

Influences of Situational Factors and Alcohol Expectancies on Sexual Desire and Arousal Among Heavy-Episodic Drinking Women: Acute Alcohol Intoxication and Condom Availability

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Abstract Although studies suggest that alcohol increases women's sexual desire, no studies to our knowledge have examined the effects of acute alcohol intoxication on women's sexual desire. The majority of research examining alcohol's effects on sexual arousal in women suggests that alcohol increases self-reported arousal. In an alcohol administration study in which women projected themselves into an eroticized scenario depicting a consensual sexual encounter with a new male partner, we examined the effects of alcohol and condom condition on women's sexual desire and arousal. The moderating effects of sex-related alcohol expectancies were also examined. Results revealed that alcohol intoxication was related to less desire to engage in sex with a new partner and condom presence was related to more desire. Alcohol interacted with sexual disinhibition alcohol expectancies, indicating that more expectancy endorsement was associated with greater sexual desire and self-reported arousal in the alcohol condition, but not the control condition. Condom condition had no effect on self-reported sexual arousal. The present research suggests that sexual desire merits research attention in non-clinical samples, and experimental

methodology can provide valuable information about alcohol's influence on women's sexual desire, thus advancing our understanding of this relationship beyond cross-sectional correlations. The current findings also provide evidence that sex-related alcohol expectancies may play an important role in alcohol-involved sexual experiences including desire and arousal.

Keywords Sexual desire · Alcohol · Women · Alcohol expectancies · Sexual arousal

Introduction

There has been considerable research and clinical interest in women's sexual desire, much of it related to diagnosis and treatment of sexual dysfunctions. By contrast, little is known about sexual desire among non-clinical samples, particularly women who drink alcohol, and the influence of situational factors. This is an important knowledge gap given that alcohol use before sex is common (e.g., Fortenberry, Orr, Zimet, & Blythe, 1997) and that the prevalence of alcohol consumption by women in the U.S. is substantial. The National Institute on Alcohol Abuse and Alcoholism statistics indicate that 60 % of women have had at least one drink in the past year, 21 % of these women averaged 3 or more drinks per day, and 14 % averaged one monthly instance of heavy episodic drinking (defined as four or more drinks within 2 h). In addition, what is known about alcohol and sexual desire in women is limited by the seemingly exclusive reliance on cross-sectional survey data (e.g., George & Gilmore, 2013). In comparison to extant knowledge gaps about sexual desire, considerably more is known about alcohol and sexual arousal, defined as a physiological and psychological sexual sensation and excitement. Current research on alcohol and sexual arousal suggests that alcohol attenuates physiological sexual arousal, while increasing self-reported sexual arousal

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at low levels of intoxication and has no effect on self-reported sexual arousal at higher levels of intoxication (e.g., George & Gilmore, 2013). Sexual desire may, like sexual arousal, be sensitive to situational factors, such as alcohol as well as sexual safety considerations, especially condom availability (Graham et al., 2006; Higgins, Tanner, & Janssen, 2009). To our knowledge, not a single experimental study exists in the literature addressing an elemental question: Do alcohol intoxication and condom availability affect women's sexual desire? The aim of the current study was to investigate the effect of alcohol intoxication and condom availability in an experimental scenario on desire to engage in sex in the scenario and to do so while considering self-reported sexual arousal, about which much more is known regarding alcohol's effects.

Defining and Operationalizing Sexual Desire

Sexual desire is typically defined as an individual's motivation or urge to engage in sexual activity (Bancroft & Graham, 2011; Hardy, 1964; Whalen, 1966). Indicators of sexual desire include self-reported interest in engaging in sexual fantasy, activity, and/or interest in experiencing sexual pleasure and orgasm. Previous work has relied on such global definitions of sexual desire, as operationalized in questions such as frequency of desire for different types of sexual activity (Taylor, Rosen, & Leiblum, 1994). When defined globally, sexual desire is generally construed as a relatively stable phenomenon, and because of the constraints inherent in cross-sectional survey methods, it has not been considered subject to situationally proximal influences (such as acute alcohol intoxication). By contrast, a situational definition of sexual desire may be operationalized as the desire to engage in sexual activity in a particular situation with a particular person. An advantage unique to this approach is the capacity to examine proximal situational factors using experimental methods, permitting evaluation of causal influences. Thus, the current project incorporated both the traditional global operationalization for sexual desire as a background dispositional factor and a situational operationalization to examine proximal processes.

Alcohol and Sexual Desire

The few studies that have examined alcohol and women's sexual desire consist of cross-sectional correlations and generally conclude that alcohol use is associated with increased sexual desire (Beckman, 1979; Harvey & Beckman, 1986; Mondaini et al., 2009; Rawson, Washton, Domier, & Reiber, 2002; Woods, Mitchell, & Julio, 2010). Among samples of women with alcohol use disorders, there is mixed evidence that alcohol is (Heiser & Hartmann, 1987) and is not (Johnson, Phelps, & Cottler, 2004) associated with inhibited sexual desire. This discrepancy may be attributable to the focus on alcohol use disorders typically used to assess

alcohol consumption and on sexual dysfunction typically used to assess sexual desire. Another possibility is that studies to date have only examined women's global sexual desire. However, sexual desire likely differs based on the situation (Kingsberg, 2010) and the contours of proximal factors, such as acute intoxication and sexual safety concerns. A benefit of a situational versus a global operationalization of desire is that it holds many variables constant that would differ in event-level data, thus allowing a clearer examination of alcohol's causal influences.

