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The Effects of Alcohol on Self-Regulation of Sexual Arousal in Sexually Compulsive Men Who Have Sex with Men

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Abstract

Individuals who meet criteria for sexual compulsivity tend to be more likely to engage in behaviors that may have negative consequences. Despite the clear public health relevance, however, little is known about the determinants of sexual compulsivity. This psychophysiological study examined self-regulation of sexual arousal in men high and low in sexual compulsivity, when sober and after alcohol consumption. A total of 43 men who have sex with men (MSM) participated and were presented with a series of erotic film clips. Two clips were presented after alcohol consumption (BAL .06), two other film clips were viewed when sober. Within alcohol conditions, one of the two films was combined with a suppression, the other with a no-suppression instruction. Genital responses were lower in the high sexual compulsivity group and higher during no-suppression conditions. The suppression instruction was not effective under sober conditions but impacted responses after alcohol consumption. This effect was more pronounced for the low compulsivity group. The findings suggest that sexually compulsive men are less successful in inhibiting their sexual responses, but only after alcohol consumption. The findings also suggest that sexually compulsive men may be less responsive to (researcher-selected) erotic stimuli.

Keywords

sexual compulsivity; self-regulation; sexual arousal; alcohol; psychophysiology

Although the concept of “sexual compulsivity” is surrounded by definitional and theoretical uncertainties, there is consensus that sexual behavior can be experienced as problematic and out of one’s control¹. Moreover, a growing empirical literature indicates that sexual

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¹Uncertainties and controversies extend beyond terminology (e.g., sexual compulsivity, sex addiction, sexual impulsivity, hypersexuality) to questions of nosology and the possibility of relevant behaviors (e.g., high levels of masturbation, partnered sex, use of erotic/pornographic imagery) simply representing a more extreme end of the continuum of normal sexual behavior. The present work uses the term “sexual compulsivity” as it is widely used in the research literature and may best capture the experience of “underregulated” sexual urges and behaviors.

compulsivity, assessed using self-report measures, can be associated with serious individual and public health consequences (Benotsch, Kalichman, & Pinkerton, 2001). For example, studies have found an association between scores on measures of sexual compulsivity and risky sexual behavior, including unprotected sex, particularly in men who have sex with men (Dodge, Reece, & Cole, 2004; Gold & Heffner, 1998; Kalichman & Cain, 2004; Kalichman, Johnson, Adair, Rompa, Multhauf, & Kelly, 1994; Kalichman & Rompa, 1995; Kalichman & Rompa, 2001; McBride, Reece, & Sanders, 2008; Pinkerton & Holtgrave, 2002; Reece, 2003; Reece, Plate, & Daughtry, 2001]. However, despite the clear public health relevance, little is known about the determinants of sexual compulsivity, and an empirical basis for prevention and intervention approaches is lacking.

Some preliminary research indicates that men who score high on sexual compulsivity measures may be more easily conditioned, suggesting that sexual compulsivity may be associated with a stronger propensity to attach sexual meaning to a variety of stimuli or situations (Hoffmann, Goodrich, Wilson & Janssen, 2014). Although conditioning and related learning processes may indeed be expected to play a role in the development of sexual compulsive behavioral patterns, other mechanisms, including those relevant to self-regulation, need to be considered. Thus, in addition to a higher sensitivity to sexual stimuli, it is possible that sexually compulsive individuals may be less able to consciously control their responses to relevant cues (i.e. show weaker self-regulatory control).

Self-regulation is the capacity to control one's emotional, attentional, and/or behavioral responses. Not surprisingly, self-control is inversely related to risky decision making, including risky *sexual* behavior (Boyer 2006; Byrnes, 1998; Crockett, Raffaelli, & Shennm, 2006; Raffaelli & Crockett, 2003; Steinberg, 2008). The capacity for self-regulation derives from personality as well as situational factors. Men who experience sexual compulsivity (or "sex addiction") tend to score high on sexual excitation proneness and low on sexual inhibition proneness, pointing at the relevance of individual differences in self-regulatory processes relevant to sexual arousal (Bancroft & Vukadinovic, 2004). Moreover, a common factor associated with sexual risk taking and sexual compulsivity, and one that impairs self-regulation, is alcohol use and intoxication (Parsons, Kelly, Bimbi, Muench, & Morgenstern, 2007; Putnam, 2000). For example, it has been found that individuals high in sexual compulsivity were more likely to use alcohol (and other drugs) in sexual situations and more likely to expect alcohol to enhance experiences (Kalichman & Cain, 2004). Also, research has identified sexual compulsivity as a latent variable explaining the relationship between alcohol use and HIV risk behavior (Hendershot, Stoner, George, & Norris, 2007).

