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Cognitive Mediation of Alcohol's Effects on Women's In-the-Moment Sexual Decision Making

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Abstract

Objective—To test a cognitive mediation model examining whether cognitive appraisals mediate alcohol consumption effects on condom request and unprotected sex intentions.

Design—Female social drinkers ($N = 173$) participated in an experiment comparing 4 beverage conditions: control, placebo, target BAL = .04%, and target BAL = .08%. Subjects projected themselves into a hypothetical sexual encounter with a new sex partner.

Measures—Appraisals of the situation's sexual potential, impelling and inhibiting cognitions, and behavioral intentions were assessed at several points.

Results—Findings support the theoretical model, indicating that alcohol's effects on direct condom request and unprotected sex intentions were mediated through cognitive appraisals.

Conclusion—Prevention interventions should include information about alcohol's effects on cognitions that may lead to ineffective condom negotiation and unprotected sex.

Women increasingly bear the burden of new HIV infections. From 1985 to 2004, the proportion of total female AIDS cases more than tripled, rising from 8% to 27%. Up to 80% of new HIV infections in women are attributable to heterosexual transmission (Centers for Disease Control and Prevention, 2007). Women's physiology makes them more vulnerable than men to a number of sexually transmitted diseases. For instance, women are twice as likely as men to

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contract gonorrhea or herpes after just one exposure (Lande, 1993). Women clearly have a critical need to protect themselves sexually. However, present technology leaves women at a disadvantage because currently the most effective and widely used means of protection is the male condom. Although efforts have been made to promote the female condom, it is more expensive and seems not to be as acceptable as the male condom (O'Leary, 2000).

In consensual sex, if a woman wants to protect herself with a male condom, she can negotiate and request that her male partner use one, or, if he doesn't want to use one, refuse to have sex or acquiesce to his wishes. Directly and assertively requesting a condom is one component of condom negotiation that increases the likelihood of condom use (Lam, Mak, Lindsay, & Russell, 2004). Therefore, increased understanding of the determinants of direct, assertive condom request and the decision to have unprotected sex is essential. Although background attitudes and previous experiences influence these behaviors, women's cognitive appraisals at the time of making sexual decisions may be an important influence that has received little attention. To this end, the purpose of the present study was to test a model of the cognitive appraisal processes underlying women's condom negotiation and sexual decision making.

Cognitive Mediation of Sexual Decision Making

A number of cognitive theories, such as the Theory of Reasoned Action (Ajzen & Fishbein, 1980), the Theory of Planned Behavior (Ajzen, 1991), and Social Learning Theory (Bandura, 1986), have been applied to predicting condom use (see Noar, 2007; Fisher & Fisher, 2000; and Sheeran, Abraham, & Orbell, 1999 for reviews). In their meta-analysis examining psychological correlates of condom use, Sheeran et al. concluded that variables from social cognitive models, including intentions, attitudes, social norms, and self-efficacy/perceived control, were the strongest predictors of condom use with moderate effect sizes. Despite important similarities and differences among these models, Sheeran et al. pointed out that they cannot predict why some people with positive intentions translate them into using condoms and others do not, possibly because these models fail to consider the processes by which intentions are translated into behavior. The authors called for expansions of theory to explicitly incorporate preparatory behaviors. One way to do so is to examine in-the-moment sexual decision making processes.

Norris, Masters, and Zawacki (2004) have presented a theoretical model of women's sexual decision making that is based on the proposition that situational and background influences on these behaviors are mediated through the cognitive processing of information obtained from the immediate situation. This model is derived in part from Lazarus' (1991) Cognitive-Motivational-Relational Theory (CMR), which states that individuals constantly appraise their environment to obtain information about what actions are needed to adapt to the current situation. Coping responses, that is, behavioral adaptations to the environment, result from this process of information gathering and evaluation. Although psychosocial factors, such as attitudes about condoms and previous sexual experiences, may influence women's in-the-moment sexual decision making (Sheeran et al., 1999), the situation at hand can pose challenges to enacting an intention to use a condom. Thus, it is crucial to understand how individuals cognitively process and integrate their traits, pre-existing attitudes, beliefs, and experiences with their judgments, concerns, and intents within a particular situation.

Following CMR Theory, Norris et al.'s (2004) Cognitive Mediation Model of Women's Sexual Decision Making states that a woman enters a potentially sexual situation with a hierarchical goal structure that provides the basis for evaluating the situation. For instance, when a woman is attracted to a desirable man, the goal of becoming intimate can hold some dominance. Two types of cognitive appraisals occur in this type of situation. Primary appraisals are concerned with an initial evaluation of the situation's relevance to and likelihood of reaching one's goals

– the situation’s sexual potential. In this type of situation, these might include whether a woman and her partner want to have sexual intercourse and how likely it is to occur. If the situation is seen as having some sexual potential, a woman would go on to make a series of secondary appraisals. These involve a more in-depth evaluation of the harm or benefit that can result from the situation. They focus on evaluating the pros and cons of having sexual intercourse within a particular situation. When a woman intends to use a condom, these secondary appraisals result in decisions about the strength and types of condom request the woman might engage in and ultimately about whether to have sex without a condom if one is not available or her partner refuses to use one. Therefore, this study examined women’s condom use request, as well as the intention to have sex without one.