Alcohol and Sexual Arousal

Experimental studies on women's sexual functioning in response to acute alcohol intoxication primarily consider only sexual arousal rather than examining other sexual responses like sexual desire (see review by George & Gilmore, 2013) and have shown that acute alcohol intoxication is related to increases in self-reported sexual arousal (e.g., George et al., 2009). In 13 of 15 experiments (George & Gilmore, 2013) acute alcohol intoxication increased self-reported arousal. Therefore, because self-reported arousal and desire are both self-reported rather than physiological indicators of sexual response, it seems reasonable to hypothesize that alcohol will increase sexual desire. This hypothesis is in keeping with the most likely theoretical account of alcohol's enhancing effect on self-reported sexual arousal. At high dosages of alcohol (e.g., over .08 blood alcohol concentrations [BAC]) where enhancement effects on self-reported arousal are most observed and where alcohol's physiological effects are indisputably involved (e.g., George et al., 2009), Alcohol Myopia Theory (AMT) offers the most applicable and compelling explanation (Steele & Josephs, 1990). According to this theory, alcohol intoxication creates a myopia narrowing the drinker's attention to a restricted set of salient cues prompting behavioral outcomes. Generally, in appetitive situations such as sexual encounters, the impelling or "go" cues tend to be higher in salience than inhibiting or "stop" cues (George & Stoner, 2000). As a result, the drinker's responses are more determined by narrowed (myopic) attention to high salience impelling cues in the moment than by lower salience inhibiting cues. Thus, an intoxicated person compared to a sober person would likely attend most to the sexual stimuli and her own initial arousal changes and, as a consequence, would experience and report more sexual arousal. Because self-reported sexual arousal and sexual desire both are internally experienced phenomenological states and are empirically correlated (Giles & McCabe, 2009), it is also theoretically reasonable to expect that alcohol will increase sexual desire. That is, acute intoxication would be expected to focus the drinker more narrowly on the desire in the situation to pursue a sexual interaction with this particular individual and less on the factors that might otherwise inhibit desire, resulting in more desire in intoxicated than sober women.

Sex-Related Alcohol Expectancies

While AMT is useful for explaining and describing alcohol's pharmacological effects, Alcohol Expectancy Theory (AET) is useful for describing and explaining purely psychological, i.e., without evoking physiological processes, mechanisms accounting for alcohol's effects on post-drinking behavior. AET (Brown, Goldman, Inn, & Anderson, 1980) suggests that how individuals expect they will behave and feel while intoxicated influences their actual behavior and feelings while intoxicated. This process seems true of sexual behavior (George & Stoner, 2000) about which cultural messages concerning alcohol's aphrodisiac and disinhibitory properties abound. This process may be attributable to a self-fulfilling prophecy analysis in which pre-drinking expectancies shape post-drinking behavior (e.g., George, Stoner, Norris, Lopez, & Lehman, 2000). In relation to sexual desire, AET posits that an individual who expects that alcohol will promote increases in sexual responding and outcomes will likely experience greater sexual desire after drinking. Alcohol expectancy researchers demonstrate the utility of distinct sex-related alcohol expectancies (Dermen & Cooper, 1994; Leigh, 1990). Specifically, it has been shown that individuals expect alcohol to enhance sexual experience, disinhibit sexual responding, and heighten sexual risk taking (Dermen & Cooper, 1994). According to AET, it is hypothesized that the effects of acute alcohol intoxication on sexual desire will be moderated by sex-related alcohol expectancies. Intoxication should increase desire among individuals exhibiting greater belief in alcohol's sexually salutary effects and not among individuals exhibiting weaker faith in such effects.

Condom Availability and Sexual Desire

Previous research examining alcohol and sexual desire has not addressed the role of relationship context. When examining situational sexual desire to engage in sexual activity in casual sexual relationships, it is likely that sexual health risk factors come into play. That is, the desire to have sex with a new partner is experienced in the context of concerns about negative health consequences, such as sexually transmitted infections. Thus, one important situational factor in casual sexual situations, apart from alcohol intoxication, is condom availability. Conner and Flesch (2001) found that individuals expressed greater intentions to have sex in a casual encounter when a condom was available rather than unavailable. While the authors offered no explanation for this particular finding, it seems reasonable to suggest that individuals believe that sexual health and pregnancy risks are averted when condoms are available rather than not, thereby fostering a greater willingness to have sex. Although women have sex for reasons other than sexual desire, it is possible that individuals might similarly feel more sexual desire when condoms are available rather than unavailable. This may be especially true for women, who reliably have more positive and less

negative attitudes about condom use than men (Sacco, Rickman, Thompson, Levine, & Reed, 1993), and therefore would not likely find the prospect of condom use to detract from experiencing desire. Therefore, having a condom available may be conceptualized as a disinhibiting factor, even more so for women than men, because it allays health risk concerns in a sexual encounter and condom absence as an inhibiting factor because health risk concerns remain salient.

