Published in final edited form as:

Sex Roles. 2009 November ; 61(9-10): 727–735. doi:10.1007/s11199-009-9661-1.

Examining the Role of Gender in the Relationship Between Use of Condom-Related Protective Behavioral Strategies when Drinking and Alcohol-Related Sexual Behavior

Melissa A. Lewis,

Department of Psychiatry and Behavioral Sciences, University of Washington, Box 354944, Seattle, WA 98195, USA

Diane E. Logan, and

Department of Psychology, University of Washington, Box 351629, Seattle, WA 98195, USA

Clayton Neighbors

Department of Psychiatry and Behavioral Sciences, University of Washington, Box 354944, Seattle, WA 98195, USA

Abstract

The present research aimed to examine the relationships among gender, condom-related protective behavior strategies (PBS), and condom use during alcohol-related sexual behavior. Heavy drinking, sexually active U.S. undergraduate college students from a large northwest university (N=454; 61.7% female) completed a web-survey that included measures of drinking, sexual behavior, and condom-related PBS. MANOVA findings suggested that males were more likely to use condom-related PBS than females. Negative binomial regression results suggested that use of condom-related PBS by both genders was positively associated with condom use during alcohol-related sexual behavior, but especially for women. These results suggest that condom-related PBS may be useful to incorporate in interventions targeting alcohol-related sexual behavior among heavy drinking college students.

Keywords

Condom use; Sexual behavior; Alcohol; Protective behavior strategies

Introduction

Sexually transmitted infections (STIs) remain prevalent and problematic for adolescents and young adults. Research that aids in determining strategies that adolescents and young adults use to reduce risks associated with sexual behavior is of importance, as these strategies can be incorporated into preventative interventions. Previous research has found protective behavioral strategies (PBS; i.e., strategies that individuals use to reduce or limit consequences of drinking or sexual behavior) to be independently associated with less

lewisma@u.washington.edu.

problematic drinking behavior (Martens et al. 2004, 2005, 2007) and increased condom use (Bryan et al. 2002) among college students. However, research has yet to consider condom-related PBS used when drinking, and how this may relate specifically to condom use during alcohol-related sexual behavior. The purpose of the present study was to examine the relationships among gender, condom-related PBS when drinking, and condom use during alcohol-related sexual behavior among sexually active, heavy drinking undergraduate college students in the northwest United States.

Sexually Transmitted Infections and Condom Use

According to the United States Centers for Disease Control and Prevention (CDC), there are more than 19 million new STIs occurring each year in the United States, with approximately 48% occurring among 15–24 year-olds (CDC 2008b; Weinstock et al. 2004). In 2007, Chlamydia case rates for females aged 15–24 years were higher than those observed in any other population or risk group. Moreover, in 2006, the CDC estimated that the number of HIV/AIDS cases that occurred among adolescents and young adults between the ages of 15 and 24 years accounted for approximately 14% of all HIV/AIDS cases diagnosed during that year (CDC 2008a). Additionally, research has estimated that in the United States there are more than three million unintended pregnancies each year (Henshaw 1998).

Among sexually active college students, findings from a recent national survey indicate that 3.3% of women and 1.1% of men reported having genital warts/human papillomavirus, 1.2% of women and .6% of men reported having genital herpes, and .2% of women and .4% of men reported having HIV in the past academic year (American College Health Association [ACHA] 2008). A primary reason for increased risk of STIs among college students is that condom use is not normative. Research has shown that 4.5%, 27.9%, and 52.8% of sexually active students used condoms during their most recent oral, anal, and vaginal intercourse experiences, respectively (ACHA 2008). Unintended pregnancies among sexually active college students are also problematic, with 2.3% of female students reported having become unintentionally pregnant and 2.5% of male students reporting having gotten someone pregnant unintentionally within the previous academic year (ACHA 2008).

Sex-related consequences, such as STIs and unintended pregnancies, change lives at the individual level by creating serious health problems (e.g., cervical cancer, increased susceptibility to HIV; CDC 2008a; Wasserheit 1992) and unexpected financial responsibilities, which in turn affect society by increasing the burden and costs associated with the United States' health care system. In the United States, negative consequences from STIs have direct medical costs estimated as high as $15.5 billion in a single year (Chesson et al. 2004). With sex-related consequences remaining prevalent and problematic in adolescents and young adults, including college students, research that identifies factors associated with decreased risky behaviors or increased protective behaviors is warranted.

Heavy Drinking and Risky Sexual Behavior

Previous research indicates that young adults who report substance abuse, including alcohol, are at greater risk for STIs. Based on a 2005 national survey of young adults ages 18–25, 3.9% who used both alcohol and illicit drugs and 3.1% who were heavy drinkers had an STI

in the past year compared to 1.3% of those who did not use alcohol or illicit drugs (Substance Abuse and Mental Health Services Administration [SAMHSA] 2007). Furthermore, researchers estimate that 8% of college students have had unprotected sex because of drinking in the past academic year (Hingson et al. 2005).

