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A Learning Experience? Enjoyment at Sexual Debut and the Gender Gap in Sexual Desire among Emerging Adults

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ABSTRACT



Gender differences in experience of first intercourse are among the largest in sexuality research, with women recalling less pleasure and satisfaction than men. This “enjoyment gap” has not been considered in explanations of gender differences in sexual desire. Yet, reinforcement and incentive learning features prominently in recent models of women’s sexual desire, and nonhuman animal models demonstrate their impact at sexual debut. We examined whether women’s lower sexual desire is explained by their gender or by gendered experience of enjoyment at sexual debut. Emerging adults ($N = 838$) provided retrospective accounts of physical (orgasm) and affective (satisfaction) enjoyment at (hetero)sexual debut. We replicated gender differences across behavioral, general, and multidimensional measures of trait sexual desire; however, they were contingent on experience and measurement method. When its cognitive multidimensional properties were appreciated, women’s sexual desire varied with experience of orgasm at sexual debut and diverged from men’s only when orgasm did not occur. Such effects were not observed for satisfaction, nor for men. Nor did effects of a control event – masturbatory debut – extend beyond solitary sexual desire. Findings underscore the importance of orgasm equality, and suggest its absence at sexual debut may play an unacknowledged role in differentiating sexual desire.

“UT EST RERUM OMNIUM MAGISTER USUS” [Experience is the best teacher]

—Julius Caesar (ca. 52 B.C.)

Though rarely included among sources of sexual education, a young person’s first experience of sexual intercourse is often deeply meaningful (Carpenter, 2005) and memorable (Hearn et al., 2003), with important connections to later sexual knowledge (Coleman & Testa, 2006; Hoehn et al., 2016), beliefs (Reissing et al., 2012), and behavior (Heywood et al., 2015; Sprecher et al., 2019). It is also a profoundly gendered¹ experience. Young men typically describe more rewarding first intercourse encounters than young women, in terms of satisfaction and positive affective experience (Rapsey, 2014; Reissing et al., 2012; Schwartz & Coffield, 2020; Smith & Shaffer, 2013; Sprecher, 2014) as well as objective experience of orgasm (Reissing et al., 2012; Schwartz & Coffield, 2020; Sprecher et al., 1995; Tsui & Nicoladis, 2004). This gender disparity is wider at first intercourse than recent intercourse (Darling et al., 1992; Häggström-Nordin et al., 2005) and has narrowed little over time (Sprecher, 2014). In fact, enjoyment at this event, often cast as a young person’s “sexual debut,” is among the largest gender differences in sexuality research ($d = 1.08$; Sprecher, 2014), surpassing masturbation ($d = 0.53$) and attitudes toward casual sex ($d = 0.45$; Petersen & Hyde, 2010).

To date, this “enjoyment gap” at sexual debut has largely been studied as an outcome of gender differences in sexuality (e.g., virginity scripts, relational orientation), rather than as an organizing influence that might give rise to gender differences. Yet, contemporary models of sexual response suggest rewarding sexual experiences shape sexual expectations, guide sexual decision-making, and, ultimately, motivate individuals to seek out subsequent sexual experiences (Both et al., 2007; Dewitte, 2016; Toates, 2009), with initial experiences being particularly informative in this respect (Pfaus et al., 2012). Indeed, along with experiencing less enjoyable sexual debuts, women tend to experience less strong and less frequent sexual desire than men in their current sexual lives (Baumeister et al., 2001; cf., Dawson & Chivers, 2014). This discrepancy is apparent across the sexual lifespan (Eplöv et al., 2007) and is reflected in the gender ratio of sexual desire disorders, with men being overrepresented for disorders associated with high sexual desire, and women overrepresented for disorders associated with low sexual desire (reviewed in Dawson & Chivers, 2014). By far, lack of sexual desire is the most common sexual complaint among women (McCabe et al., 2016). Although there has been a great deal of interest in understanding the origins, antecedents, and precipitating events of women’s lower sexual desire (Brotto & Laan, 2015), little is known about its link to rewarding experience in the earliest parts of women’s sexual lives.

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¹In this article, “gender” is used to refer to gender/sex, denoting biological features distinguishing male and female, as well as social, cultural, and psychological traits linked to males and females through particular social contexts.

Here, we consider whether recalled enjoyment at sexual debut is connected to sexual desire in adulthood, and might account for the widely reported gender difference in sexual desire.

Experiential Learning and Sexual Desire

Traditionally, sexual desire has been understood as an “appetite,” much like hunger or thirst, that originates internally and emerges spontaneously, irrespective of experience. Early models of the sexual response cycle placed desire at the starting point of sexual experience, as a cause – but not a consequence of – arousal and enjoyment (Kaplan, 1974; Masters & Johnson, 1966). In contrast, more recent models posit circular, reinforcing connections among these components (Basson, 2000; Both et al., 2007; Toates, 2009), framing sexual desire as dynamic and responsive to experience. Rather than emerging spontaneously, the incentive motivation model of sexual response (Toates, 2009) argues sexual desire arises in the presence of sexual incentives, and the hedonic value ascribed to them determines its strength. In this framework, stimuli associated with hedonic reward, or “liking,” are attributed incentive-motivational value, and transformed from mere sensory representations into “wanted” and attractive incentives that capture attention and elicit approach behaviors. It follows that enjoyable sexual experiences alter the salience of sexual incentives over time, producing shifts in sexual motivation. In line with this view, sexual desire fluctuates with experience, showing marked change across relationships (Murray & Milhausen, 2012), major life events (Wignall et al., 2021), and exposures to sexual stimuli (Goldey & van Anders, 2012). Increasingly, clinicians consider not just the perpetuating events that contribute to sexual desire issues, but the predisposing and precipitating ones, adopting an experience-based longitudinal approach (Brotto & Laan, 2015).

Despite growing recognition that rewarding experience shapes sexual desire, the incentive motivation model has yet to be applied across developmental stages, connecting sexual desire in adulthood to enjoyment in the earliest, and potentially most formative, stages of sexual life. Nevertheless, a life course extension of this model would be consistent with several theories that implicate early experience in sexual development. Some of these address desire to engage in particular activities (e.g., partnered sex; Baumeister et al., 2000; Carpenter, 2010; Fine, 1988; Fine & McClelland, 2006), whereas others address desire to engage with particular targets (e.g., partners of a certain gender; Diamond, 2008). However, both aspects of desire – whether directed at sexual activities or at sexual targets – are addressed by contemporary learning theory. In this view, an individual’s first experiences with sexual reward form a “sensitive period” during which instrumental (action-reward) and Pavlovian (stimulus-reward) associations are readily conditioned (Pfaus et al., 2012). These, in turn, are theorized to inform sexual expectations and direct sexual motivation, providing a mechanism by which evolved sexual predispositions can be expressed flexibly and adaptively in the face of changing cost-benefit conditions.

The nonhuman animal literature provides ample evidence for an influence of early exposure to reward on appetitive behaviors that denote willingness to engage in sexual interaction, and have been used as preclinical models for sexual desire (Masters & Johnson, 1966). More than seventy years ago, Beach (1947) noted the influence of first copulation on subsequent sexual behavior was particularly profound. Since then, tests of sexual conditioning in sexually naïve insects, fish, birds, rodents, and primates have accumulated, linking sexual experience that induces an opioid reward state to the acquisition of appetitive behaviors, including approach behaviors, courtship behaviors, latencies and thresholds for copulatory behavior, instrumental behaviors that lead to mate access, and place and partner preferences (reviewed in Woodson, 2002). Following full copulation to ejaculation, male pigeons will learn to peck keys, male Guinea pigs will run alleyways, and male rats will bar-press, solve mazes, and cross electrified grids to gain access to mates (reviewed in Pfaus et al., 2012). Likewise, when sexually naïve female rats experience copulation, and it occurs under the same self-controlled conditions that induce a reward state for males, they develop an equally strong preference for the compartment in which it occurred (Martínez & Paredes, 2001).

Some evidence also supports an influence of early sexual experience on human sexual desire development. Men and women who recall an earlier experience of intercourse and masturbation report higher rates of each in adulthood (Griffie et al., 2014; Rapsey, 2014; Woo & Brotto, 2008). Likewise, individuals recalling object-assisted masturbation by the end of adolescence are more likely to engage in this activity as adults (O’Keefe et al., 2009; Stroebel et al., 2010). Woods et al. (2018) recently extended these findings, showing that rates of adulthood sexual activity are not just related to early exposures, but to ones experienced as rewarding. Men and women who received oral sex prior to age 18 years did not necessarily engage in it more frequently as adults; however, they were more likely to engage in oral sex if it had resulted in orgasm prior to adulthood. Thus, sexual stimulation is perhaps not sufficiently reinforcing to incentivize particular sexual acts, and might need to be accompanied by orgasm.

Although much of the evidence for sexual incentive learning in humans is correlational and retrospective, experimental studies of sexual conditioning illustrate that exposure to sexual reward has a direct causal impact on sexual responding in adults. This work has commonly employed Pavlovian training procedures, pairing neutral or innocuous cues with reinforcing sexual stimulation to demonstrate conditioned acquisition of sexual arousal. For example, Both et al. (2011) found conditioned increases in vaginal blood flow to a drawing of a man’s head after pairing it with brief genital vibrotactile stimulation. Others have paired simple visual cues (e.g., geometric figures; Klucken et al., 2009), complex visual cues (e.g., human torsos; Hoffmann et al., 2004), and even olfactory cues (e.g., scented candles; Hoffmann et al., 2012) with sexual reinforcement, demonstrating conditioned increases in sexual arousal. Although it was once argued that sexual arousal is more readily conditioned in men than in women, conflicting findings have since emerged, with some demonstrating gender similarities (Brom et al., 2015b, 2016), and others favoring women (Brom

et al., 2014). Recently, this line of work has expanded, linking sexual reward exposures not just to anticipatory responses that denote sexual arousal, but to appetitive ones reflecting sexual interest – which are more flexible, and may be more amenable to learning (Pfaus, 1999). Conditioned increases in expectations of reward (Brom et al., 2014, 2015a, 2016), positive appraisals (Brom et al., 2014, 2015a, 2016), and approach tendencies have since been demonstrated across genders (Brom et al., 2015a, 2016).