Current Study

To date, scientific knowledge of associations between alcohol and sexual desire are based entirely on cross-sectional research. To clarify alcohol's possible causal effects on sexual desire and sexual arousal, it is important to utilize an alcohol administration experimental paradigm to ensure that situational and intoxication factors are effectively controlled. The situation used in this experiment was a second-person story with a new partner. Consistent with AMT and research on alcohol's effects on self-reported sexual arousal (George et al., 2009), we hypothesized that desire to engage in sex with a new partner and self-reported sexual arousal would be higher for participants in the alcohol condition compared to controls. Consistent with AET, we hypothesized that stronger sex-related alcohol expectancies would be associated with more desire to engage in sex with a new partner and self-reported sexual arousal when intoxicated than when sober. We also hypothesized that condom condition would affect desire such that participants would have more desire to engage in sex with a new partner and more sexual arousal when a condom was available in the context of a casual sexual encounter compared to when a condom was unavailable. In addition to the main hypotheses, we hypothesized that sexual desire in the scenario and global sexual desire would be positively correlated.

Method

Participants

Female participants ($n = 144$) were recruited through newspapers and flyers. Because these data were part of a larger study investigating the influence of alcohol intoxication and sexual arousal on risky sexual decision-making, advertisements and letters stated that the study involved "social drinking and decision-making." Individuals interested in participating called the laboratory and were given more information about the procedures and were screened to determine whether they were eligible to participate. Inclusion criteria for the female participants were as follows: (1) between the ages of 21 and 35; (2) interested in dating opposite sex partners; (3) not currently in a committed dating relationship; (4) a non-problem drinker (defined as drinking between one and 40 alcoholic beverages per week) who engaged in heavy episodic drinking (defined as drinking 4 or more drinks

in one drinking episode in the past 6 months). Exclusion criteria were: current problem drinking or a history of problem drinking and/or currently taking medications or having a health condition contraindicated with alcohol consumption. Participants were instructed not to drive to the laboratory, not to eat or consume caloric drinks for 3 h before their appointments, and not to drink alcohol or use recreational or over-the-counter drugs for 24 h before their appointments.

Seven participants were excluded from the analyses (three withdrew at beverage administration, one had a computer crash during the experiment, two had a positive pregnancy test, one used the restroom in the middle of reading the scenario), leaving a total of 137 participants for data analyses. Participants' mean age was 25.3 years ($SD = 3.94$). The sample included 68.9 % Caucasian, 5.2 % Asian/Native Hawaiian/Pacific Islander, 8.9 % African American, 1.5 % American Indian, 0.7 % Middle Eastern/North African, 13.3 % Multiracial, 1.5 % other, and 7 % identified as Hispanic or Latino. Participants' self-reported typical drinking levels were on average 12.38 drinks per week ($SD = 8.40$). Sixty-eight percent of participants were employed with 72 % reporting an annual income of less than \$31,000 per year. Thirty-one percent were full-time or part-time college students. Participants were paid \$15 per h for their participation in the study.

Procedure

Experiment Overview

Upon arrival at the laboratory, a female experimenter verified participants' age and identity with photo identification. Participants were given a breath test (Intoxilyzer 5000; CMI Inc., Owensboro, KY, USA) prior to beginning the experiment to verify that their BAC was zero. All participants were given a pregnancy test (Osom hCG-Urine Test, Genzyme General Diagnostics, San Diego, CA, USA) and were left alone in a private room to complete background questionnaires on a computer. After completing the background questionnaires, participants were given instructions on the placement of the vaginal probe and the use of the intercom to contact the experimenter. Participants were then administered an alcoholic or non-alcoholic beverage and were breathalyzed. Once participants reached criterion BAC, they were shown the neutral and erotic films. Then, participants read an eroticized written scenario (see below for description) and reported their sexual desire and arousal on a computer. Last, participants were debriefed and paid.

Alcohol Administration

Participants were randomly assigned to an alcohol or a no alcohol condition. A yoked control design was used to reduce error variance in between-subjects intoxication levels. Participants who were assigned to the control condition were yoked to an

alcohol participant who had previously participated in the study. Individuals who were assigned to a control condition were breathalyzed at the same time intervals, completed questionnaires, and viewed the erotic film at the same time point as the alcohol participant to whom they were yoked. Participants assigned to the alcohol condition were weighed to determine the amount of 190-proof vodka mixed with orange juice consumed over 9 min needed to achieve BAC of .10 % (dosage = .68 g alcohol/kg body weight). The experimenter assessed participant BAC levels every 3 min until a criterion level ($BAC \geq 0.06$) was reached at which time participants began the sexual arousal procedures. Participants assigned to a control condition were given an equivalent volume of liquid based on body weight, but were given orange juice only. The drinks for both conditions were mixed in an anteroom, out of sight of the participant, and were given to the participant by the alcohol administrator who was a different female research assistant than the experimenter. Subjective intoxication was assessed for both alcohol and no alcohol conditions. A placebo condition was not used because the probability of manipulation failures dramatically increases when placebo participants are instructed to expect a high dose of alcohol (Martin & Sayette, 1993).

