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Influences of acute alcohol consumption, sexual precedence, and relationship motivation on women's relationship and sex appraisals and unprotected sex intentions

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Abstract

Guided by the cognitive mediation model of sexual decision making (Norris, Masters, & Zawacki, 2004. Cognitive mediation of women's sexual decision making: The influence of alcohol, contextual factors, and background variables. *Annual Review of Sex Research*, 15, 258–296), we examined female social drinkers' ($N = 162$) in-the-moment risky sexual decision making by testing how individual differences (relationship motivation) and situational factors (alcohol consumption and sexual precedence conditions) influenced cognitive appraisals and sexual outcomes in a hypothetical sexual scenario. In a path model, acute intoxication, sexual precedence, and relationship motivation interactively predicted primary relationship appraisals and independently predicted primary sex appraisals. Primary appraisals predicted secondary appraisals related to relationship and unprotected sex, which predicted unprotected sex intentions. Sexual precedence directly increased unprotected sex intentions. Findings support the cognitive mediation model and suggest that sexual risk reduction interventions should address alcohol, relationship, sexual, and cognitive factors.

Keywords

Alcohol; cognitive appraisals; relationships; sexual precedence; sexual risk taking

HIV and other sexually transmitted infection (STI) rates are rising among women, primarily due to heterosexual contact (Centers for Disease Control and Prevention [CDC], 2010).

Approximately three quarters of new HIV cases diagnosed in women are contracted during

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high-risk sexual activity with a man (CDC, 2008). When having sex, use of a male condom is currently the best protection against STIs, but this may pose problems for women if their male partners do not want to use one or if one is not available. Women can negotiate with a male partner to wear a condom, but whether or not one is used is ultimately determined by him. For this reason, when investigating women's sexual behavior in a laboratory, some researchers have focused on condom negotiation strategies and intentions to engage in unprotected sexual activity. Most of this work examines the relationship between a given factor, such as alcohol use, and condom negotiation or sexual intentions. However, less work has focused on intervening factors that may explain how independent and outcome variables are related; for instance, some research has shown that cognitions at the time of a sexual encounter may play a role in women's decisions about negotiating for a condom and whether to have unprotected sex (Norris, Masters, & Zawacki, 2004; Norris et al., 2009; Zawacki et al., 2009). Guided by the cognitive mediation model (Norris et al., 2004), the current study further addresses this gap in the literature by examining how relationship factors (a woman's level of relationship motivation and whether a woman has previously had sex with a man) and alcohol intoxication influence women's in-the-moment sexual decision making through their effects on women's cognitions.

Cognitive mediation model of women's sexual decision making

Sexual decisions are made within a particular situation. The cognitive mediation model (CMM) of sexual decision making (Norris et al., 2004) is based on Lazarus' (1991) cognitive-motivational-relational theory and offers a framework for understanding how sexual decisions unfold in the moment. Major components of the CMM are presented in Figure 1. The model as a whole is described first, and then individual aspects are described in greater detail.

The CMM states that women enter a potentially sexual situation with goals that provide the basis for evaluating the situation. Its underlying premise is that cognitive appraisals about the immediate situation mediate the effects of situational and background influences on sexual decisions. Goals may include sexual intimacy, sexual safety, and/or relationship building or maintenance. An important background factor that may influence appraisals is a woman's level of relationship motivation, the extent to which she is motivated to build or pursue a romantic relationship (Zawacki et al., 2009). Once a woman is in a potentially sexual situation, situational factors, such as alcohol consumption and whether or not she has had sex with the partner before, that is, sexual precedence, may affect her situational appraisals. Situational and background factors are posited to independently and interactively influence a woman's appraisals, and these appraisals in turn are expected to predict her sexual decisions.

According to the CMM, there are two types of cognitive appraisals that occur sequentially. Primary appraisals directly lead to secondary appraisals, which in turn lead to behavioral and/or emotional responses. Primary appraisals answer the questions of how important the situation is to the woman and to what extent she can attain her goals in the situation. For example, when making primary relationship appraisals, a woman may ask herself how much she wants a relationship with the man with whom she is interacting and how feasible

forming a relationship with him would be. When making primary sex appraisals, she may ask herself how much she wants to have sex with him and how likely she is to have sex with him. Secondary appraisals take the form of a cost–benefit analysis of acting to fulfill her goals. They seek to answer the question, to what extent will doing something help or hurt her in achieving her goals? Because the situation is sexual, the woman’s secondary appraisals may be relationship or sex related. For instance, she might ask herself if having sex with him will enhance or diminish the likelihood of a long-term relationship with him. She may also ask herself how important it is to use a condom and whether using a condom will influence the relationship likelihood. Secondary appraisals are not themselves goal-directed behaviors. However, they foster actions that are assumed to facilitate the goal, such as negotiating condom use or having sex without a condom. Thus, secondary appraisals are posited to influence responses related to risky sexual intentions.

Empirical research has supported the CMM (Davis et al., 2010; Norris et al., 2009; Purdie et al., 2011; Zawacki, 2011; Zawacki et al., 2009). For example, with a community sample of female social drinkers, Norris and colleagues (2009) randomly assigned participants to a high dose of alcohol, low dose, placebo, or control condition and then asked participants to project themselves into a story depicting an escalating sexual situation with a new male partner. As theorized, the authors found that alcohol’s effects on sexual decision making were mediated by primary and secondary appraisals. Alcohol intoxication increased primary sexual potential appraisals, which led to stronger impelling cognitions and weaker inhibiting cognitions, which led to decreased likelihood of making direct condom requests and increased likelihood of intending to have unprotected sex.

Studies have also shown that women’s background experiences, attitudes, and beliefs, as well as aspects of the situation itself, affect how women appraise a sexual situation. In a community sample of female social drinkers, Zawacki and colleagues (2009) measured relationship motivation in a background questionnaire, experimentally manipulated partner familiarity and alcohol consumption, and then participants responded to a risky sex scenario in the context of a first-time sexual encounter. As the CMM posited, background and situational factors interacted to influence appraisals. Relationship motivation, alcohol, and partner familiarity interactively predicted primary relationship appraisals such that relationship motivation and primary relationship appraisals were positively associated for women who consumed alcohol in the high-familiarity condition and sober women in the low-familiarity condition and negatively associated for women who received a high dose of alcohol in the low-familiarity condition. More positive primary relationship appraisals led to more positive secondary relationship facilitation appraisals and culminated in increased unprotected sex intentions.

The current study builds on Zawacki et al.’s (2009) work. Whereas Zawacki et al. examined the effects of partner familiarity, relationship motivation, and alcohol consumption on women’s risky sexual decision making via primary relationship appraisals, in the current study, we examined how sexual precedence (i.e., whether or not a woman and man have had sex previously), relationship motivation, and alcohol consumption influence women’s primary relationship and sex appraisals—and in turn, secondary appraisals and unprotected sex intentions—in the context of a newly developing dating relationship. The rationale for

examining relationship motivation, sexual precedence, and alcohol consumption in the context of the CMM is described below, and then the study's hypotheses are specified.