The Influence of Alcohol Consumption

The cognitive mediation model (Norris et al., 2004), like CMR Theory, asserts that the situational context within which women make their sexual decisions is critical: Cognitive mediation requires information from the environment in order for appraisals to occur. One situational influence on risky sexual behavior that has been studied in some depth is alcohol consumption. Neither global nor event-level survey studies can draw causal links between alcohol and risky sexual behavior. In addition, retrospective self-reports are subject to memory distortion, especially if a person had been drinking heavily at the time, and recalling the exact amount consumed over a specific period of time can be particularly difficult.

A growing number of experimental studies have addressed both of these issues by examining the effects of alcohol on both cognitive judgments and behavioral intentions associated with sexual decision making (Hendershot & George, 2007). These studies have demonstrated that alcohol consumption can increase men’s and women’s willingness to engage in sexually risky behavior, especially when faced with a potential new sex partner (e.g., MacDonald, Zanna, & Fong, 1996; Stoner, George, Peters, & Norris, 2007). However, different studies have examined different mechanisms of alcohol’s effects. Maisto and colleagues (Maisto, Carey, Carey, & Gordon, 2002; Maisto, Carey, Carey, Gordon, & Schum, 2004) showed that women’s perception of their own intoxication level was associated with a decrement in verbal responses to a man’s suggestions for unprotected sex. There is also evidence that alcohol consumption increases the likelihood of unprotected sex by impairing individuals’ ability to focus on cues that inhibit such behavior. Employing thought-listing tasks or ratings of expected outcomes, some researchers have demonstrated that, compared to sober subjects, intoxicated individuals are less likely to spontaneously generate inhibitory cognitions (Fromme, D’Amico, & Katz, 1999) or to rate negative outcomes as likely to occur (Fromme et al., 1999; Fromme, Katz, & D’Amico, 1997; Maisto et al., 2004). However, individuals may also increase their endorsements of justifications for having unsafe sex when an impelling environmental cue is salient (MacDonald, MacDonald, Zanna, & Fong, 2000) or if they believe that alcohol enhances sexual behavior (Maisto et al., 2004).

The relationship between cognitions and intentions to have unsafe sex is not clear. Fromme et al. (1997) found that both positive and negative outcome expectations were related to unsafe sex intentions across both drinking and non-drinking groups. However, Fromme et al. (1999) reported that intoxicated subjects were more likely to report that negative consequences would not influence their sexual decisions than sober ones, whereas MacDonald et al. (2000) found that an index composed of both impelling and inhibiting thoughts mediated the relationship between the interaction of beverage and cue and intention to have unsafe sex. Because thoughts were assessed after intention, the direction of this effect is not certain. Research is needed to more specifically delineate the relationships among alcohol consumption, impelling and inhibiting cognitions, and risky sex intentions.

In addition to alcohol having direct physiological effects, a second way that alcohol might influence sexual decision making processes is through its learned expectancy effects. These effects can be examined experimentally by manipulating expectancy set – the belief that one has or has not consumed alcohol independent of actual alcohol consumption (Marlatt & Rohsenow, 1980). Experimental studies have generally found no expectancy set effects for likelihood of having sex without a condom (Abbey, Saenz, & Buck, 2005; Abbey, Saenz, Buck, Parkhill, & Hayman, 2006; Fromme et al., 1999; Maisto et al., 2004). However, effects on cognitive judgments are less definitive. Whereas some studies have not found expectancy effects on perceptions of consequences (Fromme et al., 1997; Fromme et al., 1999), Maisto et al. (2004) found that women who believed they had consumed alcohol and held beliefs that alcohol enhanced sexual behavior were most likely to endorse expectations of positive outcomes compared to other groups. Murphy, Monahan, and Miller (1998) found that the belief of having consumed alcohol decreased women's perception of sexual risk. Similarly, Monahan, Murphy, and Miller (1999) found that belief in having consumed alcohol resulted in women having higher confidence that they could accurately perceive whether a potential partner was HIV positive. Thus, it appears that individuals' expectation of their intoxication level can play a role in determining their cognitions associated with risky sexual behavior.