It is important to note that effects of sexual conditioning are less robust in humans than in nonhuman animals, which would seem to suggest lesser relevance to humans; however, there are several notable discrepancies between human and nonhuman tests of sexual conditioning. First, human studies have exclusively tested individuals with prior sexual experience, whereas animal studies have largely tested sexually naïve ones – and might be better described as tests of conditioning from sexual debut. Second, brief induction of sexual arousal has served as reinforcement in most studies of human sexual conditioning. In contrast, animal studies have traditionally employed full copulation to ejaculation, which may induce a stronger reward state, and stronger learning. Third, both human and animal tests of sexual conditioning have typically been conducted in laboratory contexts that offer experimental control. Yet, these may lack ecological validity in human participants, producing weaker effects. Last, human studies of sexual conditioning have often neglected to include women, or to compare men and women directly. To some extent, this is also true of animal studies, which rarely compare the sexes, and often exclude females. Nevertheless, in rats, females show an equally strong response to appetitive sexual conditioning (Martínez & Paredes, 2001) and outperform males on most associative learning paradigms (Dalla & Shors, 2009). Likewise, women show greater sexual plasticity (Baumeister et al., 2000) and fluidity than men across the life course (Diamond, 2008; but see, 2016), and stronger in-lab conditioning of sexual approach behaviors that reflect motivation to engage with sexual incentives (Brom et al., 2015a, 2016). It follows that women's sexual desire may be more powerfully shaped by sexual reward than men's, and the real-world experiences of sexually naïve young women might be particularly formative in this respect.

Sexual Debut Experience and Sexual Desire

Although sexual debut's subjective quality has sometimes been a target in assessment when treating sexual dysfunction (Kaplan, 1974; Maurice, 1999), empirical research relating it to sexual desire, or any other dimension of current sexual functioning, is scant. Much of this work has employed aggregate measures of sexual functioning that combine appetitive components preceding sexual activity and consummatory ones occurring during it, making it difficult to draw conclusions about sexual desire specifically. Even so, sexual functioning was more positive among men and women who recalled more positive sexual debuts – whether in terms of affective tone (Rapsey, 2014; Reissing et al., 2012), degree of personal sexual competence (Palmer et al., 2017), or circumstances surrounding this event (Else-Quest et al., 2005). There is also

some evidence that an enjoyable sexual debut differentiates healthy women from those seeking treatment for sexual dysfunction, yet this does not hold for men (Heiman et al., 1986). Given this broader work on sexual functioning, the hypothesis that enjoyment at sexual debut plays a role in cultivating sexual desire would seem to be tenable, particularly for women.

The limited data available on sexual desire suggest that it is shaped, at least briefly in adolescence, by enjoyment at sexual debut. In a daily diary study, adolescent girls experienced no increase in positive mood or feelings of love on the day of sexual debut (Tanner et al., 2010). Nor did sexual interest on the day of sexual debut differ from the day before. There was, however, a drop in sexual interest the day after. Although this could conceivably reflect fulfilled desires, it is also consistent with diminished ones following an experience that failed, as the authors suggested, to fully meet expectations. Narrative accounts of sexual debut lend some support to this interpretation. In interviews with adolescents, many girls who describe a dull or painful sexual debut insist they will never have sex again, or they might “but it won't be soon,” suggesting unmet expectations and diminished sexual interest, at least temporarily (Thompson, 1990, p. 349). Adolescent boys have sometimes described disappointing sexual debuts as well (Carpenter, 2002), yet there is no evidence to suggest they may forego or delay future sexual experiences as a result. Even in the event of an enjoyable sexual debut, young men's sexuality is less transformed than young women's. Reissing et al. (2012) examined changes in sexual thoughts and feelings that were directly attributed to sexual debut, and found that positive affective experience predicted positive change across genders. However, experience of orgasm contributed to positive change for women only, suggesting a gender difference in sensitivity to physically reinforcing aspects of this experience.

Whether an enjoyable sexual debut relates to sexual desire at later developmental stages, such as adulthood, has been better studied but is not necessarily better understood. Some investigations explored a link between current sexual frequency and recalled satisfaction at sexual debut. These found null effects, perhaps because they relied on sexual frequency as a behavioral proxy for sexual desire (Rapsey, 2014; Smith & Shaffer, 2013). When studies examined sexual cognitions, the focus has often been on aversive ones, including sexual repulsion and avoidance (Rapsey, 2014; Reissing et al., 2012). These too do not appear to vary with satisfying or positive experience, but with recall of negative affect at sexual debut (Rapsey, 2014). Still others related satisfaction at sexual debut to sexual preoccupation, in which sexual desire is excessive. While not necessarily a favorable outcome, sexual preoccupation tracks with physical satisfaction at sexual debut – but not with emotional satisfaction or other affective dimensions of this experience (Smith & Shaffer, 2013).

To our knowledge, only one study of adults has linked enjoyment at sexual debut to sexual desire specifically. Koch (1988) asked men and women to rate their sexual debuts from “disastrous” to “terrific/fantastic,” and to indicate the frequency and impact of sexual interest concerns when engaging with their last sexual partner. Although no association was observed for men, women with a positive sexual debut experience had fewer sexual interest concerns

than those who recalled a negative one. More recently, Mitchell et al. (2009) explored factors associated with low sexual desire among women. While women's sexual competence at sexual debut was assessed instead of enjoyment per se, a lack of sexual competence, or "preparedness," at sexual debut nevertheless predicted a lack of interest in sex in the past six months.

Taken together, the limited available research suggests a possible link between an enjoyable sexual debut and sexual desire in adulthood, and one that may be stronger for women than men. However, it leaves several questions unanswered. To begin with, this work has often operationalized enjoyment at sexual debut as positive affective experience. Yet, exposure to orgasm may induce a stronger and more immediate reward state, providing more powerful and direct reinforcement of sexual activity. An additional limitation is that conceptualization and measurement of sexual desire has been highly variable across studies. Some operationalized it in behavioral terms, as the frequency of sexual activity (e.g., Rapsey, 2014; Smith & Shaffer, 2013). This approach typically yields the largest gender differences, but concerns have been raised about its construct validity (Dawson & Chivers, 2014). Others examined felt sexual interest (e.g., Mitchell et al., 2009; Tanner et al., 2010), which may better reflect sexual desire. Nevertheless, sexual interest encompasses desire to engage in a broad spectrum of sexual activities that differ in similarity to sexual debut, and may be differently reinforced by it.

The Current Study

We revisited the gender gap in sexual desire, approaching it from a developmental learning perspective. Rather than reflecting a fixed gender difference, we hypothesized that the gender gap varies with gendered experience of enjoyment at sexual debut. Like others, we examined whether recalled satisfaction at sexual debut relates to sexual desire in emerging adulthood. We also examined whether any influence on sexual desire is attributable to physical or affective enjoyment at the sexual debut event, probing links with orgasm and satisfaction, respectively. Further, we examined sexual desire in relation to experience at dyadic sexual debut (first intercourse), as well as in relation to a control event, solitary sexual debut (first masturbation). We compared these events to clarify whether effects were restricted to the corresponding sexual desire domain or generalized to other types of sexual activity. To this end, we operationalized sexual desire not just as the frequency of sexual activity or as the frequency and intensity of sexual desire along a single general dimension, but as the frequency and intensity of dyadic and solitary sexual desires, respectively. In addition to seeking to replicate gender differences in sexual enjoyment and desire described previously, our unique predictions were fourfold: (1) experience of enjoyment at sexual debut should be associated with greater sexual desire in adulthood, (2) orgasmic experience should be more predictive than satisfying experience, (3) experience effects should be strongest in the corresponding sexual desire domain, and (4) gender should moderate these associations, such that they are stronger for

women than men, and women's lower sexual desire should be better explained by their experience at sexual debut than by their gender.

Methods

Participants and Procedures

Participants were 563 women and 275 men recruited from undergraduate research pools at three Canadian universities, and online advertisements targeting Canadian residents. Inclusion criteria were: English competency, emerging adult age (18 to 25 years); previous sexual experience (dyadic and solitary); no childhood (before age 10), non-consensual, or "non-preferred" (same-gender) coital debut experience; no missing data on variables of interest; and, to achieve a more uniform interpretation of dyadic sexual desire, current involvement in an exclusive dating relationship for at least two months. Because research demonstrating a gender gap in enjoyment at sexual debut has largely been limited to cisgender and heterosexual samples, inclusion was further limited to cisgender participants with exclusively heterosexual identities. Participants completed a web-based survey wherein they indicated previous experience of intercourse ("Have you ever had sexual intercourse (i.e., vaginal or anal penetration with a partner)?") and masturbation ("Have you ever masturbated while alone?"), and provided information on demographic characteristics (gender, sexual orientation identity, age, ethnic background, education level, religious affiliation), as well as recent and lifetime sexual activity. All participants gave informed consent and received course credit or prize draw entry. All procedures were approved by the first author's institutional review board.

Measures

Recalled Sexual Debut Experience

We assessed sexual debut experience with single items of personal experience of orgasm and satisfaction at dyadic sexual debut (first intercourse), and solitary sexual debut (first masturbation). For dyadic sexual debut and then solitary sexual debut, participants were prompted to "Think back to the first time you [had sexual intercourse/masturbated]. Try to remember the circumstances, [your partner,] what took place, and how you felt." Participants specified whether they had an orgasm, and whether they had been satisfied or not, asked in a similar categorical fashion for comparison. Responses were dichotomized as "yes"/"no or unsure" (orgasm) and "yes"/"no" (satisfaction) for analysis (coded 1/0). Given possible associations with recall of enjoyment at dyadic sexual debut (Sprecher et al., 1995; Walsh et al., 2011), participants also indicated their age at this event and specified the nature of their relationship with their sexual debut partner as (1) "committed love relationship," (2) "steady dating," (3) "occasional dating," (4) "friend," (5) "casual acquaintance," (6) "stranger," or (7) "other (e.g., sibling, parent, relative, authority figure)," dichotomized as "committed" (1, 2)/"uncommitted" (3, 4, 5, 6, 7) for analysis (coded 1/0).

Current Sexual Desire

When operationalized in behavioral terms as the frequency of recent sexual activity, we assessed sexual desire for all participants using a self-report measure adapted from the Brief Index of Sexual Functioning for Women (BISF-W; Taylor et al., 1994). Participants rated their frequency of partnered and solitary sexual activity over the previous six months along a 6-point scale (1 = *Not once*, 2 = *Once a month or less*, 3 = *Several times a month*, 4 = *Once a week*, 5 = *Several times a week*, and 6 = *At least once a day*), with higher scores reflecting higher levels of sexual desire.

When operationalized as a cognitive construct with a single general dimension, we assessed sexual desire using the desire domain of the Female Sexual Function Index (FSFI-D; Rosen et al., 2000). The FSFI-D is a clinical self-report instrument that is used widely for assessing female sexual dysfunction. It has also been validated for use in community populations, including healthy young women as well as young men (Kalmbach et al., 2015). The FSFI-D comprises two items on the frequency and intensity of sexual desire over the past month: “Over the past four weeks, how often did you feel sexual desire or interest?” and “Over the past four weeks, how would you rate your level (degree) of sexual desire or interest?” Items are rated on 5-point scales, and were summed for analysis, with higher scores indicating higher levels of sexual desire (yielding total scores from 2–10). Internal consistency in the current sample was acceptable (Cronbach’s $\alpha = .79$).

