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Alcohol Intoxication and Condom Use Self-Efficacy Effects on Women's Condom Use Intentions

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Abstract

Although research has consistently demonstrated that condom use self-efficacy significantly predicts condom use, there has been little investigation of whether acute alcohol intoxication moderates this relationship. Because alcohol intoxication is often associated with increased sexual risk taking, further examination of such moderating effects is warranted. Using a community sample of young heterosexual women ($n = 436$) with a history of heavy episodic drinking, this alcohol administration experiment examined the effects of intoxication and condom use self-efficacy on women's condom negotiation and future condom use intentions. After a questionnaire session, alcohol condition (control, .10% target peak BAL) was experimentally manipulated between subjects. Participants then read and responded to a hypothetical risky sexual decision-making scenario. SEM analyses revealed that alcohol intoxication directly decreased women's intentions to use condoms in the future. Women with greater condom use self-efficacy had stronger intentions to engage in condom negotiation; however, this effect was moderated by intoxication. Specifically, the association between condom use self-efficacy and condom negotiation intentions was stronger for intoxicated women than for sober women. These novel findings regarding the synergistic effects of alcohol intoxication and condom use self-efficacy support continued prevention efforts aimed at strengthening women's condom use self-efficacy, which may reduce even those sexual risk decisions made during states of intoxication.

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Contributors

All authors have materially participated in the research and the manuscript preparation. Kelly Cue Davis contributed to the design of the project, conducted literature searches, and wrote major portions of the manuscript. N. Tatiana Masters conducted the statistical analysis and wrote portions of the manuscript. Danielle Eakins and Cinnamon L. Danube wrote portions of the manuscript. William H. George, Jeanette Norris, and Julia R. Heiman contributed to the design of the project and the preparation of the manuscript. All authors have approved the final manuscript.

Conflict of interest

None of the authors has any conflicts of interest to declare.

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Keywords

alcohol; condom use self-efficacy; condom use; condom negotiation; sexual risk

1 Introduction

Although condom use can decrease transmission of sexually transmitted infections (STIs), the majority of young adults aged 18-29 do not use condoms consistently (Reece, Herbenick, Schick, Sanders, Dodge, & Fortenberry, 2010). And while alcohol use is often considered a contributor to decreased condom use, extant findings suggest that alcohol does not increase sexual risk taking for all people or in all situations (Brown & Vanable, 2007; Scott-Sheldon, Carey, & Carey, 2010). Research elucidating factors that predict for whom, and in what circumstances, alcohol increases sexual risk taking could yield information for targeting and tailoring sexual risk reduction interventions.

Alcohol administration studies consistently report that intoxication reduces individuals' intentions to negotiate for and use condoms (Rehm, Shield, Joharchi, & Shuper, 2011). However, because risky sexual behavior typically results from the confluence of an individual, a situation, and a relationship (Cooper, 2010), alcohol intoxication may foster different sexual outcomes based on the individuals involved. For example, Morrison et al. (2003) found that while alcohol increased sexual risk taking in some individuals, for others it had no effect or even decreased sexual risk behavior. Predispositional factors may account for some of this variability, in that alcohol's attentional focusing effects may magnify the individual characteristics one brings into the situation (Davis, Hendershot, George, Norris, & Heiman, 2007; Morris & Albery, 2001).

Self-efficacy regarding condom use may be one such predisposing factor. Many theoretical models of health-related behaviors include a self-efficacy component (e.g. Bandura, 1990; Fisher & Fisher, 1992). Regarding sexual health, condom use self-efficacy – or confidence in one's ability to use condoms effectively both generally and situationally – has emerged as a significant predictor of condom use behavior (Bandura, 1990; Lescano, Brown, Miller, & Puster, 2007). Moreover, sexual risk reduction programs that target condom use self-efficacy have demonstrated that 1) intervention content is capable of enhancing condom use self-efficacy and 2) increased condom use self-efficacy is associated with increases in condom use behavior at follow-up (Brown et al., 2011; Schmiege, Broaddus, Levin, & Bryan, 2009).