The Present Study

The present study builds on previous research in multiple ways. First, it seeks to parse women's sexual decision making process, and alcohol's effects on this process, into several stages – primary appraisals, followed by secondary appraisals, and ultimately decisions concerning requesting a condom and having sex without one, as illustrated in Figure 1. This chronology from primary to secondary appraisals reflects a sexual intensification as a woman progresses from experiencing the encounter as possibly sexual to then weighing the pros and cons of a sexual outcome. Second, this study uses an integrated conceptualization of alcohol intoxication rather than examining alcohol dose *versus* alcohol expectancy *versus* perceived intoxication. As reviewed above, previous research has found both physiological and expectancy effects on cognitive judgments, but only physiological effects on intention to have unprotected sex. Maisto et al. (2004) found that perceived intoxication affected women's condom negotiation skills of which condom request is an important part. Alcohol intoxication is a complex phenomenon arising from a dose-dependent interplay among expectancies, physiological effects, and the subjective experience of those effects. Although experimental research tends to aim to disentangle unique contributions from these components, in individuals' typical drinking contexts, these components are not generally experienced as distinct from one another. Thus, the present study considered alcohol consumption as a multidimensional phenomenon. To that end, in the structural equation model presented intoxication is treated as a latent variable composed of three indicators – dose, expectancy set, and perceived intoxication.

Primary appraisals included judgments of the situation's sexual potential. Secondary appraisals involved evaluating the strength of impelling and inhibiting cognitions concerned with having sex in the situation. Condom request was assessed twice – first after it was initially apparent that one might not be available, but the man had not yet suggested having unprotected sex, and second, after the man suggested doing so. Intention to have unprotected sex included genital-to-genital contact, including vaginal intercourse.

The proposed cognitive mediation model (see Figure 1) posits that primary cognitive appraisals will predict secondary cognitive appraisals. Primary appraisals should be positively related to impelling cognitions (e.g., Having sex now would feel great) and negatively related to inhibiting cognitions (e.g., I will worry later if we don't use a condom). In turn these secondary appraisals will predict how strongly women request a condom, as well as their intention to have sex without one. Endorsement of impelling cognitions should result in a decreased likelihood

of condom request at both assessments, whereas inhibiting cognitions should be positively related to it. Endorsement of impelling cognitions will be positively related to endorsement of having sex without a condom, and the opposite should be true of inhibiting cognitions. Decreased likelihood of condom request in turn is expected to increase endorsement of having sex without a condom.

Because the proposed model asserts that alcohol effects on sexual decisions are mediated by cognitive appraisals, and previous research has found that alcohol influences cognitions related to sexual decisions, alcohol is expected to affect both types of cognitive appraisals in a progressive manner. That is, a positive association is expected between degree of intoxication and primary appraisals. Degree of intoxication is also expected to increase endorsement of impelling cognitions and decrease endorsement of inhibiting cognitions. Although earlier research has found that alcohol lowers intention to use condoms and decreases the ability to communicate with a partner about sexual risks, no direct effect of alcohol on either condom request or the intention to have sex without one was hypothesized. Rather, it was expected that these outcomes would be influenced directly by secondary cognitive appraisals which in turn would be influenced by alcohol consumption.

Method

Participants

Participants were recruited from the community as well as a university located in a large West Coast city. One hundred seventy-three women participated. Of these, 10 were dropped because of incomplete data or equipment problems and 2 because of manipulation failures, resulting in a final sample of 161 women with a mean age of 25.02 ($SD = 3.85$). Sixty-five percent identified their race as European American/White, 14.3% as African American, 12.4% as multiracial, 2.5% as Asian American/Pacific Islander, and 6.2% as “other”. Of the total sample 10.6% identified their ethnicity as Hispanic or Latina. Sixty three percent were employed, 53% full-time. Thirty four percent were full- or part-time students. Most (71.5%) had incomes of less than \$21,000 a year.

Advertisements in local newspapers and posted flyers recruited single female social drinkers between the ages of 21 and 35 to participate in a study on social interactions between men and women. Potential participants called the phone number provided and were screened to ensure they fit the study’s criteria. Exclusion criteria included being in a committed, exclusive relationship, having no interest in a relationship with a man, and never having had consensual vaginal sex with a man. This ensured that all participants would find the experimental story relevant to their current dating status and lifestyle. Participants were also screened for medical conditions and medication usage that would contraindicate alcohol consumption. Those who drank more than forty drinks per week or less than one drink per week and individuals reporting a history of problem drinking were excluded as well. The average number of drinks per week reported was 10.19 ($SD = 7.83$). Participants were instructed not to drive to the lab and not to eat for three hours prior to the session. Because of lagging participant recruitment, hourly participant compensation was increased from \$10 to \$15 per hour partway through the study.

Procedure

The session consisted of two parts. In the first, participants completed a set of background questionnaires; the second involved the experimental protocol. Upon arrival, a female experimenter greeted the participant, seated her in a private room at a table with a desk-top computer, checked her photo identification, and verified her age. A breathalyzer (Alco-Sensor IV, Intoximeters, Inc.) was used to ensure that her blood alcohol level (BAL) was at .00%. The experimenter then obtained informed consent, instructed the participant on use of the computer,

and left the room so that the participant could complete the questionnaires in private. The experimenter debriefed the participant about the questionnaires and then read a second informed consent form for the second part of the study.