Sexual Desire and Arousal Assessment

Participants first completed background questionnaires and then read an eroticized scenario. Self-reported sexual desire and sexual arousal were assessed after completing the scenario. After finishing the experiment, intoxicated participants were taken to a private room to detoxify. Intoxicated participants were debriefed, paid, and released after reaching 0.03 % BAL. Participants in the control condition were debriefed, paid, and released immediately after the experimental condition.

Stimulus Materials

Erotic Priming To create an eroticized context in the laboratory that would support elicitation and assessment of sexual arousal and desire, participants viewed a 6-min erotic film (George et al., 2011). The film depicted two scenes, each showing explicit sexual activities between a man and a woman, which included kissing, oral sex, and vaginal intercourse (New Era Productions and VCA Productions). The erotic film was preceded by a baseline neutral film, which was a 2.5 min documentary about birds (BBC-TV). Female participants found the erotic films sexually arousing in a pilot study (George et al., 2003) and experimental data on the films have been reported elsewhere (George et al., 2011; Gilmore et al., 2010; Schacht et al., 2007).

Eroticized Heat-of-the-Moment (HOTM) Scenario To assess sexual desire and arousal situationally, participants were instructed to read and project themselves into a written second-person

erotized HOTM scenario in which they were the protagonist. In the HOTM scenario, a progression of scenes is described culminating in a decision to have intercourse. The progression of scenes include being introduced to a novel potential dating partner by a mutual friend while at a party, spending time with him at the party, going to his house, and engaging in sexual foreplay activities. Participants were randomly assigned to either a scenario where a condom was available or a scenario where a condom was not available. Alcohol consumption by the protagonist in the story was matched to the participant's alcohol condition in the experiment (alcohol vs. no alcohol). Alcohol consumption by the male sex partner in the story was kept constant at two alcoholic beverages. The scenario was pilot-tested, and participants' feedback was incorporated into the final version used in the study. Participants found the scenario realistic for the typical woman and for themselves (Schacht et al., 2010).

Measures

Sexual Desire in Scenario

After completing the scenario, participants were asked, "At this point, how much do you desire to have sex with the man in the story (regardless of whether or not you actually will)?"¹ The scale was from 1 (not at all) to 5 (very much) (Kuffel & Heiman, 2006).

Global Sexual Desire

Global sexual desire was assessed using three items from the Brief Index of Female Sexual Functioning (Taylor, Rosen, & Leiblum, 1994): "How frequently have you felt a desire to receive oral sex during the past month?," "How frequently have you felt a desire to perform oral sex during the past month?," and "How frequently have you felt a desire to have sexual intercourse with vaginal penetration during the past month?" Responses ranged from 1 (not at all) to 7 (more than once a day). The scale had acceptable internal reliability ($\alpha = .74$). This scale was measured prior to drink administration and reading the scenario.

Sex-Related Alcohol Expectancies

The sex-related alcohol expectancies questionnaire included 13 items and assessed alcohol expectancies about sexuality (Dermen & Cooper, 1994). There were three subscales: alcohol enhances sexual experiences (5 items), alcohol disinhibits sexuality (4 items), and alcohol increases sexual risk-taking (4 items). Example items include: "After a few drinks of alcohol, I am a

better lover" (enhancement subscale); "After a few drinks of alcohol, I am less likely to ask a partner to use a condom" (sexual risk subscale); and "After a few drinks of alcohol, I find it harder to say no to sexual advances" (disinhibition subscale). The scale has good internal reliability overall ($\alpha = .87$) and for the subscales (enhancement $\alpha = .85$, and risk-taking $\alpha = .92$, and disinhibition $\alpha = .76$). Responses ranged from 1 (disagree strongly) to 6 (agree strongly). This scale was assessed prior to drink administration and prior to reading the scenario.

Self-Reported Sexual Arousal during Scenario

Participants estimated their subjective level of arousal on a four-item scale immediately following the scenario (1 = "no sexual arousal at all"; 7 = "extremely sexually aroused"). These ratings were in response to the following questions: (1) "Overall, how much sexual arousal did you feel during the story?" (Heiman, 1977; Hackbert & Heiman, 2002); (2) "To what extent did you feel sensation in your genitals during the story?" (Heiman & Rowland, 1983); (3) "How much sexual warmth (in your genitals, breasts, and body) did you feel during the story?" (Meston, Heiman, Trapnell, & Paulhus, 1998); (4) "To what extent did you feel sexually absorbed in the sensory components of the story?" (Koukounas & McCabe, 2001). These questions were asked prior to the sexual desire question. The final scale included the mean of the four items. The scale has good internal validity ($\alpha = .96$). This scale was assessed after reading the full scenario.

