

Alcohol's Effects on Sexual Decision Making: An Integration of Alcohol Myopia and Individual Differences*

KELLY CUE DAVIS, PH.D.,[†] CHRISTIAN S. HENDERSHOT, M.S., WILLIAM H. GEORGE, PH.D.,
JEANETTE NORRIS, PH.D.,[†] AND JULIA R. HEIMAN, PH.D.[†]

Department of Psychology, University of Washington, Seattle, Washington

ABSTRACT. Objective: We conducted an experiment to test the applicability of integrating individual perceptions of unprotected sex consequences with alcohol's myopic effects as an explanatory framework for risky sexual decision making in young heterosexual men and women. **Method:** Male and female participants ($N = 61$) rated their perceptions of unprotected sex consequences, received alcoholic (target breath alcohol concentration = .10%) or nonalcoholic drinks, and completed a risky sexual decision-making task that included a quantitative measure of sexual decision-making cue attention. **Results:** Intoxicated participants were more attentive to impelling cues and reported greater sexual

risk intentions than sober participants. Mediation analyses indicated that attention to cues fully mediated the alcohol-sexual risk intention relationship. Moderational analyses revealed that alcohol's focusing effect acts in conjunction with pre-existing individual perceptions to influence cue salience directly and sexual risk intentions indirectly. **Conclusions:** Findings demonstrate the importance of examining predispositional tendencies when investigating alcohol myopia as a mediating mechanism underlying the alcohol-risky sex relationship. (*J. Stud. Alcohol Drugs* 68: 843-851, 2007)

BOTH SURVEY AND EXPERIMENTAL RESEARCH indicate that alcohol consumption is often linked to riskier sexual behaviors, including sex with multiple partners, sex with casual partners, unprotected sexual intercourse, and intentions to engage in unprotected sexual intercourse (see Cooper, 2002, for a review). The present research examines the influence of acute alcohol intoxication on heterosexual men's and women's sexual decision making. Moreover, this work integrates individual differences in sexual risk perception with alcohol myopia-related effects on attention to explicate alcohol's effects on risky sexual decisions.

Cognitive models of alcohol's effects

It is well substantiated that alcohol intoxication results in cognitive impairment. Alcohol myopia models (Permanen, 1976; Steele and Josephs, 1990; Taylor and Leonard, 1983) contend that the reduction in cognitive processing ability created by the pharmacological effects of alcohol intoxica-

tion results in a narrowed attentional focus. Consequently, an intoxicated individual may attend to and process only the most salient situational cues. In sexual situations, impelling cues, such as sexual arousal, tend to be immediate, whereas cues that would inhibit sexual behavior, such as sexually transmitted infection (STI)/HIV risk, are more remote and abstract (Cooper, 2002; MacDonald et al., 2000b). According to alcohol myopia theory, intoxicated individuals' decreased cognitive capacity reduces their ability to process these distant risk cues, resulting in increased attention to proximal arousal cues. The net result is an increased likelihood of sexual risk behavior.

Experimental research using alcohol administration protocols generally supports the application of alcohol myopia models in interpreting alcohol's acute effects on sexual risk taking. Fromme et al. (1997a) examined sexual risk perception and found that, compared with their sober placebo and control counterparts, intoxicated young men and women rated negative consequences as less likely to occur and as less influential on their decisions to have sexual intercourse with a new partner. In a second experiment (Fromme et al., 1999), participants watched a videotape depicting a risky sexual situation and then listed the potential consequences of having unprotected intercourse. Intoxicated participants listed fewer negative consequences than did placebo and no-alcohol controls. These findings are concordant with alcohol myopia models, in that alcohol intoxication reduces the perceived relevance of the negative consequences of unprotected sex, which might inhibit risk taking during sober states.

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[†]Kelly Cue Davis was with the Department of Psychology, University of Washington, Seattle, WA but is now with the School of Social Work, Box 354900, University of Washington, 4101 15th Avenue NE, Seattle, WA 98105. Correspondence may be sent to her at that address or via email at: kcue@u.washington.edu. Jeanette Norris is with the Alcohol and Drug Abuse Institute, University of Washington, Seattle, WA. Julia R. Heiman is with the Kinsey Institute, Indiana University, Bloomington, IN.