When operationalized as a cognitive construct with multiple dimensions, we assessed sexual desire using the Sexual Desire Inventory-2 (SDI-2; Spector et al., 1996). The SDI-2 is a self-report instrument that comprises 13 items on the frequency of sexual thoughts, as well as the strength, frequency, and importance of fulfilling desires for dyadic and solitary sexual activity. In common with the FSFI-D, several items specify a reference period of the past month, providing a “trait” measure of sexual desire. Unlike the FSFI-D, the SDI-2 captures sexual thoughts and the importance of fulfilling desires for sexual activity, providing a more complete picture of the cognitive component of sexual desire. It also produces dyadic (SDI-D; 9 items, scored 0–70) and solitary subscale scores (SDI-S; 4 items, scored 0–31), allowing us to parse desire for partnered and unpartnered sexual activities. Example items include “During the last month, how often have you had sexual thoughts involving a partner?” and “How strong is your desire to engage in sexual activity [with a partner/by yourself]?” Items are rated on 8- and 9-point Likert-type scales ranging from 0 (*Not at all/No desire*) to 7 or 8 (*More than once a day/Strong desire*), and summed for each subscale, with higher scores indicating higher levels of dyadic and solitary sexual desire, respectively. Owing to clerical error, some 9-point items used an 8-point response format in the present study; thus, scores for these items were adjusted by scaling them to correspond to a 9-point scale, which allows comparison with previous investigations. The SDI-2 has been validated with non-clinical populations of healthy women and men, and internal consistency for dyadic (Cronbach’s $\alpha = .80$) and solitary subscales (Cronbach’s $\alpha = .89$) was good in the current sample.

Given possible associations with current sexual desire (Kontula & Miettinen, 2016; Murray & Milhausen, 2012; Rettenberger et al., 2016), participants also completed control measures of current relationship length (in months) and whether the current sexual partner was the same or different from the partner at sexual debut (same or different from sexual debut, coded 1/0), as well as coital orgasmic consistency (percentage of time penetrative sexual experience with a partner culminates in orgasm, rated in 10% increments and scored 0–10), and general approach tendencies (Combined Behavioral Activation System subscales of the Behavioral Inhibition/Behavioral Activation System (BIS/BAS) scale, scored 13–52; Carver & White, 1994). Example items for general approach tendencies included “I crave excitement and new sensations” and “When I see an opportunity for something I like, I get excited right away.”

Statistical Procedures

First, we compared men and women on background characteristics using independent *t*-tests for continuous variables and chi-square analyses for categorical variables. We also calculated zero-order correlations between focal predictors, as well as between outcomes, for each gender. Then, we conducted chi-square tests to confirm that previously observed gender differences in experience of orgasm and satisfaction at dyadic sexual debut were replicated in our sample, and to test whether they extended to solitary sexual debut. Likewise, we conducted independent *t*-tests to confirm whether gender differences in sexual frequency, general sexual desire, dyadic sexual desire, and solitary sexual desire were replicated in our sample. To determine whether sexual debut experience moderates the effect of gender on each measure of sexual desire (sexual frequency, general sexual desire, dyadic sexual desire, solitary sexual desire), we assessed interactions via 2 x 2 x 2 analyses of variance (ANOVAs), with gender (Woman/Man), sexual debut orgasm (Yes/No), and sexual debut satisfaction (Yes/No) as between-subjects factors. Effect sizes were calculated using phi (Φ), partial eta-squared (η_p^2), and Cohen’s *d*, as appropriate. All analyses were conducted using SPSS (version 27) with a conventional critical $\alpha = .05$.

Results

Background and Control Variables

To identify possible confounding variables, we compared background and control variables across genders. Results are displayed in Table 1. Women were younger, $t(582.615) = -3.381$, $p = .001$, $d = 0.3$, less educated (% postsecondary education), $\chi^2(1) = 5.576$, $p = .018$, $\Phi = 0.1$, less secular (% atheist or agnostic), $\chi^2(1) = 12.143$, $p < .001$, $\Phi = 0.1$, and less likely to report European ethnic backgrounds than men, $\chi^2(1) = 7.370$, $p = .007$, $\Phi = 0.1$. No gender differences in current relationship length, age at dyadic sexual debut, or involvement with a new partner since sexual debut were observed (all $p > .05$). However, women had lower coital orgasmic consistency, $t(829.260) = -35.130$, $p < .001$, $d = 2.3$, and lower general approach tendencies than men, $t(836) = -2.483$, $p = .013$, $d =$

Table 1. Sample demographics.

| Variables | Women | Men | Total |
|--|--------------|--------------|--------------|
| <i>n</i> | 563 | 275 | 838 |
| Age, years | | | |
| <i>M (SD)</i> | 21.50 (2.07) | 21.99 (1.92) | 21.66 (2.03) |
| Education completed, <i>n</i> (%) | | | |
| Less than high school | 1 (0.2) | 0 (0.0) | 1 (0.1) |
| Some high school | 9 (1.6) | 2 (0.7) | 11 (1.3) |
| High school diploma | 309 (54.9) | 130 (47.3) | 439 (52.4) |
| College or trade | 82 (14.6) | 56 (20.4) | 138 (16.5) |
| University, Bachelor's | 145 (25.8) | 81 (29.5) | 226 (27.0) |
| University, Master's | 13 (2.3) | 4 (1.5) | 17 (2.0) |
| Post-graduate degree | 3 (0.5) | 0 (0.0) | 3 (0.4) |
| Other professional degree | 1 (0.2) | 2 (0.7) | 3 (0.4) |
| Ethnicity, <i>n</i> (%) | | | |
| European | 444 (78.9) | 234 (85.1) | 678 (80.9) |
| East Asian | 65 (11.5) | 21 (7.6) | 86 (10.3) |
| South Asian | 50 (8.9) | 15 (5.5) | 65 (7.8) |
| Indigenous | 38 (6.7) | 12 (4.4) | 50 (6.0) |
| Latin | 13 (2.3) | 7 (2.5) | 20 (2.4) |
| Caribbean | 19 (3.4) | 3 (1.1) | 22 (2.6) |
| African | 14 (2.5) | 3 (1.1) | 17 (2.0) |
| Oceanic | 2 (0.4) | 3 (1.1) | 5 (0.6) |
| Religion, <i>n</i> (%) | | | |
| Atheist | 167 (29.7) | 110 (40.0) | 277 (33.1) |
| Agnostic | 144 (25.6) | 76 (27.6) | 220 (26.3) |
| Roman Catholic | 137 (24.3) | 45 (16.4) | 182 (21.7) |
| Protestant | 25 (4.4) | 10 (3.6) | 35 (4.2) |
| Christian | 26 (4.6) | 10 (3.6) | 36 (4.3) |
| Muslim | 10 (1.8) | 5 (1.8) | 15 (1.8) |
| Jewish | 2 (0.4) | 1 (0.4) | 3 (0.4) |
| Buddhist | 10 (1.8) | 3 (1.1) | 13 (1.6) |
| Other | 42 (7.5) | 15 (5.5) | 57 (6.8) |
| Relationship status, <i>n</i> (%) | | | |
| Common Law | 42 (7.5) | 16 (5.8) | 59 (7.0) |
| Exclusive cohabiting | 98 (17.4) | 64 (23.3) | 163 (19.2) |
| Exclusive non-cohabiting | 423 (75.1) | 195 (70.9) | 626 (73.8) |

0.2. Additionally, orgasm and satisfaction at dyadic sexual debut did not vary with age at onset of this experience (all $p > .05$), but a satisfying dyadic sexual debut was more likely to occur in a committed relationship, $\chi^2(1) = 5.191, p = .023, \Phi = 0.1$. Because we obtained similar results when background characteristics (i.e., age, education, ethnicity, secularity) and control characteristics were statistically controlled (i.e., coital orgasmic consistency, general approach tendencies, age at sexual debut, relationship context at sexual debut, same/different current partner, current relationship length), the results are presented below without covariates for all but one model (detailed below) that was affected by their inclusion.²

Recalled Sexual Debut Experience

To characterize dissociable aspects of enjoyable sexual debut experience, we calculated zero-order correlations, presented in Table 2. At dyadic sexual debut, there was a significant positive correlation between experience of orgasm and satisfaction ($r = .32$), with most participants (57.5%) reporting occurrence of neither ($n = 482$), and a minority reporting orgasm (13.6%; $n = 114$), satisfaction (14.2%; $n = 119$), or both (14.7%; $n = 123$). Satisfying and orgasmic experience were also related at solitary sexual debut ($r = .31$), with more participants reporting both experiences (29.6%; $n = 248$) or neither experience (35.6%; $n = 298$) than sole occurrence of orgasm (20.6%; $n = 173$) or

satisfaction (14.2%; $n = 119$). Across sexual debut events, orgasmic experience at dyadic sexual debut was significantly positively correlated with its occurrence at solitary sexual debut ($r = .27$), with a majority of the sample reporting an orgasm at each event (20.3%; $n = 170$) or neither event (41.8%; $n = 350$), and more experiencing one at solitary sexual debut only (30.0%; $n = 251$) than at dyadic sexual debut (8.0%; $n = 67$). By contrast, experience of satisfaction at dyadic sexual debut was not significantly associated with satisfaction at solitary sexual debut ($p > .05$). In all cases, correlations were moderate at most (Cohen, 1988), suggesting dissociable facets of experience that are reasonable to examine separately.

To determine whether the current sample resembled those in previous literature, we tested gender differences in enjoyment at sexual debut, summarized in Table 3. Consistent with previous studies, women were less likely than men to have experienced orgasm at dyadic sexual debut, 8.2% of women ($n = 46$) versus 69.5% of men ($n = 191$), $\chi^2(1) = 342.103, p < .001, \Phi = 0.6$, and solitary sexual debut, 40.3% of women ($n = 227$) versus 70.5% of men ($n = 194$), $\chi^2(1) = 67.518, p < .001, \Phi = 0.3$. Women were also less likely to have experienced satisfaction at dyadic sexual debut, 21.0% of women ($n = 118$) versus 45.1% of men ($n = 124$), $\chi^2(1) = 52.384, p < .001, \Phi = 0.3$. However, experience of satisfaction at solitary sexual debut did not differ by gender, 42.3% of women ($n = 238$) versus 46.9% of men ($n = 129$), $p > .05$.

Current Sexual Desire

To evaluate construct consistency across different measures of sexual desire, we obtained zero-order correlations, displayed in Table 2. Sexual frequency showed moderate correlations with other measures, such that participants with more frequent sexual activity reported more sexual desire along a single undifferentiated dimension ($r = .36$), as well as more dyadic sexual desire ($r = .39$) and solitary sexual desire ($r = .39$). When measured along a single general dimension, sexual desire was strongly correlated with dyadic sexual desire ($r = .69$) and weakly correlated with solitary sexual desire ($r = .14$). Dyadic and solitary sexual desire were moderately correlated as well ($r = .32$). In all cases but one, correlations were moderate at best, suggesting we captured related, but not redundant, constructs that are reasonable to examine separately.