After the beverage administration procedure (see below), the experimenter left the room to allow the participant privacy while reading the stimulus story and completing the dependent measures. After the participant was finished, the experimenter returned and offered the participant food and water. Participants were fully debriefed, paid, given resource materials on STDs and HIV, and released. Alcohol participants were situated in a comfortable room until their BAL fell below .03%. Participants were paid an additional \$5 for returning a follow-up survey, which was mailed approximately two weeks after the laboratory session, and which concerned the effects of participation. No adverse effects were reported.

Beverage Administration—Participants were randomly assigned to the high dose alcohol (target BAL .08%; $n = 32$), low dose alcohol (target BAL .04%; $n = 32$), placebo ($n = 33$), or control condition ($n = 34$ controls yoked to low dose alcohol and $n = 30$ controls yoked to high dose alcohol). Alcohol doses were .325g ethanol/kg body weight for the .04% target BAL and .682 g/kg for the .08% BAL. One-hundred proof vodka presented in a brand-name bottle was mixed with orange juice in a 1:4 ratio. In the alcohol and placebo conditions, to prevent experimenters from conveying subtle cues about the participant's beverage condition, a supervisor instructed the experimenter to use one of four vodka bottles the contents of which were unknown to the experimenter. Each brand-name vodka bottle contained either 100-proof vodka (alcohol conditions) or flat tonic water plus a small amount of vodka (placebo condition). Beverage cups were misted with 100-proof vodka, and lime juice previously mixed with a small amount of vodka was added to the beverage. The beverage was mixed in full view of the participant who had three minutes to consume each of three cups of the beverage. Prior to drinking, the participant was directed to rinse with a strongly flavored mouthwash and was told that this would allow a more accurate breathalyzer reading. This procedure was standardized across all conditions even though it was only necessary to prevent placebo participants from recognizing the lack of alcohol in their beverage. Control participants drank an equivalent amount of pure orange juice.

In the alcohol conditions, after a 4 to 5 minute initial absorption period, participants were breathalyzed every 2 to 5 minutes until they reached a criterion BAL of .025 (low dose) or .055 (high dose). These criterion BALs were selected to insure that participants began reading the story while their BALs were ascending toward the target. Each alcohol participant had a control participant “yoked” to her to control for individual variation in time to criterion BAL. The yoked control participant was breathalyzed at the same time points and began reading the story after the same number of minutes as her counterpart in the alcohol condition (George et al., 2004; Giancola & Zeichner, 1997).

Placebo participants were yoked to low alcohol participants. The experimenter breathalyzed the placebo participant at the same time point at which her yoked alcohol participant had reached the criterion BAL. The experimenter told the placebo participant she was right on target with a BAL of .027 and rising, and the participant started reading the story at the same time point as the alcohol participant to whom she had been yoked. A yoked placebo was not included for the high alcohol participants because of known difficulties in maintaining successful placebo deception for high doses (Sayette, Breslin, Wilson, & Rosenblum, 1994).

Materials

Experimental story—The story was approximately 2200 words and depicted a social interaction between a woman and a man to whom the woman was very attracted, but with whom she had never had sex. Written in the second person – “Your good friend Anita invites

you...”, the story was designed to assist the participant in projecting herself into the situation and, therefore, to the greatest extent possible, experience the encounter as if it were actually happening to her. Thus, in-the-moment decision making processes would be captured. The beverage consumed by both individuals in the story matched the participant’s alcohol consumption. Placebo participants read the alcohol version of the story. Participants were told to project themselves into the story at their current level of intoxication. The story was pilot tested with twenty sober participants who were recruited in the same manner as those in the experiment to ensure the realism of the scenario.

The story began with a conversation between the woman (i.e., the participant) and a female friend in which the friend invited the woman to the friend’s boyfriend’s place to watch movies. The friend mentioned that Nick, the boyfriend’s roommate, would be there and the woman responded by commenting on his attractiveness and her interest in getting to know him. The evening progressed with Nick and the woman talking, watching movies, and drinking either alcoholic or nonalcoholic drinks depending on the beverage condition. This initial portion of the story provided the background for the woman’s subsequent interaction with Nick.

The story was paused four times to assess participants’ responses. The first - assessment of primary appraisals - occurred after the woman and Nick were alone in Nick’s room, and Nick kissed her on the cheek. The second – assessment of secondary appraisals concerned with having sex in general - occurred after the couple engaged in petting partially clothed. At this point the story mentioned that the woman was on the Pill to avoid having pregnancy risk be the main concern for using a condom. The third portion of the story depicted escalating passionate sexual acts until both the man and the woman were undressed, and the man could not find a condom. At this point, secondary appraisals concerned with having sex without a condom and the woman’s condom use request were assessed. Finally the story ended with Nick suggesting that they engage in vaginal penetration without a condom after which condom use request was assessed a second time followed by intention to engage in unprotected sex.