Considering that self-regulation involves overriding impulses or emotional responses, including sexual arousal, rather than preventing them altogether, the combination of sexually compulsive tendencies (which may involve an increased responsiveness to sexual stimuli) and alcohol consumption (which may impact behavioral control as well as enhance the incentive value of relevant cues), could pose a particularly strong challenge to sexual self-regulatory processes (Baumeister & Heatherton, 1996; Ditto, Pizarro, Epstein, Jacobson, & MacDonald, 2006; Hendershot et al., 2007). The current psychophysiological study was designed to examine and compare men who score high and low in sexual compulsivity in their ability to suppress sexual arousal when sober and after alcohol consumption. It was

predicted that men with higher sexual compulsivity scores would be less able to inhibit sexual responses, and that alcohol would exacerbate this effect.

Method

Participants

Participants were recruited using flyers and online (e.g., Craigslist, Facebook) and newspaper advertisements in two Midwestern cities. One version of the recruitment materials sought sexually active men, age 21 to 39, who have sex with men (MSM) who felt they lacked control over their sexual behavior or who thought they may be “sex addicts”. A comparison group of men was recruited using flyers and advertisements seeking men who were sexually active as well but who did not believe they lacked control or considered themselves “sex addicts”.

Interested individuals were directed to a brief online screening survey that included the 10 items of the Sexual Compulsivity Scale (SCS, see below). For the purpose of the current study, a cut-off of 1.5 on the SCS was used to create a low (SCS score of 1.5 and lower) and a high (SCS score of 1.6 and higher) compulsivity group. In addition, the study used the following inclusion criteria: Participants had to have consumed alcohol during the past month, have consumed at least 4 drinks of alcohol within 2 hours at some time during the past six months, not have a history of alcohol problems (as determined by the Brief Michigan Alcoholism Screening Test, see below), and not have a medical condition or take medications which contraindicate alcohol consumption. Participants were paid \$30 for their participation.

All experimental procedures were approved by the college/university's Institutional Review Boards.

Questionnaires

Demographic and Background Information—Variables assessed included age; gender; race; Hispanic/non-Hispanic; sexual orientation self-label; lifetime number of sexual partners, and other aspects of sexual health and behavior. In addition, several questions were asked about erotica use, including the number of erotic films/videos participants had viewed in the past year (answer options: none; 1 to 10; 10–50; 50–100; more than 100) and how much money they spend each month to get access to erotic websites (answer options: \$0/I do not spend money to get access to erotic websites; less than \$10; between \$10 and \$25; between \$25 and \$50; between \$50 and \$100; more than \$100).

Sexual Compulsivity Scale (SCS; Kalichman, Johnson, Adair, Rompa, Multhauf, & Kelly, 1994; Kalichman & Rompa, 1995). This 10-item questionnaire was designed and validated for use in MSM and it has most often been used in studies of high-risk sexual behavior. Cronbach's alpha for this scale was 0.86 as reported by Kalichman & Rompa (1995) and 0.92 for the current sample.

Brief Michigan Alcohol Screening Test (Pokorny, Miller, & Kaplan, 1972). This widely used, and clinically validated (Connor, Grier, Feeney, & Young, 2007) measure was used to screen and exclude for problem drinking.

Stimuli and tasks

Film excerpts—Participants were presented with a series of four erotic film clips. All excerpts were taken from commercially available erotic films, depicting consensual sexual interactions between adult men. Excerpts were 3 minutes in duration and depicted combinations of petting (1st minute), oral sex (2nd minute), and anal intercourse (3rd minute). (In addition to film stimuli, participants were also presented with a series of still images as part of a risk intent task. Findings of that task will be presented elsewhere.) Prior to the first erotic film presentation, participants were presented with a neutral film excerpt to establish baseline genital arousal levels (Janssen, Prause, & Geer, 2007). Neutral film excerpts (from nature documentaries about ocean life) were used for return-to-baseline intervals between erotic stimuli.

