Hormones and Behavior 59 (2011) 730–738

Contents lists available at ScienceDirect

Hormones and Behavior

journal homepage: www.elsevier.com/locate/yhbeh

Women's sexual arousal: Effects of high alcohol dosages and self-control instructions

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ARTICLE INFO

Article history:
Received 18 January 2011
Revised 9 March 2011
Accepted 16 March 2011
Available online 23 March 2011

Keywords:
Women
Alcohol
Sexuality
Sexual arousal
Sexual response
Sexual dysfunction
Vaginal plethysmography
Vaginal pulse

ABSTRACT

The basic relationship between alcohol and women's sexual arousal – especially genital arousal – received little research attention for nearly 30 years (e.g. Wilson and Lawson, 1978) until very recently (e.g. George et al., 2009). To investigate hypotheses based on earlier findings and Alcohol Myopia Theory (AMT), two experiments evaluated the effects of high blood alcohol concentrations (BACs) and arousal instructional demands on indices of vaginal responding and self-reported sexual arousal. In Experiment 1, self-control instructions to maximize (versus suppress) arousal increased peak and average Vaginal Pulse Amplitude (VPA) change. Self-control also interacted with a target BAC of .08% (versus .00%) to influence latency to peak arousal onset: Intoxicated women instructed to maximize showed a shorter latency to peak arousal than did intoxicated women instructed to suppress; however, sober women showed an undifferentiated pattern. Also, in Experiment 1, the target BAC of .08% had no effect on VPA or subjective arousal measures. In Experiment 2, a target BAC of .10% (versus .00%) attenuated peak change and average change in VPA, but this dosage had no effects on latency to peak achieved arousal, or on subjective arousal. Instructions to maximize arousal (versus no instruction) had no effect on any arousal measures. Overall, among young moderate drinking women, alcohol had attenuating effects but only at the higher dosage. Maximize versus suppress instructions about arousal had predicted effects on arousal and interactive effects on latency, but only at the lower dosage. The findings highlight the importance of dosage and contextual factors in alcohol's impact on the variability of women's sexual responding.

Research links alcohol to a variety of women's sexual outcomes (see reviews by Crowe and George, 1989; George and Stoner, 2000; Norris, 1994), including sexual functioning (e.g., Sobczak, 2009) and sexual risk taking (e.g., Norris et al., 2004b). Women's sexual arousal during states of acute intoxication is relevant to and perhaps instrumental to understanding the link between alcohol and sexual outcomes, yet has received limited attention. A goal of this research was to extend the experimental data available for delineating alcohol's high dosage effects on women's sexual arousal: self-reported arousal and genital response. A second goal was to evaluate self-control conditions inspired by an Alcohol Myopia Theory (AMT) account of alcohol's attentional effects on women's self-reported sexual arousal.

Alcohol and self-reported sexual arousal

It has become well established through controlled experimentation that acute alcohol intoxication heightens women's self-reported sexual arousal. In two initial studies utilizing erotic films depicting explicit scenes of heterosexual intercourse, researchers found that increases in both blood alcohol concentration (BACs of .001, .025, .049, .079 mg%) (Wilson and Lawson, 1976) and perceived intoxication (at a BAC of .04 mg%) (Wilson and Lawson, 1978) were associated with increased self-reported sexual arousal. Malatesta et al. (1982) also reported that increasing dosage (particularly BACs of .05 mg%, .075 mg%) was associated with greater self-reports of arousal and orgasmic pleasure. Davis et al. (2006) found that alcohol (BAC = .06 mg%) increased women's self-reported arousal to an eroticized third-person vignette depicting a man making sexual advances on a woman forcefully. Also, this effect was moderated by expectancy such that alcohol-increased sexual arousal was more evident for women who highly endorse the expectancy that "alcohol enhances sex." Using a similar vignette, Norris et al. (2004a) found no alcohol effect, but reported an

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0018-506X/$ – see front matter © 2011 Elsevier Inc. All rights reserved.
doi:10.1016/j.yhbeh.2011.03.006

interaction indicating increased arousal for women who received placebo drinks and who more highly endorsed the expectancy that "alcohol enhances sex." George et al. (2009; Study 3) found that alcohol (BACs = .00 mg%, .06 mg%, .08 mg%, .10 mg%) increased self-reported arousal to an eroticized second-person vignette of a consensual interaction in which the participant was instructed to project herself into the role of the woman in the vignette. Norris et al. (2009a) also found that alcohol (BACs = .00 mg%, .04 mg%, .08 mg%) increased arousal to an eroticized vignette of consensual sex. Examining effects in the context of sexual abuse history, Schacht et al. (2007) found that alcohol (BAC = .08 mg%) increased arousal to erotic films among women previously victimized by sexual abuse; but alcohol decreased arousal for non-victims. In a study of women who reported a history of either childhood sexual abuse, adult sexual assault, or no abuse, Schacht et al. (2010a) found alcohol (BACs = .00 mg%, .06 mg%, .08 mg%, .10 mg%) increased arousal to an eroticized vignette, regardless of abuse status. In contrast, Gilmore et al. (2010) found no effect for alcohol (BAC = .10 mg%) on women's self-reported arousal to the Schacht et al. (2007) film clips, regardless of abuse status.