MacDonald et al. (2000b) conducted a series of seven studies investigating the influence of alcohol intoxication and sexual arousal on college men's risky sex-related attitudes and intentions. Participants responded to a videotape of a hypothetical risky sex interaction between a man and a woman. Results indicated that, for participants low in self-reported sexual arousal, intoxicated men's sexual risk responses did not differ from those of the control and placebo participants. For participants with higher self-reported sexual arousal, intoxicated participants endorsed attitudes, thoughts, and intentions more conducive to engaging in unprotected sexual intercourse than did their control and placebo equivalents.

MacDonald et al. (2006b) argued that sexual arousal is a strong internal impelling cue, even in sexual situations involving STI/HIV risk cues. When sober, men retained the cognitive capacity to attend to and process the more removed inhibiting cue of disease risk as well as the more salient impelling cue of sexual arousal and thereby were less likely to respond in sexual risk-facilitating ways. When intoxicated, however, men's cognitive ability to consider the more distant inhibiting risk cues was impaired, resulting in an increased focus on salient impelling cues like arousal and subsequent responses more favorable to sexual risk taking. Moreover, a computed thought index using qualitative data revealed that participants' relative attention to impelling versus inhibitory cues fully mediated the relationship between intoxication and sexual risk intentions.

Although empirical laboratory studies have established that acute alcohol intoxication can increase sexual risk-taking intentions (Hendershot and George, 2007), event-level studies of the relationship between alcohol and risky sexual behavior indicate that alcohol intoxication does not yield greater sexual risk taking in every situation (Dermen and Cooper, 2000). In fact, some studies have found that alcohol intoxication may actually reduce sexual risk taking in some individuals (Morrison et al., 2003).

Such findings are not necessarily incompatible with alcohol myopia models: If the salience and immediacy of cues that inhibit sexual risk taking outweigh the salience and immediacy of cues that instigate sexual risk taking, alcohol intoxication should result in more cautious sexual behavior through an increased attention to the more proximal risk cues. To test this counterintuitive notion, MacDonald et al. (2000a) presented sober and intoxicated participants with impelling and inhibiting cues regarding sexual risk. Consistent with alcohol myopia predictions, sober (control and placebo) participants' risk intentions and justifications did not differ when presented with strong impelling versus strong inhibiting cues, yet intoxicated participants presented with strong impelling cues endorsed significantly greater sexual risk intentions and justifications than did those presented with strong inhibitory cues. Further, of those presented with strong inhibitory cues, intoxi-

cated participants reported significantly lower sexual risk intentions and justifications than did sober participants. Thus alcohol intoxication appears to have focused participants' attention to the more salient risk cues, thereby reducing their likelihood of taking sexual risks. This finding has been replicated in an intervention program designed to increase the salience of risk-related inhibitory cues (Dal Cin et al., 2006).

In summation, extant research suggests that alcohol myopia can result in either increased or decreased sexual risk, depending on the cues salient in the situation at the time the sexual decisions are made. Unlike other studies in which alcohol myopia-related effects are considered to be determined primarily by the situational cues present, the current work also investigates the ways in which individual differences may focus attention on particular types of contextual cues, thereby indirectly influencing the likelihood of sexual risk behavior. The underlying rationale for this is simple: Individuals do not embark on risky sexual encounters involving alcohol consumption *tabula rasa*. Individual differences in personality, attitudes, and perceptions, in addition to the environmental context, may guide attention toward either risk-facilitating or risk-inhibiting cues and thereby influence alcohol-involved sexual risk behaviors.

Individual differences in cue perception

Previous research has identified several individual difference variables, such as sensation seeking (Maisto et al., 2004), alcohol expectancies (Davis et al., submitted for publication), sexual fears (Stoner et al., 2007), cognitive reserve (Abbey et al., 2006), and gender (Abbey et al., 2005), that can influence decisions made in sexual situations. Findings from some studies indicate that alcohol intoxication may moderate the effects of individual differences. For example, Abbey et al. (2006) found that intoxicated individuals with lower cognitive reserve endorsed a greater likelihood of having unprotected sex than all sober participants and intoxicated participants with higher cognitive reserve. Davis et al. (submitted for publication) reported that individuals with strong beliefs that alcohol increases their risky sex likelihood were less likely to ask their partner for a condom when intoxicated than when sober, indicating that alcohol intoxication may especially increase sexual risk for individuals with particular expectations about alcohol's effects. Incorporating individual difference factors such as these into investigations of alcohol myopia-related sexual risk may facilitate understanding of alcohol's varied effects on sexual risk taking (Morris and Albery, 2001; Morrison et al., 2003).

