The effects of alcohol and cue salience on young men's acceptance of sexual aggression[⋆]

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Abstract

Research suggests that alcohol intoxication may increase a young man's likelihood of sexual aggression. This laboratory analogue experiment tested a disinhibition versus alcohol myopia explanation of alcohol's role by investigating effects of acute alcohol administration, expectations and individual differences drawn from Malamuth's Confluence Model of Sexual Aggression (i.e., Acceptance of Interpersonal Violence: AIV, Need for Sexual Dominance: NSD) on young men's acceptance of sexual aggression. Young adult heterosexual men (*n*=334) attended two laboratory sessions each. In the first, they completed screening and individual differences measures. In the second, they were assigned randomly to consume one of four beverages: Control, Placebo, Low Dose Alcohol (0.33 ml alcohol/kg body weight) or Moderate Dose Alcohol (0.75 ml/kg) and view one of two video-delivered scenario conditions: "Anti-Force Cues" (scenario of a couple on a date with embedded explicit cues mitigating against forced sex) or "No Cues" (Identical scenario with no Anti-Force cues). Participants then judged 1) should the man continue to force the woman to have sex? 2) would *they* force the woman? and 3) who was responsible for the outcome? Results supported a disinhibition versus alcohol myopia model. Consuming alcohol increased acceptance of sexual aggression. Further, higher NSD and AIV scores were associated with acceptance of forced sex, but only after alcohol consumption. Overall, findings showed that key individual difference factors from Malamuth's Confluence Model enhance precision of predicting sexual aggression risk by young men under the influence of alcohol.

Keywords

Sexual aggression; Alcohol administration; Need for Sexual Dominance; Acceptance of Interpersonal Violence; Heterosexual males

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1. Introduction

Up to 30% of college women report experiencing sexual coercion, making prevention of this problem a significant public health focus for young adults (Abbey, Zawacki, Buck, Clinton & McAuslan, 2004). Most typically the man is someone the woman knows or has started dating recently (Drieschner & Lange, 1999), so it is generally referred to as "date rape" or "acquaintance rape." Surveys indicate that alcohol is often involved and may be a significant catalyst for using force (e.g. Koss & Dinero, 1989; Muehlenhard & Linton, 1987; Abbey, 1991). In more than half of reported sexual coercion incidents, the man's alcohol use is cited as a factor (Abbey et al., 2004). Moreover, even the *belief* that he is intoxicated may increase a man's acceptance of using force to have sex. In a role-playing study, undergraduate men instructed to respond *as though* they were intoxicated said they would be more likely (than when sober) to use coercion to have sex and to perceive less risk to themselves for doing so (Fromme & Wendel, 1995).

The most common explanations proposed for alcohol's role in sexual coercion are based on a relatively simple Alcohol Disinhibition hypothesis or on an Alcohol Myopia-based model. Alcohol Disinhibition explanations posit that intoxication impairs a man's "normal prosocial inhibition" to the use of force to have sex (e.g. Barbaree & Marshall, 1991) in a relatively straightforward relationship to dose. Recent cognitive neuroscience research shows that acute alcohol intoxication disrupts intentional inhibitory control (Abroms, Gottlob, & Fillmore, 2006), thus providing a hypothetical mechanism. Alternately, Alcohol Myopia explanations suggest that alcohol dose interacts with situational variables. Alcohol Myopia (cf Steele & Josephs, 1990) is probably the best known of the attention-allocation models of alcohol's acute effects on social information processing. Rather than postulating a *direct* pharmacological effect on behavior, Alcohol Myopia suggests that acute intoxication impairs information processing, restricting one's cognitive ability to process the large array of internal and external cues regulating social behavior. In a dating interaction, increased intoxication reduces the range of cues a man can process and his attention becomes more focused on the most salient aspects of the situation, presumably the woman's positive behavior. Thus, with increasing intoxication, he may see her positive behavior as a sexual signal and disregard countervailing inhibitory information (e.g. the woman saying "no" to sexual intercourse).

These contrasting explanations suggest contrasting prevention strategies, so the distinction is important. Briefly, a Disinhibition explanation would focus prevention solely on the man's intoxication level, while an Alcohol Myopia explanation could suggest additional situational prevention strategies. However, the controlled alcohol-administration analogue research necessary to contrast these explanations is scarce. One relevant laboratory study (Johnson, Noel, & Sutter-Hernandez, 2000) assessed young adult males' acceptance of sexual aggression after they consumed one of four beverages (Moderate or Low alcohol dose, Placebo or a Control beverage) and then watched one of two videotaped scenarios of a couple on their first date. The two scenarios contrasted the woman's behavior so that in one she was "Clearly Disinterested" in the man but in the second she was friendly and positive ("Interested") although not explicitly sexual. Participants rated agreement with 1) the man in the scenario should have sexual intercourse with her, 2) the man should "use force" if she resisted and 3) *he* (the participant) would "use force" to have sex if he was in the same situation. The result was an interesting interaction. Regardless of the beverage consumed, participants in the Clearly Disinterested condition were unlikely to endorse using force. However, if the woman showed interest, alcohol dose was an important determinant of endorsement of force. Moderate dose Interested condition participants were the most likely to accept using force, both for the man in the video and for themselves. Interested condition

men who had consumed the other beverages did not differ from men shown the Clearly Disinterested scenario.

In discussing these results, Johnson et al. (2000) posited a contrast between Alcohol Disinhibition versus Alcohol Myopia models to explain the interaction. In a Disinhibition model, men consuming a Moderate alcohol dose would have been more likely than non-intoxicated men to endorse some coercion, regardless of situational cues (i.e., the woman's interest versus her disinterest). Instead, more consistent with an Alcohol Myopia model, the Interested (versus Clearly Disinterested) Moderate dose participants appeared to focus on the woman's salient positive actions and disregard the less salient social and/or legal sanctions against sexual aggression. This *post-hoc* Alcohol Myopia interpretation seemed plausible, but left several unanswered questions. Most importantly, the Johnson et al. experiment itself was not a true test of Alcohol Myopia versus Disinhibition hypotheses because the results actually could have supported either explanation. One could argue on behalf of a Disinhibition hypothesis that in the Clearly Disinterested condition the woman's behavior made her sexually *un*attractive, so the intoxicated participants had no inhibitions to overcome. Perhaps only Interested condition participants felt sexually attracted to her and men given the Moderate Dose were disinhibited about forcing her to have sex.

