol use (e.g., Crounce & Larimer, 2011; Lewis et al., 2010; Pearson, 2013; Prince, Carey, & Maisto, 2013). These cognitive-behavioral strategies are used to stop or limit alcohol consumption, monitor the manner of drinking, and reduce harm from drinking. Drinking PBS include strategies such as eating before drinking, avoiding drinking games, and alternating alcoholic and non-alcoholic drinks. The use of these skills is associated with less risk of alcohol-related

negative consequences (e.g, Crouce & Larimer, 2011; Lewis et al., 2010; Pearson, 2013). Sexual assault is a particularly problematic negative consequence of alcohol use, and it is possible for drinking PBS to serve as a protective factor against sexual assault.

An exception to these findings is the event-level examination of within-person drinking behaviors (for a review, see Pearson, 2013). Previous research has found that on days that individuals used more serious harm reduction PBS and limiting/stopping PBS, participants drank more than usual (Lewis, Patrick, Lee, Kaysen, Mittman, & Neighbors, 2011). Pearson, D’Lima, and Kelley (2013) found that the use of more serious harm reduction PBS predicted increased daily alcohol use. Certain drinking PBS may be used in preparation for a heavy drinking evening rather than a way to decrease drinking in general. For example, someone may plan not to drink and drive because they are planning to drink more heavily than normal. Because we are examining global drinking PBS rather than event-level PBS, the relationship between sexual assault and PBS is expected to be consistent with the research on global drinking PBS and negative consequences.

The relationship between drinking PBS and sexual assault is relatively new to the field. To our knowledge, only one study has examined the relationship between drinking PBS and ASA history and no research exists examining the relationship between drinking PBS and CSA history. Palmer et al. (2010) found that experiencing any sexual assault in the past year was associated with less use of drinking PBS. Their study included both men and women, controlling for gender in the results. Given the dearth of research in the area and because of the strong relationship between drinking PBS and alcohol-related negative consequences, it is essential to further examine the relationship between drinking PBS and sexual assault and re-assault in college women.

Because alcohol plays a central role in the sexual assault of college women, it is essential to examine if both sexual assault PBS and drinking PBS are protective against experiencing sexual assault and re-assault during college. Study 2 examines a cross-sectional relationship between sexual assault experiences at different times in the participants' lives (CSA, pre-college ASA, and since-college ASA), drinking PBS, and sexual assault PBS among college women.

Hypotheses

Consistent with previous findings (Messman-Moore & Long, 2003) and Hypothesis 1.1, it is hypothesized that sexual assault history will be associated with sexual assault (Hypothesis 2.1). Specifically, we hypothesized that a CSA history will be associated with pre-college ASA incidence and severity, and pre-college ASA incidence and severity will be associated with since college ASA incidence and severity. We also hypothesized that sexual assault history will be associated with less use of sexual assault PBS and drinking PBS (Hypothesis 2.2) and that more use of sexual assault PBS and drinking PBS will be associated with less sexual assault incidence and severity since entering college (Hypothesis 2.3). See Figure 2.1 for hypothesized model.

Methods

Participants

A total of 550 female participants aged 18 – 20 were recruited from introductory psychology courses to complete a study about “drinking and sexual behaviors.” Participants were given extra course credit for their participation and participants from these courses are generally representative both demographically and in terms of alcohol consumption of the campus population (Neighbors, Larimer, & Lewis, 2004).

Participants were 18.79 years old on average ($SD = .86$). The majority (65.2%) of participants had been in college for less than a year, were not a member of a sorority (80.4%), spoke English as a first language (62.4%), and live on campus in residence halls, dorm rooms, or sorority houses (65.1%). The majority of participants were Asian American/Pacific Islander (45.8%) or White (38.5%) and 9.7% were multiracial, 2.7% were Black/African American, 2.6% identified as “Other”, .7% were American Indian/Alaska Native, and 3.4% chose to not identify their race. Additionally, 8.3% of participants identified as Hispanic/Latina. Participants drank on average 3.19 ($SD = 5.88$) drinks per week and one-third of the participants (33.3%) reported having never engaged in consensual sex.

Procedure

Participants completed the survey online and were given course credit for their participation.

Measures

Sexual Assault Protective Behavioral Strategies. Sexual assault PBS were assessed using a revised version of the Dating Self-Protection against Rape Scale (Moore & Waterman, 1999; Breitenbecher, 2008). Participants were asked when they were with a date how often they performed a number of behaviors in order to protect themselves from possible sexual assault. Sample questions included “speak directly and assertively,” “provide your own transportation,” and “meet in a public place instead of a private place.” Answer choices ranged on a 5-point Likert-type scale (1 = *Never* and 5 = *Always*). Scores were computed by creating an average of all items. The original scale was revised from asking how often they engaged in the behavior with a date to with a date “or

someone who is sexually interested in you” to not limit the protective behaviors to “dates.” Items had excellent internal consistency ($\alpha = .94$)

Drinking Protective Behavioral Strategies. Participants were asked questions from the Protective Behavioral Strategies (Martens, Ferrier, Sheehy, Corbett, Anderson, & Simmons, 2005), with answer choices ranging on a 5-point scale (1 = *always* and 5 = *never*). Participants were asked while using alcohol or “partying” whether they engaged in a variety of behaviors categorized into three subscales, including stopping or limiting drinking, manner of drinking, and serious harm reduction. The stopping or limiting drinking subscale included seven items (e.g. “determine not to exceed a set number of drinks” and “leave the bar/party at a predetermined time”). The manner of drinking subscale included five items (e.g. “avoid drinking games” and “avoid mixing different types of alcohol”). The serious harm reduction subscale included three items (e.g. “use a designated driver” and “know where your drink had been at all times”). The items for all subscales were averaged for a total drinking PBS score. Items had excellent internal consistency ($\alpha = .94$).

Childhood Sexual Abuse. The revised Childhood Sexual Abuse questionnaire (Finkelhor, 1979) assessed childhood sexual abuse perpetrated by someone who was 5 years or older than them or by someone who was of a similar age. The first was assessed by asking participants whether prior to their 14th birthday, “anyone who was at least 5 years older than you touch or fondle your body in a sexual way or make you touch or fondle their body in a sexual way.” The second was assessed by asking participants whether prior to their 14th birthday, “anyone close to your age touch sexual parts of your body or make you touch sexual parts of their body against your will or without your

consent.” Participants were dichotomously categorized into having no CSA history and having a CSA history.

Sexual Experiences Survey. Using the Sexual Experiences Survey (Koss et al., 2007), participants were asked to indicate if they have had coerced sexual experiences at two time points: 1. After their 14th birthday, but before entering college assessed at baseline, and 2. Since entering college. The SES is a behaviorally specific assessment of sexual assault experiences and it includes experiences perpetrated by verbal coercion, incapacitation, threats of physical force, and physical force. Sexual assault experiences include sexual contact, attempted penetration, and completed penetration. Participants were asked to indicate the number of times that a tactic or multiple tactics were used for each of the experiences (0 = 0 times, 1 = 1 time, 2 = 2 times, and 3 = 3 or more times).

Sexual assault severity was determined using a 63-point scale (Davis et al., under review) for each time point (before college and since entering college), with high scores indicating more severe sexual assault experiences. This scoring procedure takes into account both frequency of experiences and severity of experiences. It was calculated using the procedures outlined in Davis et al. (under review) by multiplying a severity score (6 = *attempted or completed rape by force*, 5 = *attempted or completed rape by incapacitation*, 4 = *attempted or completed rape by verbal coercion*, 3 = *sexual contact by force*, 2 = *sexual contact by incapacitation*, 1 = *sexual contact by verbal coercion*, 0 = *no sexual assault experiences*) by number of times each has been experienced (0 = 0 times, 1 = 1 time, 2 = 2 times, 3 = 3 or more times). Because two time points were assessed, a separate severity score was calculated for before college ASA and since college ASA.

Results

Descriptive Information

All of the variables in the hypothesized model were significantly correlated in the hypothesized direction except for the relationship between CSA history and use of drinking PBS which did not have a significant correlation (see Table 2.1). In relation to sexual assault experiences, 394 participants (71.8%) reported never having a before college sexual assault experience and 436 (79.6%) reported never having a since college sexual assault experience.

Data Analysis Plan

The hypothesized model (see Figure 2.1) was tested in Mplus 7 using a path model. Maximum likelihood estimation with robust standard errors was used for missing data. To assess model fit, chi square, root mean square error of approximation (RMSEA), comparative fit index (CFI), and standard root mean square residual (SRMR) were used. Good model fit was indicated with a nonsignificant chi square, RMSEA values less than .06, CFI values greater than .90, and SRMR values less than .06 (Kline, 2005).

Because the data were cross-sectional in nature, an alternate model was tested. This alternate model tested drinking and sexual assault PBS as outcomes of CSA, before college ASA, and since college ASA (see Figure 2.2). To evaluate which model fits the data best, a comparison of the models was conducted.

Model Testing

The hypotheses were tested in a path model (see Figure 2.1). The hypothesized model was a good fit for the data, $\chi^2(3) = 5.66, p = .13$, RMSEA = .04, CFI = .99, SRMR = .03. CSA history was associated with more severe pre-college ASA ($\beta = .145, p < .01$).