Despite the importance of both alcohol and condom use self-efficacy to risky sexual behavior, their interactive effects in sexual situations have received limited empirical attention. In a cross-sectional survey of heterosexual college students, Abbey and colleagues found that lower self-efficacy regarding condom use while intoxicated was associated with less actual condom use behavior during intoxicated sexual situations (Abbey, Parkhill, Buck, & Saenz, 2007). Further, a daily diary study of HIV-positive men and women reported that with casual partners, very low condom use self-efficacy predicted less condom use on days involving high alcohol consumption and high negative affect, indicating that condom use self-efficacy fluctuates at the daily level and may be particularly influential on actual condom use in certain intoxicated sexual situations (Barta, Tennen, & Kiene, 2010). Finally, in a small alcohol administration laboratory study with young men from the community, Gordon and Carey (1996) found that intoxicated men reported less self-efficacy regarding initiating condom use discussions than did sober men. In sum, extant literature suggests that alcohol and self-efficacy to use condoms may be related at global levels (Abbey et al., 2007), at daily event levels (Barta et al., 2010), and in laboratory-based state-dependent

levels for men (Gordon & Carey, 1996). To date however, no published research has examined women's condom use self-efficacy in relation to their in-the-moment intentions to engage in condom use negotiation and future intentions to use condoms, or whether these relationships vary by states of intoxication and sobriety. Because of the importance of women's condom use self-efficacy to their condom negotiation behavior (Farmer & Meston, 2006) and because – among drinkers – many of these negotiations likely occur during states of intoxication, a greater understanding of the synergistic effects of condom use self-efficacy and alcohol intoxication in female drinkers is warranted.

The present study used an alcohol administration laboratory experiment to examine sober and intoxicated women's condom use self-efficacy in relation to their in-the-moment condom negotiation likelihood and future condom use intentions with a hypothetical casual sex partner. We were particularly interested in how sexual decisions made in one encounter with a partner would influence a woman's perceptions of her future condom use behavior with that same partner. Research indicates that rates of consistent condom use decline rapidly in newly developed sexual relationships and are likely to remain inconsistent as a relationship becomes more established or serious (Cooper, 2010; Fortenberry, Tu, Harezlak, Katz, & Orr, 2002). Thus, in-the-moment decisions to forgo condom negotiation or condom use may have not only short-term but also long-term risk implications. For these reasons, we examined the association between women's likelihood of condom negotiation in the present moment and their perceptions of their future condom use likelihood with the same partner.

Using a structural equation modeling approach (see Figure 1), we predicted that alcohol intoxication would decrease intentions both to negotiate condom use and to use condoms in the future. Additionally, we predicted that greater condom use self-efficacy would predict stronger intentions to negotiate for condom use in-the-moment, but that intoxication would moderate this association. Because intoxication can focus one's attention towards stimuli consistent with pre-existing beliefs (Davis et al., 2007), we expected that the association between condom use self-efficacy and condom negotiation intentions would be stronger for intoxicated participants relative to sober participants. For example, if a woman enters a sexual situation with a weak sense of condom use self-efficacy, alcohol intoxication may enhance this belief by focusing her attention on elements of the situation that confirm her belief that she is ineffective at negotiating for and using condoms. Consequently, this woman would report a lower likelihood of negotiating for and using a condom. Finally, we predicted that greater condom negotiation intentions in-the-moment would predict greater future condom use intentions.

2 Methods

2.1 Participants

Women aged 21-30 were recruited from an urban community through online and print advertisements seeking single female drinkers to participate in a research study on male-female social interactions. Eligible participants had at least one occurrence of unprotected sex and at least one instance of heavy episodic drinking (4 or more drinks within two hours) within the past year. Inclusion criteria also consisted of at least one of the following HIV/STI risk factors: (a) new male sex partner in the past year; (b) two or more male sex partners in the past year; (c) having had an STI; or (d) knowing or suspecting that a past year male sex partner had a concurrent sexual relationship, an STI and/or HIV, a same-sex sexual encounter, ever used IV drugs, or been incarcerated in the last 12 months. Following NIAAA guidelines (2005), exclusion criteria included 1) medical conditions or prescription medication use contraindicating alcohol consumption and 2) a history of problem drinking assessed with the Brief Michigan Alcohol Screening Test (Pokorny, Miller, & Kaplan, 1972).