Relationship issues and sexual decision making

Several researchers have found that women's relational concerns are associated with their sexual and condom use decisions (e.g., Amaro, 1995; Regan & Dreyer, 1999; Smith, 2003). Patrick, Maggs, and Abar (2007) compared young adult men's and women's reasons to have sex and found that women rated partner-focused reasons as more important than did men. These authors did not find an association between partner-focused reasons for having sex and recent unsafe sex; however, other researchers have found such a relationship. In an experimental study, Umphrey and Sherblom (2007) manipulated relationship commitment and condom negotiation as threats to relational goals. They found main effects of both factors on condom use intentions; condom use requests were less likely in the high relationship commitment condition and if condom negotiation was perceived as a threat to the relationship.

There are a variety of reasons that condom use, negotiation, or requests are less likely for women with high relationship motivation. Some women may believe that requesting a condom might imply to her partner that she has a risky past or that she is concerned about his sexual past (Hammer, Fisher, Fitzgerald, & Fisher, 1996; Wingood, Hunter-Gamble, & DiClemente, 1993). Other women may believe that because condoms are a physical barrier, they are also a symbolic barrier of trust and intimacy in a relationship (Juran, 1995).

Further, women may use different strategies to encourage their partners to use a condom (Noar, Morokoff, & Harlow, 2002). Of import to the current study are relationship-focused and assertive methods of condom negotiation. Zawacki et al. (2009) included intentions to use each method as outcomes. Although assertive condom insistence was not related to secondary appraisals in the final model, there was an association between secondary appraisals and relationship-focused condom negotiation: The stronger the women's secondary relationship facilitation appraisals, the stronger their relationship-focused condom insistence. Taken together, the available evidence suggests that women who are highly motivated to enter or maintain a relationship may thus be less apt to negotiate condom use or intend to use one, particularly if they believe a relationship is likely to develop.

Sexual precedence and unprotected sex

Having sex together on at least one prior occasion may be referred to as sexual precedence. Several survey researchers have found that condom use is more common with new or casual sexual partners than with regular partners (Brown & Vanable, 2007; Corbin & Fromme, 2002; Morrison et al., 2003; Scott-Sheldon, Carey, & Carey, 2010). For example, in one study of the relationship between sexual precedence and condom use, Macaluso, Demand, Artz, and Hook (2000) recruited a sample of 869 women from urban STI clinics who completed diary entries describing all sexual activity over 6 months. Condom use was more common for new partners and casual partners than for regular partners. Further, among women whose sexual partner status changed from a new partner to a regular partner, condom use decreased over time. These findings suggest sexual precedence should be

associated with stronger unprotected sex intentions and decreased condom negotiation. Although previous survey research has examined the role of sexual precedence in risky sexual decisions, we are not aware of any experimental research examining effects of sexual precedence on sexual decision making.

Alcohol and risky sexual decision making

Alcohol and risky sex are thought by many people to go hand in hand, and many researchers have documented that the two are related on a global level in that people who drink alcohol more frequently also have unprotected sex more frequently (e.g., Hines, Snowden, & Graves, 1998; Santelli, Brener, Lowry, Bhatt, & Zabin, 1998). However, event-level studies suggest alcohol's relationship to unprotected sex may depend on other factors, such as partner type (Brown & Vanable, 2007; Leigh et al., 2008; Manthos, Owen, & Fincham, 2013; Morrison et al., 2003; Scott-Sheldon et al., 2010).

Further, some experimental studies have investigated alcohol's causal role in sexual decision making using alcohol administration experimental paradigms (see Hendershot & George, 2007 for a review). Several authors have found that acute alcohol consumption is associated with decreased condom use intentions (e.g., Davis et al., 2009; MacDonald, Fong, Zanna, & Martineau, 2000; Maisto, Carey, Carey, Gordon, & Schum, 2004), higher perception of HIV risk potential (Monahan, Murphy, & Miller, 1999), and perceptions of affiliation between consensual partners (Lannutti & Monahan, 2002). Alcohol's effects are often moderated (e.g., Norris et al., 2013; Zawacki et al., 2009) or mediated (e.g., Davis et al., 2009; George et al., 2009; Norris et al., 2009; Zawacki, 2011) by other factors, such as sexual arousal, partner factors, or individual differences.

Alcohol's causal effects are often explained by alcohol myopia theory (Steele & Josephs, 1990; Taylor & Leonard, 1983), which suggests when people are intoxicated, their attention is directed toward salient cues in the environment at the cost of attention to subtle cues. Because for many behaviors impelling cues tend to be more salient and inhibiting cues tend to be more subtle, intoxicated people tend to focus on cues that tell them to go ahead and perform a given behavior and to ignore cues that would tell them to stop the given behavior. The manipulated factors in the present study may represent impelling and inhibiting cues for women to have unprotected sex. For a woman who is highly motivated to begin or maintain a relationship, an impelling cue for unprotected sex may also be that she has had sex with the man before, and an inhibiting cue may be that they used condoms previously. In this case, unprotected sex intentions are likely to be stronger in situations involving alcohol consumption than ones without alcohol consumption.

Overview of study and hypotheses

The current study extends previous research on women's risky sexual decision making by simultaneously examining how individual differences and situational factors influence in-the-moment cognitive appraisals of a sexual situation and, in turn, intentions to engage in unprotected sex. We were theoretically guided by the CMM (Norris et al., 2004), and this experiment builds from Zawacki et al.'s (2009) work. In the current experiment, we expected that the manipulated situational variables—alcohol consumption (none, low dose,

or high dose) and sexual precedence (none, twice, or a dozen times)—would interact with the individual difference variable—relationship motivation—to influence primary cognitive appraisals, as suggested by the CMM. These cognitive appraisals were expected to guide women's responding throughout a hypothetical scenario of escalating sexual activity in which a condom was not available.

The hypothesized model is shown in Figure 2. Hypotheses follow the figure from left to right.

Hypothesis 1a: Alcohol consumption, sexual precedence, and relationship motivation would interact to predict women's primary relationship appraisals, such that relationship potential appraisals would be highest among highly relationship-motivated women who consumed alcohol and who projected themselves into a situation with a man with whom they had had sex in the past.

Hypothesis 1b: Primary sex appraisals were expected to be highest among women who consumed alcohol, were highly relationship motivated, and projected themselves into a situation with a man they had had sex with before.

Hypothesis 2a: Primary relationship appraisals would be positively associated with secondary relationship appraisals; the more relationship potential women perceived, the more strongly they would endorse relationship-based reasons for having sex in the current situation.

Hypothesis 2b: Primary sex appraisals would be positively associated with secondary relationship appraisals; the more sex potential women perceived, the more strongly they would endorse relationship-based reasons for having sex in the current situation.

Hypothesis 3: Secondary relationship appraisals would then be positively associated with secondary appraisals for sex without a condom; the more important relationship-based reasons were for having sex, the more important would be reasons for having sex without a condom.

Hypothesis 4: Secondary appraisals for sex without a condom would be positively associated with a latent variable of risky sex intentions, as indicated by likelihood of engaging in unprotected sex and lack of condom negotiation.

Method

Participants

Participants were 162 women aged 21–35 years ($M = 24.62$, $SD = 3.53$) recruited from a large metropolitan area in the Pacific Northwest via print and online advertisements describing a study of male–female interactions among social drinkers. Interested women were screened over the telephone for eligibility criteria. Because the study involved alcohol administration and focused on a heterosexual encounter, eligibility was limited to self-defined female social drinkers who had consensual vaginal sexual intercourse with a man and who were not in a relationship with a man. Women were excluded from the study if they reported a history of adverse reactions to alcohol consumption, a history of alcohol

problems, a medical condition or medication that contraindicated alcohol consumption, or lack of interest in dating men.