Pre-college ASA severity was associated with both lower use of drinking PBS ($\beta = -.158, p < .001$) and less sexual assault PBS ($\beta = -.145, p < .001$). The use of more drinking ($\beta = -.063, p < .01$) and sexual assault PBS ($\beta = -.057, p < .05$) were associated with less severe ASA since college. Additionally, more severe ASA experiences before college were associated with more severe ASA experiences since college ($\beta = .535, p < .001$). Finally, the use of drinking PBS and sexual assault PBS were positively associated with each other ($\beta = .323, p < .001$).

Examination of the structural model showed a small to moderate amount of variance was accounted for in since college ASA ($R^2=.27$), sexual assault PBS ($R^2=.02$), drinking PBS ($R^2=.02$), and before college ASA ($R^2=.22$).

The second model tested the potential alternative hypothesis that drinking and sexual assault PBS occur after sexual assault experiences (see Figure 2.2). This alternate model was a good fit for the data, $\chi^2(5) = 10.92, p = .05$, RMSEA = .04, CFI = .97, SRMR = .03. CSA history was associated with more severe pre-college ASA ($\beta = .144, p < .01$). More severe ASA experiences before college were associated with more severe ASA experiences since college ($\beta = .553, p < .001$). More severe ASA since college was associated with less use of drinking ($\beta = -.156, p < .001$) and sexual assault PBS ($\beta = -.167, p < .001$). Finally, the use of drinking PBS and sexual assault PBS were positively associated with each other ($\beta = .322, p < .001$).

A comparison of the two models using the Bayesian Information Criteria (BIC) suggests that the original hypothesized model is a better fit for the data than the alternate model ($BIC_{\text{hypothesized}} = 11486.80$; $BIC_{\text{alternate}} = 11478.30$, $BIC_{\text{difference}} = 8.5$). A model that has a BIC that is 6 to 10 larger than another model indicates strong evidence that the

model is a better fit (Kass, Raftery, & Bayes, 1995) and the hypothesized model had a larger BIC than the alternative model, indicating better fit.

Discussion

Consistent with Study 1 and previous findings (e.g., Messman-Moore & Long, 2003), sexual assault incidence and severity at baseline was associated with increased risk of future sexual assault incidence and severity (Hypothesis 2.1). As hypothesized (Hypothesis 2.2), sexual assault history incidence and severity was associated with less use of sexual assault PBS and drinking PBS in both the hypothesized model and the alternate model. Also consistent with Study 1, it was found in the hypothesized model that the use of sexual assault PBS was negatively associated with future sexual assault incidence and severity (Hypothesis 2.3), suggesting that these PBS may serve as a protective factor in sexual re-assault. Finally, the use of drinking PBS revealed a similar pattern of associations in the hypothesized model with sexual assault as the use of sexual assault PBS (Hypothesis 2.3), serving as a protective factor for sexual assault incidence and severity. Both the hypothesized and alternate model in the current study tell a clear story: women with a history of sexual assault use fewer drinking and sexual assault strategies to protect themselves. Because the data are cross-sectional, it is impossible to determine causality or if the use of PBS or the sexually assaultive experience came first.

When examining the use of sexual assault PBS and drinking PBS, women with a sexual assault history used less sexual assault PBS. This finding is alarming, although not inconsistent with previous research. One would expect or hope that experiencing a sexual assault would result in increased caution and use of more protective strategies, but the majority of findings suggest the opposite. Instead, experiencing a sexual assault may be

harmful in a number of ways. Not only can sexual assault lead to negative mental health symptoms (e.g., Cook, Pilver, Dinnen, Schnurr, & Hoff, 2013; Zinzow et al., 2011), it was also associated with less use of sexual assault PBS (Study 2), which may then be associated with more severe future sexual assault (Study 1). This creates a disconcerting picture for college women given that their risk of sexual assault is so high. However, the findings from both Study 1 and Study 2 suggest that there is a potential way to intervene.

Strengths, Limitations, and Future Directions

To our knowledge, this is the first study to examine the association of both sexual assault PBS and drinking PBS in relation to sexual assault incidence and severity in college. There are several strengths of this study including that it addresses drinking PBS as a potential mechanism through which sexual re-assault occurs and that it includes a highly diverse sample with approximately half of the sample being Asian American/Pacific Islander.

There are several limitations to note. It is impossible to make causal conclusions based on these findings because the data are cross-sectional in nature. To attempt to address this limitation, an alternate model was tested. Although the hypothesized model was a better fit for the data, both models fit the data well suggesting that future longitudinal research is necessary to better understand the relationship among these factors. Future research could also examine these phenomena in laboratory-based settings to help understand causal factors.

More research assessing the association between sexual assault PBS, drinking PBS, and sexual assault experiences is necessary to inform sexual assault risk reduction programs because the current research only presents naturally occurring PBS. It is

possible that the individuals in the current studies were taught these PBS in formal settings, but it is also possible that they use these PBS from modeling and experience. It may also be that already used PBS are more socially acceptable in one's friend group. It is also possible that naturally occurring PBS are more automatic and would be more likely to be used when drinking. Therefore, it is unclear if formally taught sexual assault and drinking PBS would be associated with sexual assault incidence and severity in the same way. Despite the limitation of naturally occurring PBS, this is the first study to thoroughly assess sexual assault PBS and drinking PBS and their relation to sexual assault experiences.

The study sample also had limitations. College women under the age of 21 were included in the study because these women have the highest risk of experiencing sexual assault. However, future research is necessary before generalizing to other populations. Additionally, the diversity in this sample is not representative of the college campus. Therefore, results should be not generalized to the entire campus population.

Another point to note is that there is some overlap in sexual assault PBS and drinking PBS. This is because both include general safety behaviors including limiting drinking and having safe transportation. This may account for the high correlation between the two types of PBS. Despite the overlap, these two types of PBS are separate constructs intended to target different health outcomes. Because of this overlap, it may be possible to develop a set of PBS that include both drinking PBS and sexual assault PBS to target the reduction of alcohol-involved sexual assault.

Finally, it is not possible to prevent sexual assault without also addressing the perpetrators of sexual assault. The present research only presents half of the story and

future research should examine if the use of drinking PBS is related to sexual assault perpetration. Additionally, because men also experience sexual assault, future research should assess the use of sexual assault PBS and drinking PBS in men as victims of sexual assault. However, given that this study was the first to assess these relationships, it was essential to first gain an understanding in a risky sample: underage college women.

Conclusion

When examining factors that contribute to sexual assault in college, the picture is incomplete without considering alcohol use. As the findings from the current study suggest, the use of drinking PBS may serve as a protective factor for experiencing sexual assault in college. This is consistent with previous research suggesting that decreasing alcohol use may be one way to decrease the likelihood of experiencing sexual assault (e.g. Testa & Livingston, 2009). The findings from Study 2 also found a similar pattern for drinking PBS and sexual assault PBS: women with a sexual assault history are less likely to use PBS. Taking that a step further, women who have been sexually assaulted are at increased risk for experiencing future sexual assaults not only because experiencing sexual assault in itself is a risk factor for experiencing future assaults, but also alcohol use and reduced use of PBS in general may be contributing to this re-assault. It may be possible that after experiencing a sexual assault, women feel that it is pointless to use PBS because they may have been sexually assaulted after engaging in PBS. Future research should focus on understanding this relationship.

Engaging in fewer sexual assault PBS and drinking PBS may be a potential mechanism through which sexual re-assault occurs. However, one would expect that after a sexual assault occurs individuals would do everything possible to decrease the

likelihood of being re-assaulted. There are several reasons to explain why the opposite may be occurring. One predominant theory explaining sexual re-assault is through the use of maladaptive coping strategies. Unfortunately, there are two coping strategies that inherently put women at higher risk for sexual re-assault: using alcohol to cope and using sex to cope. If a woman experiences a sexual assault and is attempting to alleviate any negative feelings associated with the assault, she may engage in increased sexual and drinking behaviors, which in turn increase her risk for sexual re-assault. Previous research has supported this theory and engaging in risky sexual behavior and increased drinking does in fact mediate the relationship between sexual assault and re-assault (Messman-Moore, Ward, & Brown, 2009). However, just simply drinking or having sex does not increase a woman's risk for re-assault. For example, she could choose to drink at home alone or with female friends, or she could have sex with known safe partners. However, engaging in these behaviors in a risky way can lead to sexual assault and that is where sexual assault PBS and drinking PBS may play a protective role. It is only speculative since we did not assess engaging in sex to cope or drinking to cope, but it is possible that engaging in sexual assault PBS and drinking PBS could serve as protective factors if an individual chooses to use those particular strategies to cope with a sexual assault experience.

The strongest predictor of sexual assault severity was a history of sexual assault. This is not new knowledge, yet risk reduction programs for college women have yet to address this. Targeted interventions for women with a sexual assault history are needed. This is especially true given the findings of the current study suggesting that women with a more severe sexual assault history engage in less sexual assault PBS and less drinking

PBS. Sexual assault risk reduction programs targeting women with a sexual assault history could help reduce re-assault rates.

Additionally, our findings specify two protective factors in experiencing sexual assault: use of sexual assault PBS and use of drinking PBS. Given that both sexual assault PBS and drinking PBS are associated with less severe sexual assault experiences, it may be possible to teach these PBS to all incoming college students as a preemptive sexual assault risk reduction program for college students.