To confirm that gender differences in sexual desire extended to the present sample, we conducted comparisons on each measure and summarize results in Table 4. In line with prior studies, women reported less frequent sexual activity than men over the previous six months, $t(675.718) = -11.504, p < .001, d = 0.8$ (Figure 1a). They also reported less sexual desire when measured along a single undifferentiated dimension, $t(635.231) = -6.539, p < .001, d = 0.5$ (Figure 2a), as well as less dyadic sexual desire, $t(626.910) = -8.404, p < .001, d = 0.6$ (Figure 3a), and less solitary sexual desire, $t(668.778) = -5.165, p < .001, d = 0.4$ (Figure 4a), than did men. Scores on the FSFI and SDI-2 were in the range reported by others who administered the FSFI-D (Kalmbach et al., 2015) and the 13-item version of the SDI-2 to both genders (e.g., Peixoto et al., 2020; Santos-Iglesias et al., 2013).

²Results were also unchanged when participants who had never experienced an orgasm ($n = 42$ women, $n = 2$ men) were excluded from analysis.

Table 2. Bivariate correlations between variables of interest.

| Measure | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|--|--------|---------|--------|---------|--------|--------|---------|--------|--------|---------|---------|------|---------|--------|
| 1. Sexual frequency | | | | | | | | | | | | | | |
| 2. General sexual desire ^a | .36*** | | | | | | | | | | | | | |
| 3. Dyadic sexual desire ^b | .39*** | .59*** | | | | | | | | | | | | |
| 4. Solitary sexual desire ^b | .39*** | .14*** | .32*** | | | | | | | | | | | |
| 5. Gender ^c | .34*** | .21*** | .26*** | .16*** | | | | | | | | | | |
| 6. Orgasm/ dyadic debut ^d | .21*** | .13*** | .21*** | .10*** | .64*** | | | | | | | | | |
| 7. Satisfaction/dyadic debut ^d | .06 | .05 | .10** | .03 | .25*** | .32*** | | | | | | | | |
| 8. Orgasm/solitary debut ^d | .12*** | .07* | .08* | .19*** | .28*** | .27*** | .02 | | | | | | | |
| 9. Satisfaction/solitary debut ^d | .02 | .04 | .04 | .16*** | .04 | .04 | .06 | .31*** | | | | | | |
| 10. Relationship/dyadic debut ^d | -.07* | -.09* | -.09* | -.13*** | -.06 | .04 | .08* | -.10** | -.10** | | | | | |
| 11. Age/dyadic debut | -.00 | -.01 | -.07 | .05 | -.01 | .06 | .05 | -.02 | -.03 | -.02 | | | | |
| 12. Orgasmic consistency | .26*** | .21*** | .23*** | .03 | .71*** | .54*** | .24*** | .18*** | .06 | -.04 | -.07* | | | |
| 13. Relationship length | -.12** | -.19*** | -.12** | .03 | .02 | .05 | .05 | -.01 | -.06 | .09* | -.06 | .01 | | |
| 14. New sexual partner ^d | .09* | .07* | .07 | .02 | .04 | -.08* | -.15*** | .03 | .03 | -.32*** | -.33*** | .02 | -.26*** | |
| 15. General approach tendencies ^e | .10** | .17*** | .31*** | .15*** | .09* | .03 | .02 | .09* | .06 | -.12*** | -.11** | .07* | -.06 | .15*** |

Higher scores indicate greater sexual frequency, general sexual desire, dyadic sexual desire and solitary sexual desire, as well as masculine gender, experience of orgasm at dyadic sexual debut, experience of satisfaction at dyadic sexual debut, committed relationship context at dyadic sexual debut, older age at dyadic sexual debut (in years), experience of orgasm at solitary sexual debut, experience of satisfaction at solitary sexual debut, greater orgasmic consistency, longer current relationship length (in months), current sexual partner different from sexual debut partner, and greater approach tendencies. Pearson's r was computed for all variables.

^aSubscale of the Female Sexual Function Index (FSFI).

^bSubscale of the Sexual Desire Inventory-2 (SDI-2).

^cBinary variable with a higher value indicating Man and a lower value indicating Woman.

^dBinary variable with a higher value indicating Yes and a lower value indicating No/Unsure.

^eCombined Behavioral Activation System subscales of the Behavioral Inhibition/Behavioral Activation System (BIS/BAS) scale.

* $p < .05$, ** $p < .01$, *** $p < .001$

Current Sexual Desire and Recalled Sexual Debut Experience

Having replicated past findings regarding a gender gap in enjoyment at sexual debut and in current sexual desire, we next turned to testing our key predictions: that enjoyment at sexual debut would predict sexual desire in adulthood (Prediction 1), and that effects would be most marked for physical enjoyment (Prediction 2) in the corresponding sexual desire domain (Prediction 3), such that women's lower sexual desire would be better explained by their enjoyment at sexual debut than by their gender (Prediction 4). The pattern of results on our behavioral measure of current sexual desire (sexual frequency) is displayed in Figure 1. A 2 (Gender) x 2 (Orgasm) x 2 (Satisfaction) ANOVA considering dyadic

sexual debut experience indicated a main effect of gender, $F(1,830) = 57.954$, $p < .001$, $\eta_p^2 = .07$, but no main effects or interactions concerning orgasm or satisfaction (all $p > .05$; refuting Prediction 1). A similar 2 x 2 x 2 ANOVA considering solitary sexual debut experience obtained the same results, indicating a main effect of gender, $F(1,830) = 82.330$, $p < .001$, $\eta_p^2 = .09$, but no influence of sexual debut experience (all $p > .05$).

Results for our general measure of sexual desire (FSFI-D) are shown in Figure 2. A 2 x 2 x 2 ANOVA considering dyadic sexual debut experience demonstrated a main effect of gender, $F(1,830) = 14.665$, $p < .001$, $\eta_p^2 = .02$, with women scoring below men, but no main effects or interactions concerning orgasm or satisfaction (all $p > .05$; refuting Prediction 1).

Table 3. Enjoyment and circumstances at sexual debut by gender.

| Variable | Women ($n = 563$) | Men ($n = 275$) | Test statistic (t or X^2) | df | Effect size |
|-------------------------------|------------------------|----------------------|------------------------------------|------|-------------|
| Dyadic sexual debut | | | | | |
| <i>Recalled enjoyment</i> | | | | | |
| Orgasm | | | | | |
| n (%) | 46 (8.2) | 191 (69.5) | 342.103*** | 1 | 0.6 |
| Satisfaction | | | | | |
| n (%) | 118 (21.0) | 124 (45.1) | 52.384*** | 1 | 0.3 |
| <i>Recalled circumstances</i> | | | | | |
| Committed relationship | | | | | |
| n (%) | 422 (75.0) | 190 (69.1) | 3.226 | 1 | — |
| Age, yr | | | | | |
| M (SD) | 17.14 (1.93) | 17.12 (1.80) | 0.185 | 836 | — |
| Solitary sexual debut | | | | | |
| <i>Recalled enjoyment</i> | | | | | |
| Orgasm | | | | | |
| n (%) | 227 (40.3) | 194 (70.5) | 67.518*** | 1 | 0.3 |
| Satisfaction | | | | | |
| n (%) | 238 (42.3) | 129 (46.9) | 1.613 | 1 | — |

For all variables, women and men were compared using independent t -tests or chi-square analysis, with Cohen's d or Φ denoting effect sizes.

*** $p < .001$

Table 4. Current sexual desire and circumstances by gender.

| Variable | Women (n = 563) | Men (n = 275) | Test statistic (t or χ^2) | df | Effect size |
|-----------------------------|--------------------|------------------|------------------------------------|----------------------|-------------|
| Sexual function | | | | | |
| <i>Sexual desire</i> | | | | | |
| Sexual frequency | | | | | |
| M (SD) | 4.46 (1.04) | 5.21 (0.81) | -11.458*** | 676.611 ^c | 0.8 |
| General ^a | | | | | |
| M (SD) | 6.93 (1.73) | 7.68 (1.45) | -6.539*** | 635.231 ^c | 0.5 |
| Dyadic ^b | | | | | |
| M (SD) | 45.38 (9.58) | 50.68 (8.03) | -8.404*** | 636.910 ^c | 0.6 |
| Solitary ^b | | | | | |
| M (SD) | 14.08 (8.08) | 16.74 (6.41) | -5.165*** | 668.778 ^c | 0.4 |
| Orgasmic consistency | | | | | |
| M (SD) | 28.69 (32.62) | 89.53 (17.47) | -35.130*** | 829.260 ^c | 2.3 |
| Sexual circumstances | | | | | |
| Relationship length, mo | | | | | |
| M (SD) | 25.53 (20.12) | 26.36 (20.40) | -0.576 | 836 | — |
| New sexual partner | | | | | |
| n (%) | 361 (64.1) | 187 (68.0) | 1.229 | 1 | — |

Absolute range is 1–6 for Sexual frequency; 1–10 for General sexual desire; 0–70 for Dyadic sexual desire; 0–31 for Solitary Sexual Desire; 0–100 for Orgasmic consistency. Higher scores indicate greater sexual frequency, general sexual desire, dyadic sexual desire, solitary sexual desire, and orgasmic consistency, as well as longer relationship length. For all variables, women and men were compared using independent t-tests or chi-square analysis, with Cohen's d denoting effect sizes.

^aSubscale of the Female Sexual Function Index (FSFI).

^bSubscale of the Sexual Desire Inventory-2 (SDI-2).

^cDegrees of freedom were adjusted according to Welch-Satterthwaite equation given a violation of Levene's test for equality of variances, $ps < .001$.

*** $p < .001$.

When solitary sexual debut experience was considered, a $2 \times 2 \times 2$ ANOVA indicated a similar effect of gender, $F(1,830) = 26.665$, $p < .001$, $\eta_p^2 = .03$, and no other main effects or interactions (all $p > .05$).

Results for our multidimensional measure of sexual desire (SDI-2), as they relate to sexual desire in the dyadic domain, are displayed in Figure 3. A $2 \times 2 \times 2$ ANOVA considering dyadic sexual debut experience demonstrated a two-way interaction between gender and orgasm, $F(1,830) = 5.545$, $p = .019$, $\eta_p^2 = .01$ (supporting Prediction 1). However, no main effects or interactions concerning satisfaction were found (all $p > .05$; supporting Prediction 2). Post hoc tests revealed that men had similar dyadic sexual desire whether they had an orgasm at dyadic sexual debut (50.47 ± 8.28) or not (51.15 ± 7.48 ; $p > .05$), and that women with exposure to orgasm at this event matched them in dyadic sexual desire (49.07 ± 7.28 ; all $p > .05$). By contrast, women who did not experience orgasm at dyadic

sexual debut scored below men (45.05 ± 9.70 ; all $p < .001$; $d = 0.6$ to 0.7), and below women with such experience ($p = .001$; $d = 0.5$; supporting Prediction 4). When solitary sexual debut experience was considered instead, a similar $2 \times 2 \times 2$ analysis of covariance (ANCOVA) adjusted for covariates revealed a main effect of gender on dyadic sexual desire, $F(1,820) = 14.235$, $p < .001$, $\eta_p^2 = .02$, but no main effects or interactions concerning orgasmic or satisfying sexual debut experience (all $p > .05$; supporting Prediction 3).