Further, high variability in participants' ratings suggested that important intrapersonal factors (not assessed) had moderated alcohol's effects on acceptance of force. Along these lines, Malamuth's Confluence Model of Sexual Aggression (Malamuth, Sockloskie, Koss & Tanaka, 1991) identifies a specific set of intrapersonal variables that predicted sexual aggression in one of the few *longitudinal* (10-year) studies of young men's sexual coercion (Malamuth, Lintz, Heavey, Barnes & Acker,1995). Young men most likely to sexually aggress had a history of early and promiscuous sexual behavior *as well as* a hostile, suspicious and domineering attitude towards women, as measured by the Acceptance of Interpersonal Violence (AIV, Burt, 1980) and the Need for Sexual Dominance (NSD, Nelson, 1979) scales. Similar research showed that young men with a history of sexual coercion usually tried to dominate women even in conversations (Malamuth & Check, 1985) and often interpreted a woman's *assertive* refusal of sex as hostile and threatening (Murphy, Coleman & Haynes, 1986).

Additionally, a man's expectations about alcohol's effects could have moderated his sexual aggression risk. Alcohol expectations have been associated with differential intoxicated responding in a number of studies (e.g., Rohsenow, 1983) so perhaps when they are intoxicated some men accept sexual coercion because they believe that alcohol has increased their sexual desire and/or their need for power and aggression.

The goals of this study, then, were to assess an Alcohol Myopia versus a Disinhibition model for predicting men's acceptance of sexual aggression and explore how hypothetical high-risk characteristics (i.e. Need for Sexual Dominance—NSD, Acceptance of Interpersonal Violence—AIV and Alcohol Expectations—AE) might moderate alcohol dose effects. To counteract the flaw in the Johnson et al. (2000) study, we wanted to insure that male participants felt sexually attracted to the woman in both scenarios. Therefore, both videotaped scenarios that were developed and validated for this study (using men's focus groups; see Noel et al., 2008) presented *sexually impelling* stimuli in a first-date situation with a young couple. The pivotal difference between the two scenarios was the presence or absence of salient anti-force cues. The Anti-Force Cues scenario presented an extremely salient set of stimuli *very opposed to sexual aggression* (but *not* opposed to sex, per se), while the alternate video (No Cues) presented no anti-force stimuli. Disinhibition would predict the greater the participant's intoxication, the greater his acceptance of sexual coercion, with no differential effect of presence or absence of anti-force cues. Conversely,

Alcohol Myopia would predict that intoxicated participants viewing the Anti-Force Cues video would focus on the salient anti-force stimuli and be the *least* accepting of sexual coercion.

The current study used a 2 (Cue type)×4 (Beverage/Alcohol dose) between groups factorial design. Each participant attended two sessions about a week apart, with three individual differences (NSD, AIV and AE) assessed in the first session and an alcohol administration laboratory procedure in the second. In the second session, participants were randomized to one of four beverage/alcohol conditions (none, placebo, low or moderate), and after drinking, viewed either the Anti-Force Cues or the No Cues scenario. They then rated acceptability of sexual aggression in the scenario. As noted, Disinhibition predicted only an alcohol main effect: the higher the dose, the higher the acceptance of coercion. Alcohol Myopia, in contrast, predicted a beverage by cue condition *interaction* with the higher dose effects moderated by the presence or absence of anti-force cues. Additionally, we assessed moderations by the three individual difference variables on alcohol effects, predicting that the higher the dose, the stronger the association between each intrapersonal variable and acceptance of coercion.

2. Method

2.1. Participants

The participants were 334 men recruited from the community over 3½ years. The large number provided the power needed to test the moderator hypotheses. *Inclusion criteria* were age 21 to 30, heterosexual orientation and regular alcohol consumption (light, moderate or heavy—no abstainers or infrequent drinkers). *Exclusion criteria* were self-reported current or past alcohol problems, severe psychiatric symptoms or medical conditions contraindicating alcohol consumption and a history of excessive violent behavior while drinking (e.g. assaulting a police officer). To participate in the second (laboratory) session, participants also had to meet criteria regarding eating, drinking and psychoactive substance use 24 h before the session (described later) and consent to stay under laboratory supervision until detoxified.

Of the original 539 men screened, 167 were excluded: 78 for potential serious alcohol problems; 26 drank too little; 10 for serious health issues; 11 for sexual orientation; 15 for scores above the SCL-90-R cutoffs; 16 for a history of severe or frequent violence; and 11 who attended the second session but a) refused to sign the second session Informed Consent (n=3); b) refused to continue when assigned to the no alcohol (water) condition (n=3); c) became nauseated during beverage consumption (one given a Placebo, the other Moderate Alcohol) (n=2); or d) arrived for the second session having used a psychoactive drug or eaten too recently, and could not be rescheduled (n=3). Additionally, 38 eligible men refused to continue for unknown reasons during or just after their screening.

Mean age of the 334 participants was 22.6 (SD=2.1), with 276 (82.6%) European-Americans, 28 (8.4%) African-Americans, and the rest Hispanic, Asian-American or Native American Indians. Special efforts were made to recruit a larger sample of African-Americans, but about 50% of African-American men approached by recruiters were ineligible due to low drinking levels. Most participants were single (216; 65%) or involved in a "steady dating" relationship (88; 26%); five were married and the rest divorced. In terms of education, 235 (70%) were college juniors and seniors, though not necessarily full time students, another 50 (15%) were college graduates and/or current graduate students. The rest ranged from less than high school education to current freshmen and sophomores.