Primary cognitive appraisals: Sexual potential—Primary cognitive appraisals were assessed after Nick first kissed the woman on the cheek but when they had not yet proceeded to fondling or disrobing. These questions focused on the early expectations and desires of the woman and Nick to have sex. All responses were rated on 7-point Likert scales from 0 (not at all) to 6 (extremely). This measure was composed of five items ($M = 3.67$; $SD = 1.17$; Cronbach’s $\alpha = .83$): How much does Nick want to have sex with you?, How much do you want to have sex with Nick even if you don’t think it will actually happen?, How much does Nick expect to have sex with you?, How much do you expect to have sex with Nick?, and How likely are you to have sex with Nick in this situation?

Secondary cognitive appraisals: Impelling and inhibiting cognitions—These items were designed to assess women’s impelling and inhibiting cognitions related to having sex, first in the situation in general, and second specifically after it became apparent that no condom was available. The first assessment occurred after both Nick and the woman had no clothes on their upper bodies, but it was not yet apparent that no condom was available (Before No Condom); the second occurred after petting continued and the woman requested a condom, but the pair discovered that neither apparently had one (After No Condom). Participants responded to 20 impelling and 20 inhibiting statements before they realized there was no condom and 16 of each afterward. These items were developed in part from earlier focus groups with women recruited in the same way as in the present study (Norris, 2005). All items were assessed on 7-point Likert scales from 0 (I would not consider it at all) to 6 (I would consider it extremely). Cognitions Before No Condom focused on whether to have sex in general, for instance, “Having sex now would feel great” (impelling) and “I might have my feelings hurt” (inhibiting). Cognitions After No Condom included “It will feel better for him not to use

a condom” (impelling), and “I will worry later if we don’t use a condom” (inhibiting). Ratings of impelling ($M = 2.27$; $SD = .88$) and inhibiting ($M = 3.44$; $SD = 1.00$) cognitions were each averaged across both assessment points. Cronbach’s α s for impelling cognitions was .91, and for inhibiting was .91.

Direct Condom Use Request—Questions related to condom request were asked twice: after the initial realization that one was not available (No Condom) and after the man suggested having unprotected intercourse (Man Suggests Sex). Three items adapted from the Direct Request Subscale of the Condom Influence Strategy Scale (Noar, Morokoff, & Harlow, 2002) assessed participants’ likelihood of requesting to use a condom at each time (M s = 5.15, 4.93; SD s = 1.18, 1.45; Cronbach’s α s = .76 and .84 respectively): How likely are you to ask that we use condoms during sex; tell Nick that I would be more comfortable using a condom; and be clear that I’d like us to use condoms? These items used 7-point Likert scales ranging from 0 (definitely unlikely) to 6 (definitely likely).

Intention to have unprotected sex—Three questions assessed the likelihood of having unprotected sex (Stoner et al., 2007) after Nick suggested doing so ($M = 1.84$; $SD = 1.79$; Cronbach’s $\alpha = .85$): At this point in your encounter with Nick, how likely are you to have sex with Nick?; How likely are you to rub your clitoris against Nick’s penis without a condom?; and How likely are you to allow Nick to put his penis inside your vagina without a condom? Responses were rated on 7-point scales from 0 (definitely unlikely) to 6 (definitely likely).

Results

Preliminary Data Analyses

Data were screened for outliers, skewness, kurtosis, and missing data. Missing data that arose from participants not completing the study or manipulation failures resulted in listwise deletion. Two questions, rated on 0–6 scales, assessed the realism of the experimental story: How realistic was the story? ($M = 4.73$, $SD = 1.73$); and How well were you able to project yourself into the story? ($M = 4.24$, $SD = 1.38$). Thus, it appeared that participants were able to relate well to the story context.

Manipulation Checks

A one-way ANOVA of achieved BAL by beverage condition was significant, $F(4, 156) = 29.62$, $p < .001$. Post-hoc LSD comparisons found that low dose participants ($M = .034$, $SD = .008$) achieved a higher BAL than control and placebo participants and high dose participants ($M = .064$, $SD = .009$) achieved a higher BAL than low dose, control, and placebo participants.

Perceived intoxication was assessed with the question “How intoxicated do you feel right now?” administered at the beginning of the stimulus story. Responses were rated on a 7-point Likert scale ranging from 0 (not intoxicated at all) to 6 (extremely intoxicated). A one-way ANOVA of perceived intoxication by beverage condition was significant, $F(4, 156) = 113.92$, $p < .001$. Results of post-hoc LSD comparisons found each of the four alcohol conditions significantly different from one another in ascending order: control ($M = .05$, $SD = .38$); placebo ($M = 2.09$, $SD = 1.16$), low dose ($M = 3.09$, $SD = 1.07$), and high dose ($M = 3.91$, $SD = .93$).

Correlations

Bivariate correlations among the measured variables appear in Table 1. Impelling and inhibiting cognitions were only moderately correlated, suggesting they are related but distinct measures. Primary and secondary appraisals, condom use request, and sex without a condom were all correlated in the expected directions.