Results for solitary sexual desire are shown in Figures 4–5. A $2 \times 2 \times 2$ ANOVA considering dyadic sexual debut experience demonstrated a two-way interaction between gender and orgasm, $F(1,830) = 4.774$, $p = .029$, $\eta_p^2 = .01$ (supporting Prediction 1), but no main effects or interactions concerning satisfaction (all $p > .05$; supporting Prediction 2). Post hoc tests revealed that men had comparable solitary sexual desire whether they

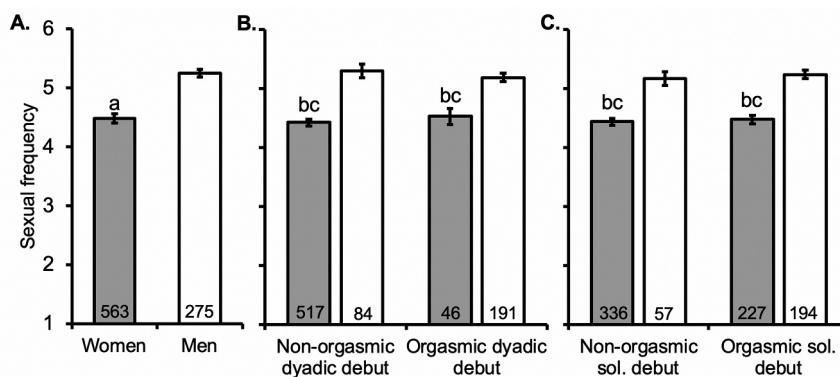


Figure 1. Sexual frequency varies with gender, but not dyadic or solitary sexual debut experience. Grey bars indicate women and white bars indicate men. Women had significantly lower sexual frequencies than men (A), and this difference persisted when sexual debut experience was considered (B,C). When stratified by experience of orgasm at dyadic (B) and solitary sexual debut (C), neither gender demonstrated an effect of experience. Nor was any influence of satisfying sexual debut experience observed (data not shown). Results are expressed in raw scores, with mean \pm SEM. a = $p < .001$ significantly different from men; b = $p < .001$ significantly different from men with orgasmic sexual debuts; c = $p < .001$ significantly different from men with non-orgasmic sexual debuts.

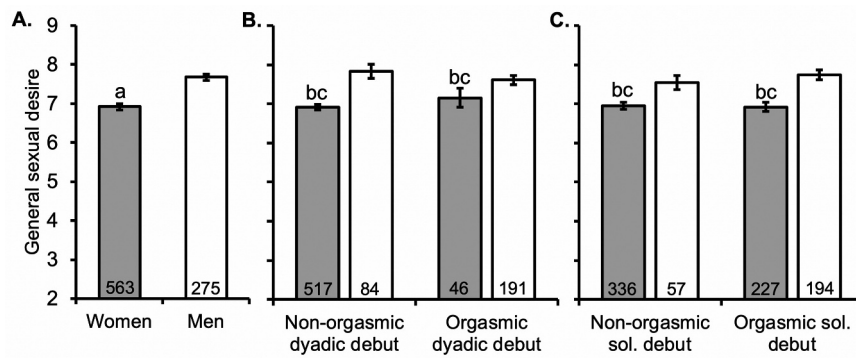


Figure 2. Sexual desire varies with gender, but not dyadic or solitary sexual debut experience when measured along a single general dimension. Grey bars indicate women and white bars indicate men. Women had significantly lower levels of general sexual desire than men (A), and this difference persisted when sexual debut experience was considered (B,C). When stratified by experience of orgasm at dyadic (B) and solitary sexual debut (C), neither gender demonstrated an effect of experience. Nor was any influence of satisfying sexual debut experience observed (data not shown). Results are expressed in raw scores on the FSFI-D, with mean \pm SEM. a = $p < .001$ significantly different from men; b = $p < .001$ significantly different from men with orgasmic sexual debuts; c = $p < .001$ significantly different from men with non-orgasmic sexual debuts.

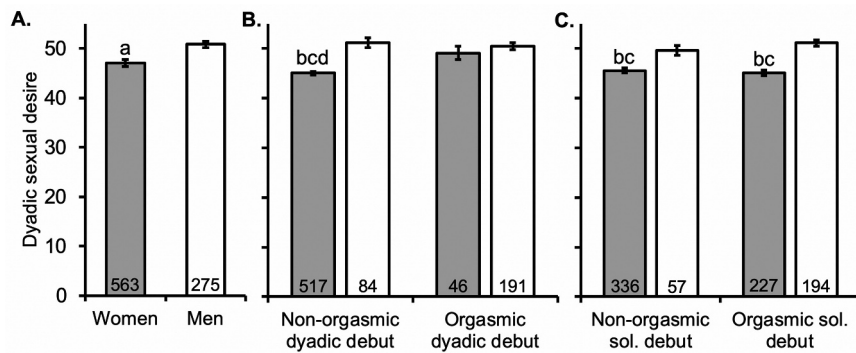


Figure 3. Dyadic sexual desire varies with gender and, for women, experience of orgasm at dyadic (but not solitary) sexual debut. Grey bars indicate women and white bars indicate men. Women had significantly lower levels of dyadic sexual desire than men (A), but this difference did not persist when sexual debut experience was considered (A). When stratified by experience of orgasm at dyadic sexual debut (B), women with orgasmic debuts did not differ from men, and had significantly more desire than women with non-orgasmic debuts. Effects did not extend to solitary sexual debut (C), with women scoring below men irrespective of orgasmic experience. No influence of satisfying sexual debut experience was observed, whether dyadic or solitary (data not shown). Results are expressed in raw scores on the SDI-2, with mean \pm SEM. a = $p < .05$ significantly different from men; b = $p < .001$ significantly different from men with orgasmic sexual debuts; c = $p < .001$ significantly different from men with non-orgasmic sexual debuts; d = $p < .001$ significantly different from women with orgasmic sexual debuts.

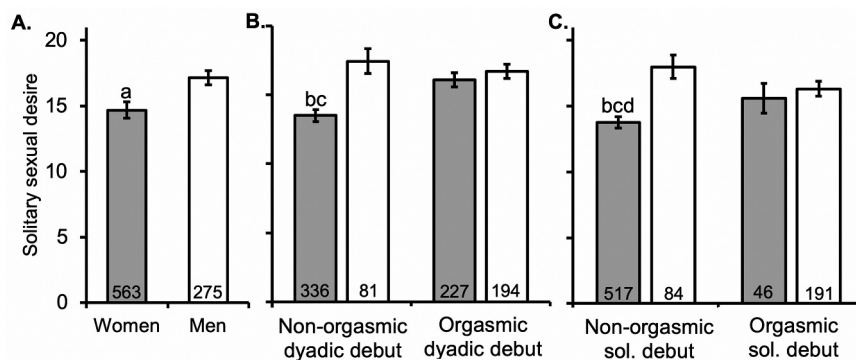


Figure 4. Solitary sexual desire varies with gender and, for women, experience of orgasm at solitary (and dyadic) sexual debut. Grey bars indicate women and white bars indicate men. Men had significantly greater solitary sexual desire than women when sexual debut experience was not considered (A). However, when grouped by dyadic sexual debut experience (B), women scored similarly irrespective of orgasm, but only women with non-orgasmic debuts scored below men. Similarly, when grouped by experience of orgasm at solitary sexual debut, (C), women with orgasmic debuts did not differ from men and had significantly more desire than women with non-orgasmic debuts. Results are expressed in raw scores on the SDI-2, with mean \pm SEM. a = $p < .001$ significantly different from men; b = $p < .001$ significantly different from men with orgasmic sexual debuts; c = $p < .001$ significantly different from men with non-orgasmic sexual debuts; d = $p < .001$ significantly different from women with orgasmic sexual debuts.

Table 5. Summary of moderation analyses predicting current sexual desire from gender and sexual debut experience.

| Sexual desire measure | Sexual debut measure | Main effect of gender present | Interaction present |
|-----------------------|----------------------|-------------------------------|--|
| Frequency | Dyadic | Yes | No |
| | Solitary | Yes | No |
| General | Dyadic | Yes | No |
| | Solitary | Yes | No |
| Dyadic | Dyadic | – | Gender and Orgasm: women without orgasm at sexual debut score below men and below women who had an orgasm at sexual debut |
| | Solitary | Yes | No |
| Solitary | Dyadic | – | Gender and Orgasm: women without orgasm at sexual debut score below men |
| | Solitary | – | Gender and Orgasm: women without orgasm at sexual debut score below men and below women who had an orgasm at sexual debut Orgasm and Satisfaction: men and women without orgasm or satisfaction at sexual debut score below men and women with experience of either |

Note. A main effect of gender denotes a difference whereby women score lower than men.

experienced orgasm at dyadic sexual debut (16.32 ± 6.61) or not (17.69 ± 5.84 ; $p > .05$). The same was true for women with (15.58 ± 8.05) and without exposure to orgasm at this event (13.94 ± 8.08 ; $p > .05$; partly supporting Prediction 3). However, only women lacking orgasm at dyadic sexual debut had less solitary sexual desire than men (all $p < .001$; $d = 0.3$ to 0.6 ; partly refuting Prediction 3).