Participants reported a mean of 41.2 (SD=25.4) days drinking in the last 90, with 59 (17.7%) reporting daily drinking. Frequency of alcohol use, measured on a scale from "none" (0) to "everyday or almost everyday" (6), averaged 4.73 (SD=1.1). Most (87%) reported 3–4 standard drinks or more, usually beer or hard liquor, when they drank. Scores on the RAPI averaged 42.4 (SD=14.7) indicating that many had experienced some negative consequences of alcohol use in the last year (e.g., missing classes or work).

2.2. Materials

2.2.1. Screening and individual differences measures

2.2.1.1. Screening: drinking frequency; quantity and problems: The QFI (Quantity-Frequency-Index, Cahalan, Cisin, & Crossley, 1969) was used primarily to identify and exclude infrequent drinkers (less than once per month) and potential problem drinkers. Respondents reported frequency and typical amounts of hard liquor, wine and beer drinking in the last 90 days. The Rutgers Alcohol Problem Index (RAPI: White & Labouvie, 1989) also screened for serious drinking problems and aggression. The RAPI's 23 items assess frequency of specific negative consequences of drinking in the past 12 months (current study, a=0.93). *Drug Problems*: Self-report of current drug problems disqualified a participant. *Psychiatric Problems*: The Symptom Checklist 90-R (SCL 90-R, Derogatis, 1977) screened for current psychiatric problems. Men scoring above clinical cutoff points for major disorders (i.e. Paranoia, Psychosis) were excluded (all as >0.75). *Medical and Physical Problems*: Self-report of poor current health disqualified a respondent while chronic disorders or medication use required physician approval. Men taking medication for an acute illness (e.g. an antibiotic) were not scheduled until 48 h after completing the medication course. *Sexual Orientation:* Participants rated themselves on a single item ranging from 1 (heterosexual) to 3 (bisexual) to 5 (homosexual) (similar to Kinsey, Pomeroy, & Martin, 1948). Only those rated 1 or 2 were eligible to participate.

2.2.1.2. Measures of individual differences

a. *Need for Sexual Dominance (NSD).* The NSD is an eight-item self-report measure derived by Malamuth, Heavey, and Lintz (1993) from a 24-item sexual motives inventory (Nelson, 1979). The NSD subscale assesses the degree to which feelings of control over one's partner (e.g. "Because I like the feeling of having another person submit to me.") motivates sexuality. Each item is answered on a four point scale (1=not at all important to me to 4=very important to me). In this study, the NSD yielded a range of scores from 8 to 32 (*M*=16.8; SD=4.9; a=0.82). In Malamuth et al.'s (1993, 1995) studies this instrument discriminated males most likely to engage in sexual coercion.

b. *Acceptance of Interpersonal Violence (AIV).* The AIV is a six-item scale (Burt, 1980) that measures attitudes condoning the use of force in sexual relations (e.g. "Being roughed up is sexually stimulating to some women."). Each item is answered on a seven-point scale (1=strongly disagree to 7=strongly agree). In this study, the AIV yielded a range of scores from 6 to 37 (*M*=14.1; SD=5.0; a=0.58). Malamuth et al. (1993, 1995) reported that the AIV, despite its somewhat low internal consistency, was one of the strongest predictors of men most likely to be sexually aggressive during the next 10 years.

c. *Alcohol Expectancies (AEQ-2).* The AEQ-2; (Rohsenow, 1983) measures expectations about the effects of alcohol (e.g. "A few drinks make me less shy."). Each item requires a dichotomous response: 1 = true or mostly true for me; 0 = false or mostly false for me. Only the Sex (5 items) and Power and Aggression (6 items) subscales were used in this study. The Sex subscale yielded a range of scores

from 0 to 5 (M=1.9; SD=1.6; a=0.68). The Power and Aggression subscale yielded a range from 0 to 6 (M=2.4, SD=1.8; a=0.68).

Two way analyses of variance or chi square analyses found no demographic differences, baseline drinking differences or differences in the distribution of the Intrapersonal variables (AIV, NSD, AEQ-2) among the eight cells of the study design.

2.2.2. Dependent measures and video manipulation checks—These measures are described later in the Procedure section on video presentation.

2.3. Procedure

2.3.1. Recruitment and screening—Male and female teams of recruiters publicized the study by leaving flyers on the two local campuses, restaurants and stores and by making direct approaches to young men both downtown and on the local beaches. We also maintained a website and dedicated telephone.

Research assistants held screening sessions (about 45 min) in small group rooms on campus. Each participant signed a consent form approved by the UNCW IRB, was breath tested and paid $15. The initial consent was for screening only which was used to determine eligibility for the study. A Graduate Research Assistant (GRA) scheduled eligible men for the second experimental session.

2.3.2. Alcohol administration study

2.3.2.1. Scheduling the experimental laboratory session: Participants were scheduled for individual evening appointments, beginning about 6 pm. They were asked to eat nothing for 3 h before the session commenced and refrain from alcohol or other psychoactive substance use the day of their appointment, with the exception of tobacco and caffeine. Because we did not want the participants to be in nicotine or caffeine withdrawal during the experimental session, regular smokers were allowed to smoke up to 30 min prior to the session and caffeine was allowed up to 3 h beforehand. Participants were told that to bring a driver's license for age identification and plan on staying at least 2 h, possibly up to six, at $15/h.

To reduce demand bias, we followed a standard social psychological research procedure (e.g. Johnson et al., 2000), telling participants they would be part of two experiments: the first assessing effects of alcohol on problem solving (in reality, just a distracting task while BAC was rising); the second, specifically not an alcohol experiment, involved observing and remembering the actions of people in a videotape while waiting for the alcohol to process out.

2.3.2.2. Introduction, informed consent and random assignment: Both undergraduate research assistants (Experimenters 1 and 2) who interacted directly with the participant were blind to his beverage and cue condition. Only the supervising GRA, who prepared the drinks in a separate room, knew the condition. The GRA had no direct contact with participants or Experimenters until each participant's debriefing.