While research has established links between alcohol use and sexual behavior, findings related specifically to condom use have been mixed (Cooper 2002). Recent research has begun to further explore the specific relationship between alcohol and condom use. For example, Neal and Fromme (2007) found that, when evaluating the relations between drinking and sexual behavior at the event-level among college students, alcohol intoxication did not influence the decision to engage in sexual behavior but did decrease the use of protective behaviors (i.e., reduced the likelihood of talking about or using protection) when one did engage in sexual activities. In addition, Goldstein et al. (2007) found that consuming alcohol in conjunction with engaging in sexual behavior was associated with discussing fewer sex-related topics, including condom use, among sexually active, drinking college students. In sum, prior research suggests that a combination of alcohol and sexual behavior puts college students at risk for many negative consequences, particularly reducing the likelihood of using sexual protective behaviors.

Protective Behavioral Strategies

As mentioned above, research has supported associations between drinking-related PBS and less problematic drinking as well as condom-related PBS and increased condom use among college students. Specifically, research has found that college students who use drinking-related PBS experience fewer alcohol-related negative consequences (Martens et al. 2004, 2005, 2007), and in particular fewer sex-related alcohol consequences (Lewis et al. 2009). Moreover, Bryan et al. (2002) conducted a two-month longitudinal study in which they found college students who reported using condom-related PBS reported using condoms more frequently. However, research has yet to consider condom-related PBS that students may use when drinking to reduce negative consequences associated more specifically with alcohol-related sexual behavior. Thus, this study aimed to examine the relationships among gender, condom-related PBS when drinking, and condom use during alcohol-related sexual behavior among sexually active, heavy drinking undergraduate college students in the United States. This is important because strategies that college students use when drinking to reduce risks associated with alcohol-related sexual behavior might be readily incorporated into preventative interventions.

Condom-related PBS are behaviors that individuals use to reduce or limit risks associated with not using condoms, such as talking about condom use with a partner prior to sex and buying condoms. Condom-related PBS are important because these strategies can be adapted, learned, and targeted in brief interventions (Albarracín et al. 2003, 2005; Noar 2008). However, prior to implementing condom-related PBS into general prevention efforts aimed at reducing alcohol-related sexual behavior, it must first be established that (1) male and female students use these strategies when drinking to reduce negative consequences associated with alcohol-related sexual behavior, and (2) use of these strategies when

drinking is associated with greater frequency of condom use during alcohol-related sexual behavior. The present study aims to fill this gap in the literature.

Gender Differences

Women are particularly at risk for contracting STIs and HIV/AIDS (CDC 2008a; Padian et al. 1991). In addition to biological vulnerability, a primary method of protection and its use (i.e., male condom) may also factor into why women are more susceptible to contracting STIs. Male condoms offer the highest protection against STIs; and, research has demonstrated that men are more likely to report condom use than women (Sheeran et al. 1999). Moreover, previous research conducted by Brackett (2004) found that females are more likely to report embarrassment related to purchasing condoms in comparison to men, and that when purchasing condoms are likely to employ strategies that may lessen embarrassment (i.e., purchase additional items, choose female clerk over male clerk, avoid older clerk). Men who were not embarrassed by purchasing condoms provided reasons such as: purchasing condoms is a status symbol, it is the responsible thing to do, and purchasing condoms is a male's job.

Furthermore, research has examined evaluations of women who provided condoms in a sexual encounter, and who carried condoms. Kelly and Bazzini (2001) found that when reading scenarios describing heterosexual sexual encounters, women rated females who provided condoms less favorably, and more negatively, than when no condom was used. Females also perceived that the female's behavior in the scenario would be viewed more negatively by her male sexual partner if she provided the condom. Interestingly, in this study, this was not the case as men were more likely to rate the female less favorably if the male provided the condom as compared to when she did. Frankel and Curtis (2008) found that a female who carried one condom in her purse was perceived to have sex more frequently, and more casually when three condoms were carried in her purse, in comparison to when no condom was present in her purse.

In summary, different standards and social norms apply to men and women regarding condom use. Research indicates that men report more frequent condom use and less embarrassment when purchasing condoms, and women may receive (or at least perceive) negative evaluations for providing or carrying condoms. We anticipate these findings may generalize to condom-related PBS use when drinking. As such, we expected that men would be more likely to report using condom-related PBS when drinking than women.

Because men ultimately have the decision of whether or not to wear a condom, women are at a disadvantage and must therefore successfully negotiate condom use (Noar et al. 2002; Norris et al. 2004). Prior research has found that women are more likely than men to convince their partners to use a condom, and that men were more likely than women to report being convinced to use a condom (Carter et al. 1999). Because men have an advantage in terms of deciding to use a condom regardless of whether or not they use condom-related PBS, the relationship between condom-related PBS and condom use during alcohol-related sexual behavior may be weaker for men. In other words, because women are at a disadvantage compared to men in terms of making the decision to use a condom and must negotiate condom use, using condom-related PBS may be particularly effective for women.

Thus, it was expected that the relationship between condom-related PBS when drinking and condom use during alcohol-related sexual behavior would be stronger for women.

