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Higher sexual excitation is associated with an increase in sex-linked substance use in women with a history of unwanted sexual contact

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Abstract

Survivors of unwanted sexual contact have an increased likelihood of using substances in sexual situations, which puts them at heightened risk for intoxication-related harms. Separately, research has indicated that women may intentionally use substances in sexual situations to either enhance pleasure (i.e., increase sexual excitation) and/or reduce sexual anxiety or shame (i.e., reduce sexual inhibition), a phenomenon termed sex-linked substance use (SLSU). A predominant assumption in the literature is that women with unwanted sex histories are more likely to disengage during sex, suggesting greater inhibition-related SLSU; however, there is little prior research directly examining if women who have unwanted sex histories primarily engage in SLSU to increase sexual excitation or decrease inhibitions. We conducted exploratory analyses of an online survey in a convenience sample of 516

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undergraduate women including data on their history of unwanted sex, SLSU, and sexual excitation/inhibition. Sexual excitation mediated the association between a history of unwanted sexual contact and SLSU, suggesting that women with unwanted sexual histories reported higher levels of sexual excitation, which in turn was associated with a higher likelihood of using substances to increase pleasure during sexual activity. Specifically, arousability, partner characteristics, and power dynamics subfactors were significant mediators. Sexual inhibition did not mediate the relationship between a history of unwanted sexual contact and SLSU, suggesting that women with unwanted sex histories may have been less likely to use substances to reduce sexual inhibitions. If replicated, these findings suggest that sexual excitation may be a useful target of intervention surrounding SLSU, particularly in women with histories of unwanted sexual contact. Specifically, treatments targeting cognitive and affective tendencies associated with sexual excitation may help women who engage in SLSU to have safe, pleasurable sexual activity, without increasing the risk of intoxication-related harms.

Keywords: Alcohol, sexual excitation, sexual trauma, substance use, women

Women who have a history of sexual assault are at increased risk of problems with substance use overall (e.g., Corbin et al., 2001), and subsequently, an increased risk of substance-related harms such as intoxication-related assault (Abbey et al., 2001). Although a variety of populations use substances in sexual situations (Lawn et al., 2019; Sumnall et al., 2007), women with sexual assault histories appear to use substances in sexual contexts at a higher rate (Corbin et al., 2001). This is compounded by the finding that college-age women who report unwanted sexual experiences identify their own alcohol use as a significant risk factor for those experiences (Flack et al., 2007). However, while there are numerous studies documenting associations between overt sexual trauma and substance use, considerably less is known about the mechanisms by which histories of unwanted sexual contact (USC) may contribute to women's substance use.

Although USC includes nonconsensual sexual touching and sexual assault, for the purposes of this study, USC refers to any experience of intercourse, oral or anal sex, or other sexual contact (e.g., sexual touching) that was unwanted, regardless of relationship context or self-identification of these acts as traumatic or assaultive. Using a broad, multifaceted definition of USC prevents the underreporting of unwanted sexual experiences that is typical in studies focusing on overt or forcible assault (Akre et al., 2013) Moreover, it encompasses

a range of USC that prior research has missed, including coercive experiences as well as consensual but unwanted sex. While these experiences differ in some key dimensions, there are also some compelling similarities warranting study. In particular, there is evidence that substance use—particularly alcohol use—is significantly elevated both among women who report a history of forcible rape and those who reported unwanted but consensual sex (Kelley et al., 2018; Shaw & Read, 2021); moreover, there is evidence of multiple forms of USC being specifically associated with higher substance use in sexual contexts (Herbenick et al., 2019; Willis et al., 2021). That is, despite significant differences between survivors of sexual assault, coercion, and unwanted but consensual sex in outcomes such as post-traumatic stress disorder (Brown et al., 2009), there is nevertheless a striking similarity in substance use outcomes. This suggests that there are mechanisms that contribute to a higher risk for substance use in women with a broad array of USC histories. If these mechanisms can be identified, they would be valuable targets for both primary prevention and intervention efforts to reduce the negative sequelae of unwanted sex. Thus, research is needed to determine what factors may drive increased rates of substance use in sexual contexts among women with USC histories under this broader definition.

Research on women with sexual trauma histories suggests higher use of alcohol and other substances such as marijuana than women without a trauma history (e.g., McCauley et al., 2010; Saladin et al., 1995; Senn et al., 2008), including in sexual situations (Schraufnagel et al., 2010). Further, alongside increased alcohol use, women with sexual assault histories are more likely to have more positive alcohol and marijuana expectancies—that is, the belief that substances will result in desirable outcomes and experiences—than women without an assault history (Saladin et al., 1995; Senn et al., 2008). Both factors may increase the likelihood that women engage in sex-linked substance use (SLSU), that is, the intentional use of drugs and/or alcohol for the purpose of experiencing those substance's effects during sexual activity (Hendershot et al., 2010; Lawn et al., 2019). While most research on SLSU has been studied in the context of alcohol use, it is possible that women engage SLSU with a variety of different substances for distinct purposes as individual substances may have differing excitatory or sedating effects.

Women may engage in SLSU to either enhance pleasure and/ or reduce inhibitions, such as coping with sexual anxiety; indeed, some work suggests that women with a history of sexual trauma are more likely to use alcohol to quiet traumatic intrusions that inhibit sexual arousal and enjoyment (Bird et al., 2018; Walsh et al., 2014). However, prior research on substance use in sexual trauma survivors may not fully describe patterns across women with different USC histories as USC may or may be associated with trauma-related psychopathology (Flack et al., 2007). While there is some evidence that overt sexual trauma may influence factors related to SLSU, less is known about the broader context of unwanted sex more generally.

Understanding how a woman's history of USC may inform her future substance use, and the driving forces behind SLSU, are essential in targeting interventions to reduce SLSU-associated risks such as greater intentions to engage in unprotected sex (Hendershot et al., 2010; Scott-Sheldon et al., 2016). SLSU may impair the ability to communicate about consent for sexual activity or contraceptive use negotiation, potentially leading to vulnerabilities for sexual victimization, stealthing, sexually transmitted infection, or unwanted pregnancies. While the onus of sexual victimization always lies at the hands of the perpetrator, understanding factors related to SLSU in women with a USC history can help inform interventions to allow women to increase the benefits of SLSU while reducing potential risks. The present exploratory study examined the role of two potential predictors of SLSU—sexual excitation and sexual inhibition—that may explain the higher incidence of SLSU among women with a history of USC.

Women report using substances in sexual situations to achieve two different goals: either to increase excitation and pleasure or to reduce inhibition. Some research favors the role of inhibition, as women with a history of USC may be more likely to use substances during or before sexual situations to reduce inhibitions and distress surrounding sexual activity (Benson et al., 2007). Women with trauma histories may experience dissociation or emotional numbing during sexual activity, which may be distressing but may also be desired if it allows avoidance of overwhelming emotions connected to sexual activity (e.g., Bird et al., 2017; Boysan et al., 2009). Alcohol use can serve as a maladaptive mechanism to increase experiential avoidance—including desired avoidance— during sexual activity (Klanecky et al., 2008). To the

extent that women with USC histories also experience significant distress during sexual activity, they may engage in higher levels of SLSU due to using substances as a coping mechanism for sexual anxiety and to further dissociate during sexual activity.