Experimenter 1 greeted the participant, read and signed the informed consent with him and then confiscated his driver's license, car keys and cell phone. The consent form stated that the participant might consume enough alcohol to make him feel intoxicated and it might take him up to 6 h to completely process the alcohol. Although he could stop *participation* at any time, he had to sign a "Ulysses" contract (NIAAA, 1989) agreeing to be "temporarily restrained" (from leaving the facility) even though he "might protest the restraint later," until his BAC returned to zero (NIAAA, 1989, p. 9). No intoxicated participants asked to leave early. Each participant was breath-tested and verified through self-report that he met study

criteria for current health, eating, alcohol, caffeine, nicotine and other drug use. As noted earlier, three participants had to be rescheduled.

The participant's room was the size of a small office and equipped with a medical weight and height scale, a VCR and television monitor, a computer monitor, a small table and chair, a sofa and an easy chair. This room was connected audio-visually with a Control room housing a refrigerator and beverage measuring and mixing equipment. Experimenter 1 measured his weight and height, and then seated him in the chair facing the television monitor. The GRA in the Control room randomly assigned a beverage condition and prepared the appropriately measured drink. Because assignment was truly random, the final *n*s for each of the experimental groups are uneven (see Table 1).

2.3.2.3. Beverage administration: The GRA calculated doses of vodka by inputting height, weight, age and gender in a computer program intended to produce a BAC of 0.04% (*Low Dose*) or 0.08% (*Moderate Dose*). The *Placebo* was chilled tonic water disguised as alcohol by serving it from a vodka bottle and swabbing vodka around the outside and the rims of the glasses and on the serving tray. Thus, all "alcohol" beverages (including Placebo) looked and smelled like a vodka tonic.

To preserve the blind, the GRA prepared the beverages out of sight of participants and Experimenters. Beverages were served on a tray holding a chilled pitcher with five chilled highball glasses, a cold bottle of tonic water, a chilled bottle of "vodka," a lime and ice cubes alongside. The capped "vodka" bottle actually contained flat tonic water only (Placebo) or flat tonic water mixed with required amounts of vodka (Low or Moderate dose). Except in the Control (Ice water) condition, the tray, bottles and glasses were sprinkled with vodka to make the Placebo smell believable. *Control* participants were given plain ice water with a slice of lime, to make it absolutely clear to them that they had *not* been given alcohol.

Experimenter 1 delivered the tray to the participant, opened the vodka and tonic bottles, mixed the drinks in the pitcher, sliced the lime and garnished each glass with a wedge. Each participant then sat alone for 25 min to drink. He was asked to space out his drinks—one glass every 5 min to allow a steady infusion of alcohol.

Experimenter 1 then removed the beverage tray and for the following 25 min the participant engaged in two standard word association and mental rotation tasks preprogrammed on the computer. These tasks were distractions and the interval allowed his BAC to rise. Experimenter 1 had no further interaction with him.

2.3.2.4. "Experiment II": viewing the scenario: Experimenter 2 took over after the participant had finished drinking (this kept him blind to the beverage condition) and set up the "second experiment" in which the participant watched one of the two videotapes. Experimenter 2 asked him to "Be alert" and "Observe carefully" because the study was on social memory processing.

Both 10-minute scenarios (filmed by a professional video company) were intended to maximize participants' sexual attraction, while differing *only* on the presence or absence of Anti-Force Cues. Developing the videos to meet high standards for validity took several months (four sequential formative studies). Focus groups and questionnaires validated that the targeted group of men perceived that (a) the woman was sexually interested, (b) the sexual cues were salient, (c) the Anti-Force cues were salient (Anti-Force video only), and (e) the Anti-Force cues inhibited acceptance of forced sex. See Noel et al. (2008) for a detailed account.

In both scenarios, a young couple, Jenn and Kip, enter her apartment after she has singled him out from a crowd of friends at a bar. Her apartment is decorated with posters, candles and feminine knick-knacks. Jenn cuddles next to Kip on the sofa. Among other topics, they discuss a book on her coffee table and a university class she is taking. Jenn asks Kip to get her a glass of wine while she changes into "something more comfortable." She leaves the bedroom door slightly ajar so he can glimpse her changing clothes. She returns wearing a t-shirt and very short shorts. Jenn asks for a backrub, then instigates a short wrestling match on the sofa trying to grab his wallet (to look at his driver's license photo). He pushes her down on the sofa, kisses her and begins to try to have sexual intercourse with her. As he tries to pull down her shorts, she says to stop. She doesn't want intercourse. He continues, pushing her hands away, and as the scene fades he is clearly overpowering her while she sounds progressively more distressed.

The *Anti-Force Cues* scenario embedded three very salient, explicit cues reminding participants that forced sex is never acceptable: 1) feminist-themed posters on the walls (e.g. a National Organization for Women poster), 2) the class and book were for her "women's studies" major and 3) the t-shirt into which she changed was red with "Rape Crisis Center" emblazoned on the back. In the contrasting *No Cues* scenario, the corresponding stimuli were: 1) posters of kittens and a rock band, 2) a psychology class in animal behavior and 3) a plain white t-shirt.

2.3.2.5. Dependent measures description and administration: Immediately following the video, participants responded to a series of questions (dependent measures and manipulation checks). The questions included:

1   Given the situation, Kip should continue to try to have sex with Jenn

2   If you were in this situation, you would continue to try to have sex with Jenn

In response to each question (1 and 2), the participant circled a number on a scale from 1 = strongly disagree to 7 = strongly agree.

3   Assume the scene continued and that Jenn and Kip had sexual intercourse. To what extent is this Jenn's responsibility?

4   Assume the scene continued and that Jenn and Kip had sexual intercourse. To what extent is this Kip's responsibility?

For each question (3 and 4), participants placed an X on a continuous six-inch line with "None" as the anchor point on the left and "100%" as the anchor point on the right. Scores were the distance, calculated in inches, from the beginning of the line ("none") to the X.

Question 1 measured the degree to which the participant accepted forced sex in the situation. Question 2 measured if *the participant himself* might force sex in such a situation. Questions 3 and 4 assessed the participant's judgment of responsibility for the forced sex.