Structural equation modeling (SEM)

SEM using Mplus statistical modeling software for Windows (version 4.0, Muthén & Muthén, 2007) was used to test the theoretical model (Figure 1). Maximum likelihood estimation with robust standard errors (MLR estimator) was used to correct for moderate skewness found in some measured variables. To assess both physiological and expectancy facets of alcohol's potential effects, a latent variable for alcohol intoxication was formed using three indicators: perceived intoxication, achieved BAL measured immediately before the experimental story, and level of expected alcohol dose where controls = 0, placebo and low dose = 1, and high dose condition = 2. Factor loadings for the indicators of alcohol intoxication are shown in Figure 2. The latent variable of alcohol intoxication accounted for 76% of the variance in perceived intoxication, 75% of the variance in achieved BAL, and 94% of the variance in expected alcohol dose.

The hypothesized structural path model in Figure 1 fit the data well, $\chi^2(19) = 22.981, p = .24$, CFI = .993, TLI = .987, RMSEA = .036, SRMR = .031. Inspection of the path coefficients revealed that the paths between alcohol intoxication and impelling and inhibiting cognitions did not significantly differ from zero ($z_s < 1.96, p_s > .05$). All other paths were significant.

The non-significant paths were fixed to zero in the final model (Figure 2), which also fit the data well, $\chi^2(21) = 23.909, p = .30$., CFI = .995, TLI = .992, RMSEA = .029, SRMR = .033. Satorra-Bentler scaled chi-square difference testing (Satorra & Bentler, 2001) was used to compare the hypothesized model to the final model. Results indicated that the final model fit the data as well as the hypothesized model, $T_d(2) = 1.625, p = .443$. All of the paths that were free to vary in the final model remained significant, with the exception of the path from inhibiting cognitions to unprotected sex without a condom which approached significance ($z = 1.92, p = .055$). The final model accounted for 50% of the variance in unprotected sex without a condom, 60% of the variance in the second condom request (Man Suggests Sex) and 32% in the first condom request (No Condom), 12% of the variance in impelling cognitions, 10% of the variance in inhibiting cognitions, and 3% of the variance in the primary appraisal of sexual potential.

We tested the significance of alcohol's indirect effects on unprotected sex following procedures suggested by Bryan and colleagues (Bryan, Schmiege, & Broaddus, 2007). Indirect effects were examined by calculating the specific and total indirect effects of the pathways from alcohol intoxication to unprotected sex via (1) primary appraisal through secondary appraisals, (2) primary appraisal through secondary appraisals through first condom request (No Condom), and (3) primary appraisal through secondary appraisals through first condom request (No Condom) through second condom request (Man Suggests Sex). The specific indirect effect for the path from alcohol intoxication to unprotected sex through primary appraisals and the secondary appraisal of impelling cognitions was significant ($\beta = .02, p_s < .05$). None of the other specific indirect effects reached significance. However, there was a significant total indirect effect of alcohol intoxication on unprotected sex ($\beta = .05, p < .05$) with greater alcohol intoxication predicting higher endorsement of unprotected sex. Results indicate that alcohol has indirect effects on unprotected sex through both cognitive appraisals and condom request.

Discussion

This study tested a cognitive mediation model of women's sexual decision making using an experimental paradigm which aimed to capture in-the-moment appraisals of a sexual situation with a first time sex partner. The effects of alcohol consumption on these appraisals and sexual decisions were also examined. By and large the model was supported, and hypotheses regarding alcohol were partially sustained. Thus, it appears that the hypothesized cognitive appraisal

process has some bearing on the way in which women make decisions regarding condom use and having unprotected sex.

Women's heightened initial appraisals of the situation's sexual potential led to increased endorsement of impelling cognitions related to having sex and to decreased endorsement of inhibiting cognitions. This is an especially noteworthy finding in that these primary appraisals were made at the point in the story that the man had only kissed the woman on the cheek. Yet the mean rating was above the midpoint of the scale. It seems clear that these women were aware of and interested in this hypothetical encounter's sexual possibilities quite early. This initial appraisal seemed to be key in beginning a process of becoming more sexually involved and taking it to the next level of weighing possible risks and benefits.

As expected, to the extent that women more strongly endorsed impelling cognitions, their direct condom request at both subsequent time points was lower, while the opposite was true for endorsement of inhibiting cognitions. As expected, too, a lower level of direct condom request after the man suggested having unprotected sex led to a greater self-reported likelihood of doing so. This could indicate that although a woman might feel quite assertive about requesting use of a condom initially – even if she and her partner have gone quite far toward having intercourse, low level prompting by the man to have sex without one might lower her resolve and subsequently lead to having unprotected sex.

An expected finding as well was the positive direct relationship between impelling cognitions and the likelihood of unprotected sex. In contrast, the negative relationship between inhibiting cognitions and unprotected sex was weaker than we expected. Interestingly, inhibiting cognitions seemed to have their strongest influence on the first assessment of direct condom request. As the scenario continued and the man suggested having sex without a condom, it appeared that inhibiting cognitions became less influential. These findings are consistent with those of Davis and colleagues (Davis, Hendershot, George, Norris, & Heiman, 2007) who found similar relationships between impelling and inhibiting cognitions and unprotected sex intention. They point to the importance of cognitions that occur immediately prior to having sex, especially those that promote doing so, in determining this outcome.