Instructions—There were two types of trials: suppression and no-suppression. During suppression (regulation) trials, subjects were asked to try and suppress their genital responses to the erotic video (“try not to become sexually aroused”). During no-suppression trials, subjects were asked to just watch the erotic films.

Alcohol administration—Participants were weighed at the beginning of the session and asked for their height. Also at this time, their blood alcohol level (BAL) was assessed, using a portable breathalyzer, to ensure they arrived at the laboratory sober. Formulas based on previous research² were used to establish the appropriate amount of alcohol to increase the participant's blood alcohol level (BAL) to .06%, which is considered a moderate dose (Brick, 2006). Participants were given the appropriate amount of alcohol over a 20 min period in drinks consisting of one part 80-proof vodka to four parts orange juice. BAL was assessed repeatedly using a portable breathalyzer. Participants were asked to stay in the laboratory until their BAL fell below .03 and to either walk home or arrange transportation (e.g., a taxi or a ride from a friend).

Order of conditions—The order of the instructions (suppression/no-suppression) was randomized within groups. Alcohol trials always followed no-alcohol conditions.

Genital responses

Genital responses were measured using an electromechanical strain gauge (Behavioral Technologies, Inc., Salt Lake City, Utah). The gauges measure penile circumference and were calibrated (in mm) at the start of each laboratory session using a set of calibrated rings (Barlow, Becker, Leitenberg, & Agras, 1970; Janssen, Prause, & Geer, 2007). Participants were instructed to place the gauge towards the base of the penis. Change in penile circumference (in mm) to the stimuli were calculated by subtracting penile tumescence

²The authors used Formula 14 from Brick (2006) after correcting for two errors in the equations presented in the original formula: Time should be in hours instead of minutes (e.g., 2.5 hrs instead of 150 minutes) and the final multiplication should include the variable “BAC_{target}” on the left side of the equation.

levels from the prestimulus baseline period. Psychophysiological data were recorded on a Biopac system with AcqKnowledge software (Biopac Systems, Inc., Goleta, California). Penile gauges were disinfected after each use (Janssen, Prause, & Geer, 2007)

Procedure

The study session took place in one of two psychophysiological laboratories located in the two Midwestern cities from which the subjects were recruited. After providing informed consent, subjects were seated in a reclining lounge chair in front of a computer and, after careful instruction, asked to put the genital device in place in private. They signaled the experimenter, who was in the adjoining room, when they were ready to start via an intercom. This was followed by the neutral and sexual films, with suppression/just watch instructions, and the alcohol conditions. All instructions, stimuli and tasks were presented using MediaLab software (Empirisoft, New York, NY). At the end of the testing session, participants stayed in the laboratory until their BAL fell below .03, payment arrangements were made, and participants were debriefed regarding the purpose of the study.

Main Outcome Measures

Penile circumferences were averaged for each of the three minutes of each sexual film, to allow for the evaluation of the effects of the suppression instruction over time and at different stimulus intensities. Erectile responses were calculated by subtracting the average circumference recorded during the last minute of the first neutral film from the three means obtained from the sexual film conditions. These difference scores were subjected to a mixed-model ANOVA using IBM SPSS Statistics 20 for Mac OS X. The Greenhouse-Geisser epsilon procedure was applied to correct for the violation of the sphericity assumption (Vasey & Thayer, 1987).

Results

Sample Characteristics

A total of 51 men participated in the study. Eight subjects were excluded due to incomplete questionnaire or psychophysiological data, leaving the data of 43 men for analysis. In total, 25 men were assigned to the low sexual compulsivity group (mean age = 27.3; mean SCS = 1.3) and 18 men were assigned to the high compulsive group (mean age = 29.6, n.s.; mean SCS = 2.1, $p < .001$). Both groups were predominantly white (92.0% of the low SCS and 83.3% of the high SCS group, n.s.). The high compulsive men reported a significantly higher number of one-time sexual partners (mean number of one-time partners = 36.0, SE = 10.0; after capping three outliers at 100) than the low compulsive men (mean number of one-time partners = 12.8, SE = 8.1, $p < .05$).