However, competing literature suggests that USC histories are associated with a greater desire for sexual activity and sexual novelty, potentially contributing to higher use of substances to enhance sexual pleasure (Slavin et al., 2020; Turchik et al., 2010). Women with sexual assault histories report higher positive alcohol expectancies than women without assault histories (Bedard-Gilligan et al., 2011), with similar effects reported in women with USC histories (Palmer et al., 2010). These positive alcohol expectancies refer to an individual's belief about the sexual-enhancement effects of alcohol (Blume & Guttu, 2015). Women with higher positive alcohol expectancies are more likely to use substances in sexual contexts (Kalichman et al., 1998). Furthermore, women with a history of USC may use alcohol in sexual situations, in part, to enhance sexual experiences, feel sexy, or act out sexual fantasies and to feel better overall (e.g., Corbin et al., 2001; Palmer et al., 2010; Pumphrey-Gordon & Gross, 2007). Other research suggests that women with a history of childhood physical, emotional, and sexual abuse may have higher tendencies toward sensation seeking, or the tendency to seek out novel sexual stimuli (Bornovalova et al., 2008). In turn, women with higher levels of sensation seeking are more likely to engage in high-risk sexual encounters, including SLSU (Bancroft et al., 2009; Muise et al., 2013). It is possible that women with higher levels of sexual sensation seeking may also have higher levels of sexual excitation, which may increase the motivation to use substances in sexual situations to increase pleasure (Velten, 2017).

Finally, it is possible that both factors operate simultaneously. Research on women with alcohol-related sexual assault histories report using alcohol for tension reduction (i.e., to feel relaxed or calm), for "liquid courage" and to enjoy sex more, be a better lover, feel sexy, or act out fantasies (Bedard-Gilligan et al., 2011). More broadly, one study found women without a history of USC had similar endorsements of both motives for their SLSU, with 40% endorsing pleasure or excitation motives and 31% endorsing motives to reduce inhibition or anxiety (Sumnall et al., 2007). In sum, these different lines of literature pose two potentially parallel pathways to explain the higher rates of

SLSU in women with histories of USC: using substances to mitigate inhibitions during sexual activity (colloquially called “self-medication”) or enhance sexual sensation and positive feelings.

Separately, broad literature has examined how people may differ in their tendencies towards sexual excitation and inhibition. Trait-level sexual excitation and sexual inhibition are integral in sexual decision-making. The Dual Control Model suggests that adaptive sexual behavior will occur when there is a balance between excitatory and inhibitory systems (Bancroft et al., 2009; Bancroft & Janssen, 2000). This model posits that a sexual response, such as sexual arousal, will occur when sexual excitation is greater than sexual inhibition (Bancroft et al., 2009; Bancroft & Janssen, 2000). Individual differences in trait sexual excitation and inhibition can help explain sexual behaviors and functioning. For instance, if someone has higher trait sexual excitation and lower sexual inhibition, they may be more likely to engage in a wide range of sexual activities, including those that confer risk (Nguyen et al., 2012; Sanders et al., 2008). Alternatively, women with higher sexual inhibition are more likely to report sexual problems such as problems with desire, arousal, lubrication, and satisfaction as well as higher sexual anxiety (Sanders et al., 2008).

Although sexual excitation and sexual inhibition are both trait-level factors, a history of USC can influence the expression of both sexual excitation and inhibition. For instance, women with a history of childhood sexual abuse (CSA) have lower body esteem than do women without a CSA history, and these levels of self-perceived sexual attractiveness were found to influence sexual responses, specifically through sexual excitation and inhibition pathways (Kilimnik & Meston, 2016). Women with a CSA history also experience higher levels of inhibitory sexual responses at both a physiological level (e.g., increases in physiologic stress responses to sexual cues) and at a cognitive level (e.g., describing sexual stimuli with more negative affect) compared to women without a CSA history (Rellini, 2008). Similarly, some studies have found that trauma symptoms following sexual assault predict increases in negative sexual self-schema, or the tendency to see oneself as sexually inhibited and less arousable (Lipinski & Beck, 2020).

Changes in both sexual excitation and inhibition are also consistent with the theory of traumatic sexualization, the process by which

a person's sexual response and feelings are influenced and shaped by an unwanted sexual experience early in life (Finkelhor & Browne, 1985). Specifically, women with a history of childhood sexual abuse may have been rewarded for engaging in sexual activity—even that which they did not want—and consequently be more motivated to not only engage in a wide range of sexual experiences (increased trait excitation) but also distract themselves or dissociate during sex (increased trait inhibition; (Finkelhor & Browne, 1985). This suggests a directionality in which USC, particularly that which was experienced in adolescence or early adulthood, may influence a woman's subsequent levels of sexual excitation or inhibition, which, in turn, may influence her use of sexual behaviors and SLSU. As noted earlier, however, while there is evidence that overt sexual trauma may influence the development of sexual excitation and inhibition, there is relatively less known about the broader context of unwanted sex more generally. In the present study, we examined a sample of young women whose unwanted sexual experiences had been, by virtue of their age, experienced early in life and thus potentially important in shaping the organization of their sexuality.

Recognizing the impacts of individual differences in sexual excitation and inhibition can be useful for developing therapies for encouraging the safe use of substances in sexual contexts. Notably, levels of sexual excitation and inhibition are relatively stable factors, but their correlates, such as sensation seeking and sexual anxiety, are cognitive and affective tendencies that can be targeted in psychotherapy. Therefore, understanding the impacts of sexual excitation and sexual inhibition in women with USC histories who engage in SLSU could be beneficial in ultimately targeting cognitive and affective tendencies to allow these women to have safe and pleasurable sexual activity. Moreover, it may be helpful to explore the subcomponents of both excitation and inhibition to observe specifically which aspect may drive associations between a history of USC and SLSU. For example, within the construct of sexual excitation, are sexual power dynamics or physical arousability a stronger predictor of women's SLSU? Understanding these dynamics may further target our interventions to support women engaging in SLSU, particularly women who have a history of USC.

To investigate these relationships, we tested a series of mediation models. Our analyses were exploratory in nature and thus, did not establish a priori directional hypotheses. Instead, we were guided by the following research questions: Is the relationship between USC and SLSU mediated by sexual excitation or sexual inhibition, and if so, which is a better predictor of the relationship?

Methods

The data for the present analyses were derived from a larger study of women's sexuality and substance use. The larger study included a variety of measures not presented here; see <https://bit.ly/3n66Dkk> for descriptions of these additional measures. There are additional papers from this data set examining questions distinct from those presented here (e.g., sexual functioning in sexual minority women; Lorenz, 2021).

Participants and Procedures

Participants were recruited from the psychology participant pool at a large university in the Midwestern United States to complete an online study, advertised as a study of women's drinking and substance use habits. Inclusion criteria included identification as a woman older than age 19 (the age at which participants are legally able to consent to participate in research in Nebraska, United States). Following reading and acknowledging an informed consent form, participants completed a survey battery consisting of measures described in what follows. Attention check measures (e.g., "Over the past month, how often did you time travel?") were included throughout the survey, and data from participants who failed more than one attention check were excluded from the current analysis. Participants received credit toward research requirements in their psychology courses as compensation. All study procedures were approved by the institutional review board at the University of Nebraska–Lincoln.

Measures

Unwanted Sexual Contact History

Participants completed a modified version of the Sexual Coercion Scale (SCS; Aalsma & Fortenberry, 2010). The scale was designed to assess instances of unwanted sex that are not always captured by traditional scales of sexual assault history. Modifications from the original scale included additional items related to coercion within a relationship; reliability in the modified scale was confirmed with Cronbach's alpha and additional factor analyses (Bogen et al., 2022; see also the study registration page on the Open Science Framework at <https://bit.ly/3n66Dkk> for additional details on this measure).