Study 3:

A Randomized Controlled Trial Targeting Alcohol Use and Sexual Assault

Study 3 seeks to address the clinical implications gleaned from Study 1 and Study 2: It may be possible to reduce sexual assault incidence and severity in college women by targeting both alcohol use and sexual assault. Study 1 and Study 2 suggest that teaching both sexual assault PBS and drinking PBS may be one way to reduce sexual assault incidence and severity. Thus, Study 3 will include both sexual assault PBS and drinking PBS components in an intervention targeting both alcohol use and sexual assault risk among college women.

A Randomized Controlled Trial Targeting Alcohol Use and Sexual Assault

Sexual assault and alcohol use are common experiences for college women, with up to 75% of college women experiencing sexual assault (Abbey, Parkhill, & Koss, 2005) and approximately 40% of college students engaging in heavy episodic drinking (HED; Mitka, 2009). Sexual assault is nonconsensual sexual contact ranging from sexual touching to penetration and HED is 4 drinks or more over a 2-hour period for women (NIAAA, 2004). Alcohol use and sexual assault often co-occur, with up to 70% of sexual assaults involving alcohol use (Reed et al., 2009). Additionally, women are more likely to experience sexual assault on days of HED than when not drinking (Parks et al., 2008).

Sexual assault and HED are particularly common for college women under the age of 21. The highest risk of experiencing sexual assault is between ages 16 and 19 (Bureau of Justice Statistics, 2006) and the highest risk in college is within the first year (Humphrey & White, 2000). Additionally, women are more likely to adopt HED in college compared to men (Reifman & Watson, 2003) and rates of HED have continued to increase for women under the age of 21 (Gruza, Norberg, & Bierut, 2009). Drinking under the age of 21 can lead to negative outcomes including sexual assault, risky sexual

behavior, physical injuries, illness, and legal, academic, and psychological difficulties (White & Hingson, 2014).

The co-occurrence of sexual assault and alcohol use may occur in part because intoxicated women are at risk for sexual assault due to diminished risk perception and decreased likelihood of using effective resistance strategies (Norris et al., 2006; Stoner et al., 2007; Testa, Livingston, & Collins, 2000). In addition to the physiological effects of alcohol, environmental context factors like being at bars or college parties may put women at risk for sexual assault (e.g., Fillmore, 1985; Parks & Miller, 1997), suggesting that higher exposure to drinking environments or cues may predict sexual assault. Men's perceptions of intoxicated women may also increase a woman's vulnerability to sexual assault because men may perceive intoxicated women to be more sexual (e.g., Abbey, Zawacki, & McAuslan, 2000; George et al., 1997). Finally, some men may use intoxication as a tactic for sexual assault, referred to as incapacitated rape.

Because of the high rates and co-occurrence of HED and sexual assault in college women under the age of 21, it may be possible to target alcohol use to decrease sexual assault risk in college women who engage in HED (Testa & Livingston, 2009). Two studies have focused on alcohol reduction as a target for reducing intoxicated sexual assault incidence (Clinton-Sherrod et al., 2011; Testa, Hoffman, Livingston, & Turrisi, 2010) and have shown reduced incapacitated sexual assault, particularly for first year students. However, targeting both alcohol and sexual assault risk perception and resistance strategies may be a more effective way to reduce all forms of sexual assault.

Sexual assault risk reduction (SARR) programs for college women

Existing SARR programs have two important limitations. First, there has been insufficient tailoring and targeting. Despite the strong association with alcohol, alcohol is not typically a primary focus in college SARR programs. Also the strong association between sexual assault history and subsequent assaults has not been addressed. Women with a sexual assault history are at high risk of experiencing a sexual re-assault. However, women with a sexual assault history are not typically the focus of SARR programs.

Second, although college SARR programs targeting female audiences are effective in changing sexual assault-related constructs including sexual assault knowledge, behavioral intent, and attitudes (Anderson & Whiston, 2005; Breitenbecher, 2000; Vladutiu et al., 2011); they are generally ineffective at decreasing sexual assault incidence or increasing use of SARR strategies. Moreover, women with a sexual assault history have had differential outcomes for SARR programs compared to women with no sexual assault history. Some studies have found that women with a sexual assault history do not benefit from the SARR programs (e.g., Hanson & Gidycz, 1993) and others have found that they do benefit (e.g., Gidycz et al., 2001; Mouilso, Calhoun, & Gidycz, 2011). It may be that those who target sexual assault history are more effective at reducing re-assault incidence while those who do not are less effective. Therefore, when assessing the effectiveness of a SARR program, it is essential to consider the potential effects of sexual assault history. It is also essential to focus on empirically-based components including alcohol use, sexual assault risk perception, resistance strategies, and barriers to resistance (Norris, Nurius, & Dimeff, 1996) rather than focusing merely on education and attitudes.

Brief alcohol interventions for college students

The relationship between alcohol and sexual assault in college women suggests that it is imperative to emphasize alcohol in SARR programs. One way to target alcohol use is by using brief personalized feedback interventions because they are efficacious in reducing college student drinking and related harms (Dimeff et al., 1999; Cronce & Larimer, 2011; Scott-Sheldon, Carey, Elliot, Garey, & Carey, 2014). One effective personalized feedback intervention targeting college students is the Brief Alcohol Screening and Intervention for College Students (BASICS; Dimeff et al., 1999). Feedback in these interventions include a personalized summary of drinking and related consequences, moderation education, alcohol expectancies, and other didactic information using the spirit of motivational interviewing. Social norms are also addressed in personalized feedback interventions where individuals are presented with a comparison of the individual's drinking behavior, perceived drinking norms, and actual drinking norms. Many personalized feedback interventions incorporate key components of BASICS to decrease alcohol use and are efficacious in doing so (Miller et al., 2013).

Web-Based Interventions

Web-based personalized feedback interventions can be particularly useful for college students. Web-based interventions are easier to disseminate than in person interventions due to cheaper costs and less participant demands. Many universities require incoming students to participate in education programs and it may be possible for evidence-based SARR programs to be implemented during the required education program times. Although current SARR programs at colleges are not research based, there is evidence that web-based formats are useful in reducing alcohol use (for a review, see Larimer & Cronce, 2007) and in reducing sexual-risk behaviors (e.g. Lewis et al.,

2014) in college students. Thus, a web-based SARR program for college women may be useful. Survey research suggests that participants are likely to report private information, like sexual experiences, in a computer-based format (Turner et al., 1998). This is likely to occur because they may be more comfortable and may perceive greater anonymity compared to in-person formats. Web-based SARR programs may be more comfortable for individuals who have a sexual assault history to reduce any potential stigmatization.

Combined Interventions

Targeting both alcohol use and sexual assault risk may be the most effective way to reduce sexual assault on college campuses. Interventions that target two health outcomes (e.g., alcohol use and sexual-risk behaviors) suggest that combined interventions can be effective in reducing targeted behaviors (e.g. Lewis et al., 2014). Furthermore, excluding alcohol use from SARR provides an incomplete picture and it may be invalidating to individuals with alcohol-involved sexual assault histories by not portraying women with an alcohol-involved sexual assault history to see that their sexual assault was a “real” sexual assault or that they are not to blame for their sexual assault because they were drinking. Combining personalized feedback for alcohol use with a SARR program may be an effective approach for decreasing sexual assault.

Current Study

The current study was a randomized control trial targeting both sexual assault risk and alcohol use in college women who engage HED using web-based personalized feedback. The three personalized feedback conditions (alcohol only, SARR only, and combined alcohol and SARR) were compared to control condition (assessment only) on

drinking and related factors in addition to sexual assault risk factors. A minimal assessment only condition was also included to compare to the control condition.

It was hypothesized (Hypothesis 3.1) that participants in the combined condition would have greater changes in alcohol-related sexual assault outcomes (less incidence of incapacitated attempted or completed rape, higher alcohol-involved sexual assault risk perception, and less use of alcohol before sexual activity) than the full assessment only control condition and that the effects would be more effective for women with higher sexual assault incidence/severity at baseline.

It was hypothesized (Hypothesis 3.2) that participants in the conditions with SARR components (SARR condition and combined condition) would have greater changes in sexual assault-related outcomes (less incidence/severity of sexual assault, higher likelihood estimation of experiencing verbally coerced sexual assault, more use of sexual assault PBS) compared to the full assessment only control condition and that the effects would be more effective for women with higher sexual assault incidence/severity at baseline.

It was hypothesized (Hypothesis 3.3) that participants in the conditions with alcohol components (alcohol only condition and combined condition) would have greater changes in drinking-related outcomes (less frequent HED, lower drinking norms, more use of drinking PBS) compared to the full assessment only control condition. Exploratory analyses were examined to determine if the alcohol only and combined interventions differentially affected drinking based on baseline sexual assault incidence/severity. The minimal assessment was also compared to full assessment on drinking outcomes.

Method

Participants

A total of 674 participants began the web-based screening assessment, 264 (39.17%) were eligible and enrolled in the study. Participants were eligible for the larger study if they were a) female, b) reported consumption of 4 drinks over a 2 hour period at least once in the past month, and c) were between the ages of 18 and 20. Participants were recruited from introductory psychology courses for a study about “drinking and sexual behaviors.” Students in these courses are generally representative both demographically and in terms of alcohol use of the campus (Neighbors et al., 2004).