In total 6 men (3 in the low and 3 in the high sexual compulsivity groups), or approximately 14%, did not respond with at least 5 mm circumference change to *any* of the sexual film conditions and were classified as nonresponders. Nonresponse is not uncommon in psychophysiological research and higher nonresponse rates (e.g., 25 – 30%) have been found in other studies than the current one (Janssen, Goodrich, Petrocelli, & Bancroft, 2009; Reiger, Chivers, & Bailey, 2005).

Genital response

A mixed-model (Group: high/low compulsivity \times Alcohol: yes/no \times Instruction: suppression/no-suppression \times Time: 1st minute/2nd minute/3rd minute) ANOVA revealed significant main effects of Group ($F(1,34)=5.95$, $p<.03$) and Instruction ($F(1,34)=9.72$, $p<.005$). In addition, a significant interaction of Group \times Alcohol \times Instruction \times Time ($F(2,68)=3.98$, $p<.04$) was found. Overall, the instruction to suppress sexual arousal turned out to be effective: Genital responses were lower during the suppression condition (mean erectile response = 8.0 mm, SE = 1.4) than during the no-suppression condition (mean erectile response = 11.7 mm, SE = 1.6). With respect to the other main effect, men assigned to the high sexual compulsivity group (mean = 6.5 mm, SE = 2.1) responded on average less strongly to the sexual films than men assigned to the low compulsivity group (mean = 13.2 mm, SE = 1.8).

Post-hoc tests to further examine the higher-level interaction effect revealed no significant effects of suppression under sober conditions. Follow-up tests for the alcohol condition did reveal an effect of suppression on genital responses, and this effect was more pronounced for men who scored low than those who scored high on sexually compulsivity (see Figure 1).

The association between genital response levels and other variables was explored, including actual SCS scores and erotica experience. The average genital response obtained during the laboratory session was negatively correlated with SCS scores ($r = -.35$, $p<.05$). In addition, SCS scores, and to a smaller degree average genital response levels, were associated with measures of erotica use, including the number of erotic videos viewed in the past year (SCS: $r = +.37$, $p<.06$; average genital response: $r = -.23$, ns) and the amount of money spent on erotic websites (SCS: $r = +.55$, $p<.005$, average genital response: $r = -.39$, $p<.05$).

Discussion

The current study examined self-regulatory ability in men scoring high and low in sexual compulsivity, when sober and after the consumption of alcohol. Our findings suggest that men who score high relative to those who score low in sexual compulsivity indeed tend to have a reduced capacity for self-regulation, but only after consuming alcohol. Post-hoc tests following up on the significant higher-level interaction revealed no significant effects of suppression under sober conditions. The latter finding is not inconsistent with findings of previous research. For example, a previous study found a significant but relatively small effect of suppression in a study without alcohol (peak response: 28 vs. 21 mm) and no clear association with SCS (Winters, Christoff, & Goralka, 2010).

After consuming alcohol, and when not asked to suppress their genital responses, men who scored low in sexual compulsivity reached response levels similar to those found when they were sober. However, when asked to suppress their genital responses, they were more successful in doing so after consuming alcohol than when they were sober. In a previous study in a nonclinical sample of heterosexual men (George et al., 2008) alcohol consumption decreased genital response when men were attempting to maximize (as compared to suppress) their arousal. No difference was found in suppression between sober and intoxicated subjects. In addition to the fact that the comparison was between maximize and

suppress -- and not, as in the current study, between suppress and 'just watch' -- instructions, our findings suggest that successful suppression of sexual arousal may be more likely in certain subgroups of men (i.e. men who score low on sexual compulsivity). Thus, it is possible that alcohol consumption may facilitate the use or effectiveness of methods men may use to suppress arousal (e.g., self generated distraction, 'disconnecting' from sexual stimuli (George et al., 2008), but only in men who are low on sexual compulsivity.