In this measure, participants are provided with a general definition of USC: "intercourse, oral or anal sex, kissing or sexual touching, exchanging sexual pictures, and so on, that you didn't want to have, even if it was with someone you know." They are then asked how often in their lifetime they experienced USC under six different conditions: being forced or threatened with physical force, in response to verbal pressure from a sexual or romantic partner, to avoid a breakup, when too intoxicated to consent, survival sex (needing food, money, or a place to stay), or withdrawing consent after starting to engage in sexual activity. Participants rated if they had experienced USC under that condition never (0), once (1), or more than once (2). If participants indicated any USC history, they were then presented with follow-up questions about their age(s) when these incidents occurred. In the following analyses, we coded USC history as presence (any item selected as "once" or "more than once") or absence (selected "never" for all items).

Trait Sexual Excitation and Sexual Inhibition

Sexual excitation and inhibition were measured using the Sexual Excitation/Sexual Inhibition Scale for Women (SESI-W; Milhausen et al., 2010). Factor analysis supports eight factors comprising a total of 36 items and two higher order factors: sexual excitation and sexual inhibition. The measure demonstrated excellent test-retest reliability

(Graham et al., 2006). Validation studies suggest that it has good convergent and divergent validity with other measures, such as sensation seeking and relationship satisfaction (Gaither & Sellbom, 2003; Milhausen et al., 2010). In the current sample, there was adequate reliability for both the individual subfactors (Cronbach's α ranging from 0.58–0.81) and the superordinate factors (Excitation $\alpha = 0.89$; Inhibition $\alpha = 0.80$). Participants are asked if a series of statements apply to them; items are rated on a 4-point Likert scale ranging from strongly agree to strongly disagree.

Sexual excitation consists of five subscales: Arousability, Partner Characteristics, Sexual Power Dynamics, Smell, and Setting. The Arousability subfactor consists of nine items related to stimuli that can increase sexual arousal (e.g., "When I think about someone I find sexually attractive, I easily become sexually aroused"), with higher scores indicating high ease with becoming aroused. The Partner Characteristics subfactor consists of three items related to a partner's personality or behaviors (e.g., "Someone doing something that shows he/she is intelligent turns me on") and one item related to eye contact with a partner. The Sexual Power Dynamics subfactor includes four items related to force, domination, or dirty talk in sexual situations (e.g., "Feeling overpowered in a sexual situation by someone I trust increases my arousal"). The Smell subfactor consists of two items related to the ability of olfactory cues to enhance sexual arousal (e.g., "Particular scents are very arousing to me"). The Setting subfactor consists of four items related to increased arousal in situations that may be in a new setting or at increased risk of being seen or heard while having sex (e.g., "I get really turned on if I think I may get caught while having sex"). Higher scores on the sexual excitation subfactors indicate arousal in those situations.

Sexual inhibition includes three subscales: Concerns about Sexual Function, Arousal Contingency, and Relationship Importance. The Concerns about Sexual Function subfactor consists of four items related to worries about sexual functioning or performance (e.g., "If I am worried about taking too long to become aroused, this can interfere with my arousal"). The Arousal Contingency subfactor consists of three items that involve the potential for arousal to be inhibited by situations (e.g., "When I am sexually aroused, the slightest thing can turn me off"). Finally, the Relationship Importance subfactor consists

of six items related to the possible importance of relationships on sexual arousal (e.g., “I really need to trust a partner to become fully aroused”). Higher scores on the sexual inhibition subfactors indicate a greater interference with arousal if these situations are experienced.

SLSU

Participants completed a 3-item measure of SLSU that asked how often in the last month they used drugs or alcohol to (a) feel less sexually inhibited, (b) increase their sexual desire or arousal, or (c) increase their sexual pleasure or make it easier to have an orgasm. This brief measure has shown good internal consistency (Chronbach’s $\alpha = 0.87$) and validity in heterosexual and sexual minority women (Lorenz, 2021). Participants were presented with five options on a Likert response scale, ranging from 0 (not at all) to 2 (more than 2 times per week). SLSU was calculated as a total sum across the three questions.

Demographics

Participants were asked to indicate their gender label, sexual orientation, age, relationship status, and race/ethnicity. For all variables except age (which was free response and continuous), participants were able to respond using established categorical choices or select “other” and provide a free-response answer.

Analytic Plan

To investigate if sexual excitation and/or inhibition mediates the effect of a history of USC on SLSU, we conducted a series of mediation analyses using the *mediate* package in R (version 4.0.0; Tingley et al., 2014). We opted to use mediation analyses despite our cross-sectional data, due to the proposed directionality of the effects. Although some authors have argued that mediation cannot be established with cross-sectional data (see O’Laughlin et al., 2018), others have noted that cross-sectional data can support mediation modelling if there is a theoretically supported temporal sequence, and the results of these analyses are appropriately interpreted as exploratory (e.g., Fairchild & McDaniel, 2017; Shrout, 2011). Our model proposes that USC can

influence sexual excitation and/or sexual inhibition which may then be related to SLSU. In terms of inferring causality, it is more plausible that women's experiences of USC shaped the development of their sexual tendencies in emerging adulthood. Concurrently, it is much less plausible that their sexual excitation/inhibition patterns resulted in their early-life experiences of USC. Therefore, although the cross-sectional nature of the data indicates these analyses should be interpreted with caution, mediation analyses are an appropriate analytic tool for our research question.

We first examined the superordinate factors (i.e., overall excitation, overall inhibition) as mediators of the association between USC and SLSU. When the superordinate factor was significant, we then conducted further analyses to examine the individual subfactors as mediators. The mediate package used bootstrapping to estimate the indirect and direct paths of a model. In each case, the "direct" pathway indicates the strength of association between a history of USC and SLSU in the presence of the focal mediator (either sexual excitation or inhibition). The "indirect" pathways demonstrate mediation effects or the degree to which sexual excitation/inhibition explained the association between a history of USC and SLSU. We considered a lack of a significant direct path combined with significant indirect path evidence for full mediation, while a significant direct and significant indirect path would be considered partial mediation. Additionally, a significant direct path but lack of a significant indirect path may suggest that the association between a history of USC and SLSU remains even when considering the effects of the putative mediator. A de-identified version of the data set used for these analyses is available via the Open Science Framework at <https://bit.ly/3n66Dkk>.

Results

Participant Characteristics

The current analysis included 516 cisgender women aged 19 to 39 ($M = 21.09$, $SD = 1.56$) who identified as White/Non-Hispanic (80%), White/Hispanic (6.8%), East Asian (4.7%), Black (2.7%), Other (2.5%), Multiracial (1.7%) and South Asian (1.6%). Most participants

reported being exclusively heterosexual (81.8%) or mostly heterosexual (9.3%), with 6.2% identifying as bisexual and 2.7% identifying as exclusively lesbian/gay or another sexual orientation. About half the participants ($n = 288$; 55.8%) reported at least one lifetime instance of USC. Specifically, 50.2% of the participants reported coercion (either due to pressure from a partner or to avoid a breakup), 23.8% reported intoxication-related USC, 41.3% reported withdrawn consent, and 10.5% reported forced sex or survival sex; note these indications were not exclusive, and some participants reported multiple instances or types of USC. Additionally, 10.5% of participants reported at least one USC experience prior to age 14. Of participants who reported a history of USC, 26.7% reported SLSU in the past month, in contrast to the 12.4% of women without USC histories, $\chi^2(1, N = 516) = 15.5, p < .001$.