When solitary sexual desire was examined in relation to solitary sexual debut experience, there were two-way interactions between gender and orgasm, $F(1,830) = 7.051$, $p = .008$, $\eta_p^2 = .01$, as well as between orgasm and satisfaction, $F(1,830) = 6.587$, $p = .01$, $\eta_p^2 = .01$ (supporting Prediction 1 and Prediction 3). To follow up the first interaction, the effect of orgasm was followed up separately for each gender, revealing a significant effect for

women, $t(1,561) = -4.901$, $p < .001$, $d = 0.4$, but not men ($p > .05$). Post hoc analyses revealed that women with exposure to orgasm at solitary sexual debut had solitary sexual desire similar to men (16.07 ± 8.05 ; all $p > .05$), whether men had an orgasm at this event (16.75 ± 6.54) or not (16.70 ± 6.11). However, women lacking orgasm at solitary sexual debut had less solitary sexual desire than all other groups (12.73 ± 7.84 ; all $p < .001$; $d = 0.4$ to 0.6 ; supporting Prediction 4). To follow-up the second interaction, we examined the effect of orgasm on solitary sexual desire separately for those who did or did not experience satisfaction, and orgasm's influence reached significance only among those who were not satisfied at solitary sexual debut, $t(1,469) = -5.154$, $p < .001$, $d = 0.5$. Post hoc tests indicated that participants whose solitary sexual debuts lacked orgasm and satisfaction had less

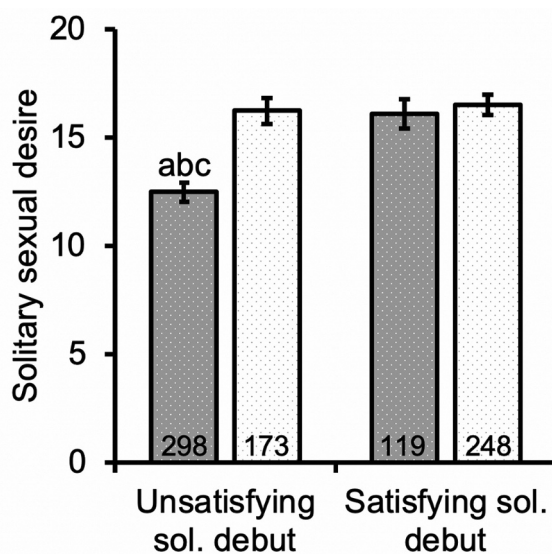


Figure 5. Solitary sexual desire varies with experience of orgasm and satisfaction at solitary sexual debut. Grey bars indicate those with solitary sexual debuts involving orgasm and white bars indicate those without. When grouped by experience of satisfaction, individuals with neither satisfying nor orgasmic solitary sexual debuts had significantly less solitary sexual desire than those with experience of either. Results are expressed in raw scores on the SDI-2, with mean \pm SEM. a = $p < .001$ significantly different from individuals with orgasmic and satisfying sexual debuts; b = $p < .001$ significantly different from individuals with non-orgasmic but satisfying sexual debuts; c = $p < .001$ significantly different from individuals with unsatisfying but orgasmic sexual debuts.

solitary sexual desire (12.48 ± 7.71) than those who experienced orgasm (16.07 ± 7.02), satisfaction (16.22 ± 7.40), or both (16.50 ± 7.40 ; all $p < .001$, $d = 0.4$ to 0.6).

Discussion

This study reexamined the gender gap in sexual desire, approaching it from a learning perspective, and disentangling effects of gender from gendered experience of enjoyment at sexual debut. Like others (e.g., Darling et al., 1992; Häggström-Nordin et al., 2005; Rapsey, 2014; Reissing et al., 2012; Schwartz & Coffield, 2020; Sprecher, 2014; Sprecher et al., 1995), we found that women recalled less enjoyable sexual debuts than men when a partner was involved, whether operationalized as experience of orgasm or satisfaction. This difference was diminished at solitary sexual debut, where women were less likely to recall experience of orgasm, but not satisfaction. In addition to having less enjoyable sexual debuts, women also had less sexual desire than men currently, and this held across behavioral, general, and multidimensional measures of trait sexual desire (see Table 5 for overall pattern of results). However, this gender gap was no longer apparent when the cognitive component of sexual desire was examined along separate dyadic and solitary dimensions, and physical enjoyment at dyadic sexual debut was considered. Namely, women with exposure to orgasm at dyadic sexual debut matched men in the corresponding sexual desire domain, and diverged from women without such experience. Women who had an orgasm at this event also had solitary sexual desire comparable to men. Similar effects were not observed for men, whose sexual desire did not vary with their experience at dyadic sexual debut. Nor did effects of a control event, solitary sexual debut, extend beyond desire for solitary sexual activity. Rather than speaking to a fixed gender difference in sexual desire, these findings raise the possibility that a (hetero)sexual debut lacking orgasm is a common part of women's sexual socialization, wherein sexual activity may be de-incentivized, and sexual desire differentiated accordingly.

An Enjoyment Gap at Sexual Debut

The present findings replicate the enjoyment gap at sexual debut that has been described for fifty some-odd years (e.g., Eastman, 1972). At dyadic sexual debut, men were approximately twice as likely to be satisfied and eight times more likely to have experienced an orgasm than women. These results are consistent with reports of gender gaps in experience of positive affect (Darling et al., 1992; Häggström-Nordin et al., 2005; Rapsey, 2014; Smith & Shaffer, 2013; but see, Tsui & Nicoladis, 2004) and orgasm at first intercourse (Reissing et al., 2012; Schwartz & Coffield, 2020; Sprecher et al., 1995; Tsui & Nicoladis, 2004), which are wider than those at recent intercourse (satisfaction: Darling et al., 1992; Häggström-Nordin et al., 2005; orgasm: Richters et al., 2006). A novel finding is that the enjoyment gap at sexual debut was wider when

a partner was present. At solitary sexual debut, women were roughly half as likely to report experiencing an orgasm as men, but equally likely to report being satisfied.

A Sexual Desire Gap in Emerging Adulthood

When sexual debut experience was not considered, we replicated the gender gap in sexual desire across behavioral, general, and multidimensional measures. However, the size of this gap varied with the way sexual desire was assessed. On a behavioral measure, women reported less current sexual activity than men. This gender difference was large in effect size, and comparable to that described by others who examined the frequency of solitary sexual activity in young adulthood (e.g., $d = 0.7$ – 1.0 ; Hald, 2006; Pinkerton et al., 2003). Similarly, when sexual cognitions were captured on the FSFI-D, women reported less current sexual desire than men but the gender gap was narrowed. Like others who administered the FSFI-D to men ($d = 0.5$; Kalmbach et al., 2015), we found a medium-sized gender difference. This difference was preserved – albeit weakened – on the SDI-2. In line with previous reports, there was a medium-sized gender difference in dyadic sexual desire (Elaut et al., 2012; Santos-Iglesias et al., 2013; van Anders, 2012), and a gender difference in solitary sexual desire, albeit a small one, as some have described (Rosen et al., 2019; Winters et al., 2010). Our finding of a narrower gender difference in solitary than dyadic sexual desire corroborates some findings (Kagerer et al., 2014; Peixoto et al., 2020; Winters et al., 2010), but not others (Dosch et al., 2016; López-Rodríguez et al., 2020; van Anders, 2012). It is worth noting that we did not include adults without masturbatory experience in our sample, which is more common among college-aged women (36%) than men (2%; Pinkerton et al., 2003), and results may be biased toward high solitary sexual desire as a result – particularly for women.

Bridging the Gaps

When sexual desire was examined in relation to sexual debut experience, results generally supported our predictions. Supporting Prediction 1, recalled enjoyment at sexual debut was associated with current sexual desire, and this held across all measures of sexual desire. On each one, exposure to orgasm at dyadic sexual debut and solitary sexual debut was associated with more sexual desire at present, with the largest correlations observed in the corresponding sexual desire domain (i.e., dyadic or solitary). A satisfying sexual debut was also linked to more sexual desire, but only in the corresponding domain, supporting Prediction 3. This observation also suggests an orgasmic sexual debut is more consequential for sexual desire than a satisfying one, supporting Prediction 3.

When the gender gap in current sexual desire was related to sexual debut experience, support for our predictions varied according to the particular construct assessed. On our behavioral measure of sexual desire, a gender difference was apparent whether sexual debut was enjoyable or not. Similarly, when sexual desire was measured directly, but along a single general dimension on the FSFI-D, a gender difference was found irrespective of sexual debut experience, with women reporting less

sexual desire than men. That these methods failed to capture experience effects was not predicted, but was not necessarily surprising. As others noted (Dawson & Chivers, 2014), behavioral outlet measures of sexual desire may have limited construct validity, particularly for women. Beyond being skewed by practical restrictions on women's sexual activity (e.g., menstrual dysphoria and bleeding; Dennerstein et al., 1994; Hedricks, 1994), they are likely to be confounded by undesired sexual activities, which women more frequently consent to than men (Kaestle, 2009). It follows that sexual frequency may have been a poor reflection of women's sexual desire in the current sample. Because the FSFI-D measures sexual cognitions, it does not suffer from these shortcomings. However, it does not account for sexual thoughts or the importance of fulfilling desires, and so may not fully capture the cognitive component of sexual desire – let alone experiential shifts in it. Perhaps most importantly, neither method distinguishes between desire to engage in dyadic versus solitary sexual activities, which differ in their resemblance to sexual debut and may be differently reinforced by it.

When sexual desire was operationalized as a cognitive construct with multiple dimensions, and sexual debut experience was considered, experience effects emerged and were moderated by gender. In support of Prediction 4, women's lower sexual desire was better explained by their experience of orgasm at sexual debut than by their gender. However, it did not vary with experience of satisfaction. Nor did experience effects extend to men. Specifically, women who did not have an orgasm at dyadic sexual debut reported less dyadic sexual desire than women with such experience. They also reported less dyadic sexual desire than men. By contrast, women who had an orgasm at this event reported levels of dyadic sexual desire similar to men. Somewhat unexpectedly, they also matched men in solitary sexual desire. Group differences were of similar (medium) effect size, both within women and across genders, suggesting that the gender gap in sexual desire may need clarifying. Thus, when sexual desire is assessed as a cognitive multidimensional construct, gender gaps might be better characterized as experiential ones that are contingent on orgasmic reinforcement at first intercourse.

It is important to emphasize that experience effects were also found when the gender gap in sexual desire was examined in relation to a control event (solitary sexual debut). However, effects were entirely restricted to the corresponding sexual desire domain. Supporting Prediction 4, women who did not have an orgasm at solitary sexual debut reported less solitary sexual desire than women with such experience. They also reported less solitary sexual desire than men. In contrast, women who had an orgasm at solitary sexual debut reported solitary sexual desire similar to men. We also found that individuals who experienced orgasm or satisfaction at this event had more solitary sexual desire than those lacking both. No other effects of solitary sexual debut experience were found, including none on dyadic sexual desire. This would seem to indicate that learning from this event does not generalize across sexual desire domains, supporting Prediction 3. That this prediction did not seem to hold for dyadic sexual debut was unexpected, in that effects on both sexual desire domains were observed. This result might indicate that learning at first

intercourse is applied more broadly than learning at first masturbation – perhaps due to greater recency, recall accuracy, or salience. Alternatively, because women's orgasmic pleasure is stronger in dyadic than solitary contexts (Rowland et al., 2019), it might also be stronger at dyadic sexual debut, producing stronger reinforcement. It could also be the case that solitary sexual desire is less constrained by partner-related circumstances than dyadic sexual desire, and so is more attuned to experience. In line with this possibility, there is some evidence to suggest that women's solitary sexual desire is more sensitive to recent (Goldey & van Anders, 2012) and adolescent experience (Lorenz, 2020) than their dyadic sexual desire. Indeed, the current findings echo a previous report that women's solitary (but not dyadic) sexual desire is predicted by their solitary sexual experience, and that the different masturbation frequencies of men and women account for gender differences in sexual desire (van Anders, 2012). Although sexual frequencies were operationalized as indicators, not predictors, of sexual desire in the present study, it is nevertheless possible that enjoyment at solitary sexual debut acts on sexual desire via masturbation frequency, and that first and cumulative exposure to orgasm each shape solitary sexual desire.