Previous research has shown that being in a serious relationship is associated with less frequent condom use (Sheeran et al. 1999). As such, relationship status is an important covariate when examining the relationships among gender, condom-related PBS, and frequency of condom use during alcohol-related sexual behavior. Related, typical drinking behavior and frequency of sexual behavior are likely to account for substantial variance in frequency of condom use during alcohol-related sexual behavior and there inclusion as covariates is likely to present a more precise evaluation of condom use during alcohol-related sexual behavior.

Hypotheses

Based on our review of literature presented above, we expected that men would be more likely to report using condom-related PBS when drinking than women (Hypothesis 1). We also expected gender differences in relevant high-risk and protective behaviors (Hypothesis 2). Specifically, consistent with previous research, we expected men to consume more alcohol than women (O'Malley and Johnston 2002; Read et al. 2002). Additionally, we expected (Hypothesis 3) that greater use of condom-related PBS when drinking would be associated with more frequent condom use during alcohol-related sexual behavior, controlling for relevant covariates (i.e., relationship status, drinking and sexual behavior). Finally, we hypothesized (Hypothesis 4) this relationship to be stronger among women.

Method

Participants and Procedures

Incoming first-year students (N=4,103) at a large northwestern university were invited to complete a 20-minute web-based screening survey for a large multi-year prevention trial in the fall of 2005. Of these students, 2,095 (51.1%) completed the screening survey and were compensated $10. Those who completed the screening survey were younger (M=18.16, SD=.56) than those who did not, (M= 18.67, SD=0.50, t (4,102)=32.10,p<.001). Caucasians and Asian/Pacific Islanders were more likely to complete the screen relative to other students (p's<.001). Of those invited to complete screening, 51.0% were Caucasian and 28.1% were Asian. Of those who completed screening, 58.0% were Caucasian and 31.1% were Asian/Pacific Islanders. All students meeting heavy drinking criteria (five/four or more drinks in one occasion for men/women; n=898; 42.9%) were then invited to complete the 30-minute web-based baseline survey within 2 weeks as part of a larger study of social norms interventions targeting alcohol consumption. Eligible students were heavier drinkers (by definition). They were also more likely to be Caucasian 65.8% and less likely to be Asian/Pacific Islander 23.5%, p's<.001.

Of the eligible 898 invited, 818 (91.1%) participated and were compensated $25. Invited students who participated did not differ significantly from students who did not participate with respect to age, gender, or ethnicity. These students were then invited to complete web-

based follow up assessments every 6 months for 2 years, and received $25 for each completed survey.

The current data were drawn from 18-month follow-up responses (n=686; 83.9%). Retention at 18-months was higher among women (86.6%) than men (80.1%), χ^2 (df=1, N=818)=6.26, p<.05, but did not differ significantly with respect to ethnicity or drinking. For the purposes of this study, the sample was limited to students who reported having sex at least once during the previous 6 months (n=454; 64%). The mean age of the sample was 19.67 (SD=0.74) and was 61.7% female. Ethnicity was 67.2% Caucasian, 20.5% Asian, and 12.3% classified as other. About half of students (45.5%) reported being single and not dating or single and casually dating, compared to the 55.5% who reported being in a serious relationship, engaged, or married.

Measure

Alcohol Consumption—The number of typical drinks per week was assessed with a modified version of the Daily Drinking Questionnaire (DDQ; Collins et al. 1985). Participants were asked: “Consider a typical week during the last month. How much alcohol, on average (measured in number of drinks), do you drink on each day of a typical week?” A response table with each day of the week was presented and the participants reported how much they typically drink on each day of the week. Scores were computed by summing the number of drinks the participants reported drinking on each day of the typical week.

Sexual Behavior, Alcohol-Related Sexual Behavior, and Condom Use During Alcohol-Related Sexual Behavior—Participants were asked, “How many times have you had sexual intercourse in the past 6 months?” Participants were also asked, “You said you had sex times in the past 6 months. Of those times, how many times did you consume alcohol before or during the sexual encounter?” To assess condom use during alcohol-related sexual behavior, participants were asked, “You said you had consumed alcohol before or during sex times in the past 6 months. Of the times, how many times did you use a condom?” Participants’ responses to relevant questions were piped into the to remind them of their responses. Response options ranged from *0 = None* to *10 = 10 or more times* for all three questions.

Condom-Related PBS During Alcohol-Related Sexual Behavior—Students were asked to indicate the degree to which they engaged in six sex-related protective behaviors prior to or when using alcohol or “partying.” This measure was modified from a measure previously used by Bryan et al. (2002) by including three new strategies related to mental planning and talking about condom use, as well as specifying that these behaviors were used prior to or when using alcohol or “partying.” Response options ranged from *0 = Never* to *5 = Always.* The six items had good internal consistency (α =.91) and are presented in Table 1. Final scores were the mean of the six items.