Sexual Excitation Mediation Analyses

There was evidence that sexual excitation mediated the association between a history of USC and SLSU, as the indirect pathway was significant (effect estimate = 0.067, 95% CI 0.025–0.142, $p < 0.001$; Figure 1). Moreover, the direct effect of history of USC on SLSU when accounting for the indirect effects of sexual excitation scores was not significant (effect estimate = 0.228, 95% CI –0.040–0.461, $p = 0.070$). In other words, there was evidence that sexual excitation fully mediated the relationship between USC and SLSU. Post hoc analyses revealed that history of USC predicted a higher self-reported sexual excitation (effect estimate = 0.302, $SE = .092, p < .001$), which, in turn, significantly predicted higher SLSU (effect estimate = 0.239, $SE = .061, p < .001$; Figure 1).

We then examined the individual subfactors of sexual excitation (arousability, sexual power dynamics, smell, partner characteristics, setting). Model estimates are presented in Table 1. Notably, the arousability, power dynamics, and partner characteristics subfactors of sexual excitation each independently mediated the relationship between USC and SLSU (Table 1). However, the smell and setting subfactors of sexual excitation did not impact the relationship between USC and SLSU (indirect path p -values > 0.05).

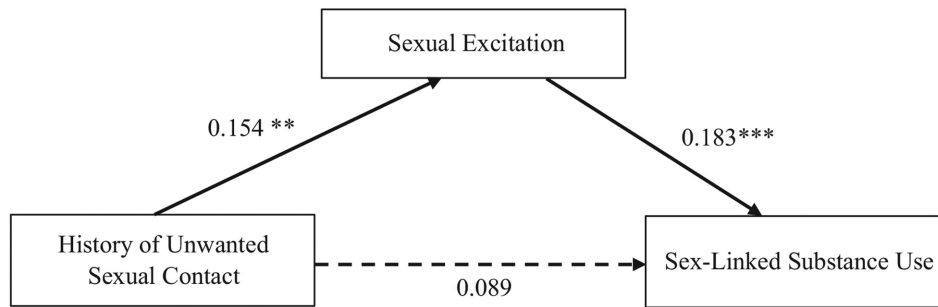


Figure 1. Standardized coefficients of the path model testing sexual excitation as a mediator of the association between unwanted sexual contact and sex-linked substance use. *Note.* * $p < 0.001$. ** $p < 0.010$.

Table 1. Model Estimates for Direct and Indirect Pathways Between Unwanted Sexual Contact (USC) and Sex-Linked Substance Use (SLSU) with Serial Mediations of the Sexual Excitation Subscales

Mediator Tested	Indirect Effect (Mediation Pathways)			Direct Effect (USC → SLSU)		
	Effect Estimate	95% Confidence Interval	<i>p</i>	Effect Estimate	95% Confidence Interval	<i>p</i>
Arousability	0.060	(0.015, 0.145)	0.010**	0.080	(-0.076, 0.479)	0.112
Power Dynamics	0.062	(0.020, 0.148)	0.002**	0.099	(-0.027, 0.507)	0.062
Partner Characteristics	0.520	(0.013, 0.123)	0.010**	0.090	(-0.020, 0.472)	0.066
Smell	0.034	(0.002, 0.096)	0.108	0.103	(0.020, 0.500)	0.036*
Unusual Setting	0.011	(-0.015, 0.056)	0.506	0.097	(-0.029, 0.497)	0.062

Note. * $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

Sexual Inhibition Mediation Analyses

We then tested if sexual inhibition mediates the relationship between a history of USC on SLSU. There no was evidence that the superordinate sexual inhibition factor mediated the association between USC and SLSU (indirect path effect estimate = 0.011, $p = 0.254$, 95% CI [-0.002-0.047]). However, the direct effect of USC history on SLSU was significant when accounting for the indirect effects of sexual inhibition scores (direct effect estimate = 0.224, $p = 0.014$, 95% CI [0.052-0.506]).

Discussion

The present study examined the role of sexual excitation and inhibition in predicting SLSU and how these factors may explain the higher incidence of SLSU among women with a history of USC. Given the exploratory nature of the study, we first examined the superordinate factors (i.e., overall excitation, overall inhibition) as mediators of the association between USC and SLSU. When a superordinate factor was significant, we then conducted further analysis to examine the individual subfactors as mediators. We found that sexual excitation mediated the relationship between a history of USC and SLSU, suggesting that women with a history of USC are more likely to have higher levels of sexual excitation, which, in turn, is associated with higher likelihood of using substances during sexual activity. This finding highlights a potential intersection for further analysis.

Sexual Excitation as a Mediator of Associations Between USC and SLSU

A history of USC predicted higher self-reported sexual excitation, which, in turn, significantly predicted higher SLSU. Additionally, the direct effect of a history of USC on SLSU was not significant when accounting for the indirect effects of sexual excitation, suggesting complete mediation (Figure 1). Higher sexual excitation has previously been correlated with higher levels of self-reported arousal as well as greater sexual risk-taking (Skakoon-Sparling & Milhausen, 2020). It is possible that higher sexual excitation mediates the relationship between USC and SLSU by providing an avenue for women to enhance sexual pleasure. This parallels other work on women's sexual expectancies for alcohol or drug use, such as the belief that alcohol and marijuana enhance sexual desire, enjoyment, and overall activity (Harvey & Beckman, 1986). Higher sexual arousal expectancies may result in more frequent substance use in sexual contexts to achieve higher sexual pleasure. Indeed, women who have a history of alcohol-involved sexual assault also report greater alcohol use and positive expectancies compared to women with non-alcohol-involved sexual assaults (Bedard-Gilligan et al., 2011). Higher sexual arousal expectancies may combine with higher levels of sexual excitation, resulting

in an increase in substance use in sexual contexts, especially among women with a history of unwanted sexual activity.

Subfactor Analyses: Arousability, Power Dynamics, and Partner Characteristics

Within the superordinate factor of sexual excitation, three sub-factors were each independent mediators of the relationship between USC history and SLSU: arousability, power dynamics, and partner characteristics. These specific components of sexual excitation may yield specific implications for use in targeting interventions to support women engaging in SLSU.

A person's arousability is the ease at which they become aroused. Women with higher levels of arousability may be more likely to use substances prior to sexual activity to enhance novelty and engagement with sexual stimuli, similar to women high in sensation seeking. Given the correlation between sexual excitation and sensation seeking overall (Velten, 2017), it is likely that women with higher arousability may use alcohol in sexual situations to further increase pleasure by facilitating sexual activity with novel partners or stimuli.

Power dynamics were similarly a significant mediator between USC history and SLSU. Given the intrinsic intersection of sexualized power dynamics and gender roles (Conley et al., 2013; Farvid et al., 2017; Wiederman, 2005), these findings suggest that the use of substances in sexual situations might empower women to pursue sexual situations that are not viewed as culturally acceptable within a proscriptive feminine role. For instance, a qualitative study found that women reported using alcohol to be "bold" and initiate sexual relationships that are taboo for them given the sociocultural norms for women (Dumbili, 2016). Women with a history of USC, in particular, might experience greater stigma surrounding exploring power dynamics in sexual situations, which may result in greater use of substances to engage in these sexual situations. For instance, women with alcohol-involved sexual assaults reported higher positive expectancies of alcohol use for sexual activity, such as acting out fantasies, compared to women without an alcohol-involved sexual assault history (Bedard-Gilligan et al., 2011). Similarly, a qualitative study found that some women reported

higher engagement in sexual activities outside of a traditional heteronormative script when using alcohol, including anal sex and “rough” sex (Lewis et al., 2015). Moreover, some participants reported that they desired certain types of sexual activity when drunk (Lewis et al., 2015). Our results suggest that higher levels of sexual excitation, specifically related to power dynamics, may mediate the relationship between USC and SLSU by providing an avenue for women to pursue desired, but potentially culturally stigmatized, sexual activities.