The majority (63%) identified as European American/White, 11% were multiracial, 7% were African American/Black, 7% were Asian, and 12% reported other races. Ten percent indicated a Hispanic or Latina ethnicity. To increase minority representation in the study, we oversampled women of color. In particular, more multiracial and Latina women participated than resided in the community at large. In all, 54% had earned an associate's degree or higher and 34% reported current full- or part-time student status. Seventy-four percent were employed full- or part time, and the median income was in the US\$11,000–US\$20,999 range. Participants reported an average of 9.94 ($SD = 6.34$) alcoholic drinks per week and 1.35 ($SD = 1.19$) consensual vaginal male sexual partners in the past 3 months.

Procedure

General study procedures—The University's Human Subjects Division approved all aspects of the study. The experimental session included two parts: the completion of background questionnaires and the experimental protocol. When a participant arrived at the lab, she was greeted by a female research assistant and seated in a private study room with a desktop computer. She provided photo identification to confirm her identity and age, took a breathalyzer test (Alco-Sensor IV) to verify that her blood alcohol level (BAL) was 0.00%, was weighed to determine the appropriate alcohol dose, and took a human chorionic gonadotropin urine pregnancy test (OSOM Genzyme Diagnostics). The participant provided informed consent and was left alone to complete the computerized background questionnaires. When she finished, the research assistant began the beverage administration protocol. The participant consumed her assigned beverage (see next section), then read the stimulus story, and completed the experimental measures alone on the computer. She was then debriefed, given an STI and HIV information packet, and released. Participants who consumed alcohol remained at the lab until their BAL fell below 0.03%. Participants were compensated US\$15/h.

Beverage administration—Participants were randomly assigned to one of three beverage conditions: high-dose alcohol (target peak BAL of 0.08%), low-dose alcohol (target peak BAL of 0.04%), or control (no alcohol). Participants in the high-dose condition received 0.682 g ethanol/kg body weight and those in the low-dose condition received 0.325 g ethanol/kg body weight. One-hundred proof vodka was mixed with orange juice in a 1:4 ratio; control participants received an equivalent amount of pure orange juice. Beverages were mixed in front of participants. Participants consumed each of three glasses of beverage in 3 min and then waited during a 4- to 5-min absorption period. Women in alcohol conditions were then breathalyzed every 2–5 min until their BAL reached a criterion (0.025% in the low-dose condition; 0.055% in the high-dose condition) to ensure that when they read the stimulus story and completed the experimental measures, they would be on the ascending limb of the BAL curve. To account for individual variation in time to criterion BAL, control participants were temporally “yoked” to an alcohol participant. Each control participant completed the same number of breathalyzer tests as an alcohol participant and

began reading the stimulus story after the same amount of time as her alcohol counterpart (Giancola & Zeichner, 1997).

Stimulus story

Participants were randomly assigned to read an experimental story about an encounter with Nick, a man with whom they had had sex on zero (no sexual precedence condition, $n = 53$), two (low sexual precedence condition, $n = 55$), or a dozen (high sexual precedence, $n = 54$) times before. The approximately 2,200-word story was written in the second person (e.g., “You and Nick met 4 months ago ...”) to help participants feel that the actions in the story were actually happening to them. They were instructed to project themselves into the situation as the female character. The drinks consumed by the man and the woman in the story matched the woman’s alcohol condition to enhance the story’s realism; in the control condition, the characters drank soda, and in the alcohol conditions, the characters consumed mixed drinks and beer.

In the first part of the story, the woman (i.e., the participant) and her female friend were on their way to a small party at Nick’s apartment. It was established that the participant and Nick had been happily dating for 6 weeks, that she was on birth control pills, and that she used condoms as well. Sexual precedence condition was also explicitly stated by describing the number of times that the woman and Nick had had sex. Once the woman and her friend arrived at the party, they were greeted by Nick. The woman and Nick talked, drank, and watched a movie with the others. After the movie, the woman, Nick, and several others went to Nick’s room to use the computer. After the others had left the room, and the woman and Nick were alone sitting on Nick’s bed, he started kissing her. At this point, the story paused and the primary relationship and sex appraisals (see the subsequent section for all measures) were assessed.

The remainder of the story involved escalating sexual activity. In the second part of the story, the woman and Nick kissed and touched each other and removed both shirts. The story paused here again, and secondary relationship appraisals were assessed. In the third part of the story, kissing and touching continued and Nick began removing the woman’s jeans. The woman asked Nick if he had a condom, but he did not. In both the high and low sexual precedence conditions, it was stated that they had used one the previous time they had had sex. The woman did not have one either, nor did Nick’s roommate. Nick asked to have sex without a condom. The story paused here a third time, and the women’s reasons for having unprotected sex were assessed. The story resumed with removing the remaining clothes and additional kissing and touching and concluded with Nick urging the woman to have unprotected sex. Condom negotiation and the likelihood of sex without a condom were then assessed.

Measures

Relationship motivation—As part of the background questionnaire that was administered before the experiment began, a subset of Sanderson and Cantor’s (1995) Social Dating Goals Questionnaire focused on intimacy measured women’s relationship motivation. This 9-item scale included such items as, “In my dating relationships, I try to

date people with whom I might fall in love” and “In my dating relationships, I try to date those whom I can count on.” Items were rated on 1 (*disagree strongly*) to 5 (*agree strongly*) scales. The scale mean was computed ($M = 3.82$, $SD = .59$), and higher scores indicated stronger relationship motivation; Cronbach’s α was .74. In a confirmatory factor analysis, all items loaded significantly on a single factor, all $t_s > 3.19$, $p_s < .05$.

Primary relationship appraisals—Two items used in a previous study (Zawacki et al., 2009) assessed primary relationship appraisals early in the encounter. Women were asked, “How interested are you in a long-term relationship with Nick?” and “How likely are you to have a long-term relationship with Nick?” Both items were rated on 0–6 scales; anchors for the “interested” question were *not at all interested* and *extremely interested*, and anchors for the “likely” question were *definitely unlikely* and *definitely likely*. The mean was computed ($M = 4.45$, $SD = 1.30$); Cronbach’s α was .85.

Primary sex appraisals—Two items, parallel to the primary relationship appraisal items and also used in previous research (Norris et al., 2009; Norris et al., 2013; Purdie et al., 2011), assessed primary sex appraisals early in the encounter. Women were asked, “How much do you want to have sex with Nick (even if you don’t think it will actually happen)?” and “How likely are you to have sex with Nick in this situation?” Both items were rated on 0–6 scales; anchors for the “want” question were *not at all* and *extremely*, and anchors for the “likely” question were *definitely unlikely* and *definitely likely*. The mean was computed ($M = 4.47$, $SD = 1.39$); Cronbach’s α was .80.

Secondary relationship appraisals—Three items used in previous research (Zawacki et al., 2009) assessed relationship-based reasons for having sex with Nick. After heavy petting started but before a condom was requested, women rated how important each reason was in deciding whether to have sex with Nick. The items were presented on 0 (*not at all important*) to 4 (*extremely important*) scales. Items stated, “Maybe this is the right guy for me so we should go ahead and have sex,” “We could end up being boyfriend and girlfriend if we have sex now,” and “He’ll like me more if we have sex now.” Items were averaged ($M = 1.90$, $SD = .97$); Cronbach’s α was .68. Although this reliability estimate is lower than desired, the items loaded onto a single factor in a confirmatory factor analysis, $t_s > 5.02$, $p_s < .05$.