Data Analysis Plan

To test the hypotheses a multivariate analysis of variance (MANOVA) with categorical and continuous predictors was used with SPSS. All variables were examined to ensure the assumptions for a MANOVA were met before analyses, independence among categorical predictors, multivariate normality, linearity, lack of outliers, homogeneity of the variance-covariance matrix, and multicollinearity.

Results

Preliminary Analyses

Sexual desire in the scenario was significantly related to global sexual desire, $r = .21$, $p = .01$. For descriptive information, see Table 1.

MANOVA

A between-subjects multivariate analysis of variance with categorical and continuous predictors was performed on two dependent

¹ In the larger study (Gilmore et al., 2013), desire to engage in sex in the scenario was significantly correlated with likelihood of engaging in sex in the scenario ($r = .56$, $p < .01$).

variables: sexual desire and self-reported sexual arousal. Independent variables were condom condition and beverage condition. Interactions tested were condom condition by beverage condition, beverage condition by sexual enhancement alcohol expectancies, beverage condition by sexual risk alcohol expectancies, and beverage condition by sexual disinhibition alcohol expectancies.

With the use of Wilks' criterion, the combined dependent variables were significantly affected by acute alcohol intoxication, $F(2, 126) = 4.62, p = .01, \eta^2 = .07$, condom presence, $F(2, 126) = 4.99, p < .01, \eta^2 = .07$ and the interaction between acute alcohol intoxication and sexual disinhibition alcohol expectancies, $F(4, 252) = 3.18, p < .01, \eta^2 = .05$. The dependent variables were not significantly affected by the interaction between acute alcohol intoxication and sexual enhancement alcohol expectancies, $F(4, 252) = 1.61, \eta^2 = .03$, or the interaction between acute alcohol intoxication and sexual risk alcohol expectancies, $F(4, 252) = 1.71, \eta^2 = .03$.

To investigate the impact of each main effect and interaction on the individual dependent variables, the univariate between-subjects analyses were examined. Intoxicated participants expressed significantly less desire ($M = 3.97, SD = 1.36$) than sober participants ($M = 4.46, SD = 0.93$), $F(1, 127) = 9.01, p < .01, \eta^2 = .07$. There were no differences in self-reported sexual arousal based on acute alcohol intoxication condition $F(1, 127) = 2.88, p = .09, \eta^2 = .02$.

Condom presence increased desire ($M = 4.41, SD = 1.03$) in the story compared to condom absence ($M = 3.94, SD = 1.34$), $F(1, 127) = 9.43, p < .01, \eta^2 = .07$. However, condom presence

did not affect self-reported sexual arousal, $F(1, 127) < 1, \eta^2 < .01$.

There was a significant interaction between acute alcohol intoxication and sexual disinhibition alcohol expectancies predicting desire, $F(2, 127) = 4.69, p = .01, \eta^2 = .07$, and self-reported sexual arousal, $F(2, 127) = 3.39, p = .04, \eta^2 = .05$.

An examination of the slopes revealed that sober women did not differ in their sexual desire based on sexual disinhibition alcohol expectancies, $t(133) = .30, p = .76$. Intoxicated participants, however, did differ based on sexual disinhibition alcohol expectancies, $t(133) = 3.74, p < .01$, such that for intoxicated women, those with low sexual disinhibition alcohol expectancies had lower sexual desire compared than those with high sexual disinhibition alcohol expectancies (see Fig. 1).

When examining the slopes of the interaction between alcohol and sexual disinhibition alcohol expectancies on self-reported sexual arousal, it was found that sober women did not differ in their self-reported sexual arousal based on sexual disinhibition alcohol expectancies, $t(133) = .52, p = .60$. Intoxicated participants, however, did differ based on sexual disinhibition alcohol expectancies, $t(133) = 2.56, p = .01$, such that for intoxicated women, those with low sexual disinhibition alcohol expectancies had lower sexual arousal compared to those with high sexual disinhibition alcohol expectancies (see Fig. 2).

Discussion

We conducted an experimental study to measure the effects of intoxication and condom availability on sexual desire and sexual

Table 1 Descriptive information

	Beverage condition		Condom condition	
	Alcohol	Control	Present	Absent
Descriptive information				
Age (<i>M</i> , <i>SD</i>)	25.83 (4.83)	24.95 (3.73)	4.98 (3.77)	25.96 (4.21)
Employed (% Yes)	64.7 %	75.0 %	68.6 %	70.7 %
Percent student (% Yes)	29.0 %	33.9 %	34.3 %	27.6 %
Race/ethnicity				
Caucasian (%)	62.9 %	74.6 %	67.6 %	69.0 %
Asian American (%)	4.3 %	6.8 %	7.0 %	3.4 %
Black/African American (%)	12.9 %	5.1 %	8.5 %	10.3 %
Multiracial (%)	15.7 %	10.2 %	11.3 %	15.5 %
Other (%)	4.4 %	3.3 %	5.6 %	1.8 %
Sexual behavior (<i>M</i> , <i>SD</i>)				
Age of first consensual sex	15.87 (3.06)	16.72 (2.28)	16.37 (3.10)	16.12 (2.28)
Lifetime sex partners	25.33 (27.21)	14.63 (14.56)	18.63 (28.76)	22.29 (43.35)
Variables				
Global sexual desire (<i>M</i> , <i>SD</i>)	3.86 (1.20)	3.91 (1.17)	3.82 (1.05)	3.96 (1.33)
Sexual disinhibition expectancy	3.19 (1.32)	3.30 (1.10)	3.15 (1.20)	3.35 (1.24)
Sexual desire in scenario	3.93 (1.38)	4.48 (.94)	4.42 (1.05)	3.90 (1.36)
Self-reported sexual arousal	4.39 (1.47)	4.17 (1.47)	4.31 (1.48)	4.26 (1.47)