Results

Prior to data analyses, variables were assessed for multi-collinearity and normality. All condition indexes were under 30 and no variable had more than one Variance Proportion

greater than .50, suggesting that multicollinearity was not problematic (Tabachnick and Fidell 2001). Drinks per week, frequency of sexual behavior, and frequency of alcohol-related sexual behavior did indicate departures from normality. Drinks per week and frequency of alcohol-related sexual behavior were positively skewed and frequency of sexual behavior was negatively skewed. The data for these three variables were log-transformed to reduce skewness and kurtosis. All analyses were run with both the untransformed and transformed data. Given the similar pattern of findings, the untransformed data are presented here.

In addition, preliminary analyses revealed extreme non-normality of condom use during alcohol-related sexual behavior (i.e., positively skewed, S=1.84, K=2.89). Because of the violation of normality assumption and because we were interested in examining "how many times" students used condoms during alcohol-related sexual behavior rather than "whether or not" they used a condom, we did not analyze the data with traditional regression or logistic regression. Because the variance was substantially greater than the mean, indicating overdispersion and potential inappropriateness of a Poisson distribution, a negative binomial probability distribution was selected to model condom use during alcohol-related sexual behavior (Atkins and Gallop 2007). Thus, to test Hypothesis 3, we used a generalized linear modeling approach with the distribution specified as negative binomial (i.e., negative binomial regression) to examine the relationship between condom-related PBS and condom use during alcohol-related sexual behavior, when controlling for gender, relationship status, typical drinking behavior, and sexual behavior. Furthermore, to test Hypothesis 4, we examined whether the relationship between condom-related PBS and condom use during alcohol-related sexual behavior varied as a function of gender. Gender was dummy coded (1 = men, 0 = women). Relationship status (1 = relationship, 0 = no relationship), typical drinks per week, frequency of sexual behavior, frequency of alcohol-related sexual behavior, and condom-related PBS were mean centered to facilitate interpretation of parameter estimates (Cohen et al. 2003).

To test Hypothesis 1, we conducted a MANOVA to examine if there were gender differences in the use of condom-related PBS. The six condom-related PBS items were the dependent variables, and gender was the independent variable. Partial eta squared (η_p^2) describes the proportion of total variability in the dependent variable(s) attributable to an effect. According to Cohen's (1988) definition of effect sizes, the following values of η_p^2 are described as the minimum: for a small effect, .01; for a medium-sized effect, .06; and for a large effect, .14. As expected, results suggested gender differences, such that men reported using condom-related PBS more often than women, Wilks' Λ=.89, F(6, 440)=9.13, p<.001, η_p^2=.11. Univariate results, which are presented in Table 1, indicate that this was primarily due to gender differences in two items: "buying condoms" and "carrying a condom and keeping it handy." Item means indicate that use of condom-related strategies ranged from 1.39 to 2.80, suggesting that when drinking, students' use of condom-related PBS range from relatively rare (e.g., buying condoms) to sometimes (e.g., told partner I wanted to use a condom).

To evaluate Hypothesis 2, we examined gender differences in relevant high-risk and protective behaviors. A MANOVA was conducted with the total condom-related PBS score, typical drinks per week, frequency of sexual behavior, frequency of alcohol-related sexual behavior, and frequency of condom use during alcohol-related sexual behavior as the dependent variables. Gender was the independent variable. Multivariate findings suggested gender differences in these drinking and sexual behaviors, Wilks' Λ=.87, $F(5, 433)=13.20$, $p<.001$, $\eta_p^2 = .11$. As expected, univariate results (Table 2) showed that men used condom-related PBS more and consumed more drinks per typical week than women.

To test Hypotheses 3 and 4, a negative binomial regression analysis was conducted. Assessment of fit for the negative binomial distribution was adequate, since the value of deviance [X^2 (432, N=439)=321.44] divided by the number of degrees of freedom was close to one. Results presented in Table 3 indicated significantly less frequent condom use (35.10%) for students in a relationship relative to students who were not in a relationship. In addition, students who reported more frequent alcohol-related sexual behavior were more likely to use a condom during alcohol-related sexual behavior. For each unit increase in frequency of alcohol-related sexual behavior, the model predicted a 35.67% increase in condom use during alcohol-related sexual behavior. As predicted with Hypothesis 3, individuals who used condom-related PBS were more likely to use a condom during alcohol-related sexual behavior. For each unit increase in the condom-related PBS score, the model predicted a 41.23% increase in condom use during alcohol-related sexual behavior. Further, results revealed that the two-way interaction between condom-related PBS and gender was significant. As indicated in Fig. 1, the relationship between condom-related PBS and condom use during alcohol-related sexual behavior was stronger for women than for men, supporting Hypothesis 4.

Discussion

The present research demonstrated that students used condom-related PBS when drinking, and that more frequent use of condom-related PBS when drinking was associated with more frequent condom use during alcohol-related sexual behavior. This finding is important, as alcohol-related sexual behavior is a context that has been associated with greater risk of negative consequences, and in which condom use may be particularly difficult to negotiate (Cooper 2002; Hingson et al. 2005; Norris et al. 2004). The present findings extend prior research on condom-related PBS by evaluating their use when drinking, as well as their association with alcohol-related sexual behavior. This finding is particularly valuable because the findings that college students use condom-related PBS when drinking, and that their use is associated with condom use during alcohol-related sexual behavior provides an empirical foundation for implementing condom-related PBS into prevention efforts aimed at reducing alcohol-related risky sexual behavior.