2.3.2.6. Manipulation checks: To assess if anti-force cues were salient and memorable, three open-ended questions were asked: 1) What was Jenn wearing in the last half of the video? 2) What was the book and class they discussed? and 3) What were the posters about? In the No Cues condition, 3% of all participants forgot that Jenn was wearing a plain white t-shirt at the end of the video. Otherwise fewer than 1.5% of participants forgot each cue, and no participant was "absolutely cueless" in either cues condition.

Finally, to assess the participant's response to the important cues present in both scenarios, he rated two statements from 1 = strongly disagree to 7 = strongly agree: 1) Jenn was flirting with and teasing Kip; and 2) Jenn is sexually attractive. For these two questions, analyses of

variance showed that in both scenarios Jenn was rated high on "Flirting" (i.e. her sexual cues were salient in both scenarios) (overall M=6.2, SD=1.0) with no between group differences (all Fs non-significant). Moreover, Jenn was judged above the mid point (4) in sexual attractiveness in both scenarios, but Anti-Force cues appear to have diminished her attractiveness somewhat (F=3.9; df=1, 323; p <0.048) (M Anti-Force Cues = 4.6; SD = 0.9; M No Cues = 4.8; SD=1.1). No alcohol-related differences or alcohol interactions with cues were seen (all other Fs not significant).

Blood alcohol concentrations (BAC; Alcosensor III, Intoximeters, Inc.) were recorded immediately following the ratings (35 min post drinking cessation), but not shown to participants. Instead, participants saw a form which defined a standard drink and asked, 1) How many standard drinks did you have in the experiment? 2) Please estimate on a scale of 0 (not at all)–10 (extremely) how intoxicated you are right now. These questions assessed perceptions of the Low versus Moderate dose and the effectiveness of the Placebo.

All participants began both the screening and laboratory sessions at 0.0% BAC. In the Moderate Alcohol condition, BACs immediately following the video ranged from 0.04% to 0.18% (the latter was an extreme outlier; the next lowest BAC was 0.09%, but his questionnaire responses were not different than the others, so he was retained), (M=0.065%; SD=0.02). In the Low Alcohol condition, BACs ranged from 0.01% to 0.049% (M=0.03%; SD=0.01). A univariate F test revealed that Moderate dose BACs were significantly greater than Low dose BACs (p<0.0001), while subsequent BAC assessments showed that all alcohol condition participants were at or nearing peak BAC when they viewed and responded to the video. Table 1 shows participants' self-estimates of intoxication level and number of standard drinks consumed. Participants given Moderate Alcohol estimated significantly greater levels and drinks than Low Alcohol. Low Alcohol produced marginally greater estimates than the Placebo, but the Placebo apparently did lead participants to believe they had consumed some alcohol. Only three of the 84 Placebo participants thought they had had no alcohol. Separate analyses of the main dependent variables with these three removed revealed no differences, so they were retained. One Control (Water Only) Condition participant suspected he had been "slipped a little alcohol," so he was not included in subsequent analyses. At the end of the session, each participant was given a meal, debriefed by the GRA, and kept under supervision in the laboratory until a breathalyzer showed that his BAC was zero (a requirement of the UNCW IRB).

3. Results

3.1. Primary analyses

Table 1 shows the numbers of participants in each cell who completed the laboratory session and presents the means and SDs of the four dependent variables, 1) Should the man continue (Man Continue)? 2) Would you continue (You Continue)? 3) How responsible was the woman (Woman Responsible)? and 4) How responsible was the man (Man Responsible)? Initial examination of the data for the first two dependent measures suggested that the distribution could be best described as binary. For both measures, the median score was 1 (strongly disagree) with only 63 participants (19.0%) accepting the use of force by the man (Man Continue) and 61 (18.1%) accepting the use of force for themselves (You Continue), so both measures were recoded as dichotomous variables (accepted/did not accept) for further analyses.

With outcome measures recoded as bimodal, analysis of variance were inappropriate. Instead, we used binary logistic regression procedures (SPSS15) to test our *a priori* predictions. Both the Disinhibition and the Alcohol Myopia hypotheses predicted different beverage effects on acceptance of force so we contrasted: 1) Alcohol (both doses) versus No

Alcohol (water condition); 2) Alcohol (both doses) versus Placebo; and 3) Moderate dose versus Low dose of alcohol. The Disinhibition hypothesis predicted just a main effect for Beverage Condition, but the Alcohol Myopia hypothesis predicted a Beverage Condition by Cue Condition (Anti-Force Cues versus No Cues) interaction, so these were contrasted separately.

To avoid the problem of multicollinearity in the beverage condition contrasts, we conducted three separate analyses for each outcome variable (Man Continue, You Continue, Woman Responsible, Man Responsible). Each analysis tested the effects of Beverage contrasts and Cue condition contrast (each as a main effect) and the interaction of Cue condition with the Beverage contrasts.

For Man Continue, we found a main effect for the first contrast ($p<0.012$) and the second contrast ($p<0.009$). Both Moderate and Low dose Alcohol groups showed greater acceptance of force than the Control (Water only) group and both Alcohol groups showed greater acceptance of force than the Placebo group. However, the third contrast was not significant, showing no difference between participants given Moderate versus Low Alcohol. In addition, there were no differences related to exposure to anti-force cues versus no anti-force cues in the video. Finally, none of the interactions terms was significant. For You Continue, there were no significant findings.

Because we found no difference between alcohol conditions on either Man Continue or You Continue, alcohol conditions were collapsed for the exploratory analyses (below). In addition, we collapsed the Control (Water Only) and Placebo conditions together, so that we could use a binary variable (Alcohol/No Alcohol) for our further analyses.

Participants' ratings on Woman Responsible were skewed with a median of 1.3 on a six-point scale while the ratings of Man Responsible were skewed in the opposite direction (Median=5.5), so both also were converted to binary variables through a median split. Binary logistic regressions with the Alcohol/No Alcohol binary variable failed to show any significant differences in Responsibility ratings.