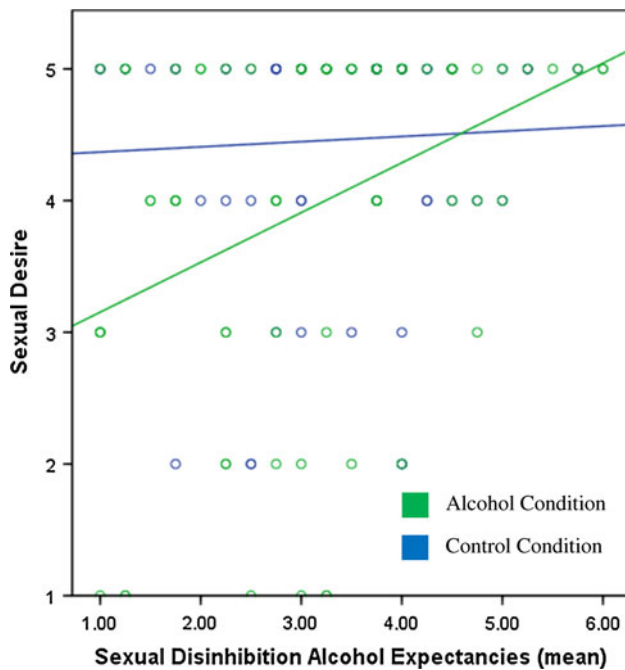


Fig. 1 Interaction between sexual disinhibition alcohol expectancies and alcohol on sexual desire

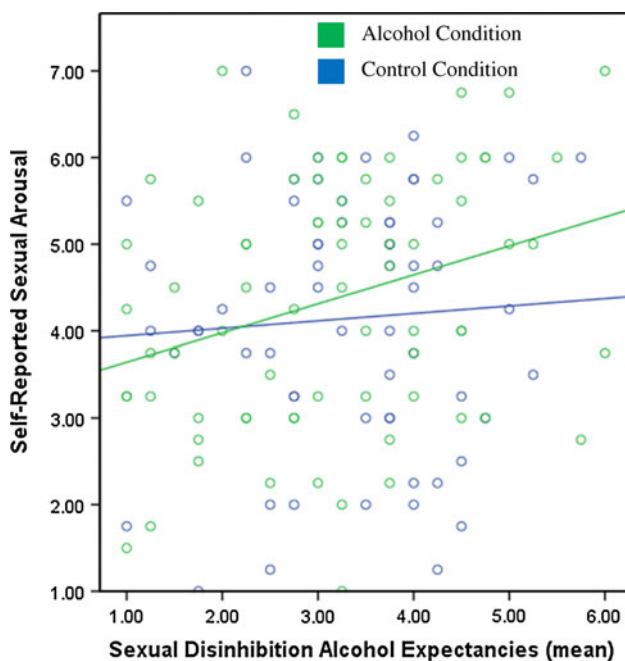


Fig. 2 Interaction between sexual disinhibition alcohol expectancies and alcohol on self-reported sexual arousal

arousal to a second-person story with a new partner. In regards to the alcohol effects, our hypotheses were partially supported. Consistent with AMT, alcohol decreased desire to engage in sex with a new partner and, consistent with AET, sex-related alcohol expectancies moderated this relationship such that

those who were intoxicated and who had high sexual disinhibition alcohol expectancies had more desire to engage in sex with a new partner compared to those who were intoxicated with low sexual disinhibition alcohol expectancies. In addition, consistent with AET, sex-related alcohol expectancies moderated the relationship between alcohol and self-reported sexual arousal in a similar pattern as its effect on sexual desire: those who were intoxicated and who had high sexual disinhibition alcohol expectancies had more self-reported sexual arousal compared to those who were intoxicated with low sexual disinhibition alcohol expectancies. In regards to the condom availability effects, women expressed greater desire to engage in sex with a new partner when a condom was available than unavailable; yet their self-reported arousal did not differ based on condom presence. Overall, these data demonstrate that desire to engage in sex and sexual arousal can be subject to the influence of prevailing contextual conditions.