In addition, this research examined protective behavioral strategies that require action (i.e., buying condoms, carrying condoms and keeping them handy, direct request for partner to use condom, talking to partner about condom use) in addition to those that consisted of mental planning (i.e., have a mental plan to use a condom, have a mental plan to talk about

condom use with partner prior to sex). Having a mental plan to use a condom is distinct from buying or carrying a condom as it involves formulating how or when one would use a condom during a sexual encounter. For example, mentally planning to use a condom could entail envisioning how one would use a condom as a part of foreplay and thus would be available for use.

The present study provided important considerations with respect to gender. As expected, men reported using more condom-related PBS than women, which appeared to be primarily based on men's higher likelihood of buying condoms and carrying condoms. This finding may reflect an underlying social norm that it is men's responsibility to provide a condom, although men and women do not differ with respect to plans for using a condom or expression of desire to use a condom. Furthermore, we found that using condom-related PBS when drinking was associated with increased condom use during alcohol-related sexual behavior for both genders, but especially for women. This is inconsistent with previous research conducted by Bryan et al. (2002), where they found that buying condoms, carrying condoms, and discussing condoms were all associated with condom use without gender differences. Condom-related PBS may be particularly effective for increasing condom use during alcohol-related sexual behavior for women because these strategies may increase condom use negotiation and/or sexual assertiveness. Specifically, because the decision to wear a condom is ultimately up to men, women must successfully negotiate that a condom be used. Because women are at a disadvantage and must negotiate with men to use condoms, using condom-related PBS may be particularly effective, resulting in a stronger relationship between condom-related PBS and condom use during alcohol-related sexual behavior.

Implications for Preventative Interventions

The current findings have important implications for preventative interventions, as they suggest that condom-related PBS may be important components for efforts aimed at reducing alcohol-related risky sexual behavior among heavy drinking college students. If utilized in a multicomponent prevention intervention, condom-related PBS would provide the tools for how someone could reduce risks and/or consequences associated with alcohol-related sexual behavior. Similar to frequency findings of drinking-related PBS (Martens et al. 2005), the current study demonstrated that use of individual condom-related PBS when drinking was relatively low, coinciding with "rarely" or "occasionally" anchors. These findings indicate room for increasing use of these strategies for sexually active, heavy drinking college students by including these strategies as an intervention component. Recent research found that drinking-related PBS mediated the efficacy of a mailed alcohol feedback intervention (Larimer et al. 2007). Participants who received the intervention were more likely to use drinking-related PBS more frequently and the use of drinking-related PBS was associated with subsequent reductions in alcohol use. Additional research is necessary to evaluate whether condom-related PBS might serve a similar function in brief interventions designed to reduce sexual risks related to heavy alcohol use among college students.

The gender differences noted above may suggest different emphases in talking to men and women about condom-related PBS in the context of alcohol-related sexual behavior. In discussing condom-related PBS for men it may be worthwhile to affirm that many men carry

condoms, especially in comparison to women, while at the same time emphasizing that carrying a condom is not enough and that men might consider using additional strategies such as mentally planning on how they will use a condom. Alternatively, for women, it may be worthwhile to suggest that while many men carry condoms, others do not. Discussing with women how purchasing and carrying condoms would be helpful, especially should they find themselves in a situation where sex is anticipated, a condom is desired, and the male partner does not have a condom. Because women are more likely to report embarrassment over purchasing condoms than men (Brackett 2004), interventions could include strategies for reducing embarrassment when buying condoms. Moreover, men and women were equally likely to engage in some condom-related PBS; thus, interventions targeting condom-related PBS in the context of alcohol-related sexual behavior might equally emphasize the importance of having a plan to use a condom and discussing and expressing desire to use a condom for men and women. Finally, findings indicate that increasing use of condom-related PBS when drinking is likely to be associated with increased condom use during alcohol-related sexual behavior, especially for women.

Limitations/Future Directions

Several limitations to the present study are notable. The present data were collected as part of a larger longitudinal prevention trial but the variables most pertinent to the present manuscript (i.e., condom-related PBS) were only included at a single assessment point. Thus, the data used in the present study were correlational and inferences regarding causal direction based on these data are speculative. In addition to being cross-sectional, these data represent averages over time. Future research should consider using ecological sampling methods (Bolger et al. 2003) for alcohol-related sexual behavior to lessen concerns of retrospective recall and to examine the relationship between use of condom-related PBS and alcohol-related sexual behavior at an event-level. Moreover, all data were assessed via self-report with a web-based survey which may be influenced by socially desirable responses, though assessment of drinking and sexual behavior via the web has been found to be an effective means of data collection among college students (Kypri and Gallagher 2003; McCabe et al. 2002, 2005; Pealer et al. 2001).