Finally, partner characteristics were a significant mediator of the relationship between USC and SLSU. Survivors of USC may experience feelings of mistrust and anxiety (van Berlo & Ensink, 2000). Consequently, it may be that these survivors need a higher level of trust with their partner(s) in order to engage in SLSU (Brecklin & Ullman, 2010; Burnett et al., 2009; Wiehe & Richards, 1995). It is possible that the partner characteristics that contribute to higher sexual excitation are correlated with cues of safety, allowing women to feel more comfortable using substances in sexual situations. Alternatively, the partner characteristic subfactor is comprised of statements such as “seeing a partner doing something that shows his/her talent can make me very sexually aroused” that are related to attention to one’s partner(s). Therefore, it is possible that substances might increase an individual’s awareness of their partner(s), specifically the salience and intensity of partner cues, in line with alcohol myopia theory (Griffin et al., 2010). For instance, intoxicated women are more likely to pay attention to sexual arousal cues, including cues of attraction to their partner, than sexual risk cues (Davis et al., 2007). This suggests that alcohol may also impact the perception and saliency of sexually arousing partner cues when under the influence of substances. If so, we may expect that women with a history of USC use substances in sexual situations to increase awareness and focus on their present partner(s) and less on cues of sexual risk. While a focus on cues of alcohol may increase risk in sexual situations (see, e.g., Masters et al., 2014), it is also likely that increased focus on partner characteristics may be associated with a focus on “green flags,” or cues of safety from potential partners.

Lack of Effect of Sexual Inhibition

Sexual inhibition was not a significant mediator of the relationship between USC history and SLSU. This finding is counter to literature that suggests women with a history of USC use substances during or before sexual situations to reduce inhibitions surrounding sexual activity (Benson et al., 2007). However, in our study, the direct effect of USC history on SLSU was significant when accounting for the indirect effects of the sexual inhibition score. This suggests that sexual inhibition is still playing a role in the pathway between USC history and SLSU but not as a mediator. Possibly, sexual inhibition is acting on this path via an inverse relationship with sexual excitation as women with higher sexual excitation are more likely to report lower levels of sexual inhibition. If so, this would challenge narratives that cast women—particularly women with a history of USC—as sexually passive recipients of others' sexual interest, requiring SLSU to overcome inhibitions to be able to tolerate sexual activity. However, as these were exploratory analyses, we cannot conclude that the lack of evidence of an association is definitive; further analysis may help parse out the exact role of sexual inhibition.

Clinical Implications

Given that sexual excitation, rather than sexual inhibition, mediated the relationship between a history of USC and SLSU, these findings suggest a potential pathway for intervention. SLSU can be associated with problems communicating consent or following through on condom use intentions (e.g., Jozkowski & Wiersma, 2015; Scott-Sheldon et al., 2016) and potentially, contribute to higher risk of negative sexual outcomes such as experiencing unwanted sex (Abbey et al., 2001). Although SLSU can be associated with unsafe sexual situations, it is important to reaffirm that the responsibility of USC is always with the perpetrator. Given that SLSU is associated with higher likelihood of negative outcomes, one focus of intervention should reside with potential assailants surrounding safer sex communication and awareness with partners who engage in SLSU.

However, recognizing sexual excitation as a mediator of the pathway between a history of USC and SLSU could be particularly useful

for guiding women who are using substances for sexual motivation and pleasure by creating targeted interventions focused on the safe use of substances in sexual situations. These findings suggest that when having conversations about SLSU, it is important to acknowledge and embrace that women with a USC history often intentionally use alcohol or other drugs for pleasure and sexual enhancement. Therefore, potential interventions should focus on centering women's sexual arousal and pleasure and finding ways to safely engage and enhance that pleasure, as opposed to emphasizing inhibitory cues. Interventions may include conversations about the importance of sexual communication within the scope of SLSU. Focusing prevention efforts on how to use substances effectively and safely for women's sexual arousal and pleasure, rather than for inhibitory reasons, may uniquely improve outcomes in women with a history of USC. Similarly, insofar as women's SLSU indicates a perception that they must use substances to "excuse" their higher sexual arousability and interest, interventions may focus on building women's agency and permission for pleasure. These efforts may be most applicable to college-aged women in university settings.

Limitations and Future Directions

The current study has limitations worth noting. These analyses were exploratory, and our findings should be interpreted as preliminary. As noted earlier, the results of mediation analyses with cross-sectional data should be interpreted with caution. Furthermore, as with all self-report measures, the study relied on self-report measures that may be subject to bias, particularly in the context of substance use (Johnson & Bowman, 2003). That said, some research does suggest that individuals can consistently and accurately report their substance use (Simons et al., 2015).

The demographics of the current study represent undergraduate women with a relative lack of diversity among race/ethnicity and socioeconomic status. In addition, our sample was primarily exclusively heterosexual (81%). Given that some groups of sexual minority women report higher sexual interest (Savin-Williams & Vrangalova, 2013), lower sexual inhibition (Bellis et al., 2008), more positive

alcohol expectancies (Talley et al., 2012), and correlations between marijuana use and SLSU (Lorenz, 2021), further analysis examining the role of sexual minority status on the association between USC history, sexual excitation, and SLSU could be beneficial. The study was also conducted with undergraduate women; relative to the general population, undergraduate women are at increased risk of experiencing sexual violence and sexual assault and use alcohol at higher rates. Thus, the implications of this study should be limited to undergraduate women until the findings have been replicated in a broader sample.

The results of this study suggest that even using a broader definition of USC that potentially includes assault, coercion, and consensual but not wanted sex, there are some shared pathways linking USC with SLSU. However, future studies may investigate the ways in which specific types of USC histories are associated with SLSU and the potential differing role of sexual excitation or inhibition in this relationship. It is possible that overt forms of unwanted sexual experiences, like assault and rape, may be associated with higher levels of inhibitions, regardless of sexual excitation levels, and a desire for intentional avoidance or numbing

with sexual activity that may remind them of their trauma— much like post-assault narratives suggest. Future studies may be beneficial in parsing out the role of sexual excitation and in what instances it might overcome high levels of sexual inhibition.

Similarly, the current study conceptualized SLSU as the use of any substance for sexual purposes, irrespective of its pharmacologic mechanism of action or the legality of use. Possibly, these differences across substance types may moderate the observed effects. For example, we may expect substances with an excitatory effect (such as stimulants) may have even stronger associations with sexual excitation than substances with a sedative effect (such as alcohol). Finally, we did not assess for information about women's sexual partners while using substances (e.g., new vs. regular partner) or the specific contexts of SLSU (e.g., at a party vs. at home). Further analysis examining these contextual and dyadic factors is warranted.

However, recognizing these limitations, these findings contribute to the current literature on sexual excitation and SLSU, particularly in women with a history of USC. In addition to ongoing efforts to address women's alcohol expectancies, our findings suggest that sexual

excitation may also be a useful target of intervention surrounding substance use and SLSU, particularly in women with a history of USC. Ultimately, such interventions are needed to empower women with a history of sexual assault to evaluate how to use substances to improve their sexual well-being while minimizing potential negative consequences.