Alcohol had its predicted effect on the primary appraisal of the situation having sexual potential, consistent with evidence from prior research that has shown alcohol's influence on cultivating a sexual ambience (George & Stoner, 2000) and increasing sexual interest (Abbey, Zawacki, & McAuslan, 2000). In addition this finding is suggestive of an alcohol myopia effect (Steele & Josephs, 1990; Taylor & Leonard, 1983) whereby the ability to process information decreases as intoxication level increases, resulting in a focus on the most salient environmental cues. In the type of situation depicted in this study where sexual meaning is readily perceived, cues associated with sexual pleasure would presumably be quite salient. As the sexual intensity of the interaction builds, cues that might indicate risk would become less salient, resulting in an increased likelihood of unprotected sex (Cooper, 2002).

Although previous experimental studies have found that alcohol consumption results in an increased endorsement of high risk sexual activity (Abbey, Saenz, & Buck, 2005; Abbey, Saenz, Buck, Parkhill, & Hayman, 2006; Fromme, Katz, & D'Amico, 1997; MacDonald, Zanna, & Fong, 1996; Maisto, Carey, Carey, & Gordon, 2002; Maisto, Carey, Carey, Gordon, & Schum, 2004; Stoner, George, Peters, & Norris, 2007), this study found only indirect effects of alcohol on unprotected sex and condom use request, as well as on secondary appraisals. In other words, alcohol consumption affected these variables only through its effect on primary appraisals evaluating the sexual potential of the situation. This finding partially supports the hypothesis that sexual outcomes would be mediated through the cognitive appraisal process. That alcohol did not directly affect secondary appraisals was an unexpected finding because

of previous research showing that alcohol can affect expectations associated with risky outcomes (Fromme et al., 1997; Fromme et al., 1999; Maisto et al., 2004). Rather, the evaluative primary appraisal mediated between intoxication and endorsement of impelling and inhibiting cognitions.

Related to this apparent succession of cognitions commencing with alcohol consumption, research on sexual scripts (Parsons et al., 2004) has shown how alcohol can serve to start a sequential process leading to risky sex, depending on individuals' expectations and associations with drinking. Although some studies have suggested that expectancies about alcohol's effects may play a role in sexual decision making (Fromme et al., 1999; Maisto et al., 2002), this study could not determine to what extent physiological versus learning mechanisms affected women's decisions. Fromme et al. (1999) suggest that alcohol expectancies provide the motivation to engage in drinking-related sexual risk taking, but that cognitive impairment resulting from alcohol consumption focuses individuals on the positive aspects of risk taking. Further work is needed to determine how different alcohol mechanisms affect sexual decision making.

The experimental paradigm employed in this study provided a means for assessing ongoing decision making processes. Its use also allowed for the control and assessment of multiple alcohol effects and the ability to draw causal connections between alcohol consumption and subsequent judgments. None of these is possible in retrospective survey studies. Nevertheless, future research should examine how these responses generalize to situations outside the lab. It is possible that within a laboratory setting, individuals might want to present themselves in the best light and feel hesitant to admit to a high likelihood of risky sexual behavior. Therefore, the responses of this study's participants may underestimate their actual likelihood of this type of behavior in their real-world sexual encounters.

The situation portrayed in this study was limited to one set of variables and circumstances; other types of situational influences on sexual decision making should also be examined. In addition, affect, especially sexual arousal, can play a major role in influencing sexual decisions (see, for instance, George et al., in press). Our finding that intoxication increased primary appraisals of sexual potential suggests that sexual arousal may also have come into play. Our focus here on cognitive mechanisms is not meant to detract from the importance of affective factors. Future work that integrates affective and cognitive mechanisms will likely explain a major portion of the variance in determining sexual decision making. Personality traits and attitudes undoubtedly also influence this process. For example, Stoner et al. (2007) have shown that sexual fear can interact with alcohol consumption to affect risky sex decisions. Kalichman and Cain (2004), too, have demonstrated relationships among sexual sensation seeking, alcohol consumption, and sexual risk taking. Future research should take these factors into account. Although our sample was ethnically diverse and included both students and those employed full-time, administering alcohol in the lab requires that research participants be of legal drinking age and not have a history of problem drinking. Thus, it is not clear to what extent the responses of younger women or regularly excessive drinkers would match those of the women in this study.