3.2. Intrapersonal variables analyses

Each of the four intrapersonal variables (NSD, AIV, AE-Sex and AE-Power and Aggression) was subjected to a median split to analyze their roles as moderators with the binary Alcohol/No Alcohol variable and Anti-Force Cues/No Cues variable in predicting participants' acceptance of sexual aggression. Each intrapersonal variable was entered as a dichotomous variable (high versus low). Four binary linear regressions were conducted for each of the dichotomous sexual aggression acceptance variables (Man Continue and You Continue) examining main effects of Alcohol/No Alcohol and Cues/No Cues as the first step, the two way interactions (Alcohol×Cues; Alcohol×Intrapersonal variable; Cues×Intrapersonal variable) as the second step; and the three-way interaction as the third step.

There were no main effects seen in any analysis, except for the already established main effect for Alcohol/No Alcohol. However, these analyses revealed three interactions. First, a significant AIV×Alcohol interaction was noted ($p<0.04$) for Man Continue such that under alcohol conditions only, high AIV scores were associated with higher acceptance of the man's use of force, regardless of Cue condition. Table 2 shows the final model and Fig. 1 illustrates the interaction.

Second, for both Man Continue and You Continue, we found significant three-way interactions of NSD, Alcohol and Cues ($p<0.049$ Man Continue; $p<0.003$ You Continue).

For both variables, the Alcohol×NSD interaction was significant as well, but these interactions need to be interpreted in light of the higher level three-way interactions. Table 3 shows the final models for both variables and Fig. 2(a and b) illustrates this complex relationship. To further assess this interaction, we limited our sample to the High NSD participants and conducted binary logistical regressions of the two sexual aggression variables entering Alcohol and Cues separately as the first step and adding the interaction as the second step. Only Alcohol emerged as a significant determinant ($p<0.03$ for Man Continue; $p<0.04$ for You Continue). Similar analyses using only the Low NSD participants found a main effect for alcohol ($p<0.05$ for Man Continue and $p<0.05$ for You Continue) as well as an interaction of Alcohol and Cues ($p<0.03$ for Man Continue and $p<0.02$ for You Continue).

These results suggest that under sober conditions high Need for Sexual Dominance was not associated with acceptance of sexual aggression. However, after alcohol consumption, high NSD *was* associated with accepting sexual aggression both for the man in the video and for the participant himself, with anti-force cues having no effect on these judgments.

A similar analysis limited to Low NSD participants showed results that are more difficult to characterize (especially for those who were sober), but after consuming alcohol, it appears that those who saw the anti-force cues were less accepting of sexual aggression than those who saw no anti-force cues.

Because NSD and AIV scores were significantly correlated ($r=0.26$, $p<0.01$), we conducted a final binary linear regression with each variable (Alcohol, Cues, NSD and AIV) entered at the first step, all two way interactions entered at the second step, all three way at the third step, and the four way interaction at the fourth step. The results were the same as those described earlier, with the Alcohol×AIV interaction and the Alcohol×Cues×NSD interactions emerging as the only significant findings.

Following the same plan, we used regression analyses to examine the dichotomous responsibility ratings. However, no significant main effects or interactions were found.

4. Discussion

The main findings in this study support an Alcohol Disinhibition rather than an Alcohol Myopia explanation of sexual aggression. Even when intoxicated participants were exposed to and aware of explicit anti-force cues, initial analyses indicate that they were more likely to ignore the cues in making decisions about the acceptability of sexual aggression. Instead, if a participant had consumed alcohol (Low or Moderate dose versus Placebo or Control), he was more likely to accept sexual aggression for the man in the scenario.

However, the data also were consistent with a complex variation of the Disinhibition model that incorporates person variables relevant to sexual violence. Men with a high Need for Sexual Dominance and high Acceptance of Interpersonal Violence tended to give socially appropriate responses when sober. When the woman in the video said "No," they were less likely to accept sexual aggression and appeared to be responsive to the anti-force cues. However, under the influence of even a small amount of alcohol, these men became significantly more accepting of using force both by the man in the video *and* (if they had high NSD scores) and for themselves. Alternately, the men who scored lower on both these scales appeared somewhat more accepting of force after intoxication, but not as much as the high scoring men, and they appeared more responsive to salient anti-force cues. Understanding their reactions to the anti-force cues when sober is somewhat more difficult, but there appear to be a few outlier respondents in the low NSD group.

In summary, men's individual differences in Need for Sexual Dominance and their Acceptance of Interpersonal Violence towards women appeared to be important predispositions for alcohol's role in increasing acceptance of sexual aggression. Our findings are compatible with and extend Malamuth's Confluence model (Malamuth et al., 1991), suggesting that alcohol intoxication, even at a low level, may disinhibit sexually domineering men with a hostile, suspicious view of women, making sexual aggression more likely.

Two hopeful pieces of information emerged as well. The first is that a large majority of study participants did not accept force, even when they were intoxicated. Although the laboratory analogue paradigm tends to underestimate the intensity of responses in "real life," this is a good indicator that many young men find sexual aggression unacceptable. Second, the information derived from this research can be helpful in more precisely predicting which men are high-risk as sexual aggressors when intoxicated. Prevention efforts can then target them more specifically.

As with any experiment, our study has some limitations. One is that we did not measure some variables that might also have interacted with alcohol to affect acceptance of sexual aggression, such as participants' sexual arousal levels, a factor that has been associated with greater likelihood for engaging in risky or aggressive sexual decisions (Davis, Norris, George, Martell, & Heiman, 2006). A second limitation is one often raised about laboratory studies, namely that acceptance of sexual aggression is not the same as committing a sexually aggressive act. Others (e.g. Hall & Hirshman,1993) have set up analogue situations in the laboratory that might be more realistic than our scenario procedure (e.g. allowing a man to show a violent pornographic film to an "unwilling" young woman). However, we felt that these procedures might even be too realistic and we were uncomfortable placing our participants as well as female research assistants in such a position.