Alcohol and Sex-Related Alcohol Expectancies

Sexual Desire

The results indicated that there was an interaction between sexual disinhibition expectancies and acute alcohol intoxication on desire to engage in sex with a new partner. For sober women, while desire to engage in sex with a new partner was generally high, it was unrelated to expectancies. For intoxicated women, we found that desire to engage in sex with a new partner varied as function of expectancy, consistent with an AET self-fulfilling prophecy analysis. This is consistent with longstanding AET accounts indicating that alcohol expectancies operate as self-fulfilling prophecies, which become activated when drinking and subsequently guide post-drinking behavior; but these same expectancies remain inactivated and essentially dormant under sober conditions (George et al., 2000; George, Cue, Lopez, Crowe, & Norris, 1995; George, Derman, & Nochajski, 1989).

Despite the interaction, the negative main effect of alcohol on desire was contrary to our initial hypothesis and therefore warrants commentary. First, it should be noted that there was nearly a ceiling effect on desire to engage in sex with a new partner in the sober condition ($M = 4.48$ out of 5). This ceiling effect suggests that for the majority of the women participating in the study, desire to engage in sex with a new partner in the scenario was quite high. Alcohol has wide-ranging effects on one's phenomenological experience. It is possible that other effects, such as fatigue, may detract from feelings of sexual desire, particularly in contrast to near ceiling levels of desire in the sober condition. Second, in the context of an alcohol-induced reduction of desire to engage in sex, alcohol expectancies functioned as theorized, increasing desire to engage in sex with a new partner to such an extent that intoxicated high-expectancy women achieved levels of desire comparable to sober women. Third, the expectancy scaling was bipolar such

that scores of 4-to-6 reflected agreement with alcohol-disinhibits-sexuality statements; but scores of 1-to-3 reflected disagreement with such statements. This suggests that the disagree vs. agree scores reflected more than just expectancy strength, but also expectancy valence. In this light, it is conceivable that so-called low-expectancy, i.e., expectancy disagreeing, intoxicated women were focusing on protecting against what it is that alcohol disinhibits (in this case: have sex with people whom I wouldn't have sex with if I were sober; do sexual things that I wouldn't do when sober; find it harder to say no to sexual advances; be more likely to have sex on a first date). This protective stance may have resulted in a compensatory effect, causing them to experience less sexual desire than sober counterparts.

Finally, given alcohol had a negative rather than positive effect on desire, AMT would infer simply that the finding was a function of what these women were myopically attending to during the desire to engage in sex with a new partner assessment. In addition to the self-fulfilling prophecy interpretation, the expectancy moderation effect also supports the possibility that different women were possibly focusing on different facets of the situation based on their individual differences in expectancy strength. As we discussed above, the difference may have been a function of either strength of belief in the alcohol-disinhibits-sexuality statements or valence of belief. This potentiality is consistent with the AMT-AET integration proposed by Moss and Albery (2009), whereby expectancies dictate what drinkers myopically attend to while intoxicated. Similarly, Davis, Hendershot, George, Norris, and Heiman (2007) reported that alcohol-induced myopic attention to the benefits-versus-risks of unprotected sex was moderated by drinkers' a priori perceptions of the likelihood of positive consequences from sexual risk taking.

Sexual Arousal

Consistent with the sexual desire findings, there was an interaction between sexual disinhibition expectancies and acute alcohol intoxication on self-reported sexual arousal. For intoxicated women, those with low sexual disinhibition expectancies had lower self-reported arousal compared to those with high sexual disinhibition alcohol expectancies. However, no differences were found for self-reported sexual arousal based on sexual disinhibition alcohol expectancies for women in the sober condition. Given that sexual desire and self-reported sexual arousal are both self-reported measures about their sexuality, it makes sense that the findings are in a similar direction. Consistent with the AET explanation given above that alcohol expectancies can operate as self-fulfilling prophecies activated while drinking, if a woman believes that she is sexually disinhibited while drinking this suggests that she believes she will be more aroused in a scenario involving sexually explicit material. Finally, although self-reported sexual arousal was assessed using a mean score of several different questions including

both subjective arousal and perception of genital arousal, similar results were found when analyses were run using each item of sexual arousal individually, suggesting that these results are not specifically driven by an individual question or subset of questions in the sexual arousal measure.

Condom Availability

We also found a main effect of condom condition. Condom availability predicted desire to engage in sex with a new partner such that when a condom was present desire was higher than when a condom was absent. This conceptually replicates a previous finding in which individuals expressed greater intentions to have sex in a casual encounter when a condom was available (Conner & Flesch, 2001). This finding is consistent with the suggestion that women may believe that sexual health and pregnancy risks can be averted when condoms are available rather than not and thereby experience a greater desire and willingness to have sex. Further research is warranted to ascertain whether the condom availability effects we observed are indeed a function of perceived health risks. Also, it will be important to evaluate this effect with men, who, compared to women, tend to have less positive and more negative attitudes about condom usage (Mizuno, Kennedy, Seals, & Myllyluoma, 2000).

We also found that condom availability did not have an effect on self-reported sexual arousal. The results of this study suggest that a situational factor, such as the mere presence of a condom in a sexual scenario, can impact desire to engage in sex but it may not change one's sexual arousal. Thus, it may be possible for a woman to still be sexually aroused and not want to engage in sex if a condom is not present. This could have implications for interventions to teach women (and men) that arousal does not equal desire in sexual situations.