Analyses included those who began the follow-up survey ($N = 207$; 78.41%) whether or not they viewed the personalized feedback¹. Those that participated in the completers compared to non-completers did not significantly differ on baseline measures except that completers drank less ($M = 9.25$; $SD = 7.28$) than non-completers ($M = 11.57$; $SD = 7.78$), $t(261) = 2.10$, $p = .037$. At baseline, the participants were on average 18.77 years old ($SD = .76$). The majority of participants reported they were freshman (61.10%), were not members of a sorority (65.00%), lived on campus or in a sorority house (72.90%), and were not in a serious relationship (71.50%). Participants identified as 57.60% White, 20.50% Asian American/Pacific Islander, 14.10% multiracial, 3.90% Black/African American, 2.90% other, 1.00% Native American, and 9.50% Hispanic/Latina.

Measures

Alcohol-Related Sexual Assault: Intoxicated Attempted or Completed Rape.

Items from the Sexual Experiences Survey (SES; Koss, Abbey, Campbell, Cook, Norris,

¹ Intent to treat (ITT) analyses were completed with the full sample whether or not they completed the follow-up using multiple imputation to impute outcomes for noncompleters. These analyses were reported in footnotes only when there were differences from the analyses reported.

Testa, & White, 2007) assessed intoxicated attempted or completed rape at follow-up. Participants were asked to indicate how many times (0, 1, 2, or 3 or more) they have had attempted or completed penetrative sex by incapacitation in the past 3 months.

Alcohol-Related Sexual Assault: Risk Perception of Alcohol-Involved Rape.

Participants estimated the likelihood in a percentage that they will experience nonconsensual sex while being incapacitated by alcohol by a man that they know while in college. Estimations were made both at baseline and at follow-up.

Alcohol-Related Sexual Assault: Alcohol Use before Sexual Activity.

Participants were also asked how often they consume alcohol prior to or during sexual activity. Answer choices were on a 5-point scale (0 = *never*, 1 = *about a quarter of the time*, 2 = *about half of the time*, 3 = *about three quarters of the time*, and 4 = *always*).

Alcohol use before sexual activity was reported both at baseline and at follow-up indicating behavior in the past 3 months.

Sexual Assault: Sexual Assault Incidence/Severity. Using the SES (Koss et al., 2007), participants indicated if they have had coerced sexual experiences at three time points: after their 14th birthday but before entering college (baseline), since entering college (baseline), and in the past 3 months (follow-up). Baseline experiences were combined. The SES is a behaviorally specific assessment and it includes experiences perpetrated by verbal coercion, incapacitation, threats of physical force, and physical force. Sexual assault experiences include sexual contact, attempted penetration, and completed penetration. Participants were asked to indicate the number of times that a tactic or multiple tactics were used for each of the experiences (0 = *0 times*, 1 = *1 time*, 2 = *2 times*, and 3 = *3 or more times*).

Sexual assault incidence and severity was scored using a 63-point scale (Davis et al., in press) for each time point (baseline and follow-up), with high scores indicating more severe sexual assault experiences and zeros indicating no sexual assault experiences. This scoring procedure takes into account both frequency of experiences and severity of experiences. It was calculated using the procedures outlined in Davis et al. (in press) by multiplying a severity score by number of times each has been experienced.

Sexual Assault: Verbally Coerced Sexual Assault Risk Perception.

Participants estimated the likelihood (percentage) of experiencing verbally coerced nonconsensual sex by a man that they know while in college at baseline and follow-up.

Sexual Assault: Protective Behavioral Strategies. Sexual assault PBS were assessed using a revised version of the Dating Self-Protection against Rape Scale (Moore & Waterman, 1999; Breitenbecher, 2008). Participants indicated how often they engaged in behaviors (e.g., “provide your own transportation” and “meet in a public place instead of a private place”) when they were with a date (and revised to include “or someone who is sexually interested in you”). Answer choices ranged on a 5-point scale (1 = *Never* and 5 = *Always*). Scores were computed by creating an average of all items for baseline and follow-up. Items had excellent internal consistency ($\alpha = .88$).

Alcohol Use: Drinks per Week. Participants indicated the number of drinks typically consumed each day of their average week in the past 30 days using the Daily Drinking Questionnaire (Collins, Parks, & Marlatt, 1985) at baseline. Average drinks per week were calculated by summing the drinks consumed each day.

Alcohol Use: HED Frequency. HED frequency was assessed by asking “How often did you have 4 or more drinks containing any kind of alcohol within a 2 hour

period” in the past month at baseline and in the past 3 months at follow-up. Answer choices ranged from 0 times in the past month to everyday.

Alcohol Use: Drinking Norms. The Drinking Norms Rating Form (Baer, Stacy, & Larimer, 1991) was used to determine participants’ perception of alcohol use at the participant’s university. Participants were asked how many drinks they perceived the typical female student at the participant’s university drinks on each day of the week at baseline and follow-up. Average perceived drinks per week were calculated by adding the number of perceived drinks per day.

Alcohol Use: Protective Behavioral Strategies. Participants were asked 15 items from the Protective Behavioral Strategies (Martens, Ferrier, Sheehy, Corbett, Anderson, & Simmons, 2005), with answer choices ranging on a 5-point scale (1 = *always* and 5 = *never*). Items were reverse scored (1 = *never* and 5 = *always*). Participants were asked while using alcohol or “partying” whether they engaged in behaviors (e.g. “determine not to exceed a set number of drinks,” “avoid mixing different types of alcohol,” and “know where your drink had been at all times”). Items were averaged for a total drinking PBS score ($\alpha = .94$) at baseline and follow-up.

Study Conditions

SARR Only Condition. This condition included components of already established SARR programs and the components with empirically-based models of sexual assault risk perception and resistance within a personalized feedback program. Feedback consisted of personalized components including college- and state- specific laws, sexual assault risk perception, sexual assault resistance strategies and barriers to resistance, and resources.

Alcohol Only Condition. This condition consisted of a personalized feedback modeled on existing brief personalized feedback interventions (Dimeff et al., 1999; Neighbors et al., 2004). Feedback consisted of personalized components including personalized normative feedback, alcohol education, and drinking PBS.

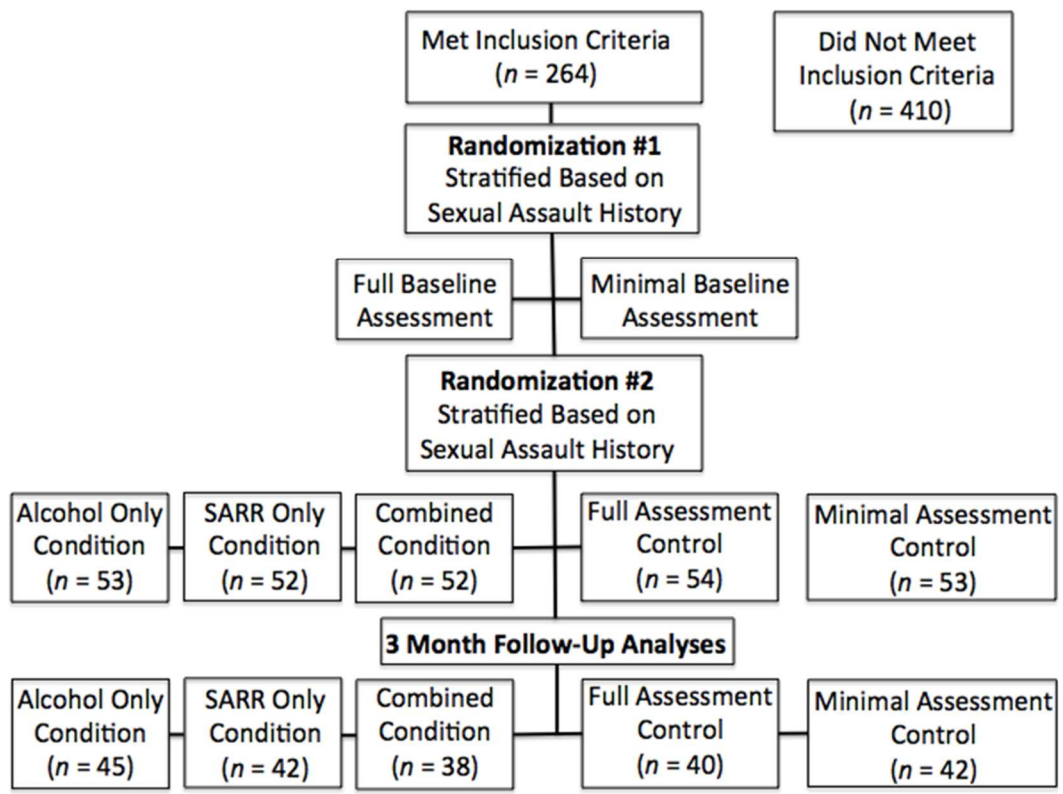
Combined Alcohol and SARR Condition. This condition includes all components from the Alcohol Only and SARR Only conditions in addition to providing additional information in the alcohol education including sexual assault examples (e.g. ability to perceive sexual assault risk was used as an example in the BAC information) and additional information in the sexual assault education including alcohol examples (e.g. situations where alcohol is involved as an example of a context where sexual assault is more likely) to provide integrated information of the two components.