The final data set included 436 women. While 448 women participated in the study, 12 women's data were not included in the final sample due to data loss ($n = 1$), experimenter error ($n = 2$), early study withdrawal ($n = 4$), or failure of scenario comprehension checks ($n = 5$; see Section 2.4.2). Participants' mean age was 24.8 years ($SD = 2.6$). Participants were predominantly European American (72.5%); 5.8% were African American, 6.0% were Asian American, 0.9% were Native American, and 14.8% were multi-racial or other. Hispanic/Latino ethnic identity was reported by 6.7% of participants. Proportions of the sample belonging to each racial or ethnic group roughly matched those of the region in which the study was conducted. Participants reported consuming an average of 14.0 drinks per week ($SD = 8.0$) and an average of 14.8 lifetime sexual partners ($SD = 11.50$, capped at 50).

2.2 Procedures

When the participant arrived at the laboratory, a female experimenter used a handheld breathalyzer (Alco-Sensor IV, Intoximeters, Inc.) to verify that her blood alcohol concentration (BAC) was 0.00%, obtained informed consent, and had the participant take a urine test to ensure she was not pregnant. Participants then completed background questionnaires in a private room.

Participants were randomly assigned to a beverage condition (alcohol or control). Beverage condition was not masked; participants in both groups were cognizant of whether they were receiving an alcoholic or control beverage. Each participant was weighed to determine the amount of 190-proof grain alcohol needed to achieve a peak blood alcohol concentration (BAC) of .10%, with participants receiving 1.0 ml ethanol/kg body weight. Drinks consisted of one part grain alcohol to six parts cranberry juice (or juice only for controls), were divided into three equal portions, and were consumed over a 12 minute period. Alcohol participants received breathalyzer tests every four minutes until a criterion BAC of .07 or greater was reached to ensure they were on the ascending limb of the blood alcohol curve for the presentation of the sexual scenario. Following a yoked control protocol (Schacht, Stoner, George, & Norris, 2010), control participants completed the same number of breathalyzer tests as their alcohol yokes.

After meeting the BAC criterion, participants read the stimulus story and completed dependent measures. The mean BAC among alcohol participants immediately prior to beginning the story was .08% ($SD .01$); immediately upon completion, it was .10% ($SD .01$). Post-story, alcohol participants completed a detoxification period until their BACs were below .03%. All participants were debriefed, paid (\$15/hour), and released. Procedures were approved by the university's Human Subjects Division.

2.4 Measures and Instruments

2.4.1 Condom Use Self-Efficacy Scale (CUSES)—Participants' condom use self-efficacy (CUSE) was measured using 14 items of the 28-item Condom Use Self-Efficacy Scale (Brafford & Beck, 1991). To reduce participant burden, we administered only those items with content most relevant to this study. Each item asked about confidence in using condoms generally and across a range of situations. Items were answered on a 5-point Likert scale of 1 (*strongly disagree*) to 5 (*strongly agree*) and exhibited excellent reliability ($\alpha = .88$). See Table 1 for descriptive information.

2.4.2 Stimulus Story—The experimental sexual scenario was developed using data from focus groups on young women's sexual relationship experiences, as well as the team's previous research, and was pilot tested to ensure realism. Participants read the written scenario on a computer screen in a private room. The approximately 1600-word stimulus

story described a sexual situation with the participant as the protagonist. It established that she had previously had sex with the male character (“Michael”), that they had previously used a condom, and that she was on the pill (to eliminate pregnancy concerns associated with unprotected sex). Validity checks indicated that 97% of participants correctly perceived scenario prior condom use and 95%, scenario oral contraceptive use. The relationship’s potential was manipulated as either low (“you’re uncertain whether there’s any future in this”) or high (“you’re hopeful that there might be a future...”). Participants’ perception of the male partner’s relationship potential was assessed during the scenario; means in the low relationship potential condition were significantly lower than those in the high relationship potential condition. The story then described a dating situation, which eventually led to sexual activity where no condom was available, and the male character requested unprotected sex. Descriptions and dialogue were eroticized to increase the participant’s sexual arousal. Participants rated the scenario as very realistic ($M = 5.80$, $SD = 1.37$; 1 *not at all realistic* to 7 *extremely realistic*). For more information about the scenario, see (Author Citation, 2013).