Whereas our findings suggest that alcohol consumption increased low sexually compulsive men's ability to voluntarily suppress their genital arousal, our predictions focused on the high compulsivity group and were, in fact, in the opposite direction: It was expected that men scoring high in sexual compulsivity would show a decreased capacity to suppress sexual responses after alcohol consumption. In addition, we anticipated that this reduced ability to suppress genital arousal might be associated with possibly *higher* response levels (making suppression more difficult) in sexually compulsive men. The findings, however, were more complex. The high sexual compulsivity group indeed demonstrated a reduced ability to suppress genital responses, and when comparing their response patterns to the other group, this was most prominent after alcohol consumption. However, their response levels were not particularly high, and definitely not increased, during either condition, after alcohol consumption. In fact, men assigned to the high sexual compulsivity group responded on average less strongly to the sexual films than the men assigned to the low compulsivity group. To what degree this may have interacted, and possibly interfered, with the suppression instruction is unclear. Yet, the possibility exists that the findings in the high compulsivity group were, at least in part, attributable to a floor effect, indicating that their responses were too low to effectively suppress.

It was neither predicted nor anticipated that response levels would be lower in the high sexual compulsivity group. This, to our knowledge, is the first study to directly compare men who score high and men who score low on sexual compulsivity in their genital responses to visual sexual stimuli, before and after alcohol consumption. Our post-hoc correlational analyses suggest that the lower response levels in the high compulsivity group may be partly attributed to a more extensive experience with erotic stimuli. Sexual compulsivity scores were positively and genital response levels negatively correlated with the number of erotic videos the participants had viewed, and also with the amount of money they had spent on erotic websites. Future studies could examine the links between sexual compulsivity, sexual responsivity, and erotica use in more depth, and possibly include a condition in which participants view erotic materials of their own choosing. This would help distinguish between the possibility that sexually compulsive men are generally less sexually responsive or more particular in their preference for sexual stimulation. In addition, studies could explore whether men low and high in sexual compulsivity differ in habituation proneness and in need for stronger (visual and/or tactile) stimulation.

Overall, the findings of this study provide support for the role of self-regulation processes in sexual compulsivity and warrant further research. Future studies could focus on more distinct groups of sexually compulsive men (e.g., men who are seeking help). In addition, future studies could counterbalance the alcohol and no-alcohol conditions in the design and include a no-alcohol placebo condition and a wider range of blood alcohol levels (e.g., .04

– .08 BAL). A better understanding of the role of self-regulation processes and situational factors such as alcohol intake in sexual compulsivity is, in our view, essential to the development of innovative and effective intervention and prevention programs. The findings of this project, while preliminary in nature, show the feasibility and relevance of studying these variables, and lay the foundation for more extensive research on sexual compulsivity and its impact on sexual decision making and risk behaviors.

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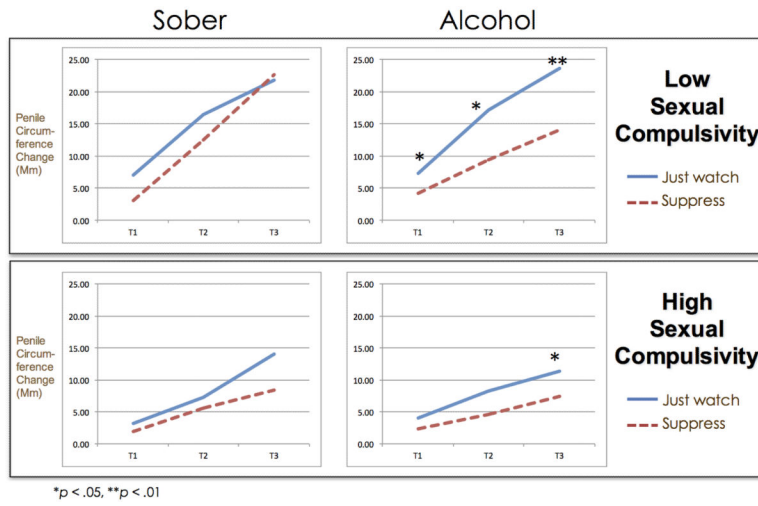


Figure 1. Mean genital responses to sexual films for low and high sexually compulsive men during suppression and no-suppression conditions before and after alcohol consumption.