Nonetheless, this study demonstrated the utility of the proposed cognitive mediation model. Taking into account cognitions that occur during the process of sexual decision making suggests a number of potential intervention points for increasing women's assertive condom use request, thereby potentially lowering the occurrence of unprotected sex. Making women aware of how alcohol consumption can impart a strong sexual connotation early in a social encounter might allow women an opportunity to consider this possibility ahead of time and to make informed decisions about their drinking and subsequent actions before they are too caught up in the heat of the moment. Addressing women's cognitions that can lead to risky sexual

behavior is also crucial. As suggested by our findings, impelling cognitions primarily stoke the tendency to have unprotected sex, whereas inhibiting cues motivate direct condom use request; thus, interventions should address both types of cognitions. Finding ways of enhancing inhibiting cognitions and concomitantly suppressing or controlling impelling cognitions could provide one means of reducing the incidence of risky sexual practices and enhancing women's ability to assert their desire to use a condom. Future research should also investigate how the cognitive processes examined in this study are influenced by emotional and physiological responses including sexual arousal. Cognitively processing environmental cues is but one aspect of a larger set of factors that determine sexual decision making. It is important to understand how different types of influences converge to bring about these sexual outcomes.

The proposed cognitive mediation model can provide a basis for investigating how women evaluate situational information and use it to make sexual decisions. This study focused on alcohol's effects on appraisals and cognitions related to condom use request and unprotected sex. A particular strength was the ability to manipulate alcohol dose and examine several aspects of its influence in the context of in-the-moment decision making. That primary appraisals of a situation's sexual potential are an important antecedent of cognitions that can facilitate or inhibit both risky sex and condom use communication is a novel finding. Identifying the relative importance of impelling and inhibiting cues in affecting both condom use request and endorsement of risky sexual practices can inform the development of interventions related to these outcomes. The question of how alcohol affects cognitive processes underlying sexual decision making is undoubtedly a complicated one. This study was an initial step toward developing an integrative understanding of this process.

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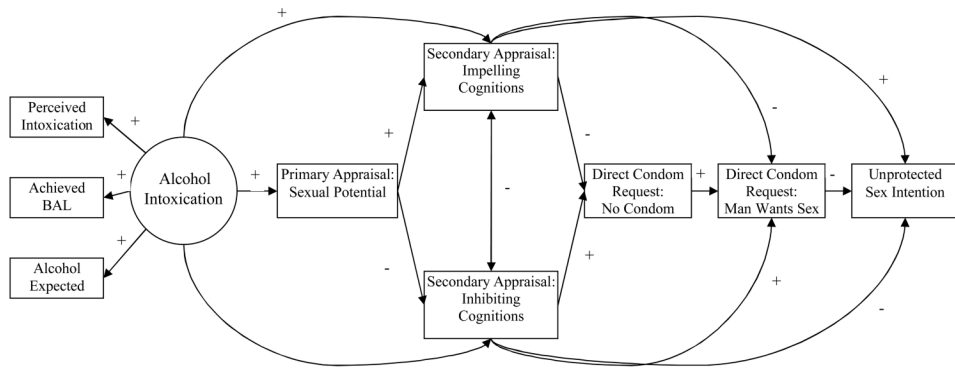
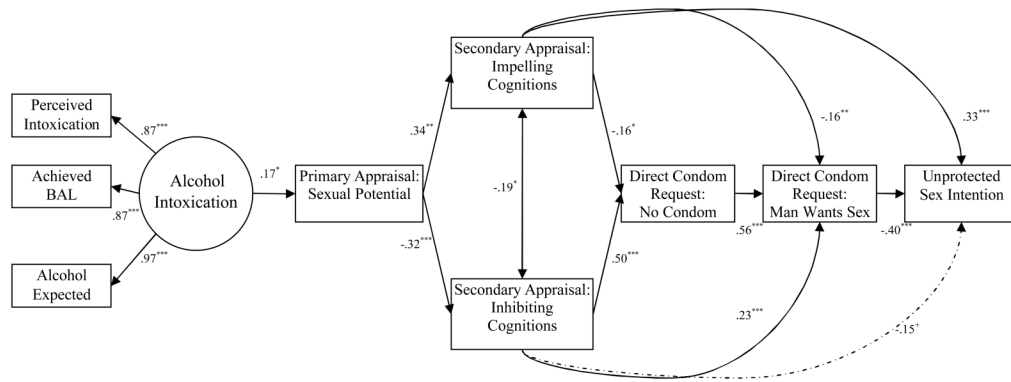


Figure 1.
Hypothesized cognitive mediation model.



$^+ p < .06$. $^* p < .05$. $^{**} p < .01$. $^{***} p < .001$.

Figure 2. Final cognitive mediation model with standardized estimates.

Table 1
 Bivariate Correlations Among Measured Variables (N = 161)

Variable	1	2	3	4	5	6
1. Primary Appraisal: Sexual Potential	--	.34***	-.32***	-.17*	-.21**	.32***
2. Secondary Appraisal: Impelling Cognitions		--	-.30***	-.31***	-.40***	.54***
3. Secondary Appraisal: Inhibiting Cognitions			--	.54***	.58***	-.48***
4. Direct Condom Request: No Condom				--	.73***	-.48***
5. Direct Condom Request: Man Wants Sex					--	-.62***
6. Unprotected Sex Intention						--

* p<.05.

** p<.01.

*** p<.001.