2.4.3 Condom Negotiation Intentions—Relevant items from the Condom Influence Strategy Questionnaire (Noar, Morokoff, & Harlow, 2002) were used to measure participants’ likelihood of negotiating for condom use with the male story character with a 7-point Likert scale of 1 (*not at all likely*) to 7 (*extremely likely*). The 7 items were averaged and had good reliability ($\alpha = .87$).

2.4.4 Future Condom Use Intentions—The future condom use intentions variable was a one item indicator of intentions to use a condom for future sex with the male story character, measured on a 7-point Likert scale of 1 (*not at all likely*) to 7 (*extremely likely*).

2.5 Analytic Approach

We employed structural equation modeling (SEM) using Mplus statistical modeling software for Windows (version 6; Muthén & Muthén, 2010) to test the theoretical model in Figure 1, which represents all of the hypothesized relationships among variables. We screened data for outliers, skewness, kurtosis, and missingness prior to modeling. Our estimation method was maximum likelihood with robust standard errors, and we employed full information maximum likelihood (FIML), standard with Mplus, to handle rare instances of missing data.

3 Results

3.1 Preliminary Analyses

Bivariate correlations are depicted in Table 1. Alcohol intoxication was significantly associated with decreased intentions to use condoms in the future, but it was not associated with condom negotiation intentions. CUSE was significantly positively correlated with condom negotiation intentions and with intentions to use condoms in the future, which were also positively correlated. Because preliminary tests indicated no differences across relationship potential conditions, we collapsed these 2 groups for subsequent modeling.

3.2 Model Testing

The hypothesized model is shown in Figure 1. It was not a good fit for the data, $\chi^2(2) = 12.51$, $p = .002$; RMSEA (root mean square error of approximation) = .110; CFI (comparative fit index) = .958; SRMR (standardized root mean squared residual) = .037. Based on modification indices, we added a direct path from condom use self-efficacy to future condom use intentions. The re-specified model was a good fit, $\chi^2(1) = .64$, $p = .42$;

RMSEA = .00; CFI = 1.00; SRMR = .005 and accounted for 30% of the variance in future condom use intentions.

3.3 Direct and Indirect Effects

Figure 1 also illustrates the final re-specified model; it displays standardized coefficients for significant paths only. Intoxicated women were less likely than sober women to intend to use condoms in the future, though alcohol intoxication did not directly influence in-the-moment condom negotiation intentions. Women who were higher in condom use self-efficacy had greater intentions to use condom negotiation strategies in-the-moment, however, alcohol moderated this effect. Specifically, the positive relationship between condom use self-efficacy and greater intentions to negotiate condom use in-the-moment was stronger for intoxicated women relative to sober women. Figure 2 displays this interaction graphically. Finally, greater condom negotiation intentions in-the-moment predicted greater future condom use intentions.

We also tested the significance of indirect effects of alcohol, condom use self-efficacy, and their interaction on future condom use intentions. Alcohol did not have an indirect effect on future condom use intentions; the path from alcohol to condom negotiation intentions was not significant. However, the indirect path from CUSE to condom negotiation intentions to future condom use intentions was significant (standardized estimate = .15, SE = .03, $p < .001$), as was that from the interaction of alcohol and CUSE (standardized estimate = .05, SE = .03, $p < .05$).