Secondary appraisals for sex without a condom—Sixteen items assessed how important each reason was in deciding whether to have sex with Nick after they found out that neither person had a condom (Norris et al., 2009). Sample items include, “I feel closer to him without a condom” and “If we use a condom, he’ll lose his erection.” Items were rated on 0 (*not at all important*) to 4 (*extremely important*) scales. The mean was computed ($M = 1.25$, $SD = .84$); Cronbach’s α was .92. Furthermore, in a confirmatory factor analysis, all items loaded on a single factor, $t_s > 4.99$, $p_s < .05$.

Risky sex intentions—Three scales were included as indicators of the latent construct of risky sex intentions. *Sex without a condom*: Three items assessed how likely women were to have genital contact with Nick without a condom: “At this point in your encounter with

Nick, how likely are you to allow Nick to put his penis inside your vagina without a condom?” “How likely are you to rub your clitoris against Nick’s penis WITHOUT a condom?” and “How likely are you to have sex with Nick?” Responses were made on 0 (*definitely unlikely*) to 6 (*definitely likely*) scales. Items were averaged ($M = 2.48$, $SD = 1.89$); Cronbach’s α was .84. *Lack of relationship-related condom negotiation*: Four items adapted from the Condom Influence Strategy Scale (Noar et al., 2002) assessed how likely women were to use relationship-related condom negotiation strategies. Adaptation to the original items reflected minor wording changes to make them apply to the story. Participants were asked “How likely are you to:” and were then presented with a list of statements about condom negotiation. A sample item states, “Tell Nick that using a condom would really show how he cares for me.” Response options were presented on 0 (*definitely unlikely*) to 6 (*definitely likely*) scales. Items were reverse scored so that higher scores reflected greater sexual risk intention. Items were then averaged ($M = 2.34$, $SD = 1.89$); Cronbach’s α was .91. *Lack of assertive condom negotiation*: Six items, adapted from the direct request and withholding subscales of the Condom Influence Strategy Scale (Noar et al., 2002), assessed participants’ likelihood of using assertive condom negotiation. These items were presented along with the items in the relationship-related condom negotiation scale. Sample items read, “Be clear that I’d like us to use condoms” and “Tell Nick that I will not have sex with him if we do not use condoms.” Items were rated on 0 (*definitely unlikely*) to 6 (*definitely likely*) scales. Items were reverse scored so that higher scores reflected more sexually risky behavior. The mean was then computed ($M = 1.55$, $SD = 1.75$); Cronbach’s α was .96.

To confirm the validity of using these three scales to form the latent risky sex intentions construct, we conducted a confirmatory factor analysis using LISREL 8.80 software (Jöreskog & Sörbom, 2006). A higher order model reflecting the latent construct fits the data significantly better than a model with a single factor, $\chi^2_{\text{difference}}(df = 3) = 289.64$; $p < .001$, and significantly better than a model with three uncorrelated factors, $\chi^2_{\text{difference}}(df = 3) = 194.57$; $p < .001$.

Data analytic strategy

Our strategy involved three steps. First, we conducted preliminary analyses to examine manipulation checks, descriptive statistics, and correlations among the variables. Second, we used LISREL 8.80 software (Jöreskog & Sörbom, 2006) to test and refine our hypothesized model and evaluate our hypotheses. Model fit was evaluated with multiple criteria: a nonsignificant χ^2 , root mean square error of approximation (RMSEA) below .08 (Browne & Cudeck, 1993), standardized root mean square residual (SRMR) below .08 (Hu & Bentler, 1999), and comparative fit index (CFI) above .95 (Bentler, 1990; Bentler & Bonett, 1980; Browne & Cudeck, 1993). Third, to interpret the interactions suggested in Hypothesis 1, we used Statistical Package for Social Sciences v. 21 to conduct hierarchical linear regression as suggested by Cohen, Cohen, West, and Aiken (2003).

Results

Preliminary analyses

Prior to running the primary analyses testing our hypotheses, we checked the alcohol and sexual precedence experimental manipulations, examined women's ratings of the scenario's realism, and examined the correlations among study variables. The alcohol manipulation was checked by comparing the control (no alcohol), low-dose, and high-dose participants' achieved BAL and perceived intoxication. A one-way analysis of variance (ANOVA) demonstrated a significant effect of alcohol condition on achieved BAL before the story began, $F(2, 159) = 586.65, p < .001$; least significant difference post hoc tests assessed group differences. Women in the high-dose condition ($M = .064, SD = .016$) began reading the stimulus story at a significantly higher BAL than women in the low-dose ($M = .037, SD = .012, p < .001$) and no alcohol conditions ($M = .000, SD = .00, p < .001$); women in the low-dose condition began reading the stimulus story at a significantly higher BAL than women in the no alcohol condition, $p < .001$.

Average perceived intoxication was assessed at the first story break with the question, "How intoxicated do you feel right now?" Response options ranged from 0 (*not at all intoxicated*) to 6 (*extremely intoxicated*). A one-way ANOVA demonstrated a significant effect of alcohol condition, $F(2, 159) = 426.15, p < .001$. Women in the high-dose condition ($M = 4.37, SD = .94$) felt significantly more intoxicated than women in the low dose ($M = 3.20, SD = 1.24, p = .001$) and no alcohol conditions ($M = 0.07, SD = 0.41, p < .001$); women in the low-dose condition felt more intoxicated than women in the no alcohol condition, $p < .001$.

The sexual precedence manipulation was checked with the question, "Prior to this encounter, how many times have you and Nick had sex?" Response options were *zero times*, *a couple of times*, and *a dozen times*. Six women were excluded from analyses because they incorrectly answered this question; therefore, the final sample size for analyses was 156.

Because the CMM suggests that alcohol consumption level affects primary appraisals, we also tested for an alcohol dose effect on primary relationship and sex appraisals by comparing the low- and high-dose groups. There were no significant differences in relationship appraisals, $M_{\text{low dose}} = 4.01, SD = 1.71, M_{\text{high dose}} = 4.42, SD = 1.16, t(74) = 1.19, p = .24$, or sex appraisals, $M_{\text{low dose}} = 4.46, SD = 1.55, M_{\text{high dose}} = 4.62, SD = 1.04, t(74) = .53, p = .60$. For the remaining analyses, we collapsed over alcohol condition such that women who did not consume alcohol ($n = 80$) were coded as 0, and women who consumed alcohol ($n = 76$) were coded as 1.

After the story concluded, participants were asked, "How realistic was the story?" and "How much were you able to project yourself into the story?" with response options ranging from 0 (*not at all*) to 6 (*extremely*). The story was perceived as quite realistic, $M = 4.78, SD = 1.22$, and women were able to project themselves into the situation well, $M = 4.44, SD = 1.20$. There were no significant differences by alcohol or sexual precedence condition, all F s $< 1.35, ps$ not significant (*ns*).