In mixed gender experiments, women (and men) exhibited alcohol-induced increases in self-reported arousal. McCarty et al. (1982) found that participants reported greater arousal to erotic slides after they had received an alcoholic drink (BAC = .045 mg%) that they did not know contained alcohol rather than a known non-alcoholic beverage that they knew contained no alcohol. Abbey et al. (2006) found that participants reported greater arousal to a video depicting sexual advances, after they had received an alcoholic (BAC = .08 mg%) rather than a known non-alcoholic beverage. Prause et al. (2011) found that alcohol (BACs = .025 and .08 mg%) increased self-reported sexual arousal across multiple exposures to both erotic and neutral films. George et al. (2009; Study 1), found that alcohol at a high dosage (BAC = .08 mg%) – but not at a low dosage (BAC = .04 mg%) – increased arousal to an eroticized vignette. In an experiment manipulating alcohol (BAC = .08 mg%) and BAC limb (BAC was either ascending or descending), Davis et al. (2009) found support for a model indicating direct effects for alcohol on perceived intoxication, which, in turn, led to greater arousal among participants exposed to an eroticized vignette. Furthermore, individuals with ascending BACs reported greater perceived intoxication, which led to greater perceived arousal, than individuals with descending BACs, confirming speculation that intoxication phase – as well as dosage – is an important parameter in understanding alcohol's effects on sexual arousal (George and Stoner, 2000).

In sum, with little exception (Gilmore et al., 2010; Norris et al., 2004a), alcohol increased women's self-reported sexual arousal under controlled conditions in 13 of 15 experiments. This alcohol enhancement effect also occurred when women were asked to appraise the sexual potential of a vignette (e.g. Norris et al., 2009b). The effect has been observed with varying dosages, although generally it is more evident with higher dosages. It has also been observed with varying stimulus paradigms: erotic slides, film depictions of sexual advances, film depictions of explicit nude intercourse, eroticized third-person vignettes of nonconsensual sex, and eroticized second-person vignettes of consensual sex.

Alcohol and genital responding

Paradoxically, there is considerable evidence indicating that alcohol can have opposite – i.e. attenuating – effects on physiological indices of vaginal responding. This paradox is not surprising given the low agreement generally between women's self-report and genital measures across all sexual arousal studies (not just alcohol studies). In Chivers et al.'s (2010) meta-analysis of studies examining the correspondence between self-report versus genital arousal, self-report and genital measures correlated substantially lower for women (r = .26) than for men (r = .66). Therefore, although paradoxical, it is not contradictory empirically that alcohol can have opposite effects on women's self-reported versus genital arousal.

Eight studies have examined alcohol's effects on genital responding. Two initial studies (Wilson and Lawson, 1976; 1978) evaluated the effects of acute intoxication on vaginal pulse amplitude (VPA). Wilson and Lawson (1976) found a negative linear relationship between dosage and VPA. Wilson and Lawson (1978) found that alcohol lowered vaginal pulse pressure. Malatesta et al. (1982) assessed vaginal blood volume, but did not report on it as an arousal indicator. Instead, they combined vaginal and behavioral data to indicate orgasm latency, revealing that increased dosage linearly increased latency, suggesting decreased genital arousal. In our own laboratory, findings have been mixed. George et al. (2009; Study 3) found that alcohol decreased VPA to an eroticized consensual second-person vignette. Gilmore et al. (2010) found that alcohol (BAC = .10 mg%) decreased VPA to erotic films. However, in studies distinguishing victimized and non-victimized women, alcohol had no effect on VPA to erotic films (Schacht et al., 2007; BAC = .08 mg%) or to a vignette (Schacht et al., 2010a; BAC = .10 mg%). In the only mixed gender study reported, alcohol had no effect on VPA to erotic films (Prause et al., 2011). Thus, across eight studies, all but three (Prause et al., 2011; Schacht et al., 2007; Schacht et al., 2010a) revealed that alcohol reduced genital arousal with the effect being more evident at higher dosages.

Alcohol myopia theory and attentional processes

There is no unifying explanation of alcohol's enhancement effect on women's self-reported arousal and its attenuation effect on genital arousal. When the alcohol dosage is greater than .08, it is generally understood that alcohol's physiological effects exert a greater influence than its expectancy (learned) effects. At these higher dosages where enhancement effects on self-reported arousal have been most observed and where alcohol's physiological effects are indisputably and determinatively at play, Alcohol Myopia Theory (AMT) offers the most applicable and compelling explanation. One of alcohol's most reliable physiological effects is that it impairs cognitive information processes, restricting attention allocation to a narrower range of behaviorally influential cues (Giancola, 2002). AMT builds on this well-established finding and asserts that intoxication narrows 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. 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 thereby experience and report more arousal. In accord with this line of reasoning, any manipulation fostering greater salience of or attention to erotic stimuli and/or the arousal response should consequently intensify the alcohol effect on self-reported arousal.

Attentional processes and self-control of arousal

Attentional processes also play a central role in our understanding of sexual arousal generally (Barlow, 1986). Furthermore, "the relevance of attentional processes to sexual arousal was perhaps first established by the early studies on *voluntary control of sexual arousal*" (italics added, de Jong, 2009, p. 239). In studies not involving alcohol, voluntary arousal control has been clearly demonstrated in women. Cerny (1978) and Hoon (1980) found that sexually functional women exhibited greater physiological vaginal responding and subjective arousal when instructed to increase rather than to decrease arousal. Likewise, Laan et al. (1993) found that sexually functional women exhibited greater VPA and subjective arousal when given a "performance demand" instruction to "try to become as aroused as