Sexual Desire Assessment

Basing our assessment of sexual desire on a particular situation and assessing potentially similar constructs proved important in three ways. First, sexual desire was correlated with self-reported sexual arousal, which was also assessed in a situationally-specific manner. This is consistent with previous research indicating that the two constructs inhabit overlapping conceptual space. Also, when examining the effect of situational factors like alcohol and condom presence, the results differed somewhat for sexual desire and sexual arousal. This suggests that self-reported arousal, a composite score of genital and psychological arousal, and desire to engage in sex—at least, when measured situationally—are not redundant. Second, our situationally specific sexual desire assessment was significantly but only modestly correlated with the global assessment, accounting for less than 4 % of shared variance. Methodologically speaking, this low association suggests utility in supplementing global indicators with situational indicators, depending on the study questions. It would be

valuable to capture sexual desire varying along dimensions of particular conceptual or clinical relevance: Sexual desire with an established mate versus a new partner, a high versus low risk situation, a situation related to previous trauma or current partner conflict, etc. Such work could conceivably reveal that, when responding to global indicators, respondents are estimating across only certain types of situations systematically and thus not fully capturing the breadth of their sexual desire experience or capacity. The low association observed in the current study also indicates that the particular situation used here—a newly met casual partner encountered in a party situation involving alcohol—was not typical of the types of circumstances participants considered when responding to the global assessment. Third, as noted earlier, situationally assessed desire proved sensitive to these in-the-moment influences, suggesting the utility of exploring other situational determinants of desire.

Strengths and Limitations

A strength of this study was that we examined sexual desire and self-reported sexual arousal in an experimental paradigm. This allowed for a better understanding of the relationship between alcohol and sexual desire separate from the relationship between alcohol and self-reported sexual arousal. Another strength of this study is that alcohol factors, including dosage and limb of the BAC curve, were controlled through rigorous procedures involving consistent BAC monitoring and specific BAC criterion starting points. A limitation of the alcohol administration procedure is that a placebo condition was not used; however, placebos are generally ineffective at such high alcohol doses (Martin & Sayette, 1993). Another strength regarding our community sample was including both students and nonstudents, bolstering the generalizability of our findings.

This study used a single item to measure sexual desire. Many of the global sexual desire measures include multiple items to indicate sexual desire. It would be beneficial to examine the current findings while using a multiple item indicator of situational sexual desire which may include additional questions about desires to engage in specific sexual behaviors or current presence of sexual fantasies. The significant correlation with global sexual desire provides some support—albeit modest—for the validity of the situational sexual desire measure. Garnering further construct validity evidence is certainly warranted. Two specific recommendations that would likely result in stronger validity support are (1) for assessing situational sexual desire, develop additional desire items about the index situation, such as desire for different sexual activities (e.g., oral receiving, oral giving, vaginal, manual, and anal); and (2) for assessing global sexual desire, develop multiple prototypic contexts, such as desire with an establish versus new partner or desire when at home versus other places or desire when sober versus intoxicated. However, it is also conceivable that the low correlation between global and situational desire also reflects the possibility is that the situational

assessment could be reflecting the likelihood of actually engaging in sex. Further, research is needed to address these and other possibilities.

The generalizability of these findings is limited. The immediate effects of consuming alcohol on sexual desire and arousal were not assessed in this study. It is possible that changes in sexual desire and arousal occurred immediately after the first sip of alcohol; however, since this was not assessed in the current study, the findings should be interpreted accordingly. Our sample included nonproblem drinkers who were interested in sex with men. Additionally, the sample consisted of community women who volunteered for sex research. Sex research volunteers are typically more sexually experienced and have more positive sexual attitudes when compared to individuals that do not volunteer for sex research (Strassberg & Lowe, 1995). Finally, the eroticized HOTM scenario was preceded by erotic films. Thus, these findings may only be generalizable to individuals who are primed with some sexual content or sexual arousal while in a particular scenario.

Conclusion

This was the first study that has examined acute alcohol intoxication effects on women's sexual desire and to do so using a non-clinical sample and an experimental approach. Previously, alcohol's association with women's sexual desire has been primarily studied with survey methods. Although experiments examining alcohol's effects on women's sexual arousal have been increasing in the past few years, experiments on women's sexual desire are needed to gain a better understanding of alcohol's effects. Previous research has also relied heavily on clinical samples selected for extant sexual and/or alcohol disorders. The present research suggests that alcohol affects desire to engage in sex in a particular situation, which merits research attention on alcohol and sexual desire in non-clinical samples. Such research—combined with experimental methodology—could prove valuable in identifying and isolating elemental dynamics about the degree to which women's sexual desire is responsive to alcohol in a particular encounter. The current findings also extend evidence that sex-related alcohol expectancies play an important role in sexual experiences especially sexually risky experiences (Davis et al., 2007, 2010; Hendershot, Stoner, George, & Norris, 2007).

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