One individual difference factor likely relevant to sexual risk behavior is the perception of the risks and benefits associated with engaging in unprotected sex (Fromme et al., 1997a, 1999). Fromme et al. (1997b) argue that for any

given individual, his or her sexual risk behavior (or lack thereof) is driven by an idiosyncratic focus on the positive or negative consequences of risk taking most personally salient to that individual. Relevant to alcohol myopia, individual differences in a priori perceptions of the benefits and risks of unprotected sex may be predictive of each individual's personal relative salience of impelling versus inhibiting situational cues. When intoxicated, such a priori perceptions may steer one's alcohol myopia-related narrowed attentional focus to either personally salient impelling cues or personally salient inhibitory cues (Davis et al., 2006). This is the first study we are aware of to test the applicability of integrating a priori perceptions of sexual risk-taking consequences with the myopic effects of acute alcohol intoxication to predict sexual risk intentions.

Hypotheses

We hypothesized that intoxicated participants would report a higher likelihood of risky sexual intentions than their sober counterparts and that men would report stronger risky sex intentions than women. In accordance with alcohol myopia models, we predicted that, relative to sober participants, intoxicated participants' attention during the sexual decision-making process would be directed more toward impelling cues, such as sexual arousal, and less toward inhibitory cues, such as STI/HIV risk. We anticipated that this greater focus on impelling cues relative to inhibitory cues would mediate the alcohol-risky sex intention relationship. We also hypothesized that individual differences in a priori risk/benefit perception would moderate the influence of alcohol intoxication on attention to impelling and inhibitory cues by steering individuals' attention to the cues most corroborative of their risk/benefit perception.

Method

Participants

The study included 61 participants (49% female; mean [SD] age = 24.3 [7.2] years; 40% college students and 60% community residents). The sample was 74% white, 7% Asian American or Pacific Islander, 5% Hispanic, and 3% black; 11% listed their background as "multiracial" or "other" or did not report race/ethnicity. Because we sought a sample of single, heterosexual social drinkers, inclusion criteria consisted of being (1) age 21-35, (2) a regular drinker (defined as having a minimum of five drinks per week and at least one episode of consuming five or more drinks in the past 6 months), (3) single (reportedly not in a current committed relationship), and (4) interested in an opposite-gender relationship. Exclusion criteria consisted of reported history of alcohol use problems or medical conditions/medication regimens contraindicating alcohol consumption.

Participants reported consuming a mean of 13.4 (9.1) drinks per week in the past month and reported 3.7 (2.9) sexual partners in the past year, on average. Average reported frequency of unprotected sex and alcohol use before sex in the past 12 months on a scale of 0 (never) to 6 (all of the time) was 3.36 (2.08) and 4.20 (1.50), respectively.

Procedure

Participants were recruited via newspaper and community advertisements stating that single social drinkers were wanted for a study on "social drinking and decision-making." Interested parties called to obtain information and complete an eligibility screening; qualifying individuals were scheduled for an appointment. Participants were instructed to refrain from eating for 4 hours before the experiment and from drinking alcohol for 24 hours before the experiment and were told not to drive to their appointment.

On arrival, participants provided a breath alcohol reading (Alco-Sensor IV, Intoximeters Inc., St. Louis, MO) to ensure a breath alcohol concentration (BrAC) of zero. After they provided informed consent, participants completed a set of background questionnaires, including individual difference measures, in a private room using a computer. Following the questionnaire session, an experimenter weighed the participant to determine alcohol dose. Female participants completed a urine pregnancy screening.

Beverage administration

Participants were randomly assigned to one of two conditions: alcohol beverage or control beverage. All participants were informed of the actual content of their drinks (i.e., no placebo conditions or deception were used). Participants assigned to the alcohol condition received a mix of grain alcohol (190 proof) and fruit juice in a 1:6 ratio. Alcohol dosage was set at 0.988 g/kg for men and 0.790 g/kg for women, with body weight-adjusted volume calculated to achieve a target BrAC of .10% (see Friel et al., 1999, for a discussion of alcohol dosing guidelines). Because prior experimental studies in this area have typically employed moderate to moderately high target BrAC levels (.06%-.08%), we used a higher BrAC level (.10%) not only to expand the literature in this area but also to investigate risky sexual situations involving heavier alcohol consumption. Participants assigned to the control condition received fruit juice in an amount proportionate to the beverage volume he/she would have consumed if assigned to the alcohol condition (based on gender and body weight). All participants received beverages in three equivalent portions and were allotted 3 minutes to consume each portion.