In conclusion, our results show the value of assessing several levels of variables in attempting to understand alcohol's role in young men's sexual aggression. An initial straightforward explanation, that alcohol disinhibits sexual aggression, was enriched by the inclusion of key individual difference variables from Malamuth's confluence model of sexual aggression. In sum, a complex relationship is suggested in which men who exhibit a hostile, suspicious and domineering attitude towards women, activated by alcohol intoxication, may be aroused enough in a dating situation to consider forcing an unwilling woman to have sex. Unraveling and understanding the specific mechanisms involved in this complex, multidimensional relationship will require the development of more sophisticated models of the alcohol/sexual aggression relationship that account for personality and contextual variables beyond the pharmacological effects alone.

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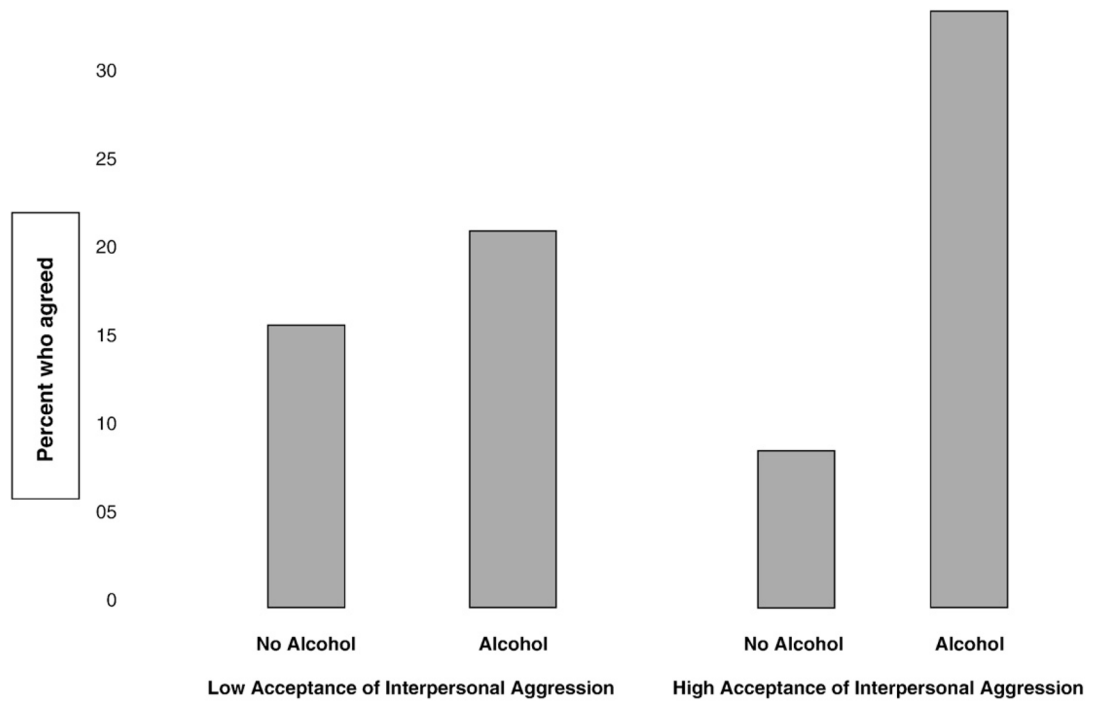
Fig. 1.
Percent of participants agreeing that the man should continue (Man Continue) grouped by high versus low Acceptance of Interpersonal Violence (AIV) and alcohol versus no alcohol consumed.
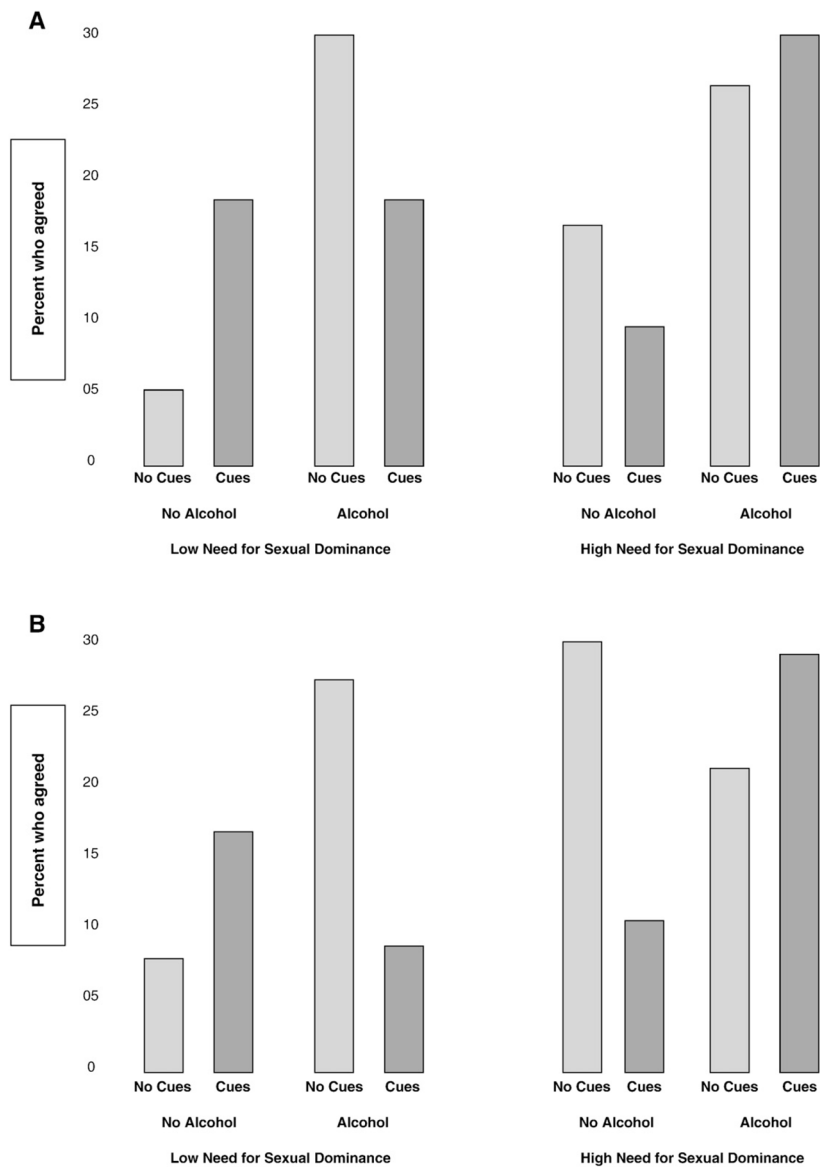
Fig. 2.
a: Percent of participants agreeing that the man should continue (Man Continue) grouped by high versus low Need for Sexual Dominance (NSD) and alcohol versus no alcohol consumed. b: Percent of participants agreeing that they would continue (You Continue) grouped by high versus low Need for Sexual Dominance (NSD) and alcohol versus no alcohol consumed.