Although enjoyment at first intercourse has traditionally been studied as an affective state, we found the gender gap in sexual desire was present regardless of whether women recalled satisfying sexual debuts. When correlations between recalled satisfaction and current sexual desire were observed, they were weaker and less widespread than those for recall of orgasm. In this respect, results support Prediction 2 and would seem to suggest that positive affective experience at sexual debut might have some minor influence on sexual desire, but its contribution toward the sexual desire gap is more limited than that of orgasm. It should, however, be acknowledged that we relied on binary measures of sexual debut experience, and these were perhaps better suited to capturing orgasm than satisfaction. In comparison to orgasm, sexual satisfaction is a broad construct – and broader for women than men (McClelland, 2014). In addition to being more variable in interpretation, its recall is more likely to be skewed by lapses in memory, subsequent experiences (e.g., breakups) with sexual debut partners, and the current sexual lives of participants. Indeed, recalled satisfaction at first intercourse varies with current sexual satisfaction (Rapsey, 2014; Smith & Shaffer, 2013). Thus, the meaning and interpretation of a “satisfying” sexual debut may itself be amenable to learning.

Our finding that experience effects were driven by women aligns with accounts of greater sexual plasticity (Baumeister et al., 2000), fluidity (Diamond, 2008), and conditionability among women (Brom et al., 2015b, 2015a, 2016). It also agrees with reports that the quality of first intercourse relates to sexual desire (Koch, 1988), thoughts and feelings on sexuality (Reissing et al., 2012), and overall sexual functioning for women only (Heiman et al., 1986). Although our results support previous research and generally support our predictions, they were still somewhat surprising. We anticipated that sexual desire among women would be elevated if their dyadic sexual debut was an orgasmic one, and that women with such experience would diverge from other groups. Instead, we found that women *lacking* such experience were

the “odd group out.” While this pattern would seem to confirm a possible influence of sexual debut experience on sexual desire, it is not clear whether this effect is likely to be driven by sexual satiation (“enrichment”) or sexual frustration (“deprivation”).

One interpretation of the present results is that exposure to sexual reward at dyadic sexual debut critically shapes sexual desire, and that women are more sensitive to its influence than men. It might be that sexually naïve girls have less sexual desire than boys, but occurrence of orgasm at first intercourse reinforces sexual activity for girls and strengthens its incentive salience, such that sexual desire becomes “masculinized.” This reading aligns with reports that subjective pleasure at orgasm is greater for women than for men (Arcos-Romero & Sierra, 2018). It also agrees with reports that women are more responsive than men to appetitive sexual conditioning – at least with respect to approach tendencies (Brom et al., 2015a, 2016). Our findings suggest this gender gap might extend from the laboratory to the first sexual experiences of men and women. It is, nevertheless, important to acknowledge that null effects for men might stem from the timing of first sexual experiences rather than their reward value. With respect to chronological timing, men may be more likely than women to experience orgasm prior to dyadic sexual debut. Occurrence of orgasm at first intercourse may thus lack novelty, and produce weaker learning (Coria-Avila et al., 2016; Pfauts et al., 2012), both in comparison to that demonstrated by women, and to learning at first masturbation. It is also possible that null effects for men stem from the developmental timing of dyadic sexual debut: There is some evidence suggesting a narrow window of male sexual plasticity in childhood (reviewed in Baumeister et al., 2000), yet first intercourse typically occurs once this window has closed.

An alternate reading of our results is that deprivation of sexual reward at sexual debut, rather than presentation of sexual reward, informs the development of sexual desire – and that women are more sensitive to its influence. Because women who did not have an orgasm at this event reported less sexual desire than other groups, a sexual debut that lacks orgasm may not merely lack reinforcing properties, but have punishing ones. It might be that sexually naïve girls have similar sexual desire to boys, but experience of sexual frustration at first intercourse de-incentivizes sexual activity, and sexual motivation becomes “feminized.” Nonhuman animal findings would seem to support this possibility. Sexually naïve male rats, for example, avoid partners associated with thwarted or “incomplete” copulation attempts (Kagan, 1955), confirming that sexual activity can have aversive effects when it does not induce a reward state. There is also some evidence that sexual frustration is aversive for humans. In a field test of sexual conditioning, men showed decreased genital responding to cues that had been paired with physical contact with their partner but had not been reinforced by sexual activity (Hoffmann et al., 2012). Females have not been the focus of research on sexual frustration. However, women are more responsive than men to aversive sexual conditioning paradigms (Brom et al., 2015b) and to behavioral aversion therapies aimed at

changing “deviant” sexual response patterns (Bancroft, 1974). It is possible that this increased capacity for aversive sexual conditioning might extend from the laboratory to women’s earliest sexual experiences, and from punishing stimulation to reward deprivation. That said, it is important to emphasize that women lacking orgasm at dyadic sexual debut did not score in the range associated with sexual dysfunction on the SDI-2 (e.g., Rosen et al., 2019).

It is also worth considering that, rather than men being less susceptible to sexual reward deprivation, first intercourse may be rewarding even when it is not enjoyable. Boys are said to become men at first intercourse, and it is likely to be an affirming experience, even when it lacks orgasm. The same does not hold for girls, who are said to become women at menarche, and at best, receive relationship affirmation from first intercourse (Holland et al., 2010). Further, because boys are more likely to frame virginity as a stigma, they may be delighted to have shed it – even when doing so was not a particularly enjoyable experience (Carpenter, 2002).

Taken together, the present findings suggest that a life-course extension of the incentive motivation model may be tenable, particularly for women. They also challenge the notion that human sexual conditioning is relatively weak and short-lived. On the contrary, it may be pronounced for sexually naïve individuals, and still apparent years later, provided that real-life exposures to potent sexual rewards are considered. Although vastly more is known about the timing of first intercourse than its reward value, others have shown that the timing of this event is largely only significant to sexual functioning inasmuch as it approximates its quality (Palmer et al., 2017; Rapsey, 2014), particularly for women (Reissing et al., 2012). That is not to say that the timing of sexual debut is unimportant. Indeed, it is not clear whether the current effects originate from a “sensitive period” around first exposures to sexual reward, or around adolescent exposures more broadly. Although we controlled for age at dyadic sexual debut, it nevertheless occurred during adolescence for 79% of participants, when the brain is uniquely sensitive to rewards (Suleiman et al., 2017). Future research should disentangle the possible influence of initial and adolescent exposures to orgasm on interest in particular sexual activities, and clarify whether their influence extends to interest in particular sexual partners. If either is a sensitive period for sexual learning, such preferences are perhaps not modeled only on caregivers (e.g., Bereczkei et al., 2004), but on first sexual partners as well.

Strengths and Limitations

This research was unique in its sample size, mixed recruitment methods, and appreciation of physical and affective dimensions of sexual debut experience. To our knowledge, this study is among the first to move beyond a unitary concept of sexual debut and connect subjective experience of first masturbation to later sexual health. The current research was not, however, without limitations. First, it should be emphasized that a cross-sectional, retrospective self-report design was used, which precluded causation and relied on honest and accurate recall of respondents. It cannot be ruled out that women who experienced an

orgasm at dyadic sexual debut had higher sexual desire prior to this event. Additionally, although every effort was made to have participants recount their experience at the time of sexual debut, they were nevertheless asked to comment on a dyadic sexual debut event occurring an average of 4.5 years in the past, with solitary sexual debut likely occurring even earlier. Accounts of sexual debut may, therefore, have been affected by recall errors and the current sexual lives of participants. To confirm directionality and reliability of effects, future research should employ a prospective longitudinal approach tracking participants across the sexual debut transition or, at minimum, a cross-sectional approach confirming that current sexual desire is better predicted by enjoyment at first intercourse than enjoyment at last intercourse. Second, although the present sample was large and not limited to college students, participants were primarily White, college-aged individuals, who were either enrolled in or had completed postsecondary education. Whether their feelings and experiences mirror those of the general population or persist across adulthood remains to be seen. Additionally, our participants all identified as cisgender and heterosexual and were currently involved in romantic relationships. Thus, they may differ in several ways from single individuals (e.g., Braithwaite et al., 2010), and from individuals of diverse genders and sexualities. At the same time, women with same-gender attractions tend to report more enjoyable sexual debuts (Carpenter, 2002; Carpenter, 2005; Thompson, 1990) and more sexual desire than women without such attractions (Lippa, 2020), suggesting the current findings might extend to sexual minority populations. Future research should characterize sexual debut experience beyond the gender binary and clarify whether the enjoyment gap at sexual debut extends from heterosexual women to sexual minority and transgender women.

It is important to note that our sample of women with experience of orgasm at dyadic sexual debut was relatively small, which may have limited our ability to detect statistical differences from other groups, as well as generalizability of results. While heightened sexual desire in this group drove our finding that enjoyment at sexual debut explains gender differences in sexual desire above and beyond current coital orgasmic consistency and general approach tendencies, other possible alternative explanations cannot be definitively ruled out. Women who experienced orgasm at sexual debut may have differed from those who did not on other traits, such as sexual assertiveness, sexual self-efficacy, sexual arousability, and sexual subjectivity (Horne & Zimmer-Gembeck, 2005), each of which could conceivably predict future sexual desire. Likewise, experiential confounds beyond age and relationship context at sexual debut cannot be dismissed, such as having solitary or precoital sexual experience prior to first penetrative sex. Such experiences could themselves reflect greater sexual desire, or greater sexual expertise – thus increasing the likelihood of reaching orgasm at sexual debut. Indeed, there is growing recognition that sexual competence, or “preparedness,” at sexual debut (e.g., using contraception, being willing to engage in sex) is an important predictor of subsequent sexual health outcomes (Sprecher et al., 2019). It is possible

that being practiced in achieving orgasm at first sex could be an important addition to the conceptualization of sexual competence at debut.

An additional limitation was our focus on positive dimensions of sexual debut experience to the exclusion of negative experiences that also tend to differ as a function of gender (e.g., guilt; Sprecher, 2014; pain: Tsui & Nicoladis, 2004; Walsh et al., 2011) – and might give rise to equal or stronger aversive conditioning than lack of enjoyment. Our reliance on one-item measures of enjoyment at sexual debut should also be emphasized. These may have lacked precision, and did not capture subjective experience of orgasm, which has been shown to differ across genders (Arcos-Romero & Sierra, 2018), raising the possibility of a second orgasm gap at sexual debut. Nevertheless, we were able to replicate orgasm and satisfaction gaps that have been widely described, providing some assurance of construct validity. Some caution may be warranted as well due to our use of trait measures of sexual desire, which quantified sexual desire as a relatively stable construct instead of a dynamic emotional state. Future studies should explore whether interest evoked by sexual cues varies with sexual debut experience, and whether deliberate or automatic appraisals are more susceptible to its influence (Dewitte, 2016). Indeed, the sexual response to preferred sexual cues is another gender gap worth exploring. If the competence of these cues scales with their reinforcement via orgasm during (hetero)sexual intercourse (Chivers, 2017), it might also be shaped by such experience at (hetero)sexual debut.