Participants in the control beverage condition were yoked to a same-gender participant in the alcohol condition, such that the elapsed time between beverage administration and

the onset of experimental procedures was standardized among yoked pairs (Giancola and Zeichner, 1997). This procedure was used to attenuate between-groups variability in waiting time following beverage administration. In both the alcohol and the control conditions, participants gave BrAC readings at 3-minute intervals. For intoxicated participants, experimental procedures began on achieving a criterion BrAC of .065% so that participants completed the primary dependent measures when BrAC reached approximately .10% on the ascending limb of the blood alcohol curve. For control participants, elapsed time between beverage administration and onset of experimental procedures was equal to that of the participant to which he/she was yoked.

Sexual risk scenario

A hypothetical sexual risk scenario was created using a vignette-based paradigm. Participants read a 1,000-word story written in the second person that described a first-time sexual encounter with a new acquaintance. Participants received instructions to envision themselves acting as the protagonist of the story at their current level of intoxication (Davis et al., 2004).

In the story, the protagonist (i.e., the participant) attends a party with a platonic friend, who introduces the participant to an attractive opposite-gender friend, referred to as Dan (for female participants) or Ellen (for male participants). The participant and Dan/Ellen engage in conversation and flirting. As the party winds down, Dan/Ellen invites the protagonist home, where the couple begins kissing and engaging in foreplay. Each indicates a desire for intercourse, but they realize that no condom is available. As the story progressed, participants received four separate prompts at which point they stopped reading to provide estimates of sexual desire and behavioral intentions. Each prompt contained a unique set of questions that were specific to that point in the story (i.e., questions were not repeated across prompts). Participants' estimated likelihood of engaging in unsafe sex with the partner in the vignette was assessed using a single behavioral intention item: "How likely are you to have sex with Ellen/Dan even if s/he does not have a condom?" Responses ranged from 1 ("not at all likely") to 5 ("very likely").

To reduce the likelihood that pregnancy risk influenced participants' decisions, the story stipulated that the female character used birth control. The vignette was eroticized to increase the likelihood that it would be sexually arousing. In addition, immediately before reading the vignette, participants completed a sexual arousal induction protocol in which they viewed two 3-minute erotic film clips depicting explicit heterosexual intercourse. A within-subjects analysis of variance confirmed that the arousal induction procedure successfully increased self-reported arousal from before viewing to after viewing ($F = 390.54$, 1/60 df, $p < .001$).

See George et al. (2006) for further detail on the arousal induction protocol.

Assessment of cues during sexual decision making

Following the sexual risk scenario, participants were presented with a list of contextual cues that they may have considered during sexual decision making. Given our aim to provide a test of alcohol myopia theory, we used cues that were likely to be either impelling or inhibitory in the context of a sexual situation. Specifically, current theory concerning alcohol myopia and sexual risk behavior states that sexual arousal-related cues and sexual risk-related cues likely represent the most salient impelling and inhibitory cues, respectively, during a sexual encounter (e.g., George and Stoner, 2000; MacDonald et al., 2000a). We therefore used items that provided face-valid examples of arousal- and risk-related themes.

Seven arousal cues and seven risk cues were used. Arousal cues were the following: "Dan/Ellen seems very aroused"; "I'm attracted to Dan/Ellen"; "I'm horny"; "Dan/Ellen seems nice"; "Dan/Ellen seems really attracted to me"; "Dan/Ellen seems to really like me"; and "Having sex would feel very good." Risk cues were: "I don't know Dan/Ellen very well"; "I don't know Dan's/Ellen's sexual history"; "Dan/Ellen seems like the type to sleep around"; "We don't have a condom"; "I usually don't have sex without a condom"; "We could wait until we have a condom"; and "I could get an STD [sexually transmitted disease] or HIV."

Participants rated each item on two dimensions: (1) cue presence (i.e., if the participant considered the cue during sexual decision making) and (2) cue influence (i.e., the extent to which participants perceived the cue as making sexual behavior more likely or less likely). Each cue was presented individually, followed by the question, "Did you consider this when you made your decision about whether or not to have sex with Ellen/Dan?" Options were "yes" or "no." If a given cue was endorsed, a subsequent item queried the perceived influence of that cue on sexual decision making by asking, "How did it affect your decision?" Response options were presented on a Likert scale from -3 ("much less likely to have sex") to 3 ("much more likely to have sex").