Table 1

Means and SDs of participants' intoxication ratings and estimates of standard drinks consumed and post video ratings

Alc dose	Anti-force cues				No anti-force cues			
	Moderate	Low	Placebo	None	Moderate	Low	Placebo	None
# Participants	36	45	42	39	43	40	42	47
Intoxication **	4.2 (1.8)	3.0 (1.9)	1.7 (1.3)	0 (0)	4.6 (1.8)	3.0 (1.9)	2.0 (1.7)	0 (0)
# Drinks ***	5.2 (1.6)	4.1 (1.5)	3.6 (2.3)	0.1 (0.4)	4.8 (1.9)	4.3 (2.5)	4.3 (2.4)	0 (0)
Man Continue?	1.6 (0.9)	1.3 (0.9)	1.2 (0.4)	1.3 (0.6)	1.4 (0.8)	1.7 (1.2)	1.2 (0.7)	1.1 (0.4)
You Continue?	1.4 (0.9)	1.4 (1.1)	1.1 (0.4)	1.3 (0.8)	1.2 (0.5)	1.6 (1.1)	1.4 (0.8)	1.3 (0.9)
Woman Responsibility	1.9 (1.6)	2.0 (1.6)	1.7 (1.7)	1.2 (1.1)	1.7 (1.7)	1.9 (1.7)	1.9 (1.6)	1.8 (1.7)
Man Responsibility	4.8 (1.5)	5.4 (1.1)	5.4 (1.3)	5.4 (1.4)	5.2 (1.6)	5.3 (1.4)	5.4 (1.1)	5.3 (1.4)

Note 1. Intoxication was on a scale of 0–10 ("Not at All" to "Extremely"). "Number of Drinks" was open-ended.

**

Mod > Low > Placebo > No Alcohol (all $p<0.0001$); Cues and the Interaction of Cues and Alcohol Dose non-significant.

***

Mod > Low = Placebo > No Alcohol (all $p<0.001$, except Low versus Placebo, n.s.) Cues and the Interaction of Cues and Alcohol Dose non-significant.

Note 2. Video Ratings were all on a 1–7 Scale (from 1 "Strongly disagree" to 7 "Strongly agree").

Note 3. Responsibility ratings were on a scale of 1 (none) to 6 (100%).

Table 2

Summary of binary logistic regression analysis of variables predicting acceptance of sexual aggression for the video character (Man Continue) at low versus high Acceptance of Interpersonal Violence (AIV) (*N*=334)

Man continue	Overall model *p*<0.016						95.0% C.I. for Odds ratio	
Variable	Beta	S.E.	Wald	*df*	Significance	Odds ratio	Lower	Upper
Alcohol/No Alcohol	0.70	1.00	0.49	1	0.49	02.01	0.28	14.44
AIV Hi/Low	0.27	1.01	0.07	1	0.79	01.31	0.18	09.45
Cues/No Cues	0.31	0.51	0.36	1	0.55	01.36	0.50	03.68
Alc×Cues	0.70	0.61	1.32	1	0.25	02.02	0.61	06.71
Alc×AIV	1.27	0.63	4.08	1	0.04	03.58	1.04	12.33
Cues×AIV	−0.28	0.60	0.23	1	0.63	00.75	0.23	02.43
Constant	−2.81	1.44	3.80	1	0.05	00.06		

Table 3

Summary of binary logistic regression analysis of variables predicting acceptance of sexual aggression for the video character (Man Continue) and self (You Continue) at low versus high Need For Sexual Dominance (NSD) (*N*=334)

Variable	Beta	S.E.	Wald	df	Significance	Odds ratio	95.0% C.I. for odds ratio	
							Lower	Upper
Man continue	Overall model *p*<0.029							
Alcohol/No Alcohol	2.07	1.40	2.17	1	0.14	07.89	0.51	123.09
NSD Hi/Low	2.43	1.56	2.43	1	0.12	11.35	0.53	240.77
Cues/No Cues	1.49	0.82	3.28	1	0.07	04.44	0.87	22.31
Alc×Cues	2.08	0.99	4.42	1	0.04	08.02	1.15	55.86
Alc×NSD	3.69	1.96	3.54	1	0.06	39.89	0.86	1855.54
Cues×NSD	1.85	1.06	3.05	1	0.08	06.38	0.80	51.14
Alc×Cues×NSD	−2.54	1.29	3.88	1	0.05	00.08	0.01	0.99
Constant	−7.49	3.05	6.04	1	0.01	00.01		
You Continue	Overall model *p*<0.037							
Alcohol/No Alcohol	3.06	1.62	3.57	1	0.06	21.35	0.89	511.04
NSD Hi/Low	0.90	0.73	1.53	1	0.22	02.46	0.59	10.23
Cues/No Cues	2.46	1.51	2.67	1	0.10	11.73	0.61	224.92
Alc×Cues	2.30	1.01	5.14	1	0.02	09.95	1.36	72.57
Alc×NSD	5.60	2.12	6.99	1	0.01	271.04	4.26	17237.94
Cues×NSD	2.05	0.96	4.57	1	0.03	07.75	1.19	50.66
Alc×Cues×NSD	−3.80	1.30	8.59	1	0.01	00.02	0.01	0.28
Constant	−8.09	2.96	7.46	1	0.01	00.01		