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Data Availability The deidentified data that support the findings of this study are publicly available in Open Science Framework at <https://bit.ly/3n66Dkk>, DOI 10.17605/OSF.IO/JGTR5. Demographic data are available on request from the authors.

References

- Aalsma, M. C., & Fortenberry, J. D. (2010). Sexual coercion scale. In *Handbook of Sexuality-Related Measures*. Routledge. <https://doi.org/10.4324/9781315881089.ch38>
- Abbey, A., Zawacki, T., Buck, P. O., Clinton, A. M., & McAuslan, P. (2001). Alcohol and sexual assault. *Alcohol Research & Health*, 25(1), 9.
- Akre, C., Chabloz, J.-M., Belanger, R. E., Michaud, P.-A., & Suris, J.-C. (2013). Unwanted sexual experiences among adolescents: Shedding light on the gray zone between consensual and non-consensual sex. *International Journal of Adolescent Medicine and Health*, 25(1), 69–74. <https://doi.org/10.1515/ijamh-2013-0009> Medline:23314518
- Bancroft, J., Graham, C. A., Janssen, E., & Sanders, S. A. (2009). The dual control model: Current status and future directions. *Journal of Sex Research*, 46(2–3), 121–142. <https://doi.org/10.1080/00224490902747222> Medline:19308839
- Bancroft, J., & Janssen, E. (2000). The dual control model of male sexual response: A theoretical approach to centrally mediated erectile dysfunction. *Neuroscience & Biobehavioral Reviews*, 24(5), 571–579. [https://doi.org/10.1016/S0149-7634\(00\)00024-5](https://doi.org/10.1016/S0149-7634(00)00024-5)
- Bedard-Gilligan, M., Kaysen, D., Desai, S., & Lee, C. M. (2011). Alcohol-involved assault: Associations with posttrauma alcohol use, consequences,

- and expectancies. *Addictive Behaviors*, 36(11), 1076–1082. <https://doi.org/10.1016/j.addbeh.2011.07.001> Medline:21813246
- Bellis, M. A., Hughes, K., Calafat, A., Juan, M., Ramon, A., Rodriguez, J. A., Mendes, F., Schnitzer, S., & Phillips-Howard, P. (2008). Sexual uses of alcohol and drugs and the associated health risks: A cross sectional study of young people in nine European cities. *BMC Public Health*, 8(1), 155. <https://doi.org/10.1186/1471-2458-8-155> Medline:18471281
- Benson, B. J., Gohm, C. L., & Gross, A. M. (2007). College women and sexual assault: The role of sex-related alcohol expectancies. *Journal of Family Violence*, 22(6), 341–351. <https://doi.org/10.1007/s10896-007-9085-z>
- Bird, E. R., Gilmore, A. K., Stappenbeck, C. A., Heiman, J. R., Davis, K. C., Norris, J., & George, W. H. (2017). Women's sex-related dissociation: The effects of alcohol intoxication, attentional control instructions, and history of childhood sexual abuse. *Journal of Sex & Marital Therapy*, 43(2), 121–131. <https://doi.org/10.1080/0092623X.2015.1124304> Medline:26735683
- Bird, E. R., Seehuus, M., Heiman, J. R., Davis, K. C., Norris, J., & George, William. H. (2018). Sexual vs. nonsexual currently most upsetting trauma: A fresh look at attenuation of sexual response, alcohol intoxication, and post-traumatic stress. *The Journal of Sex Research*, 55(7), 915–926. <https://doi.org/10.1080/00224499.2017.1380159> Medline:29023137
- Blume, A. W., & Guttu, B. L. (2015). Categories of alcohol outcome expectancies and their relationships to alcohol related consequences. *Addictive Behaviors Reports*, 1, 64–67. <https://doi.org/10.1016/j.abrep.2015.04.005> Medline:29531981
- Bogen, K. W., Jones, H. R., & Lorenz, T. K. (2022). Relational and trait factors mediate the associations between women's intoxication-related unwanted sexual experiences, pleasure, and desire. *The Journal of Sex Research*. Advanced online publication. <https://doi.org/10.1080/00224499.2022.2030661> Medline:35262426
- Bornoalova, M. A., Gwadz, M. A., Kahler, C., Aklin, W. M., & Lejuez, C. W. (2008). Sensation seeking and risk-taking propensity as mediators in the relationship between childhood abuse and HIV-related risk behavior. *Child Abuse & Neglect*, 32(1), 99–109. <https://doi.org/10.1016/j.chiabu.2007.04.009> Medline:18155295
- Boysan, M., Goldsmith, R. E., Çavuş, H., Kayri, M., & Keskin, S. (2009). Relations among anxiety, depression, and dissociative symptoms: The influence of abuse subtype. *Journal of Trauma & Dissociation*, 10(1), 83–101. <https://doi.org/10.1080/15299730802485185> Medline:19197714
- Brecklin, L. R., & Ullman, S. E. (2010). The roles of victim and offender substance use in sexual assault outcomes. *Journal of Interpersonal Violence*, 25(8), 1503–1522. <https://doi.org/10.1177/0886260509354584> Medline:20056819
- Brown, A. L., Testa, M., & Messman-Moore, T. L. (2009). Psychological consequences of sexual victimization resulting from force, incapacitation, or verbal coercion. *Violence Against Women*, 15(8), 898–919. <https://doi.org/10.1177/1077801209335491> Medline:19502576

- Burnett, A., Mattern, J. L., Herakova, L. L., Kahl, D. H., Tobola, C., & Bornsen, S. E. (2009). Communicating/muting date rape: A co-cultural theoretical analysis of communication factors related to rape culture on a college campus. *Journal of Applied Communication Research*, 37(4), 465-485. <https://doi.org/10.1080/00909880903233150>
- Conley, T. D., Ziegler, A., & Moors, A. C. (2013). Backlash from the bedroom: Stigma mediates gender differences in acceptance of casual sex offers. *Psychology of Women Quarterly*, 37(3), 392-407. <https://doi.org/10.1177/0361684312467169>
- Corbin, W. R., Bernat, J. A., Calhoun, K. S., McNair, L. D., & Seals, K. L. (2001). The role of alcohol expectancies and alcohol consumption among sexually victimized and nonvictimized college women. *Journal of Interpersonal Violence*, 16(4), 297-311. <https://doi.org/10.1177/088626001016004002>
- Davis, K. C., Hendershot, C. S., George, W. H., Norris, J., & Heiman, J. R. (2007). Alcohol's effects on sexual decision making: An integration of alcohol myopia and individual differences. *Journal of Studies on Alcohol and Drugs*, 68(6), 843-851. <https://doi.org/10.15288/jsad.2007.68.843> Medline:17960302
- Dumbili, E. W. (2016). Gendered sexual uses of alcohol and associated risks: A qualitative study of Nigerian University students. *BMC Public Health*, 16(1), 474. <https://doi.org/10.1186/s12889-016-3163-1> Medline:27267273
- Fairchild, A. J., & McDaniel, H. L. (2017). Best (but oft-forgotten) practices: Mediation analysis. *The American Journal of Clinical Nutrition*, ajcn152546. <https://doi.org/10.3945/ajcn.117.152546> Medline:28446497
- Farvid, P., Braun, V., & Rowney, C. (2017). 'No girl wants to be called a slut!': Women, heterosexual casual sex and the sexual double standard. *Journal of Gender Studies*, 26(5), 544-560. <https://doi.org/10.1080/09589236.2016.1150818>
- Finkelhor, D., & Browne, A. (1985). The traumatic impact of child sexual abuse: A conceptualization. *American Journal of Orthopsychiatry*, 55(4), 530-541. <https://doi.org/10.1111/j.1939-0025.1985.tb02703.x> Medline:4073225
- Flack, W. F., Daubman, K. A., Caron, M. L., Asadorian, J. A., D'Aureli, N. R., Gigliotti, S. N., Hall, A. T., Kiser, S., & Stine, E. R. (2007). Risk factors and consequences of unwanted sex among university students: Hooking up, alcohol, and stress response. *Journal of Interpersonal Violence*, 22(2), 139-157. <https://doi.org/10.1177/0886260506295354> Medline:17202573
- Gaither, G. A., & Sellbom, M. (2003). The sexual sensation seeking scale: Reliability and validity within a heterosexual college student sample. *Journal of Personality Assessment*, 81(2), 157-167. https://doi.org/10.1207/s15327752jpa8102_07 Medline:12946922
- Graham, C. A., Sanders, S. A., & Milhausen, R. R. (2006). The sexual excitation/sexual inhibition inventory for women: Psychometric properties. *Archives of Sexual Behavior*, 35(4), 397-409. <https://doi.org/10.1007/s10508-006-9041-7>
- Griffin, J. A., Umstatt, M. R., & Usdan, S. L. (2010). Alcohol use and high-risk sexual behavior among collegiate women: A review of research on alcohol