Additionally, the sample was limited to heavy drinking college students who had been participating in an ongoing study related to social norms and drinking. It is not clear how results may have differed in the absence of heavy drinking screening criteria or whether participants who had dropped out of the larger study prior to the assessment point from which the current data were drawn may have differed with respect to condom-related PBS or alcohol-related sexual behavior.

Finally, there were limitations associated with some of the measures used in the present study. For example, items assessing sexual behavior had a limited upper range (i.e., 10 or more times). Because of the 6 month timeframe, frequency of sexual behavior displayed a ceiling effect. Although examined as a covariate, important data regarding frequency of sexual behavior greater than 10 times was not available in the current study. Furthermore, the wording of the instructions may have affected the low means for some of the condom-related PBS items. For example, the low mean on buying condoms perhaps relates to a

problem in question wording, as it asked the degree to which participants “engaged in the following behaviors when using alcohol or ‘partying.’” This instruction could be construed as being engaged in the acts of drinking and partying and then going to buy condoms. A more accurate strategy in this regard would be to buy condoms before starting to drink or party. This ambiguity in question wording calls into question the validity of this item and future research is needed to clarify this ambiguity in instructions and to replicate the current findings.

Conclusion

In conclusion, the present research provides unique insights into condom-related PBS used when drinking in the context of alcohol-related sexual behavior. This research represents an important step toward the development of interventions encouraging condom use in the context of alcohol-related sexual behavior and offers some considerations regarding how interventions might be tailored differently for men and women.

References

Albarracín D, McNatt PS, Klein C, Ho R, Mitchell A, & Kumkale GT (2003). Persuasive communications to change actions: an analysis of behavioral and cognitive impact in HIV prevention. Health Psychology, 22, 166–177. [PubMed: 12683737]

Albarracin D, Gillette JC, Earl AN, Glasman LR, Durantini MR, & Ho MH (2005). A test of major assumptions about behavior change: a comprehensive look at the effects of passive and active HIV-prevention interventions since the beginning of the epidemic. Psychological Bulletin, 131, 856–897. [PubMed: 16351327]

American College Health Association. (2008). American college health association—national college health assessment spring 2007 reference group data report (abridged). Journal of American College Health, 56, 469–479. [PubMed: 18400658]

Atkins DC, & Gallop RJ (2007). Rethinking how family researchers model infrequent outcomes: a tutorial on count regression and zero-inflated models. Journal of Family Psychology 21, 726–735. [PubMed: 18179344]

Bolger N, Davis A, & Rafaeli E (2003). Diary methods: capturing life as it is lived. Annual Review of Psychology 54, 579–616.

Brackett KP (2004). College students’ condom purchase strategies. The Social Science Journal, 41, 459–464.

Bryan A, Fisher JD, & Fisher WA (2002). Tests of the mediational role of preparatory safer sexual behavior in the context of theory of planned behavior. Health Psychology, 21, 71–80. [PubMed: 11846347]

Carter JA, McNair LD, Corbin WR, & Williams M (1999). Gender differences related to heterosexual condom use: the influence of negotiation styles. Journal of Sex and Marital Therapy, 25, 217–225. [PubMed: 10407794]

Centers for Disease Control and Prevention, National Center for HIV/ AIDS, Viral Hepatitis, STD, and TB Prevention (2008a) 2006 Disease Profile, 2008, pp. 1–65. Atlanta, GA: U.S. Department of Health and Human Services.

Centers for Disease Control and Prevention. (2008a). Sexually transmitted disease surveillance, 2007. Atlanta, GA: US Department of Health and Human Services.

Chesson HW, Blandford JM, Gift TL, Tao G, & Irwin KL (2004). The estimated direct medical cost of sexually transmitted disease among American youth, 2000. Perspectives on Sexual and Reproductive Health, 36, 11–19. [PubMed: 14982672]

Cohen J (1988). Statistical power analysis for the behavioral sciences. Hillsdale, NJ: Lawrence Erlbaum Associates.

Cohen J, Cohen P, West SG, & Aiken LS (2003). Applied multiple regression/correlation analysis for the behavioral sciences (3rd ed.). Mahwah, NJ: Lawrence Erlbaum Associates.

Collins RL, Parks GA, & Marlatt GA (1985). Social determinants of alcohol consumption: the effects of social interaction and model status on the self-administration of alcohol. Journal of Consulting and Clinical Psychology, 53, 189–200. [PubMed: 3998247]

Cooper ML (2002). Alcohol use and risky sexual behavior among college students and youth: Evaluating the evidence. Journal of Studies on Alcohol, Suppl, 14, 101–117.

Frankel A, & Curtis DA (2008). What's in a purse? Maybe a woman's reputation? Sex Roles, 59, 615–622.