Table 1 shows the bivariate correlations among study variables. Notably, beverage condition was significantly negatively associated with primary relationship appraisals, and sexual precedence was significantly positively associated with primary sex appraisals. Both primary appraisals were positively associated with secondary relationship appraisals, secondary relationship appraisals were positively associated with secondary appraisals for sex without a condom, and these secondary appraisals were positively associated with all three indicators of unprotected sex intentions.

Model testing

We tested the hypothesized model presented in Figure 2 using LISREL 8.80 software (Jöreskog & Sörbom, 2006). To acknowledge measurement error, for single-scale indicators we set $\lambda = 0.95$ and $\theta = 0.10$ (Andrews, 1984). As noted in the Method section, risky sex intentions were modeled as a latent variable, indicated by lack of relationship-related condom negotiation, lack of assertive condom negotiation, and intention to have sex without a condom. Condom negotiation scales were reverse scored so that for all three indicators, higher scores referred to stronger unprotected sex intentions. Errors of interaction terms that were significantly correlated in preliminary analyses (e.g., the three-way interaction term and the relationship motivation by sexual precedence two-way interaction term) were allowed to correlate. Including the interaction in the model, rather than conducting multiple groups analysis, is particularly recommended when there are several groups that would be formed and continuous measures are included (Marsh, Wen, Nagengast, & Hau, 2012). This model fit the data well, $\chi^2(62, N = 156) = 78.08, p = .082, RMSEA = .0409, SRMR = .0583, CFI = .981$ and fit the data better than an alternative model that did not include the two- or three-way interaction effects on primary appraisals, $\chi^2(31, N = 156) = 61.74, p < .001, RMSEA = .0800, SRMR = .0715, CFI = .938$.

The modification indices of the hypothesized model suggested that model fit would improve if we included a direct path from sexual precedence to unprotected sex intentions. Although we had not hypothesized this path, previous research supports its inclusion (e.g., Macaluso et al., 2000). This model fit the data very well, $\chi^2(61, N = 156) = 71.71, p = .164, RMSEA = .0337, SRMR = .0494, CFI = .992$. Final model parameters are presented in Table 2 and the standardized estimates of significant paths are shown in Figure 3. This model accounted for 34% of the variance in primary relationship appraisals, 14% of the variance in primary sex appraisals, 17% of the variance in secondary relationship appraisals, 9% of the variance in secondary appraisals for sex without a condom, and 52% of variance in unprotected sex intentions.

Testing our hypotheses

Hypothesis 1a: The interaction between alcohol consumption, sexual precedence, and relationship motivation significantly directly predicted primary relationship appraisals. To probe and interpret the interaction between alcohol consumption, sexual precedence, and relationship motivation on primary relationship appraisals, we ran a hierarchical linear regression (cf. Zawacki et al., 2009). The main effects were entered in the first step, the three two-way interactions were entered in the second step, and the three-way interaction was entered in the third step. Sexual precedence and relationship motivation

were both centered, and the interaction terms were formed with the centered terms (Cohen et al., 2003).

The overall model predicting primary relationship appraisals was significant, $F(7, 148) = 3.16, p < .01$. As shown in Table 3, on the first step, the main effects accounted for a marginal proportion of variance in primary relationship appraisals, $F(3, 152) = 2.53, p = .06$. Adding the two-way interactions accounted for an additional significant proportion of variance explained, $F(3, 149) = 3.10, p < .05$. There were two significant interactions: sexual precedence by relationship motivation ($\beta = .18, p < .05$) and sexual precedence by alcohol consumption ($\beta = .22, p < .05$). The two-way interactions were subsumed by the addition of the significant three-way interaction on the third step, $F(1, 148) = 4.48, p < .05$.

Figure 4 depicts the nature of the interaction. The top panel shows the relationship between sexual precedence condition and relationship motivation for women who did not consume alcohol. None of the slopes was significant, all $t(148) < .303, ps ns$; thus, relationship motivation was unrelated to primary relationship appraisals (at any level of sexual precedence) when women did not consume alcohol. However, when women consumed alcohol, the association between relationship motivation and primary relationship appraisals depended on sexual precedence level. In the no prior sex condition, relationship motivation was unrelated to primary relationship appraisals, $t(148) = -.38, p = ns$. In the low sexual precedence, $t(148) = 2.12, p < .05$, and high sexual precedence, $t(148) = 3.31, p < .05$, conditions, there were significant positive associations between relationship motivation and primary relationship appraisals. In other words, when drinking alcohol and contemplating a relationship with a man with whom they had had sex before, the stronger the women's relationship motivation, the stronger their primary appraisals of relationship potential.

Hypothesis 1b: The hypothesized three-way interaction did not significantly predict primary sex appraisals. As shown in Table 2, there was a significant alcohol condition by sexual precedence two-way interaction that was not hypothesized. However, when probed in hierarchical multiple regression, this term failed to meet statistical significance ($\beta = .09, p = .43$). Therefore, it was not interpreted. There was a significant main effect of sexual precedence; the more times that the women had had sex with Nick in the past, the more they expected and wanted to have sex in the situation.

Hypothesis 2a: Primary relationship appraisals were then significantly positively associated with secondary relationship appraisals. The more that women felt interested in a long-term relationship with Nick and that it was likely to happen, the more strongly they endorsed relationship-based reasons for having sex with Nick.

Hypothesis 2b: Primary sex appraisals were significantly associated with higher secondary relationship appraisals. In other words, relationship-based reasons for having sex with Nick were stronger for women who, early in the encounter with Nick, wanted to have sex with him and thought it likely.

Hypothesis 3: Secondary relationship appraisals were significantly positively associated with secondary appraisals for sex without a condom. In other words, the more strongly women endorsed relationship-based reasons for sex with Nick before

they knew if a condom was available, the more strongly they endorsed reasons for having sex without a condom after it became clear that there was none.

Hypothesis 4: Secondary appraisals for unprotected sex were significantly positively associated with risky sex intentions. The more important that women felt that reasons for having sex without a condom were, the stronger their intentions to have unprotected sex and to not use assertive or relationship-based condom negotiation strategies were.

Although not hypothesized, risky sex intentions were also significantly directly predicted by sexual precedence condition. The more often women had sex with Nick in the past, the more they intended to have unprotected sex with him in the scenario.

Discussion

The goal of this study was to examine how alcohol consumption, sexual precedence, and relationship motivation interact to foster a series of in-the-moment cognitive appraisals culminating in risky sex intentions. As suggested by the CMM (Norris et al., 2004), women's background and situational factors interacted to affect women's decision-making chain—primary appraisals led to secondary appraisals that led to behavioral intentions. Overall, this study supports the CMM and adds to the literature on women's risky sexual behavior by suggesting specific factors that influence in-the-moment sexual decision making.

The CMM suggests that women enter a given sexual situation with their own personal history and within a set of contextual factors. Supporting this notion, at the start of the model, both situational and personal factors influenced women's primary relationship and sex appraisals. Primary appraisals represent how likely a woman believes she will meet her goals. In the current study, women's relationship appraisals were assessed because prior research suggested that women's sexual decisions are associated with relationship goals (Amaro, 1995; Patrick et al., 2007; Regan & Dreyer, 1999; Smith, 2003; Umphrey & Sherblom, 2007). Among women who consumed alcohol, greater desire for a relationship with the man (i.e., higher primary relationship appraisals) was associated with stronger relationship motivation and having had sex with him in the past. This suggests that when drinking, women who are highly motivated to be in an intimate dating relationship (as opposed to dating casually) may consider prior sexual activities as indicating that a serious relationship is developing. This may be due to their narrowed attention ability and subsequent focus on salient cues, as alcohol myopia theory suggests (Steele & Josephs, 1990; Taylor & Leonard, 1983). Further, these results imply that interventions to decrease women's sexual risk taking should include a discussion of how beliefs about sex and relationships may become more salient when alcohol is consumed.