Assessment Only Conditions. The control group was a full assessment control condition where participants completed the same baseline assessment as those in the other conditions. A second assessment only condition, a minimal assessment only condition, was compared to the control condition and did not include questions about drinking norms and drinking PBS.

Procedure

All study procedures were approved by the university's IRB. Participants completed the baseline screening survey online and were given course credit. Once participants had been deemed eligible to participate in the study, they were randomly assigned stratified by sexual assault history to either a minimal assessment (20%) or a full assessment (80%). Participants assigned to complete the full assessment and then were randomly assigned stratified by sexual assault history to one of four conditions: 1.

Alcohol Only Condition 2. SARR Only Condition 3. Combined Condition 4. Full Assessment Only Control Condition. Those in the Alcohol Only, SARR Only, and Combined conditions received the web-based intervention immediately following the completion of the survey. All participants were contacted 3 months after completing the survey to complete the follow-up survey and were given a \$25 electronic gift card for participation. See the flowchart:



Participants were invited to complete a feedback survey after baseline and 221 (83.71%) completed this survey. The majority of participants reported not using drugs or alcohol during the study (92.42%) and reported not being distracted ($M = 2.10$, $SD = 1.32$; 1 = *Not distracted at all*, 7 = *Highly distracted*).

Data Analytic Plan

To ensure that randomization occurred successfully, each outcome variable was examined at baseline for differences by condition. Each condition (minimal assessment control condition, combined condition, alcohol only condition, and sexual assault only condition) was compared with the full assessment only control condition for each of the drinking, sexual assault, and combined outcomes separately using regressions. For all regressions, drinks consumed per week (for non-alcohol variables) and sexual assault incidence/severity were controlled for in the first step along with the baseline measure of the outcome variable. In the second step, each condition was entered to compare to the full assessment only control condition. In the third step, interactions by sexual assault incidence/severity at baseline were included.

Results

Descriptive Results and Initial Analyses

On average, it took 112.93 days ($SD = 45.29$) to complete the follow-up survey after the baseline survey. Because participants completed the follow-up survey at different times, days between baseline and follow-up were controlled for in the analyses.

Participants in the minimal assessment only condition did not receive baseline questions regarding drinking norms or drinking PBS, therefore, that group was excluded from the analyses. Initial ANOVAs revealed no differences between conditions on outcome variables of interest at baseline (see Tables 3.1 and 3.2).

Alcohol-Related Sexual Assault: Intoxicated Attempted or Completed Rape

A regression (see Table 3.3) revealed that women with higher incidence and severity of sexual assault at baseline reported less incapacitated attempted or completed

rape in the past 3 months². Women in the combined condition reported less incapacitated attempted or completed rape in the past 3 months than women in the full assessment only control condition³. There was a significant interaction between the combined condition and incidence and severity of sexual assault at baseline (see Figure 3). Women with higher incidence and severity of sexual assault at baseline experienced less incapacitated attempted or completed rapes in the past 3 months in the combined condition compared to the full assessment control condition. Tests of simple slopes revealed that the difference between combined condition and full assessment control condition was significant for women with higher incidence and severity of sexual assault history ($t = -2.997, p = .003$) but not for women with low incidence and severity of sexual assault history ($t = -.093, p = .926$). This suggests that the combined condition reduced the sexual re-assault rates among women with a sexual assault history but not initial incapacitated rape rates.

Alcohol-Related Sexual Assault: Risk Perception of Alcohol-Involved Rape

A regression (see Table 3.3) revealed that baseline perceived risk was significantly positively associated with perceived risk at follow-up⁴. Additionally, women who consumed more drinks per week at baseline reported higher perceived likelihood of experiencing incapacitated rape while in college⁵. Women in the SARR only condition reported higher perceived likelihood of experiencing incapacitated rape while in college compared to women in the full assessment only control condition⁶.

Alcohol-Related Sexual Assault: Alcohol Use before Sexual Activity

² This was not significant in ITT analyses, $t = 1.108, p = .272$.

³ This was not significant in ITT analyses, $t = -0.341, p = .735$.

⁴ This was not significant in ITT analyses, $t = 1.198, p = .243$.

⁵ This was not significant in ITT analyses, $t = 1.531, p = .154$.

⁶ This was approaching significant in ITT analyses, $t = 1.752, p = .081$.

A regression (see Table 3.3) revealed that frequency of use of alcohol before sex at baseline and drinks per week were significantly positively associated with alcohol use before sex at follow-up. No significant main effects were found based on condition and no interactions based on sexual assault history were found.

Sexual Assault: Sexual Assault Incidence/Severity

A regression (see Table 3.4) revealed that women with more severe ASA histories and who consumed more drinks per week experienced more incidence of and severity of ASA in the past 3 months at follow-up compared to those with less severe ASA histories and who consumed less drinks per week. There were no main effects of condition on sexual assault incidence and severity. There was a significant interaction between the combined condition and ASA history (see Figure 3). Women with higher incidence and severity of sexual assault at baseline reported lower incidence and severity of sexual assault in the past 3 months in the combined condition than in the full assessment only control condition. Tests of the simple slopes indicated that there was a significant difference between combined and full assessment only control condition for women with higher incidence and severity of sexual assault history ($t = -2.442, p = .016$), but no difference for women with lower incidence and severity of sexual assault history ($t = .963, p = .337$). This suggests that the combined condition reduced the sexual re-assault rates among women with a sexual assault history but not initial rates and severity.

Sexual Assault: Verbally Coerced Sexual Assault Risk Perception

A regression (see Table 3.4) revealed that perceived likelihood of experiencing verbally coerced rape at baseline was significantly positively associated with risk

perception at follow-up⁷. There was a main effect for SARR condition with women in the SARR condition reporting higher perceived likelihoods of experiencing verbally coerced rape in college compared to those in the full assessment only condition. No other significant main effects were found based on condition and no interactions based on sexual assault history were found.

Sexual Assault: Protective Behavioral Strategies

A regression (see Table 3.4) revealed that frequency of use of sexual assault PBS at baseline was significantly positively associated with the use of more sexual assault PBS at follow-up. No significant main effects were found based on condition and no interactions based on sexual assault history were found.

Alcohol Use: HED Frequency

A regression was conducted (see Table 3.5) revealed that frequency of HED at baseline and incidence of and severity of ASA at baseline were positively associated with frequency of HED at follow-up. There was a significant interaction between the combined condition and ASA history⁸ (see Figure 3). Women with higher incidence and severity of sexual assault at baseline reported engaging in HED less frequently in the combined condition compared to the full assessment control condition. Tests of the simple slopes indicate an approaching significant slope for women with higher incidence and severity of sexual assault history ($t = -1.881, p = .061$) but no difference for women with lower incidence and severity of sexual assault history ($t = 1.052, p = .294$).

Alcohol Use: Drinking Norms

⁷ This was not significant in ITT analyses, $t = 1.141, p = .263$.

⁸ This was approaching significance in ITT analyses, $t = -1.860, p = .063$.

A regression (see Table 3.5) revealed that drinking norms at baseline was positively associated with drinking norms at follow-up. There was a significant main effect for alcohol condition such that women in the alcohol condition reported less drinking norms than those in the full assessment control condition⁹. There were no other main effects for conditions and no significant interactions.

Alcohol Use: Protective Behavioral Strategies

A regression (see Table 3.5) revealed that use of drinking PBS at baseline was positively associated with use of drinking PBS at follow-up. No significant main effects were found based on condition and no interactions were found.

Discussion

The hypotheses were partially supported. Participants in the SARR only condition reported higher risk perception of both incapacitated and verbally coerced rape in college compared to those in the full assessment only control condition. Additionally, participants in the alcohol only condition reported significantly lower drinking norms compared to the full assessment only control condition. However, when examining the interaction between sexual assault history and combined condition on alcohol-related sexual assault outcomes, sexual assault outcomes, or drinking outcomes, a clear picture emerged. The combined condition was effective at reducing number of incapacitated rapes, sexual assault incidence and severity, and frequency of HED for women with higher baseline incidence and severity of sexual assault.

Consistent with previous research, the alcohol only condition was effective at reducing drinking norms compared to those in the full assessment only control condition. Drinking norms were directly targeted in the intervention, suggesting that the mechanism

⁹ This was not significant in ITT analyses, $t = -1.654, p = .107$.

that was targeted in the intervention was effective in that drinking norms were targeted and that is what was changed. However, previous research has found that when drinking norms are targeted in larger samples, web-based alcohol use reduction programs are effective.

The perceived likelihood of experiencing verbally coerced rape by an acquaintance while in college was also higher among individuals in the SARR only condition compared to the full assessment only control. This may be because sexual assault risk perception was directly targeted in the SARR program. Participants were shown the discrepancies between their perceived risk and their actual risk while in college. Similar to changes in drinking norms, this is what was targeted in the intervention and that was what changed. Future research should include larger samples and more time points to determine if this is a mediator of outcome change.