4 Discussion

We used a laboratory experiment to examine how women's condom use self-efficacy and alcohol intoxication influenced in-the-moment condom negotiation intentions and future condom use intentions. We found support for three hypotheses, each of which has implications for interventions aimed at increasing condom use. First, alcohol intoxication diminished women's intentions to use condoms in the future with the hypothetical sex partner. This direct association supports the idea that alcohol can contribute to women's intentions to engage in risky sexual behavior, as has been found in previous research (Rehm et al., 2011). Moreover, in a unique contribution to the literature, intoxicated women reported lower *future* condom use intentions than did sober women. Because of the demonstrated association between intentions to use condoms in the future and actual condom use (Sheeran, Abraham, & Orbell, 1999), this finding could have important implications for women's sexual risk. Future research could investigate whether alcohol's effects on future condom use intentions are limited to between-group differences or if intoxication also reduces future condom use intentions on a within-subject level. Sexual risk reduction interventions could draw on the empirical link between intentions and behavior to emphasize setting an intention to use condoms for future sexual activity, particularly when drinking is involved.

In support of the idea that alcohol effects can vary individually, we found that intoxication interacted with condom use self-efficacy to influence in-the-moment condom negotiation intentions. This finding is consistent with alcohol myopia theory (Steele & Josephs, 1990), though we did not specifically test myopia as the mechanism. For a woman with high condom use self-efficacy, alcohol intoxication may have focused her attention on situational cues consistent with her belief that she can effectively negotiate for and use condoms, which translated to greater intention to do so in-the-moment. Conversely, a woman with lower condom use self-efficacy was likely focused on situational cues confirming her beliefs that she cannot use condoms effectively, resulting in reduced condom negotiation intentions. Interestingly, our findings suggested that intoxication might actually enhance safe sexual

decision-making, but only for individuals with a high level of condom use self-efficacy. Other research also suggests that intoxication can decrease risky sexual behavior, provided that the most salient features of the situation emphasize the risks of unprotected sex (Macdonald, Fong, Zanna, & Martineau, 2000).

In sum, alcohol had contradictory effects on women's overall sexual risk decisions in this study. It directly increased risk through weaker future condom use intentions, but indirectly decreased risk for women higher in condom use self-efficacy through stronger in-the-moment condom negotiation intentions. Future research should attempt to disentangle these contradictory effects, particularly through more precise exploration of the alcohol-related mechanisms underlying these findings. Perhaps alcohol myopia focusing effects on factors salient to the individual (e.g., condom use self-efficacy) have more relevance on immediate in-the-moment decisions, while other alcohol-related mechanism (e.g., disinhibition) are more relevant for future-oriented risk decisions. Until such mechanisms can be delineated, the most promising route for intervention might be to increase women's condom use self-efficacy, particularly given that higher condom use self-efficacy was also associated with greater future condom use intentions regardless of intoxication. Indeed, interventions that target women's condom use self-efficacy as a mechanism for sexual risk reduction have demonstrated significant reductions in sexual risk behavior (Schmiege et al., 2009).

Third, we predicted and found that women's intentions to engage in condom use negotiation in-the-moment were positively associated with their intentions to use condoms with the same partner in the future. If a woman believes that she will negotiate with a partner to use condoms during one encounter, she likely believes that she can also do so effectively during a future encounter. Thus, elevating women's intentions to engage in condom negotiation in a given sexual situation will likely elevate their global intentions to do so in the future. However, this result must be examined further to test whether findings are partner-specific.

Finally, though not hypothesized, condom use self-efficacy was positively associated with future condom use intentions. This suggests that even after accounting for the situational characteristics of alcohol intoxication and in-the-moment condom negotiation intentions, personal beliefs that one can be efficacious at using condoms still predicted intentions to use condoms in a future encounter. This result again supports continued intervention focus on elevating women's condom use self-efficacy as an important pathway to reducing risk.