Primary sex appraisals were assessed because, according to the CMM, in a potentially sexual situation, it is important to understand the extent to which a woman wants and expects to have sex. In the current study, greater sexual precedence led to higher primary sex appraisals. This suggests that some women may infer that sexual precedence indicates sexual inevitability. Consistent with Norris et al. (2013), primary sex and relationship appraisals were moderately correlated, and both predicted secondary relationship appraisals.

This indicates that building relationships and having sex are interwoven constructs for women.

Providing further evidence for the CMM, primary appraisals set into motion a series of in-the-moment decisions culminating in increased intentions to have unprotected sexual activity. Two types of secondary appraisals were assessed: relationship-based reasons for having sex, and then once it was clear that a condom was not available, reasons for sex without a condom. As previous research has suggested (e.g., Amaro, 1995; Zawacki et al., 2009), relationship-based reasons for having sex were important to women. The more women believed that a relationship with Nick was feasible and that they wanted to have sex with Nick at this time, the more they endorsed relationship enhancement reasons for having sex. Furthermore, the more important women's relationship-based reasons for having sex were, the more important were their reasons for having sex without a condom. This suggests that as women more strongly desire a relationship with a man, they may view sex without a condom as facilitating a stronger, more intimate relationship with him because they view sex itself as an act that facilitates the relationship.

Furthermore, the more important women perceived their reasons for sex without a condom in deciding to have sex, the stronger were their unprotected sex intentions. We modeled unprotected sex intentions as a latent construct that included the likelihood of having sexual activity without a condom and abstaining from negotiating condom use. Thus, when evaluating whether or not to have sex, the more importantly women valued sex without a condom, the less likely they were to intend to discuss using a condom and the more likely they were to intend to have sex without one. This implies that potential risk is often outweighed by in-the-moment sexual feelings and desire to continue sexual activity. This suggests that in-the-moment cognitions about reasons for and against having sex—whether with or without a condom—should be targeted when developing HIV/STI prevention programs. Rather than trying to rationally state that condom use is more health promoting and thus condoms should be used, programs should acknowledge that the decision is often made while sexual activity is occurring. As part of prevention programs, detailed sexualized scenarios could be helpful tools for putting program participants in a similar state of mind as when their actual decisions would be made.

Although our findings support the CMM, we were somewhat surprised to find a direct path from sexual precedence to risky sex intentions. In other words, the more often a couple had had sex (with condoms) in the past, the more likely women were to express an intention to have sex without a condom. Survey research provides complementary findings (e.g., Macaluso et al., 2000, Morrison et al., 2003), but we are not aware of other experimental work that has manipulated sexual precedence in a sexual risk-taking study. This finding suggests that sexual precedence would also be an important topic for sexual risk taking prevention programs. It is possible that women assumed that by having had sex with the man multiple times in the past, he was disease free or that they had developed a monogamous relationship. However, this information was not provided in the scenario; thus, these women may have (hypothetically) placed themselves at risk for an STI by engaging in unprotected sexual activity without a discussion with their partner about his history and possible concurrent relationships. The scenario did not explicitly state whether the woman

and man had used condoms for all of their previous sexual encounters, although it did mention one being used on the most recent sexual occasion and that the woman used them generally. It is possible that women in the higher sexual precedence groups inferred inconsistent condom use by the pair and concluded that if they had (possibly) had sex without a condom before, they may as well have sex without one again. It is also possible that women's (unmeasured) beliefs about condom use change over time within a relationship. Some women may have assumed that after having sex a dozen times with the man, they would have had some sort of discussion about STI history and whether or not they were in a monogamous sexual relationship.

Sexual precedence is also important to consider because it is also related to sexual assault (Parkhill, Abbey, & Jacques-Tiura, 2009). Shotland and Goodstein (1992) found that when two people had had sex more often in the past, women felt more obligated to have sex if the man wanted sexual activity even if he used violence to obtain sex. This suggests that the women in the current study may have felt that sexual intercourse was expected from the start, regardless of the availability of a condom. Future research should continue to examine sexual precedence as a risk factor for sexual risk taking and sexual victimization.

Strengths and limitations

The current study had several notable strengths. First, by gathering a community sample of single, female social drinkers, we advanced the experimental research field beyond the traditional college sample. Second, by using both survey and experimental work, we were able to combine an individual difference factor with manipulated contextual factors, which advances the field both empirically and theoretically by simultaneously considering personal and contextual influences. Third, by asking participants to respond to our scenario at multiple time points, we were able to assess and model cognitive processes as they unfolded within a situation over time and thus determined how choices early in an interaction and throughout initial sexual activity affected later decisions to discuss condom use and ultimately their intention to engage in unprotected sex. Fourth, a novel strength of this study was our manipulation of sexual precedence. Although survey research has documented decreased condom use over time, this study demonstrated that having sex more often held a direct effect on unprotected sex intentions and influenced perceptions of the likelihood of a dating relationship. Both survey work and experimental work are needed to provide converging evidence.

At the same time, there were several limitations to consider. First, our inclusion criteria limit the generalizability of our findings to single women who are social drinkers, although these women are an important group to study because they are at increased risk for STIs as well as sexual victimization (George et al., 2013). Second, an experiment cannot fully represent a real-world situation and, as such, external validity is a concern. We took many steps to ensure that our stimulus scenario was as realistic as possible (and it was highly rated as such), although no hypothetical scenario can truly mimic an actual sexual encounter. Relatedly, social desirability concerns may lead some women to underestimate their sexual intentions. Third, although the CMM has been supported in other studies (Davis et al., 2010; Norris et al., 2009; Zawacki, 2011; Zawacki et al., 2009), other factors not included in the

current study (such as affect, George et al., 2013; Stoner et al., 2007) also influence in-the-moment sexual decision making; thus, the CMM warrants further replication and possible expansion to include such factors. Fourth, this study did not include men. The CMM was developed for studying women's sexual decision-making processes. We would expect that men would use a similar appraisal process to make sexual decisions although the relative importance of specific appraisals may differ between genders.

Future research directions

The current study provided further support for the CMM as a framework for understanding cognitive factors that affect women's in-the-moment sexual decision making. Additional survey and experimental work would bolster the current findings. First, large-scale daily diary studies that assess sexual activity, condom negotiation, and similar cognitive factors would provide ecological validity. Second, other contextual factors would likely affect women's relationship appraisals and unprotected sex intentions. Interesting factors for future studies could include manipulating how the woman and man met (such as through a dating website or through friends), how much women know about a sex partner's sexual history (such as whether past partnerships and STI history have been discussed), and how the sex history knowledge has been conveyed (such as whether the man and woman discussed their own histories or whether she heard about his past from other people). Finally, other models of women's in-the-moment sexual decision making could be integrated into the CMM framework so that cognitions, affect, and arousal could be evaluated simultaneously.