The mean influence rating for all arousal cues (on a scale of -3 to 3) was >1 , whereas the mean influence rating for all risk cues was <0 . Participants' average subjective ratings of seven arousal cues were significantly higher than the average ratings of risk cues ($t = 14.93$, 57 df, $p < .001$). Thus, participants on average viewed arousal cues as impelling and risk cues as inhibitory.

We next computed three variables to serve as outcome measures. The number of impelling and inhibitory cues endorsed (of a possible seven for each category) was summed for each participant. We also divided the number of reported

impelling cues (out of seven) by the total number of endorsed impelling and inhibitory cues (out of a possible 14) for each participant. This variable reflects the proportion of endorsed cues (0.00-1.00) that were impelling in nature.

Perceived risks/benefits of unprotected sex

Participants' a priori perceptions of the risks and benefits of unsafe sex were assessed using two items adapted from the Cognitive Appraisal of Risky Events (CARE) questionnaire (Fromme et al., 1997b). These questions asked, "What is the likelihood of experiencing negative/positive consequences from having sex without a condom with a new partner?" Response options ranged from 1 ("not at all likely") to 5 ("very likely"). These items were significantly negatively correlated (Pearson's $r = -.31, p < .05$). Participants completed these items during the questionnaire session before beverage administration.

Results

Preliminary analyses

Breath alcohol analysis readings indicated that intoxicated participants achieved a mean BrAC of .092 (.011) before the sexual risk scenario (BrAC = .000 for control participants [$F = 2053.28, 1/59$ df, $p < .001$]). Post-experimental ratings of the sexual risk vignette indicated that participants, on average, saw the vignette as portraying a situation that could realistically happen to them (mean rating from 1 ["not at all possible"] to 5 ["very possible"]; 4.49 [0.81]). There were no differences in realism ratings by gender or alcohol conditions.

Intoxication and gender effects on reported cues and unsafe sex intentions

A series of stepwise linear regression analyses evaluated alcohol and gender as predictors of four dependent mea-

asures: number of reported arousal cues, number of reported risk cues, proportion of arousal to risk cues, and unsafe sex intentions. Each regression included gender (Step 1), alcohol condition (Step 2), and their interaction (Step 3). Gender was a significant predictor only of sexual risk intentions, with men reporting greater intentions for unsafe sex than women ($R^2_{cha} = .07, p < .05$). Alcohol condition was a significant predictor of three of the four variables examined. Intoxicated participants reported a greater number of arousal cues ($R^2_{cha} = .08, p < .05$), a greater proportion of arousal relative to risk cues ($R^2_{cha} = .07, p < .05$), and greater intentions for unsafe sex ($R^2_{cha} = .07, p < .05$) compared with sober controls. Intoxicated and sober participants did not differ significantly on number of risk cues endorsed, and the interaction of alcohol condition and gender was nonsignificant for all outcome measures.

Mediation and moderation analyses

Having established significant effects of alcohol condition on proportion of arousal versus risk cues and on unsafe sex intentions, we next conducted mediation analyses (Baron and Kenny, 1986) to examine whether the proportion of arousal versus risk cues reported by participants mediated the relationship between intoxication and sexual risk intentions. A stepwise regression model predicting sexual risk intentions was conducted with beverage condition entered at Step 1 and proportion of arousal versus risk cues entered with beverage condition at Step 2.

Results demonstrated that alcohol significantly predicted unsafe sex intentions at Step 1 ($\beta = .26, p < .05$) (see Figure 1). At Step 2, a higher proportion of arousal cues significantly predicted unsafe sex likelihood ($\beta = .53, p < .001$), whereas the effect of alcohol on unsafe sex likelihood fell from significance ($\beta = .12, p = .28$). A Goodman test further confirmed that the mediation pathway was statistically significant ($z = 2.00, p < .05$). Thus, the effects of intoxication on estimated likelihood of unsafe sex were fully