- myopia theory. *Journal of American College Health*, 58(6), 523-532. <https://doi.org/10.1080/07448481003621718> Medline:20452928
- Harvey, S. M., & Beckman, L. J. (1986). Alcohol consumption, female sexual behavior and contraceptive use. *Journal of Studies on Alcohol*, 47(4), 327-332. <https://doi.org/10.15288/jsa.1986.47.327> Medline:3747532
- Hendershot, C. S., Magnan, R. E., & Bryan, A. D. (2010). Associations of marijuana use and sex-related marijuana expectancies with HIV/STD risk behavior in high-risk adolescents. *Psychology of Addictive Behaviors*, 24(3), 404-414. <https://doi.org/10.1037/a0019844> Medline:20853925
- Herbenick, D., Fu, T.-C. (Jane), Dodge, B., & Fortenberry, J. D. (2019). The alcohol contexts of consent, wanted sex, sexual pleasure, and sexual assault: Results from a probability survey of undergraduate students. *Journal of American College Health*, 67(2), 144-152. <https://doi.org/10.1080/07448481.2018.1462827> Medline:29652650
- Johnson, T. P., & Bowman, P. J. (2003). Cross-cultural sources of measurement error in substance use surveys. *Substance Use & Misuse*, 38(10), 1447-1490. <https://doi.org/10.1081/ja120023394> Medline:14509547
- Jozkowski, K. N., & Wiersma, J. D. (2015). Does drinking alcohol prior to sexual activity influence college students' consent? *International Journal of Sexual Health*, 27(2), 156-174. <https://doi.org/10.1080/19317611.2014.951505>
- Kalichman, S. C., Tannenbaum, L., & Nachimson, D. (1998). Personality and cognitive factors influencing substance use and sexual risk for HIV infection among gay and bisexual men. *Psychology of Addictive Behaviors*, 12(4), 262-271. <https://doi.org/10.1037/0893-164x.12.4.262>
- Kelley, M. L., Ehlke, S. J., Lewis, R. J., Braitman, A. L., Bostwick, W., Heron, K. E., & Lau-Barraco, C. (2018). Sexual coercion, drinking to cope motives, and alcohol-related consequences among self-identified bisexual women. *Substance Use & Misuse*, 53(7), 1146-1157. <https://doi.org/10.1080/10826084.2017.1400565> Medline:29278972
- Kilimnik, C. D., & Meston, C. M. (2016). Role of body esteem in the sexual excitation and inhibition responses of women with and without a history of childhood sexual abuse. *The Journal of Sexual Medicine*, 13(11), 1718-1728. <https://doi.org/10.1016/j.jsxm.2016.09.004> Medline:27692843
- Klanecky, A. K., Harrington, J., & McChargue, D. E. (2008). Child sexual abuse, dissociation, and alcohol: Implications of chemical dissociation via blackouts among college women. *The American Journal of Drug and Alcohol Abuse*, 34(3), 277-284. <https://doi.org/10.1080/00952990802013441> Medline:18428070
- Lawn, W., Aldridge, A., Xia, R., & Winstock, A. R. (2019). Substance-linked sex in heterosexual, homosexual, and bisexual men and women: An online, cross-sectional "global drug survey" report. *The Journal of Sexual Medicine*, 16(5), 721-732. <https://doi.org/10.1016/j.jsxm.2019.02.018> Medline:30952548
- Lewis, D., Hutton, H. E., Agee, T. A., McCaul, M. E., & Chander, G. (2015). Alcohol use and unintended sexual consequences among women attending an urban

- sexually transmitted infections clinic. *Women's Health Issues*, 25(5), 450-457. <https://doi.org/10.1016/j.whi.2015.04.009> Medline:26115942
- Lipinski, A. J., & Beck, J. G. (2020). Sexual functioning and satisfaction among college survivors of sexual violence: Examining PTSD symptoms and sexual schemas. *Journal of Interpersonal Violence*, 088626052093548. <https://doi.org/10.1177/0886260520935483> Medline:32627653
- Lorenz, T. K. (2021). Sexual excitation and sex-linked substance use predict overall cannabis use in mostly heterosexual and bisexual women. *The American Journal of Drug and Alcohol Abuse*, 47(4), 433-443. <https://doi.org/10.1080/00952990.2021.1922429> Medline:34114916
- Masters, N. T., George, W. H., Davis, K. C., Norris, J., Heiman, J. R., Jacques-Tiura, A. J., Gilmore, A. K., Nguyen, H. V., Kajumulo, K. F., Otto, J. M., & Stappenbeck, C. A. (2014). Women's unprotected sex intentions: Roles of sexual victimization, intoxication, and partner perception. *The Journal of Sex Research*, 51(5), 586-598. <https://doi.org/10.1080/00224499.2012.763086> Medline:23718552
- McCauley, J. L., Ruggiero, K. J., Resnick, H. S., & Kilpatrick, D. G. (2010). Incapacitated, forcible, and drug/alcohol-facilitated rape in relation to binge drinking, marijuana use, and illicit drug use: A national survey. *Journal of Traumatic Stress*, 23(1), 132-140. <https://doi.org/10.1002/jts.20489> Medline:20135676
- Milhausen, R. R., Graham, C. A., Sanders, S. A., Yarber, W. L., & Maitland, S. B. (2010). Validation of the sexual excitation/sexual inhibition inventory for women and men. *Archives of Sexual Behavior*, 39(5), 1091-1104. <https://doi.org/10.1007/s10508-009-9554-y> Medline:19859799
- Muise, A., Milhausen, R. R., Cole, S. L., & Graham, C. (2013). Sexual compulsivity in heterosexual married adults: The role of sexual excitation and sexual inhibit. *Sexual Addiction & Compulsivity*, 20(3), 192-209.
- Nguyen, H. V., Koo, K. H., Davis, K. C., Otto, J. M., Hendershot, C. S., Schacht, R. L., George, W. H., Heiman, J. R., & Norris, J. (2012). Risky Sex: Interactions Among Ethnicity, Sexual Sensation Seeking, Sexual Inhibition, and Sexual Excitation. *Archives of Sexual Behavior*, 41(5), 1231-1239. <https://doi.org/10.1007/s10508-012-9904-z> Medline:22350123
- O'Laughlin, K. D., Martin, M. J., & Ferrer, E. (2018). Cross-sectional analysis of longitudinal mediation processes. *Multivariate Behavioral Research*, 53(3), 375-402. <https://doi.org/10.1080/00273171.2018.1454822> Medline:29624079
- Palmer, R. S., McMahon, T. J., Rounsaville, B. J., & Ball, S. A. (2010). Coercive sexual experiences, protective behavioral strategies, alcohol expectancies and consumption among male and female college students. *Journal of Interpersonal Violence*, 25(9), 1563-1578. <https://doi.org/10.1177/0886260509354581> Medline:20040711
- Pumphrey-Gordon, J. E., & Gross, A. M. (2007). Alcohol consumption and females' recognition in response to date rape risk: The role of sex-related