Goldstein AL, Barnett NP, Pedlow CT, & Murphy JG (2007). Drinking in conjunction with sexual experiences among at-risk college student drinkers. Journal of Studies on Alcohol and Drugs, 68, 697–705. [PubMed: 17690803]

Henshaw SK (1998). Unintended pregnancy in the United States. Family Planning Perspectives, 30, 24–29. [PubMed: 9494812]

Hingson R, Heeren T, Winter M, & Wechsler H (2005). Magnitude of alcohol-related mortality and morbidity among U. S. college students ages 18–24: Changes from 1998 to 2001. Annual Review of Public Health, 26, 259–279.

Kelly J, & Bazzini DG (2001). Gender, sexual experience, and the sexual double standard: evaluations of female contraceptive behavior. Sex Roles, 45, 785–799.

Kypri K, & Gallagher SJ (2003). Incentives to increase participation in an internet survey of alcohol use: a controlled experiment. Alcohol & Alcoholism, 38, 437–441. [PubMed: 12915520]

Larimer ME, Lee CM, Kilmer JR, Fabiano P, Stark C, Geisner IM, et al. (2007). Personalized mailed feedback for college drinking prevention: a randomized clinical trial. Journal of Consulting and Clinical Psychology, 75, 285–293. [PubMed: 17469886]

Lewis MA, Rees M, Logan DE, Kaysen DL, & Kilmer JR (2009). Use of drinking protective behavioral strategies in relation to sex-related alcohol negative consequences: The mediating role of alcohol consumption. Manuscript under review.

Martens MP, Taylor KK, Damann KM, Page JC, Mowry ES, & Cimini MD (2004). Protective behavioral strategies when drinking alcohol and their relationship to negative alcohol-related consequences in college students. Psychology of Addictive Behaviors, 18, 390–393. [PubMed: 15631613]

Martens MP, Ferrier AG, Sheehy MJ, Corbett K, Anderson DA, & Simmons A (2005). Development of the protective behavioral strategies survey. Journal of Studies on Alcohol, 66, 698–705. [PubMed: 16329461]

Martens MP, Ferrier AG, & Cimini D (2007). Do protective behavioral strategies mediate the relationship between drinking motives and alcohol use among college students? Journal of Studies on Alcohol, 68, 106–114.

McCabe SE, Boyd CJ, Couper MP, Crawford S, & D'Arcy H (2002). Mode effects for collecting alcohol and other drug use data: web and US mail. Journal of Studies on Alcohol, 63, 755–761. [PubMed: 12529076]

McCabe SE, Hughes TL, Bostwick W, & Boyd CJ (2005). Assessment of difference in dimensions of sexual orientation: implications for substance use research in a college-age population. Journal of Studies on Alcohol, 66, 620–629. [PubMed: 16331847]

Neal DJ, & Fromme K (2007). Event-level covariation of alcohol intoxication and behavioral risks during the first year of college. Journal of Consulting and Clinical Psychology, 75, 294–306. [PubMed: 17469887]

Noar SM (2008). Behavioral interventions to reduce HIV-related sexual risk behavior: review and synthesis of meta-analytic evidence. AIDS & Behavior, 12, 335–353. [PubMed: 17896176]

Noar SM, Morokoff PJ, & Harlow LL (2002). Condom negotiation in heterosexually active men and women: development and validation ofa condom influence strategy questionnaire. Psychology and Health, 17, 711–735.

Norris J, Masters NT, & Zawacki T (2004). Cognitive mediation of women's sexual decision making: the influence of alcohol, contextual factors, and background variables. Annual Review of Sex Research, 15, 259–296.

O'Malley PM, & Johnston LD (2002). Epidemiology of alcohol and other drug use among American college students. Journal of Studies on Alcohol Suppl, 14, 23–39.

Padian NS, Shiboski SC, & Jewell NP (1991). Female-to-male transmission of human immunodeficiency virus. Journal of the American Medical Association, 266, 1664–1667. [PubMed: 1886189]

Pealer LN, Weiler RM, Pigg RM, Miller D, & Dorman SM (2001). The feasibility of a web-based surveillance system to collect risk behavior data from college students. Health Education & Behavior, 28, 547–559. [PubMed: 11575685]

Read JP, Wood MD, Davidoff OJ, McLacken J, & Campbell JF (2002). Making the transition from high school to college: the role of alcohol-related social influence factors in students' drinking. Substance Abuse, 23, 53–65. [PubMed: 12444360]

Sheeran P, Abraham C, & Orbell S (1999). Psychosocial correlates of heterosexual condom use: a meta-analysis. Psychological Bulletin, 125, 90–132. [PubMed: 9990846]

Abuse Substance and Mental Health Services Administration. (2007). The NSDUH report: Sexually transmitted diseases and substance use. MD: Rockville.

Tabachnick BG, & Fidell LS (2001). Using multivariate statistics (4th ed.). Needham Heights, MA: Allyn & Bacon.

Wasserheit JN (1992). Epidemiologic synergy: Interrelationships between human immunodeficiency virus infection and other sexually transmitted diseases. Sexually Transmitted Diseases, 9, 61–77.