Implications and conclusions

Sex and relationships are interwoven constructs for women that can lead to having unprotected sex, even though unprotected sex may pose health risks. Norris et al. (2013) also found sex and relationship appraisals to be interrelated, and those appraisals were related to women's judgments of a partner's level of sexual risk. Because women may view partners with whom they have had sex with before as "safe," they may place themselves unknowingly and inadvertently at higher risk for contracting STIs. Further, when drinking alcohol, women who desire to build an intimate relationship may be particularly apt to infer that having sex again will enhance the likelihood of a relationship and in turn potentially increase their sexual health risk for the sake of furthering an intimate relationship.

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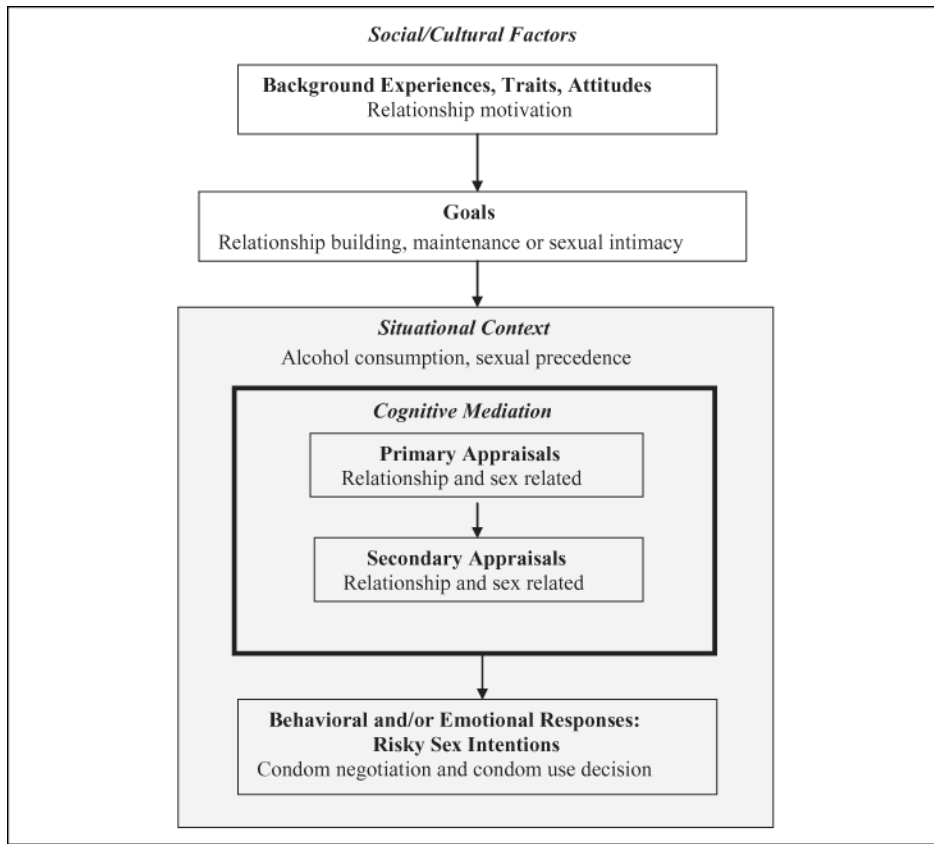


Figure 1. Conceptual representation of the cognitive mediation model.

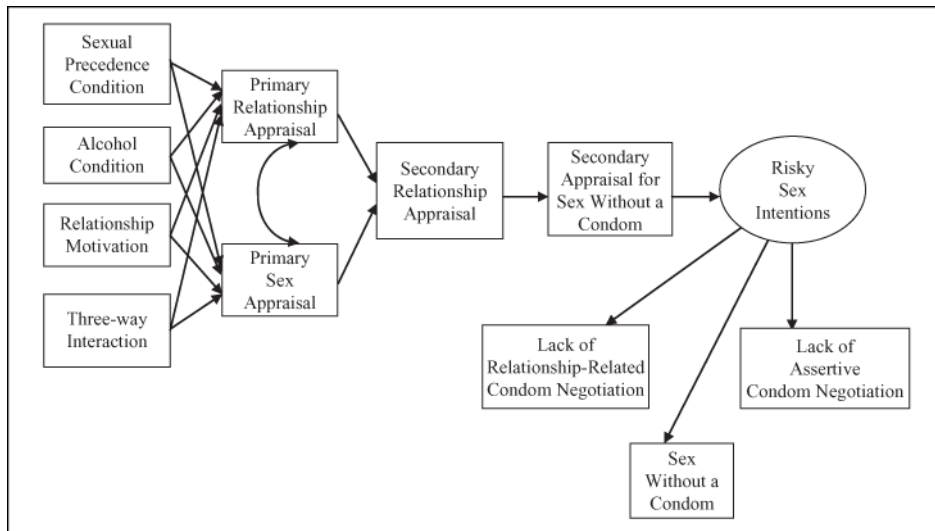


Figure 2. Hypothesized model linking alcohol consumption, sexual precedence condition, relationship motivation, cognitive mediation, and unprotected sex intentions. *Note.* Although not shown, the two-way interactions between alcohol condition, sexual precedence condition, and relationship motivation were also expected to have effects on primary appraisals.

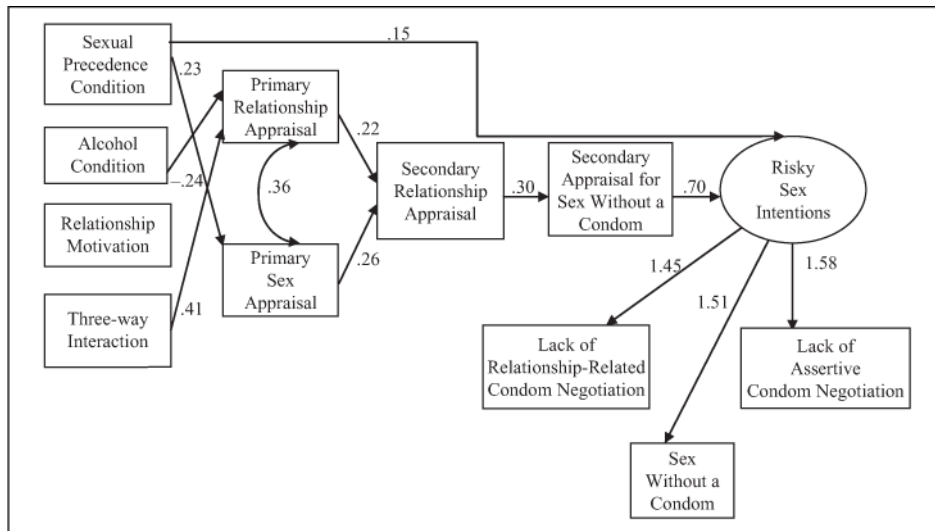


Figure 3. Significant paths in the final model linking alcohol consumption, sexual precedence condition, relationship motivation, cognitive mediation, and unprotected sex intentions. *Note.* Although not shown, the two-way interactions between alcohol condition, sexual precedence condition, and relationship motivation (and the main effects) were also modeled as predictors of primary appraisals.