4.1 Limitations

Limitations include experimental analogue constraints and generalizability concerns. First, laboratory simulations and measures can never include all elements of real sexual situations. For example, our measure of future condom use intentions only involved one item which did not stipulate the numerous contextual elements that might be relevant to such decisions. That noted, experimental scenarios can have high external validity. Studies indicate that women's reports of their past and projected future condom use in real life were significantly correlated with their likelihood of having unprotected sex in experimental scenarios (Kajumulo, Davis, & George, 2009; Norris, Kiekel, Purdie, & Abdallah, 2010). Second, care must be taken when generalizing current findings to other groups of women given that 1) volunteers for sexuality research tend to have more liberal attitudes and sexual experience than non-volunteers (Strassberg & Lowe, 1995) and 2) the alcohol consumption patterns (e.g., experienced binge drinkers) and sexual risk indicators of this study's sample are high relative to the general population. Study participants may also differ from women with lower alcohol consumption and fewer sexual risk indicators on unmeasured variables (e.g., impulsivity) that could potentially be associated with condom use intentions. Moreover, study eligibility criteria included several diverse sexual risk indicators; future studies could

explore whether women's baseline sexual risk type and level influence their alcohol-involved sexual risk intentions.

4.2 Conclusions and Future Directions

Our results suggest that it is important to investigate individual differences that might moderate the effects of alcohol intoxication on in-the-moment sexual decision making and future intentions. Though our findings have implications for interventions aimed at increasing condom use, additional research, particularly with more diverse samples, would help to clarify these associations and examine their applicability to real-world sexual decision-making. While our finding that alcohol enhanced the association between condom use self-efficacy and condom negotiation intentions is consistent with alcohol myopia theory, more research would help to determine the specific mechanisms for this effect. For instance, it would be helpful to know whether alcohol led women to focus on situational cues relevant to condom negotiation intentions, and if so what those cues were. Future work could also examine these associations at the event level in the context of real-world sexual decision-making to determine whether intentions map onto actual behaviors. Finally, the sexual encounter described in this study involved an early stage relationship. Thus, it would be fruitful to establish whether these results also hold for other types of relationships (e.g., committed partnerships).

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Highlights

- We investigated the effects of acute intoxication on women's sexual intentions.
- Alcohol intoxication decreased women's intentions to use condoms in the future.
- Intoxication moderated condom use self-efficacy effects on condom negotiation.