It is important to note that sexual assault PBS and drinking PBS did not change in this study based on condition. Previous research (Studies 1 and 2) suggests that both sexual assault PBS and drinking PBS are associated with sexual assault in college. This was consistent with the current study (see correlations in Table 3.2). The use of sexual assault PBS and drinking PBS are associated with less incidence and severity of sexual assaults and less number of incapacitated attempted and completed rape. However, this intervention was ineffective at increasing the use of these PBS. In both sexual assault PBS and drinking PBS (see Tables 3.4 and 3.5), the only significant predictors of use of PBS at the follow-up were baseline use of PBS. It may be that more personalized examinations of PBS is necessary, for example, it may be possible that participants did change which PBS that were used but it was not reflected in the average use of PBS. It

may also be possible that providing individuals with a list of PBS that they currently use while providing others that they can use in the future is an ineffective way of changing use of PBS. Future research should examine how to effectively target the use of PBS for both sexual assault and drinking PBS given that both have been shown to be effective strategies of decreasing sexual assault risk and problematic alcohol use. Future research should also examine in person deliveries of PBS for both alcohol use and sexual assault to determine if that is a more effective way to change PBS.

Previous research has suggested that alcohol use interventions can reduce incapacitated rape (Clinton-Sherrod et al., 2011; Testa et al., 2010), however, our findings did not support this. It may be because this was a web-based intervention and those that have found reductions were in person interventions. It may also be because sexual assault history was controlled for in the current study in two ways: participants were stratified to conditions based on sexual assault history and sexual assault history incidence and severity was controlled for in all of the analyses. Because sexual assault incidence and severity is so strongly associated with future sexual assaults, it is possible that if previous research controlled for sexual assault history, differences in treatment conditions may not exist. This needs to be assessed with future research.

Clinical Implications

This was the first study to develop and test the efficacy of a combined program developed to target both alcohol use and sexual assault risk among underage college women who engage in HED. Consistent with previous research, the findings from the current study suggest that web-based personalized feedback interventions can be effective at reducing risk behavior (Lewis et al., 2014; Neighbors et al., 2010). Women with more

severe sexual assault histories benefit from a combined intervention targeting both alcohol use and sexual assault risk to decrease sexual assault severity, number of incapacitated rapes, and frequency of HED.

These reductions are important for college women for three primary reasons. First, sexual assault rates are high amongst college women. This is alarming given that women with a sexual assault history are at the highest risk of experiencing a sexual assault. Secondly, SARR are generally ineffective in reducing sexual assault incidence rates. This may be because previously assessed SARR typically do not include evidence-based components including components targeting alcohol use and barriers to resistance. Third, this web-based personalized feedback combined condition can be easily disseminated on college campuses. The costs of web-based interventions are extremely low compared to in-person interventions and the personalized nature of this intervention may help participants digest the information rather than dismiss it due to optimistic bias.

Limitations

Although the current study has many strengths, several limitations should be considered when interpreting the findings. The first is that there are dosage differences among the conditions. Individuals who were in the full assessment only condition and the minimal assessment only condition did not receive any personalized information. Therefore, the time it took to participate was inherently less than if they were randomized to one of the personalized feedback interventions. Similarly, those who were assigned to the combined condition received twice as much information, making the time it took to participate inherently longer than those who were assigned to the alcohol only or SARR only conditions. This is potentially problematic given that differences in conditions may

be due to dosage effects. This study is the first of its kind to target both alcohol use and sexual assault risk and future research should control for this discrepancy in conditions.

The current study includes only approximately 200 participants. Although this is a large sample size for the first study to determine if future research should examine the effects of these conditions further, these findings should be replicated using a larger sample. This is particularly necessary when examining low base rate events such as sexual assault victimization experiences in the past 3 months, with approximately one-fourth of the current sample reporting any sexual assault experience in the past 3 months.

Participants in the study were recruited from Psychology courses and it is possible that these students differ in receptiveness to interventions like the one presented in the current study. The sample is also limited to students who are underage and engage in HED. The combined condition may not be applicable to students who are older and who do not engage in HED. Future research should include a random sample of college students to replicate the current findings. Additionally, these findings are limited to one university. It is possible that colleges and universities differ; thus, future research should include a multisite examination of the effectiveness of the current interventions.

The results should also be interpreted with caution given that participants included in the analyses were those who completed the follow-up survey. It was found that those who completed the follow-up survey engaged in less drinking at baseline than those who did not complete the follow-up survey. Additionally, the findings from the ITT analyses differed from the completers on many outcomes. However, a strength is that the completer analyses did include all participants whether or not they viewed the feedback.

Conclusions

Typically, interventions targeting sexual assault are ineffective in reducing sexual assault incidence when they are presented in a brief format and yet they are effective in changing cognitions and not behavior (Vladutiu et al., 2011). The findings from this preliminary study suggest that web-based personalized feedback programs targeting sexual assault may be a more cost effective option for college campuses given that the combined condition reduces sexual assault risk among women with a sexual assault history.

These preliminary results are exciting given that this is the first intervention to target both alcohol use and sexual assault risk in college women. It is interesting that the combined intervention was only effective in reducing sexual re-assault rates and not first sexual assault experiences. This may be because someone with a sexual assault history, or a more severe sexual assault history, may be more likely to believe that the information is applicable. Future research should assess how much individuals believe the personalized information applies to them and also how much they believe the information.

Brief Conclusions

Brief Conclusions

Study 1, Study 2, and Study 3 coalesce to support previous findings that sexual assault history is a risk factor for experiencing sexual assault and furthers the existing literature by suggesting two types of protective factors that may be associated with less incidence of and severity of sexual assault and re-assault: sexual assault PBS and drinking PBS. Results from Study 1 indicate that the use of sexual assault PBS is a protective factor against ASA incidence and severity. Results from Study 2 indicate that both sexual assault PBS and drinking PBS are important factors in sexual assault and re-assault among college women. However, targeting sexual assault PBS and drinking PBS web-based personalized interventions in Study 3 were not effective at changing PBS at a 3 month follow-up. Future research is necessary to understand why these personalized feedback interventions were ineffective at changing use of PBS given that these factors are highly associated with sexual assault risk in college women. It may be that a longer follow-up period would reflect significant changes in PBS because some research suggests that PBS need to be practiced over longer periods of time to affect consequences.

Results yielded from Study 3 suggest that combined interventions targeting both sexual assault and alcohol use among college women who engage in HED may be beneficial for women with a sexual assault history. Significant interactions between sexual assault incidence and severity at baseline and combined condition were found for sexual assault incidence and severity, frequency of incapacitated attempted or completed rapes, and frequency of HED in the past 3 months. Moderation analyses revealed that the combined condition was effective at reducing the previously mentioned 3 outcomes among women with more severe sexual assault histories when compared to those with

less severe or no sexual assault histories. The personalized feedback interventions were not effective for all participants although this intervention was effective for the highest risk group of students, those with a sexual assault history. Future research is needed to create an intervention that is beneficial for reducing sexual assault amongst all students.

The primary focus of the First Report of the White House Task Force to Protect Students From Sexual Assault (2014) is to target sexual assault perpetration. Although this should be the primary focus of the goal of reducing sexual assault on college campuses, it is also important to target individuals that are at highest risk for victimization if there are effective ways to intervene. Given that women with a sexual assault history on college campuses are at the highest risk of experiencing a sexual assault, it may be possible to provide them with the little to no cost combined condition developed and tested in Study 3. It is likely most effective to reduce sexual assault on college campuses using a three-pronged approach. It is first necessary to (1) target sexual assault perpetration and also by (2) changing the climate of sexual assault on college campuses as described by the White House. However, it is also necessary to (3) provide those at highest risk for victimization with protective skills.

Future Directions

The current studies have furthered the existing understanding of sexual assault incidence, severity, and risk reduction. However, future research is necessary to help understand and decrease the likelihood of this particular form of violence against women. The current research can be further examined in several ways. First, future studies can address the limitations of Study 3. A larger sample size could be examined. Multiple follow-up periods could be assessed to not only examine longer time periods but also to

assess potential meditational factors. Potential dosage effects could be controlled for by creating an attention control condition that is equal to the time it takes to complete the combined intervention. Other at risk populations could be targeted like lesbian and bisexual women, particular ethnicities that are at heightened risk for sexual assault like native populations and African American women, or military populations. Beyond addressing the limitations of the current study as described above, there are two primary directions that this research could go.

First, it may be possible to address a third factor that is associated with sexual assault risk among college students using similar methodology: sexual risk behaviors. Sexual risk behaviors are easily targeted through web-based personalized feedback interventions and it may be possible to develop an intervention that targets sexual assault risk, high-risk alcohol use, and sexual risk behaviors. One combined alcohol use and sexual risk reduction program has already been shown to be effective in reducing alcohol-related sexual risk behaviors (Lewis et al., 2014) and this intervention could be supplemented with the SARR components presented in the current study.

Second, it may be possible to develop a web-based personalized feedback sexual assault prevention program to reduce sexual assault perpetration for college men that also targets alcohol use. Researchers at Brown University has already begun the assessment of an in person intervention that targets alcohol use and sexual assault perpetration, however, it may be possible to create a web-based personalized feedback intervention for ease of dissemination and personalization.