Weinstock H, Berman S, & Cates W, Jr. (2004). Sexually transmitted diseases in American youth: Incidence and prevalence estimates, 2000. Perspectives on Sexual and Reproductive Health, 36, 6–10. [PubMed: 14982671]

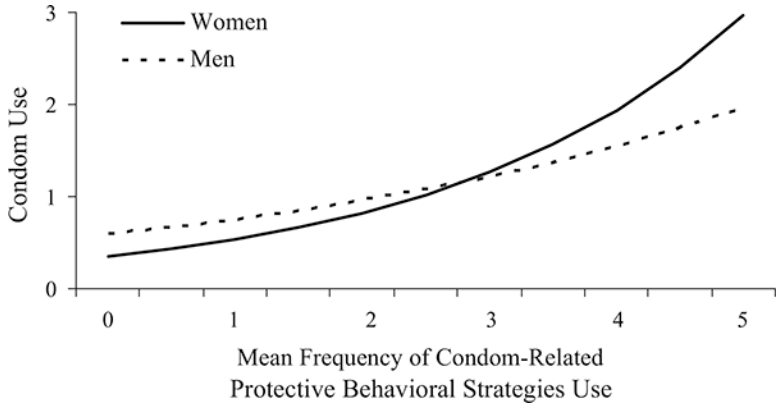

Fig. 1.

Two-way interaction between the mean frequency of condom-related protective behavioral strategies use and gender in relation to frequency of condom use during alcohol-related sexual behavior in the previous 6 months.

Table 1

Gender differences in condom-related PBS items.

Condom-related PBS items	Overall		Men		Women		Univariate results	
	M	*SD*	*M*	*SD*	*M*	*SD*	*F*	η_p^2
Told partner I wanted to use a condom	2.80	2.01	2.75	1.95	2.82	2.05	.12	.00
Have a mental plan to talk about condom use with partner prior to sex	2.34	1.99	2.33	1.93	2.34	2.02	.01	.00
Talk about condom use with partner prior to sex	2.43	1.98	2.43	1.94	2.42	2.02	.01	.00
Have a mental plan to use a condom	2.64	2.07	2.85	1.90	2.51	2.17	2.83	.01
Carry a condom and keep it handy	1.81	1.91	2.32	1.86	1.50	1.88	19.87*	.04
Buy condoms	1.39	1.71	1.96	1.66	1.04	1.66	32.23*	.07

Participants were asked to indicate "the degree to which they engaged in the following behaviors when using alcohol or 'partying.'" All items were coded on a 6-point scale ranging from 0 *(never)* to 5 *(always).*

M mean, *SD* standard deviation, *Condom-Related PBS* Condom-Related Protective Behavioral Strategies.

$N = 447$, η_p^2 =partial eta squared

*$p < .001$

Table 2

Gender differences in high-risk and protective factors.

Variables	Overall		Men		Women		Univariate results	
	M	*SD*	*M*	*SD*	*M*	*SD*	*F*	η_p^2
Condom-related PBS (total score) 2.22	1.61	2.44	1.56	2.07	1.62	5.55 *	.01	
Typical drinks per week 10.39	10.29	14.15	12.89	7.99	7.30	40.82 **	.09	
Frequency of sexual behavior 7.81	3.32	6.89	3.72	8.39	2.90	22.41 **	.05	
Frequency of alcohol-related sexual behavior 3.25	3.09	3.33	3.17	3.19	3.04	.21	.00	
Condom use during alcohol-related sexual behavior 1.72	2.46	1.95	2.57	1.57	2.38	2.54	.01	

Participants were asked to indicate "the degree to which they engaged in the following behaviors when using alcohol or 'partying.'" All items were coded on a 6-point scale ranging from 0 *(never)* to 5 *(always)*. Typical Drinks per Week ranged from 0 drinks to 25 or more drinks. Frequency of Sexual behavior ranged from 1 time to 10 or more times. Frequency of Alcohol-Related Sexual Behavior and Condom Use During Alcohol-Related Sexual Behavior ranged from 0 times to 10 or more times.

M mean, *SD* standard deviation, *Condom-Related PBS* Condom-Related Protective Behavioral Strategies.

N= 439

* $p<.05$

** $p < .001$

ηp^2 =partial eta squared

Table 3

Summary of negative binomial regression analysis predicting condom use during alcohol-related sexual behavior.

Predictor	*B*	*SE*	Z statistic	Odds ratio	95% CI for odds ratio	
					Lower	Upper
Gender	−.004	.146	−.030	.996	.747	1.326
Relationship status	−.432	.168	−2.576**	.649	.467	.902
Typical drinks per week	−.004	.007	−.473	.996	.982	1.011
Frequency of sexual behavior	−.025	.028	−.872	.976	.923	1.031
Frequency of alcohol-related sexual behavior	.305	.028	11.074***	1.357	1.285	1.432
Condom-related PBS	.345	.048	7.245***	1.412	1.286	1.551
Condom-related PBS × gender	−.188	.095	−1.988*	.828	.688	.997

Gender was coded as 1 = men and 0 = women. Condom-Related PBS = Condom-Related Protective Behavioral Strategies.

N = 439

* $p < .05$

** $p < .01$

*** $p < .001$