- alcohol expectancies. *Journal of Family Violence*, 22(6), 475–485. <https://doi.org/10.1007/s10896-007-9104-0>
- Rellini, A. (2008). Review of the empirical evidence for a theoretical model to understand the sexual problems of women with a history of CSA. *The Journal of Sexual Medicine*, 5(1), 31–46. <https://doi.org/10.1111/j.1743-6109.2007.00652.x> Medline:18069994
- Saladin, M. E., Brady, K. T., Dansky, B. S., & Kilpatrick, D. G. (1995). Understanding comorbidity between PTSD and substance use disorders: Two preliminary investigations. *Addictive Behaviors*, 20(5), 643–655. [https://doi.org/10.1016/0306-4603\(95\)00024-7](https://doi.org/10.1016/0306-4603(95)00024-7)
- Sanders, S. A., Graham, C. A., & Milhausen, R. R. (2008). Predicting sexual problems in women: The relevance of sexual excitation and sexual inhibition. *Archives of Sexual Behavior*, 37(2), 241–251. <https://doi.org/10.1007/s10508-007-9235-7> Medline:17902042
- Savin-Williams, R. C., & Vrangalova, Z. (2013). Mostly heterosexual as a distinct sexual orientation group: A systematic review of the empirical evidence. *Developmental Review*, 33(1), 58–88. <https://doi.org/10.1016/j.dr.2013.01.001>
- Schraufnagel, T. J., Davis, K. C., George, W. H., & Norris, J. (2010). Childhood sexual abuse in males and subsequent risky sexual behavior: A potential alcohol-use pathway. *Child Abuse & Neglect*, 34(5), 369–378. <https://doi.org/10.1016/j.chiabu.2009.08.013> Medline:20359749
- Scott-Sheldon, L. A. J., Carey, K. B., Cunningham, K., Johnson, B. T., & Carey, M. P. (2016). Alcohol use predicts sexual decision-making: A systematic review and meta-analysis of the experimental literature. *AIDS and Behavior*, 20(S1), 19–39. <https://doi.org/10.1007/s10461-015-1108-9> Medline:26080689
- Senn, T. E., Carey, M. P., & Vanable, P. A. (2008). Childhood and adolescent sexual abuse and subsequent sexual risk behavior: Evidence from controlled studies, methodological critique, and suggestions for research. *Clinical Psychology Review*, 28(5), 711–735. <https://doi.org/10.1016/j.cpr.2007.10.002> Medline:18045760
- Shaw, R., & Read, J. P. (2021). The differential effects of verbal sexual coercion and forcible sexual assault on alcohol use and consequence trajectories in the first year of college. *Psychological Trauma: Theory, Research, Practice, and Policy*, 13(8), 835–846. <https://doi.org/10.1037/tra0001130> Medline:34591534
- Shrout, P. E. (2011). Commentary: Mediation analysis, causal process, and cross-sectional data. *Multivariate Behavioral Research*, 46(5), 852–860. <https://doi.org/10.1080/00273171.2011.606718> Medline:26736049
- Simons, J. S., Wills, T. A., Emery, N. N., & Marks, R. M. (2015). Quantifying alcohol consumption: Self-report, transdermal assessment, and prediction of dependence symptoms. *Addictive Behaviors*, 50, 205–212. <https://doi.org/10.1016/j.addbeh.2015.06.042> Medline:26160523
- Skakoon-Sparling, S., & Milhausen, R. M. (2020). Sexual excitation and sexual inhibition in the context of sexual risk-taking. *The Journal of Sex Research*. Advanced online publication. <https://doi.org/10.1080/00224499.2020.1776820> Medline:32600069

- Slavin, M. N., Scoglio, A. A. J., Blycker, G. R., Potenza, M. N., & Kraus, S. W. (2020). Child sexual abuse and compulsive sexual behavior: A systematic literature review. *Current Addiction Reports*, 7(1), 76–88. <https://doi.org/10.1007/s40429-020-002989> Medline:33425653
- Sumnall, H. R., Beynon, C. M., Conchie, S. M., Riley, S. C. E., & Cole, J. C. (2007). An investigation of the subjective experiences of sex after alcohol or drug intoxication. *Journal of Psychopharmacology*, 21(5), 525–537. <https://doi.org/10.1177/0269881106075590> Medline:17446200
- Talley, A. E., Sher, K. J., Steinley, D., Wood, P. K., & Littlefield, A. K. (2012). Patterns of alcohol use and consequences among empirically derived sexual minority subgroups. *Journal of Studies on Alcohol and Drugs*, 73(2), 290–302. <https://doi.org/10.15288/jsad.2012.73.290> Medline:22333337
- Tingley, D., Yamamoto, T., Hirose, K., Keele, L., & Imai, K. (2014). Mediation: R package for causal mediation analysis. *Journal of Statistical Software*, 59(5). <https://doi.org/10.18637/jss.v059.i05>
- Turchik, J. A., Garske, J. P., Probst, D. R., & Irvin, C. R. (2010). Personality, sexuality, and substance use as predictors of sexual risk taking in college students. *Journal of Sex Research*, 47(5), 411–419. <https://doi.org/10.1080/00224490903161621> Medline:19711220
- van Berlo, W., & Ensink, B. (2000). Problems with sexuality after sexual assault. *Annual Review of Sex Research*, 11(1), 24.
- Velten, J. (2017). The dual control model of sexual response: Relevance of sexual excitation and sexual inhibition for sexual function. *Current Sexual Health Reports*, 9(2), 90–97. <https://doi.org/10.1007/s11930-017-0108-3>
- Walsh, K., Latzman, N. E., & Latzman, R. D. (2014). Pathway from child sexual and physical abuse to risky sex among emerging adults: The role of trauma-related intrusions and alcohol problems. *Journal of Adolescent Health*, 54(4), 442–448. <https://doi.org/10.1016/j.jadohealth.2013.09.020> Medline:24268710
- Wiederman, M. W. (2005). The gendered nature of sexual scripts. *The Family Journal*, 13(4), 496–502. <https://doi.org/10.1177/1066480705278729>
- Wiehe, V., & Richards, A. (1995). *Intimate betrayal: Understanding and responding to the trauma of acquaintance rape*. Sage Publications. <https://doi.org/10.4135/9781483327358>
- Willis, M., Marcantonio, T. L., & Jozkowski, K. N. (2021). Internal and external sexual consent during events that involved alcohol, cannabis, or both. *Sexual Health*, 18(3), 260. <https://doi.org/10.1071/sh21015> Medline:34134817