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Summary of Tables

Table 2.1. Study 2 descriptive statistics and correlations

Table 3.1. Study 3 means and standard deviations for alcohol-related sexual assault outcomes and sexual assault outcomes by condition

Table 3.2. Study 3 correlations of main outcome variables at follow-up

Table 3.3. Study 3 alcohol-related sexual assault outcomes

Table 3.4. Study 3 sexual assault outcomes

Table 3.5. Study 3 alcohol outcomes

Table 2.1

Study 2 Descriptive Statistics and Correlations

	Frequency	<i>M (SD)</i>	Correlations					
			1.	2.	3.	4.	5.	
1. CSA History	69 (12.5%)	-	1.00					
2. Before College								
ASA	155 (28.2%)	3.81 (9.27)	.14**	1.00				
3. Since College								
ASA	112 (20.4%)	1.86 (5.87)	.12**	.55**	1.00			
4. Use of								
Drinking PBS	-	3.75 (.94)	-.08	-.16**	-.17**	1.00		
5. Use of Sexual								
Assault PBS	-	2.89 (1.17)	-.14**	-.15**	-.16**	.34**	1.00	

Note: **indicates $p < .001$.

Table 3.1

Means and Standard Deviations for Alcohol-Related Sexual Assault Outcomes and Sexual Assault Outcomes by Condition

Outcome	Assessment	Full Assessment Control		Alcohol Only Condition		SARR Only Condition		Combined Condition		Minimal Assessment Control	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Alcohol-Related Sexual Assault Outcomes											
Incapacitated Attempted or Completed Rape	Baseline	.65	1.00	.62	1.09	.74	1.19	.55	.95	.69	1.24
	Follow-Up	.31	.80	.35	.87	.18	.60	.02	.16	.15	.533
Perceived Likelihood of Incapacitated Rape	Baseline	3.76	6.71	15.21	23.66	12.55	20.56	11.23	18.54	9.85	17.78
	Follow-Up	6.38	10.45	10.16	17.70	16.46	22.14	12.06	13.45	9.18	20.24
Use of Alcohol before Sex	Baseline	1.02	1.12	.96	.88	1.05	1.13	.89	.92	.81	.83
	Follow-Up	1.05	1.34	.98	.97	.98	1.21	.95	1.04	.63	.83
Sexual Assault Outcomes											
Sexual Assault Incidence and Severity	Baseline	8.05	10.45	9.89	13.71	8.86	13.72	9.08	12.26	8.90	13.00
	Follow-Up	3.10	6.54	5.72	15.66	3.62	10.05	1.27	2.80	3.08	9.27
Perceived Likelihood of Verbally Coerced Rape	Baseline	12.28	18.93	21.27	26.39	16.07	22.10	17.81	28.02	14.07	22.67
	Follow-Up	11.27	18.06	17.37	26.44	22.79	26.03	16.03	18.73	16.51	24.51
Use of Sexual Assault PBS	Baseline	2.43	1.05	2.54	.85	2.61	.86	2.36	.76	2.44	.97
	Follow-Up	2.78	1.09	2.47	1.04	2.68	1.36	2.55	.88	2.51	1.46
Alcohol Outcomes											
Frequency of HED	Baseline	2.48	1.38	2.44	1.27	2.33	1.26	2.32	1.51	2.60	1.42
	Follow-Up	2.23	1.50	1.78	1.17	1.73	1.32	2.03	1.59	1.88	1.57
Drinking Norms	Baseline	17.05	11.94	16.16	7.86	15.07	6.41	15.35	8.94	-	-
	Follow-Up	14.84	8.63	10.61	5.96	16.53	11.81	12.78	8.69	13.59	7.90
Use of Drinking PBS	Baseline	3.20	.42	3.28	.50	3.42	.45	3.27	.52	-	-
	Follow-Up	2.77	.62	2.53	.59	2.57	.60	2.70	.60	2.50	.73

Table 3.2

Correlations of Main Outcome Variables at Follow-Up

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Incapacitated Rape	-								
2. Incapacitated Rape Risk	0.182*	-							
3. Alcohol Use before Sex	0.201**	0.294**	-						
4. ASA Incidence and Severity	0.824**	0.204**	0.248**	-					
5. Verbally Coerced Rape Risk	0.133*	0.709**	0.285**	0.169*	-				
6. Use of Sexual Assault PBS	-0.193**	-0.094	-0.150*	-0.214**	-0.095	-			
7. Frequency of HED	0.223**	0.133	0.434**	0.268**	0.157*	-0.229**	-		
8. Drinking Norms	-0.025	-0.032	0.160*	0.000	-0.007	-0.064	0.227**	-	
9. Use of Drinking PBS	-0.201**	-0.161*	-0.395**	-0.246**	-0.164*	0.367**	-0.416**	-0.029	-

Note: * indicates $p < .05$, ** indicates $p < .01$.

Table 3.3: Alcohol-Related Sexual Assault Outcomes

Incapacitated Attempted or Completed Rape Frequency							
Regression Step		<i>B</i>	<i>SE</i>	<i>t</i>	β	Lower 95% CI	Upper 95% CI
1	ASA Incidence/Severity Baseline	0.015	0.004	3.996	0.283***	0.008	0.023
1	Weekly Drinking	0.010	0.006	1.671	0.118	-0.002	0.022
2	Alcohol Only Condition	0.020	0.137	0.150	0.013	-0.249	0.290
2	SARR Only Condition	-0.102	0.141	-0.725	-0.062	-0.381	0.176
2	Combined Condition	-0.289	0.142	-2.040	-0.172*	-0.569	-0.010
2	Minimal Assessment Only Control	-0.156	0.139	-1.119	-0.096	-0.430	0.119
3	SARR Condition x ASA History	-0.004	0.010	-0.369	-0.033	-0.023	0.016
3	Combined Condition x ASA History	-0.021	0.009	-2.257	-0.206*	-0.040	-0.003
Perceived Likelihood of Experiencing Incapacitated Rape in College							
1	Baseline Perceived Likelihood	0.256	0.065	3.915	0.276***	0.127	0.385
1	ASA Incidence/Severity Baseline	0.093	0.102	0.911	0.066	-0.108	0.293
1	Weekly Drinking	0.476	0.168	2.834	0.204**	0.145	0.807
2	Alcohol Only Condition	0.508	3.716	0.014	0.014	-6.742	7.922
2	SARR Only Condition	0.590	3.868	0.185	0.185*	0.689	15.954
2	Combined Condition	3.797	3.837	0.084	0.084	-3.774	11.368
2	Minimal Assessment Only Control	1.301	3.756	0.030	0.030	-6.110	8.712
3	SARR Condition x ASA History	0.281	0.258	1.088	0.099	-0.229	0.791
3	Combined Condition x ASA History	-0.232	0.249	-0.933	-0.086	-0.723	0.259
Frequency Use of Alcohol Before Sex							
1	Baseline Use of Alcohol before Sex	0.098	0.069	8.080	0.501***	0.424	0.698
1	ASA Incidence/Severity Baseline	0.561	0.005	0.329	0.019	-0.008	0.012
1	Weekly Drinking	0.029	0.009	3.234	0.205**	0.011	0.047
2	Alcohol Only Condition	-0.055	0.188	-0.295	-0.021	-0.425	0.315
2	SARR Only Condition	-0.068	0.194	-0.351	-0.025	-0.450	0.314
2	Combined Condition	-0.047	0.195	-0.240	-0.017	-0.432	0.338
2	Minimal Assessment Only Control	-0.303	0.192	-1.576	-0.112	-0.681	0.076
3	SARR Condition x ASA History	-0.011	0.013	-0.856	-0.063	-0.038	0.015
3	Combined Condition x ASA History	-0.017	0.013	-1.266	0.207	-0.096	-0.042

Table 3.4: Sexual Assault Outcomes

ASA Incidence and Severity							
Regression Step		<i>B</i>	<i>SE</i>	<i>t</i>	β	Lower 95% CI	Upper 95% CI
1	ASA Incidence/Severity Baseline	0.273	0.056	4.872	0.334***	0.163	0.384
1	Weekly Drinking	0.205	0.090	2.270	0.156*	0.027	0.383
2	Alcohol Only Condition	0.207	0.091	1.105	0.093	-1.769	6.273
2	SARR Only Condition	2.252	2.038	0.498	0.041	-3.105	5.203
2	Combined Condition	-1.970	2.115	-0.931	-0.077	-6.141	2.202
2	Minimal Assessment Only Control	0.049	2.077	0.024	0.002	-4.047	4.146
3	SARR Condition x ASA History	-0.049	0.144	-0.339	-0.025	-0.332	0.235
3	Combined Condition x ASA History	-0.369	0.139	-2.660	-0.196**	-0.643	-0.095
Perceived Likelihood of Experiencing Verbally Coerced Rape in College							
1	Baseline Perceived Likelihood	0.180	0.071	2.547	0.189*	0.041	0.319
1	ASA Incidence/Severity Baseline	0.301	0.141	2.128	0.161*	0.022	0.580
1	Weekly Drinking	0.408	0.227	1.802	0.132	-0.039	0.855
2	Alcohol Only Condition	4.010	4.991	0.803	0.072	-5.838	13.858
2	SARR Only Condition	10.943	5.204	2.103	0.183*	0.675	21.212
2	Combined Condition	3.865	5.195	0.744	0.065	-6.386	14.116
2	Minimal Assessment Only Control	4.820	5.050	0.954	0.084	-5.145	14.785
3	SARR Condition x ASA History	-0.015	0.360	-0.041	-0.004	-0.726	0.696
3	Combined Condition x ASA History	-0.635	0.340	-1.865	-0.177	-1.307	0.037
Use of Sexual Assault PBS							
1	Baseline Use of Sexual Assault PBS	0.755	0.081	9.306	0.566***	0.595	0.915
1	ASA Incidence/Severity Baseline	-0.002	0.006	-0.342	-0.021	-0.014	0.010
1	Weekly Drinking	-0.003	0.010	-0.295	-0.019	-0.022	0.016
2	Alcohol Only Condition	-0.257	0.220	-1.168	-0.090	-0.692	0.177
2	SARR Only Condition	-0.123	0.226	-0.543	-0.041	-0.569	0.323
2	Combined Condition	-0.108	0.227	-0.475	-0.036	-0.557	0.341
2	Minimal Assessment Only Control	-0.176	0.225	-0.781	-0.060	-0.619	0.268
3	SARR Condition x ASA History	-0.001	0.016	-0.049	-0.004	-0.032	0.030
3	Combined Condition x ASA History	0.020	0.015	1.324	0.109	-0.010	0.050