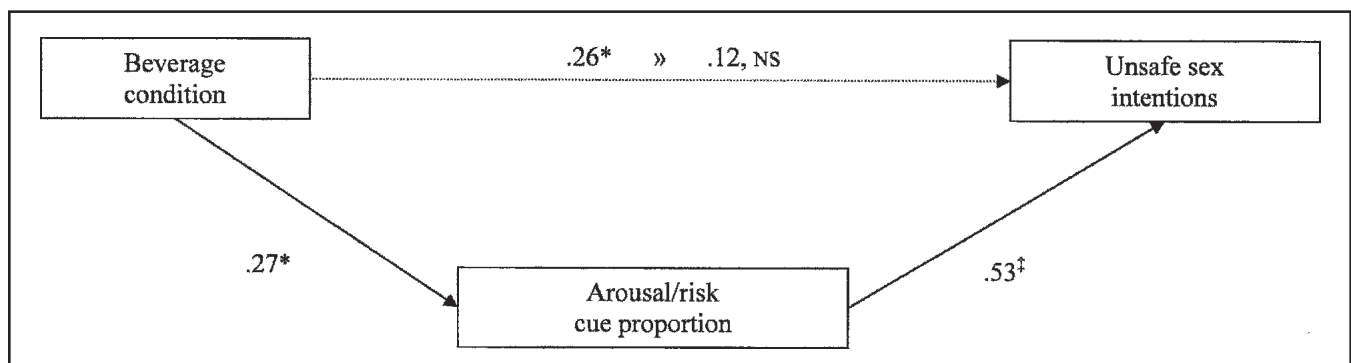


FIGURE 1. The mediating effects of arousal/risk cue proportion in the alcohol-unsafe sex intentions relationship
* $p < .05$; ‡ $p < .001$.

mediated by the proportion of arousal versus risk cues reported by participants.

(Our theory-based mediation model did not reflect the actual sequencing of these variables, because the retrospective assessment of arousal/risk cues came after participants estimated their sexual intentions in order to avoid priming their responses. We therefore also examined a mediation model in which sexual risk intentions were evaluated as a mediator of alcohol's effects on endorsement of arousal/risk cues. This mediation model was also supported in the initial regression analyses; however, the Goodman test for this alternate model was not significant, suggesting that the model with arousal/risk cues as a mediator of the alcohol-sexual intentions relationship better fit the data.)

Next, we evaluated the hypothesis that participants' a priori perceptions about the risks and benefits of unsafe sex would moderate alcohol's effects on reported arousal/risk cues. We created a variable reflecting the mean of the two CARE items (with one item reverse-scored), resulting in a 1-5 scale with 5 indicating high perceived benefits and low perceived risks of having sex without a condom. Path analysis using multiple regression analyses was used following the procedures recommended by Cohen et al. (2003). The full model consisted of two regression equations in which each dependent variable was regressed on all variables to its left in the model. Alcohol condition and CARE consequences score (centered) were entered on the first step of the regression equations, and the two-way interaction of alcohol condition and CARE consequences score was entered on Step 2.

The overall model (presented in Figure 2) accounted for 36% of the variance in unsafe sex likelihood ($R^2 = .36, p < .001$). A greater focus on arousal versus risk cues ($\beta = .52, p < .001$) significantly predicted greater unsafe sex intentions. Neither alcohol condition nor a priori CARE consequences score directly predicted unsafe sex intentions. Rather, the influence of both alcohol intoxication and a priori CARE consequences score on sexual risk intentions

occurred indirectly through their interactive influence on individuals' reported attention to arousal versus risk cues ($\beta = .29, p < .05$).

Examination of the scatterplot (Figure 3) revealed that, for intoxicated participants, those with a greater a priori focus on the positive consequences of unprotected sex also reported a greater in-the-moment focus on arousal versus risk cues, relative to intoxicated participants with a greater a priori focus on the negative consequences of unsafe sex. For sober participants, a priori CARE consequences score was not significantly related to their in-the-moment focus on arousal versus risk cues.

Discussion

Not only do these findings further establish the importance of alcohol myopia theory for understanding intoxicated sexual risk taking by providing support for theoretically relevant mediating mechanisms, they also expand our current understanding of alcohol-facilitated sexual risk by integrating individual difference characteristics into the alcohol myopia model of sexual risk and by using experimental protocols that induce high levels of sexual arousal and intoxication. Findings indicated that intoxicated participants were more attentive to impelling cues like sexual arousal relative to inhibitory cues like sexual risk. Moreover, this relative focus on impelling cues versus inhibitory cues fully mediated the alcohol intoxication-sexual risk intention relationship. Moderational analyses integrating individual differences in a priori risk/benefit perceptions of unprotected sex with a new partner revealed that alcohol's focusing effect acts in conjunction with pre-existing idiosyncratic characteristics to influence cue salience directly and sexual risk intentions indirectly.