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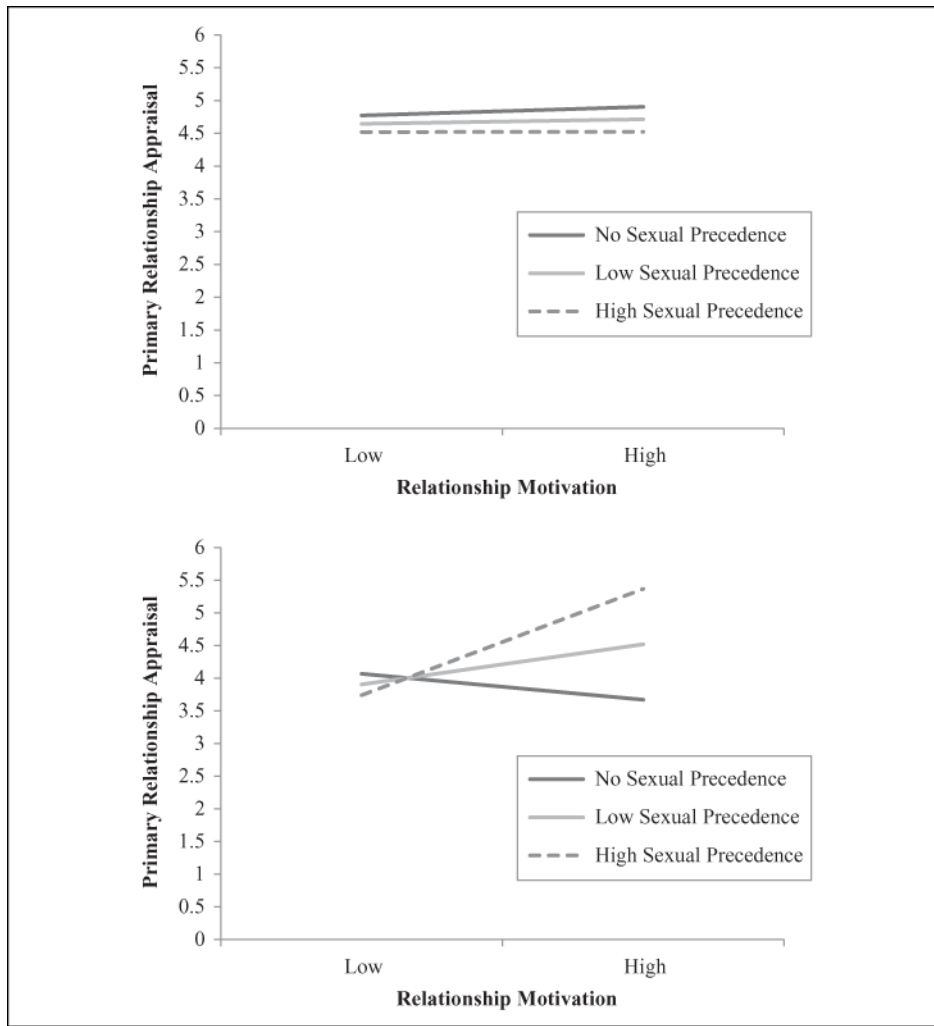


Figure 4. The interacting effects of acute alcohol consumption, sexual precedence condition, and relationship motivation on primary relationship appraisal. *Note.* Did not consume alcohol condition (top). Consumed alcohol condition (bottom).

Table 1

Bivariate correlations among study variables.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|--|-------|-------|------|-------|-------|--------|-------|-------|-------|----|
| 1. Alcohol condition | — | | | | | | | | | |
| 2. Sexual precedence | -.03 | — | | | | | | | | |
| 3. Relationship orientation | -.03 | -.04 | — | | | | | | | |
| 4. Primary relationship appraisals | -.18* | .06 | .11 | — | | | | | | |
| 5. Primary sex appraisals | .05 | .21** | -.03 | .42** | — | | | | | |
| 6. Secondary relationship appraisals | -.05 | .04 | .02 | .31** | .33** | — | | | | |
| 7. Secondary appraisals for sex without a condom | .03 | .16* | -.01 | .12 | .20** | .26*** | — | | | |
| 8. Lack of relationship-related condom negotiation | -.04 | .12 | -.05 | .13 | .10 | .04 | .44** | — | | |
| 9. Lack of assertive condom negotiation | -.07 | .23** | .02 | .15 | .12 | .14 | .58** | .75** | — | |
| 10. Likelihood of sex without a condom | .09 | .25** | .01 | .17* | .23** | .26*** | .68** | .58** | .72** | — |

Note. N = 156. Alcohol condition was coded as 0 (no alcohol consumed) and 1 (alcohol consumed). Sexual precedence condition and relationship motivation are centered.

** p < .01

* p < .05.

Table 2

Final model parameters linking alcohol consumption, sexual precedence condition, relationship motivation, cognitive mediation, and unprotected sex intentions.

| Path | Estimate | SE | Standardized estimate |
|---|----------|------|-----------------------|
| Primary relationship appraisal regressed on | | | |
| AC | -.76 | .33 | -.24* |
| SP | .10 | .14 | .06 |
| RO | .28 | .24 | .11 |
| AC × SP interaction | .53 | .24 | .20* |
| AC × RO interaction | .76 | .57 | .17 |
| SP × RO interaction | .66 | .36 | .19 |
| AC × SP × RO interaction | 2.73 | 1.36 | .41* |
| Primary sex appraisal regressed on | | | |
| AC | .32 | .36 | .09 |
| SP | .41 | .16 | .23** |
| RO | -0.10 | .26 | -.04 |
| AC × SP interaction | .66 | .27 | .23* |
| AC × RO interaction | -.01 | .61 | -.01 |
| SP × RO interaction | -.16 | .39 | -.04 |
| AC × SP × RO interaction | 1.08 | 1.20 | .15 |
| Primary relationship appraisal with | | | |
| Primary sex appraisal | .68 | .21 | .36*** |
| Secondary relationship appraisal regressed on | | | |
| Primary relationship appraisal | .16 | .07 | .22* |
| Primary sex appraisal | .18 | .06 | .26** |
| Secondary appraisal for sex without a condom regressed on | | | |
| Secondary relationship appraisal | .26 | .07 | .30*** |
| Risky sex intentions regressed on | | | |
| Sexual precedence | .28 | .10 | .15** |
| Secondary appraisal for sex without a condom | 1.25 | .18 | .70*** |

Note. AC = alcohol condition; SP = sexual precedence; RO = relationship orientation.

p < .001

**
p < .01

*
p < .05.

Table 3

Results of hierarchical linear regression predicting primary relationship appraisals.

| | | <i>B</i> | <i>SE B</i> | β |
|--------|--|----------|-------------|---------|
| Step 1 | <i>F</i> (3, 152) | | | 2.53 |
| | AC | -.46 | .20 | -.18* |
| | SP condition | .09 | .13 | .06 |
| | RO | .23 | .18 | .10 |
| Step 2 | <i>F</i> (3, 149) | | | 3.10* |
| | AC \times SP interaction | .50 | .25 | .22* |
| | AC \times RO interaction | .29 | .34 | .09 |
| | SP \times RO interaction | .47 | .22 | .18* |
| Step 3 | <i>F</i> (1, 148) | | | 4.48* |
| | AC \times SP \times RO interaction | .91 | .43 | .26* |

Note. *N* = 156. AC = alcohol condition; SP = sexual precedence; RO = relationship orientation. Alcohol condition was coded as 0 (*no alcohol consumed*) and 1 (*alcohol consumed*). Sexual precedence condition and relationship motivation are centered.

* $p < .05$.