Table 3.5: Drinking Outcomes

		HED Frequency					
Regression Step		<i>B</i>	<i>SE</i>	<i>t</i>	β	Lower 95% CI	Upper 95% CI
1	Baseline HED	0.499	0.064	7.807	0.475***	0.373	0.625
1	ASA Incidence/Severity Baseline	0.018	0.007	2.578	0.157*	0.004	0.031
2	Alcohol Only Condition	-0.475	0.266	-1.787	-0.138	-0.999	0.049
2	SARR Only Condition	-0.428	0.272	-1.575	-0.120	-0.964	0.108
2	Combined Condition	-0.147	0.277	-0.532	-0.040	-0.693	0.399
2	Minimal Assessment Only Control	-0.429	0.270	-1.590	-0.122	-0.962	0.103
3	Alcohol Condition x ASA History	-0.012	0.016	-0.726	-0.061	-0.043	0.020
3	Combined Condition x ASA History	-0.041	0.018	-2.253	-0.183*	-0.078	-0.005
		Drinking Norms					
1	Baseline Drinking Norms	0.352	0.077	4.541	0.341***	0.199	0.505
1	ASA Incidence/Severity Baseline	0.003	0.058	0.043	0.003	-0.111	0.116
2	Alcohol Only Condition	-4.124	1.864	-2.213	-0.201*	-7.805	-0.442
2	SARR Only Condition	1.838	1.901	0.967	0.087	-1.917	5.594
2	Combined Condition	-1.764	1.923	-0.917	-0.082	-5.563	2.035
3	Alcohol Condition x ASA History	0.078	0.130	0.596	0.067	-0.180	0.335
3	Combined Condition x ASA History	0.271	0.142	1.914	0.210	-0.009	0.551
		Use of Drinking PBS					
1	Use of Drinking PBS at Baseline	-0.662	0.090	-7.313	-0.522***	-0.840	-0.483
1	ASA Incidence/Severity Baseline	0.001	0.003	0.433	0.031	-0.005	0.008
2	Alcohol Only Condition	-0.185	0.114	-1.627	-0.137	-0.409	0.040
2	SARR Only Condition	-0.071	0.118	-0.598	-0.050	-0.304	0.163
2	Combined Condition	-0.022	0.118	-0.189	-0.016	-0.256	0.211
3	Alcohol Condition x ASA History	-0.008	0.008	-1.103	-0.113	-0.023	0.007
3	Combined Condition x ASA History	-0.001	0.008	-0.108	-0.011	-0.018	0.016

Note. Minimal assessment condition was not included in drinking norms or use of sexual assault PBS because these variables were not assessed at baseline.

Summary of Figures

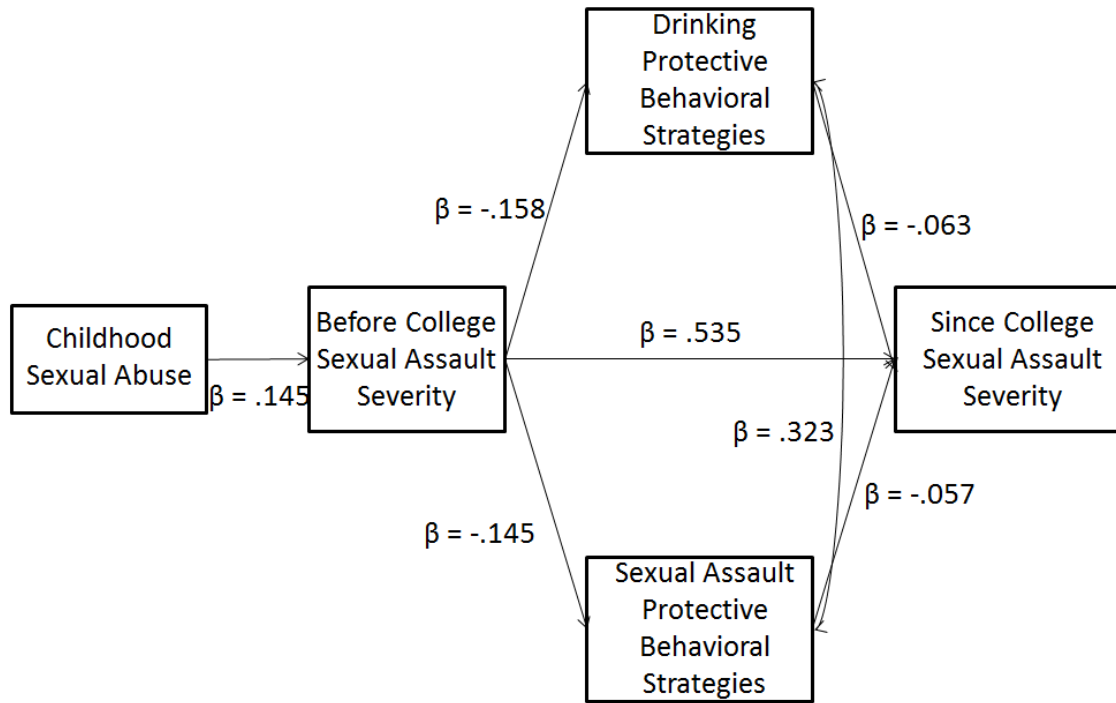
Figure 2.1. Study 2 hypothesized model

Figure 2.2. Study 2 alternate model

Figure 3. Study 3 Interactions

Figure 2.1

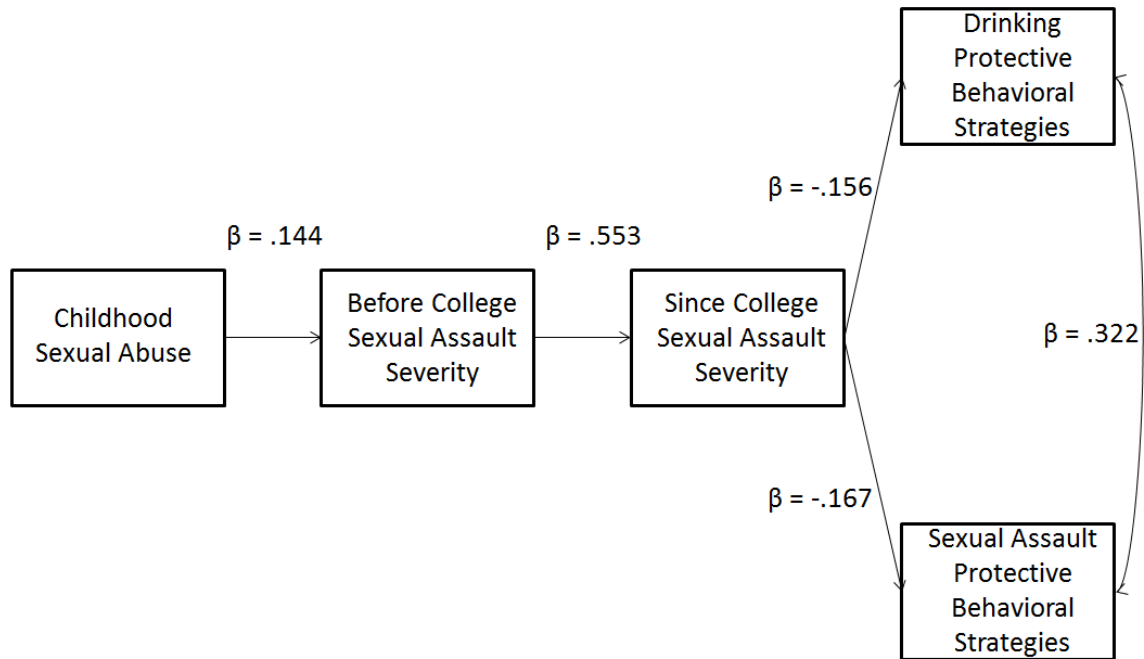
Study 2 Hypothesized Model



Note: all paths are significant $p < .05$.

Figure 2.2

Study 2 Alternate Model



Note: all paths are significant $p < .05$.

Figure 3

Study 3 Interactions