This work provides further evidence for an alcohol myopia interpretation of the alcohol-risky sex relationship. Analyses indicated that the effects of alcohol intoxication on unsafe sex responses were fully mediated by participants'

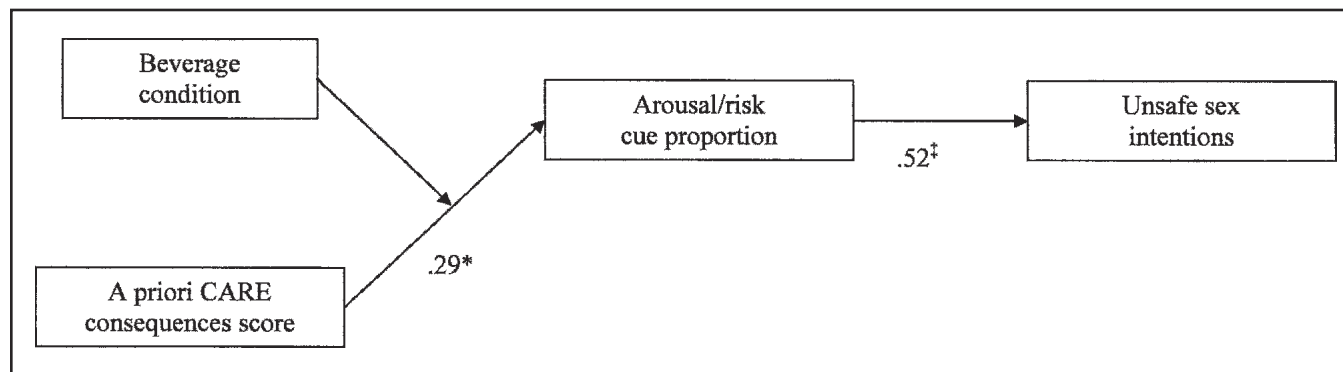


FIGURE 2. The moderating effects of perceived unsafe sex consequences on alcohol, arousal/risk cue proportion, and unsafe sex intentions. CARE = Cognitive Appraisal of Risky Events.

* $p < .05$; ‡ $p < .001$.



FIGURE 3. Arousal/risk cue proportion likelihood as a function of beverage condition and perceived unsafe sex consequences. CARE = Cognitive Appraisal of Risky Events; Rsq = R-squared.

relative focus on impelling versus inhibitory cues. This finding replicates the work of MacDonald et al. (2000b), who also found evidence that cognitive focus fully mediates the alcohol-risky sex link. Two aspects of this finding are novel, however.

First, this study included both male and female participants. Although gender had a direct effect on estimates of sexual risk taking, it did not interact with alcohol intoxication to influence sexual risk either directly or indirectly. Thus, in this study, men and women were similarly influenced by alcohol to focus on impelling cues more so than inhibitory cues and were thus equally likely to take sexual risks when intoxicated.

Second, although the participants in the MacDonald et al. (2000b) study reported some sexual arousal, the median sexual arousal score was below the midpoint of the scale. In the current study, an arousal induction protocol using highly arousing erotic stimuli induced much higher rates of sexual arousal (medians were above the scale midpoint). Thus, the context in which participants in the current studies estimated their risk-taking behavior may be more congruent with real-world sexual risk-taking experiences, which presumably involve high levels of sexual arousal; the salience of the sexual arousal cue in this paradigm is possibly more on par with its salience in real-world encounters. Situations involving a high level of sexual arousal coupled with a potentially risky new sexual partner where no condom is available may also be considered high-conflict situ-

ations, in that both impelling and inhibitory cues are strong (Steele and Southwick, 1985). Our results imply that alcohol intoxication may resolve this conflict in the risky direction; that is, intoxicated individuals concentrate their attention on the impelling cue of arousal relative to the inhibitory cue of risk, resulting in increased unsafe sex likelihood. This notion is somewhat speculative, however, in that a low-conflict condition was not tested simultaneously. Future studies could test the relevance of inhibition conflict theory to alcohol-involved sexual risk taking by comparing sexual situations involving low and high amounts of conflict.

Individual differences in a priori unsafe sex risk/benefit perception moderated the influence of these alcohol myopia effects. As predicted, among intoxicated participants, those endorsing greater perceived benefits of risky sex reported a greater proportion of arousal cues relative to risk cues, whereas this difference was not apparent among sober participants. Thus, when considered in conjunction with a predisposition to perceive greater positive consequences of engaging in unprotected sex, alcohol intoxication appears to exacerbate sexual risk likelihood by further increasing attentional focus on impelling cues relative to inhibitory cues.