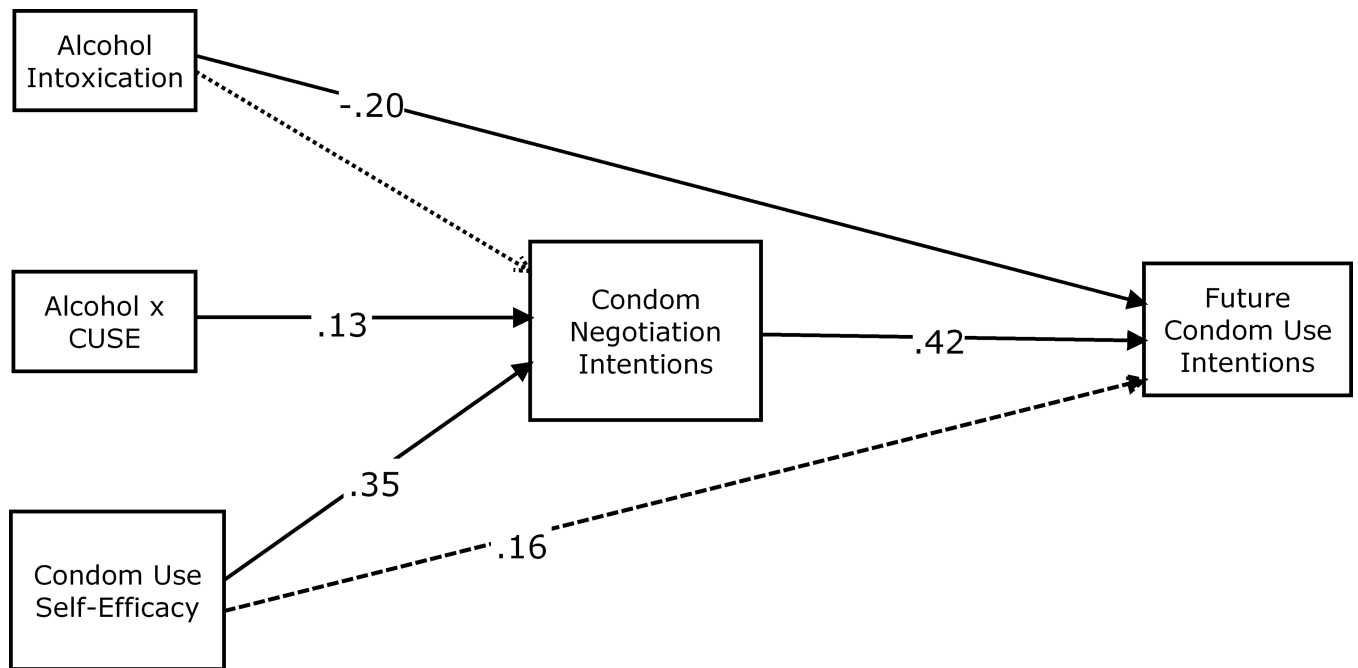


Figure 1.

Dotted line represents hypothesized path that was not significant in the final model. Solid lines represent hypothesized paths significant at $p < .05$ in the final model. Dashed line represents path added to final model based on modification indices. Standardized path values shown.

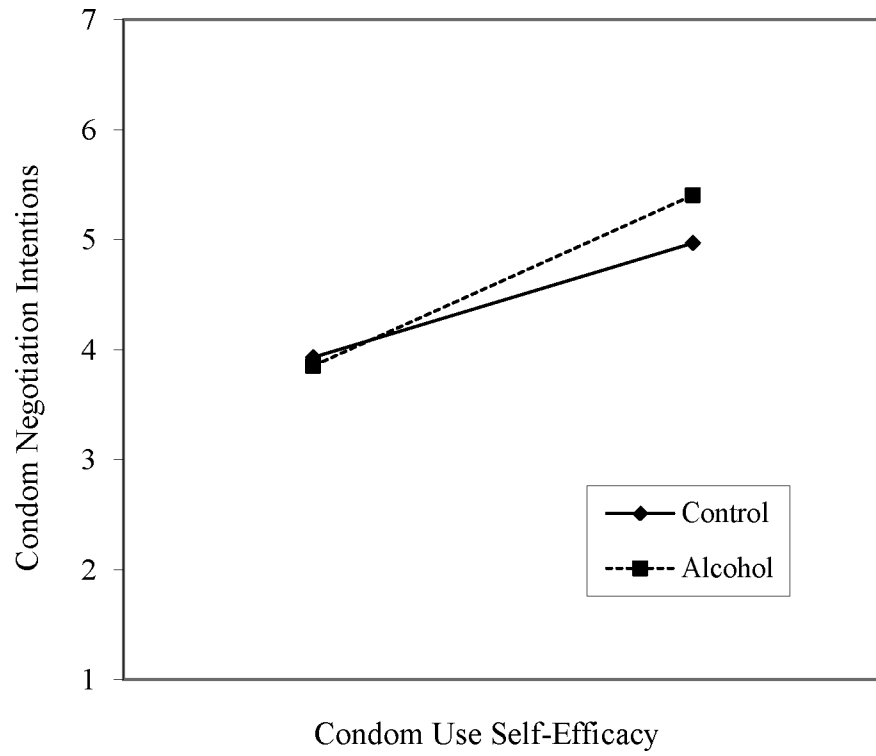


Figure 2. Values of CUSE represent estimates at mean - 1 SD and mean + 1 SD. Control and alcohol slopes differ significantly ($t = 2.01, p < .05$).

Table 1

Means, Standard Deviations, and Bivariate Correlations Among Model Variables

Variable	1	2	3	4
1. Alcohol condition	—	-.08	.03	-.21**
2. Condom use self-efficacy		—	.44**	.36**
3. Condom negotiation intentions			—	.49**
4. Future condom use intentions				—
Mean	n/a	4.50	4.53	5.68
SD	n/a	.65	1.48	1.66

Note.

N = 436.

**
 $p < .01$. Alcohol condition was coded such that 0 = control and 1 = alcohol (BAC .10%).