The converse of this relationship was not evident, however. Present findings do not indicate that alcohol intoxication may reduce sexual risk intentions in individuals predisposed to perceive greater negative consequences of

unprotected sex by steering their attention toward inhibitory rather than impelling cues.

These findings highlight the importance of integrating a situationally based alcohol myopia explanation of sexual risk behavior with individually based personality and attitudinal factors. Although alcohol myopia's focusing effects toward salient cues may occur for most intoxicated individuals, the cues that are particularly salient for each individual may be driven by idiosyncratic—as well as situational—factors (Fromme et al., 1997a).

Cue salience may shift from situation to situation as well as over time (Davis et al., 2004); similarly, cue salience may vary according to individual perception. Individuals tend to look for information within their environments that corroborates their pre-existing understanding of the world, a phenomenon known as confirmatory bias (see Evans, 1989). The focusing effects of alcohol may exacerbate this tendency by guiding an intoxicated person's limited attention to corroborative situational, interpersonal, and intrapersonal elements (Morris and Albery, 2001).

It could be speculated that the interaction of acute alcohol myopia effects with pre-existing individual perceptions may partially account for some of the varied findings in event-level analyses regarding alcohol and sexual risk. Although situational differences are almost certainly a factor in some of these differential effects, individual differences are most likely another. Perhaps individuals who engage in increased sexual risk taking when intoxicated enter into the situation believing that unprotected sex is likely to result in positive consequences and, as a result of a myopia-induced focus on these benefits, indulge in greater sexual risk taking. If so, this interpretation of our current findings emphasizes the importance of diminishing unsafe sex benefit perception as well as strengthening unsafe sex risk perception in sober individuals as a means of shifting the salience of inhibitory and impelling cues.

Although it is certainly important to increase risk awareness even in risky sexual situations not involving alcohol, current findings indicate that shifts in cue salience may have an even larger impact on intoxicated individuals. Previous research (Dal Cin et al., 2006; MacDonald et al., 2000a) has found that strengthening the salience of inhibitory cues led to decreased sexual risk taking among intoxicated individuals, even relative to sober individuals who received the same intervention. Thus, enhancing risk/inhibitory cue perception in conjunction with diminishing benefit/impelling cue perception among sober individuals may represent an optimally effective method of reducing sexual risk behavior in intoxicated individuals.

Limitations and conclusions

One limitation of this study is that we assessed attention to cues after assessing risky sexual intentions. Measuring cues

before sexual intentions would likely have biased the decision-making process by introducing contextual cues that participants may not have considered otherwise; the choice to assess cues retrospectively obviated this concern. However, our conclusions about mediation are qualified as a result.

Although the absence of a placebo comparison group limits our ability to disentangle the expectancy and physiological effects of alcohol on sexual risk cue perceptions and intentions, previous research rarely reveals significant differences between control and placebo beverage conditions for risky sexual intentions (e.g., Abbey et al., 2005). Although the use of an analog sexual decision-making scenario limits the external validity of these findings, this approach is typically necessary for studying sexual risk behavior experimentally. Participants reported finding the scenario very realistic, and the use of an arousal induction procedure likely resulted in a closer approximation of a real-life encounter compared with methods used in previous studies.

Finally, because participants were willing to engage in both alcohol consumption and erotica viewing in the laboratory, results of this study may not be generalizable to a wider population. That noted, data from this sample are quite relevant to understanding alcohol-involved sexual risk behavior, particularly given participants' recent engagement in heavy episodic drinking, alcohol consumption before sexual activities, and unprotected sexual intercourse.

The addition of alcohol to a sexually charged situation characterized by condom unavailability and a new sexual partner of unknown STI/HIV risk can tip the balance decidedly toward unprotected sex. The progression toward this outcome involves two distinct interacting mechanisms identified in our findings: a predispositional tendency to value the benefits of unprotected sex and alcohol's tendency to focus one's attention more on impelling arousal-related cues and less on inhibitory risk-related cues. Together these mechanisms fit a moderated mediation analysis, whereby these individuals drink and their attention then becomes locked onto the sexual gratification available in the moment, propelling them toward unprotected intercourse. By comparison, counterparts who are either sober or predisposed to see negative consequences associated with such situations are able to maintain attention to risks associated with the situation and avoid unsafe outcomes. This interpretation suggests that STI/HIV prevention messages should perhaps be expanded beyond content stressing the dangers of unprotected intercourse to include content also aimed at diminishing its attractions.

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