It is worth noting that our assessment of sexual desire was a single-shot one, and that dips in sexual interest across the menstrual cycle may have been misconstrued as low sexual desire. Such fluctuations have been demonstrated previously on the SDI-2 (Jones et al., 2018; van Stein et al., 2019). To this point, if incentives in the environment “pull” an individual toward sexual activity – but require a backdrop of hormonal “push” factors to sensitize an individual to sexual information (Laan & Both, 2008), we did not control for their influence at testing. Nor was their influence controlled for at sexual debut. Yet, the hormonal milieu at first exposure to sexual stimuli in the laboratory appears to predict women’s interest in them months later (Wallen & Rupp, 2010). Future investigations might extend this line of questioning, accounting not just for hormonal milieu at testing, but at first exposure to sexual intercourse.

Conclusions and Implications

The present research shows that a gender difference can be demonstrated on behavioral, general, and multidimensional measures of trait sexual desire, but that it varies with the way this construct is assessed, as well as with rewarding sexual debut experience. When operationalized as a cognitive multidimensional construct, women’s sexual desire differs from men’s only when orgasm is lacking at sexual debut, suggesting that lower sexual desire among women might be better understood as an experiential difference than a gender difference. Findings

underscore the need for a human literature on learning from sexual debut to match the substantial nonhuman animal one – and suggest that both literatures could benefit from greater inclusion of females. Studies of women’s sexual learning and development have typically neglected normative and enjoyable experiences. More often, they have focused on punishing ones like sexual abuse (e.g., Pulverman et al., 2018), framing early life as a vulnerable period for sexual problems. However, it may also represent a window of opportunity for normative exposure to sexual reward, setting the stage for “positive” and “pleasurable” experiences that are just as integral to sexual health (WHO, 2006).

To begin narrowing the enjoyment gap at sexual debut, sex education should strive to equip young people not just for sexual health, but for healthy sex (Fortenberry, 2014). Healthy sexual debuts, in particular, might hinge upon implementation of a missing curriculum of sexual pleasure (Fine, 1988; Fine & McClelland, 2006) that conveys the ongoing inequities of (hetero)sexual encounters, and solitary avenues for sexual enjoyment. As evidence for experiential shifts in sexual desire increases, there is an increasing need to expand our concept of sex education, such that it stretches beyond the instruction young people receive about sex – to their experience of it. Experiential lessons about its outcomes may be equally, if not more, important than instructional ones – particularly after sexual debut, when young people name personal experience more than formal education as their greatest source of information about sex (Barrett, 1980). There is ample evidence that this “experiential” curriculum less often includes pleasure for girls (Tolman, 2002). However, the lessons it instills, and their contributions to women’s lower sexual desire, have gone virtually untested. We begin to connect them here, and raise the possibility that the absence of orgasm in women’s earliest (hetero)sexual encounters may not simply reflect a missing curriculum of sexual pleasure, but a hidden curriculum of sexual frustration that guides them away from sexual desire.

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References

- Arcos-Romero, A. I., & Sierra, J. C. (2018). Systematic review of the subjective experience of orgasm. *Revista Internacional de Andrología*, 16(2), 75–81. <https://doi.org/10.1016/j.androl.2017.09.003>
- Bancroft, J. (1974). *Deviant sexual behaviour: Modification and assessment*. Clarendon Press.
- Barrett, F. M. (1980). Sexual experience, birth control usage, and sex education of unmarried Canadian university students: Changes between 1968 and 1978. *Archives of Sexual Behavior*, 9(5), 367–390. <https://doi.org/10.1007/BF02115939>
- Basson, R. (2000). The female sexual response: A different model. *Journal of Sex & Marital Therapy*, 26(1), 51–65. <https://doi.org/10.1080/009262300278641>
- Baumeister, R. F., Catanese, K. R., Campbell, W. K., & Tice, D. M. (2000). Gender differences in erotic plasticity: The female sex drive as socially flexible and responsive. *Psychological Bulletin*, 126(3), 385–389. <https://doi.org/10.1037/0033-2909.126.3.385>
- Baumeister, R. F., Catanese, K. R., & Vohs, K. D. (2001). Is there a gender difference in strength of sex drive? Theoretical views, conceptual distinctions, and a review of relevant evidence. *Personality and Social Psychology Review*, 5(3), 242–273. https://doi.org/10.1207/S15327957PSPR0503_5
- Beach, F. A. (1947). A review of physiological and psychological studies of sexual behavior in mammals. *Physiological Reviews*, 27(2), 240–307. <https://doi.org/10.1152/physrev.1947.27.2.240>
- Berezkei, T., Gyuris, P., Kovcs, P., & Bernath, L. (2002). Homogamy, genetic similarity, and imprinting; parental influence on mate choice preferences. *Personality and Individual Differences*, 33(5), 677–690. [https://doi.org/10.1016/S0191-8869\(01\)00182-9](https://doi.org/10.1016/S0191-8869(01)00182-9)
- Berezkei, T., Gyuris, P., & Weisfeld, G. E. (2004). Sexual imprinting in human mate choice. *Proceedings of the Royal Society of London. Series B: Biological Sciences*, 271(1544), 1129–1134. <https://doi.org/10.1098/rspb.2003.2672>
- Both, S., Brauer, M., & Laan, E. (2011). Classical conditioning of sexual response in women: A replication study. *The Journal of Sexual Medicine*, 8(11), 3116–3131. <https://doi.org/10.1111/j.1743-6109.2011.02453.x>
- Both, S., Everaerd, W., Laan, E., & Janssen, E. (2007). E., Janssen ed. *The Psychophysiology of Sex*, 8, Indiana University Press, 327–339.
- Both, S., Laan, E., Spiering, M., Nilsson, T., Oomens, S., & Everaerd, W. (2008). Appetitive and aversive classical conditioning of female sexual response. *Journal of Sexual Medicine*, 5(6), 1386–1401. <https://doi.org/10.1111/j.1743-6109.2008.00815.x>
- Braithwaite, S. R., Delevi, R., & Fincham, F. D. (2010). Romantic relationships and the physical and mental health of college students. *Personal Relationships*, 17(1), 1–12. <https://doi.org/10.1111/j.1475-6811.2010.01248.x>
- Brom, M., Laan, E., Everaerd, W., Spinhoven, P., Both, S., & Kavushansky, A. (2014). Extinction and renewal of conditioned sexual responses. *PLoS ONE*, 9(8), e105955. Article e105955. <https://doi.org/10.1371/journal.pone.0105955>
- Brom, M., Laan, E., Everaerd, W., Spinhoven, P., & Both, S. (2015b). Extinction of aversive classically conditioned human sexual response. *Journal of Sexual Medicine*, 12(4), 916–935. <https://doi.org/10.1111/jsm.12800>
- Brom, M., Laan, E., Everaerd, W., Spinhoven, P., Cousijn, J., & Both, S. (2015a). The influence of emotion down-regulation on the expectation of sexual reward. *Behavior Therapy*, 46(3), 379–394. <https://doi.org/10.1016/j.beth.2015.01.005>
- Brom, M., Laan, E., Everaerd, W., Spinhoven, P., Trimbos, B., & Both, S. (2016). The influence of emotion upregulation on the expectation of sexual reward. *Journal of Sexual Medicine*, 13(1), 105–109. <https://doi.org/10.1016/j.jsxm.2015.11.003>

- Broto, L. A., & Laan, E. (2015). Problems of sexual desire and arousal in women. In K. R. Wylie (Ed.), *ABC of sexual health* (pp. 59–80). John Wiley & Sons.
- Carpenter, L. M. (2002). Gender and the meaning and experience of virginity loss in the contemporary United States. *Gender & Society, 16*(3), 345–365. <https://doi.org/10.1177/0891243202016003005>
- Carpenter, L. M. (2010). Gendered sexuality over the life course: A conceptual framework. *Sociological Perspectives, 53*(2), 155–177. <https://doi.org/10.1525/sop.2010.53.2.155>
- Carpenter, L. (2005). *Virginity lost: An intimate portrait of first sexual experiences*. NYU Press.
- Carver, C. S., & White, T. L. (1994). Behavioral inhibition, behavioral activation, and affective responses to impending reward and punishment: The BIS/BAS scales. *Journal of Personality and Social Psychology, 67*(2), 319–333. <https://doi.org/10.1037/0022-3514.67.2.319>
- Chivers, M. L. (2017). The specificity of women's sexual response and its relationship with sexual orientations: A review and ten hypotheses. *Archives of Sexual Behavior, 46*(5), 1161–1179. <https://doi.org/10.1007/s10508-016-0897-x>
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Erlbaum.
- Coleman, L., & Testa, A. (2006). Experience of sexual intercourse and reported risk behaviour among an ethnically diverse sample of young people. *Sexual Health, 3*(3), 169–177. <https://doi.org/10.1071/SH06004>
- Coria-Avila, G. A., Herrera-Covarrubias, D., Ismail, N., & Pfaus, J. G. The role of orgasm in the development and shaping of partner preferences. (2016). *Socioaffective Neuroscience & Psychology, 6*(1), 31815. Article 31815. <https://doi.org/10.3402/snp.v6.31815>
- Dalla, C., & Shors, T. J. (2009). Sex differences in learning processes of classical and operant conditioning. *Physiology & Behavior, 97*(2), 229–238. <https://doi.org/10.1016/j.physbeh.2009.02.035>
- Darling, C. A., Davidson, J. K., & Passarello, L. C. (1992). The mystique of first intercourse among college youth: The role of partners, contraceptive practices, and psychological reactions. *Journal of Youth and Adolescence, 21*(1), 97–117. <https://doi.org/10.1007/BF01536984>
- Dawson, S. J., & Chivers, M. L. (2014). Gender differences and similarities in sexual desire. *Current Sexual Health Reports, 6*(4), 211–219. <https://doi.org/10.1007/s11930-014-0027-5>
- Dennerstein, L., Gotts, G., Brown, J. B., Morse, C. A., Farley, T. M., & Pinol, A. (1994). The relationship between the menstrual cycle and female sexual interest in women with PMS complaints and volunteers. *Psychoneuroendocrinology, 19*(3), 293–304. [https://doi.org/10.1016/0306-4530\(94\)90067-1](https://doi.org/10.1016/0306-4530(94)90067-1)
- Dewitte, M. (2016). Gender differences in implicit processing of sexual stimuli. *European Journal of Personality, 30*(2), 107–124. <https://doi.org/10.1002/per.2031>
- Diamond, L. M. (2008). *Sexual fluidity*. Harvard University Press.
- Diamond, L. M. (2016). Sexual fluidity in male and females. *Current Sexual Health Reports, 8*(4), 249–256. <https://doi.org/10.1007/s11930-016-0092-z>
- Dosch, A., Belayachi, S., & Van der Linden, M. (2016). Implicit and explicit sexual attitudes: How are they related to sexual desire and sexual satisfaction in men and women? *The Journal of Sex Research, 53*(2), 251–264. <https://doi.org/10.1080/00224499.2014.1003361>
- Eastman, W. F. (1972). First intercourse. *Sexual Behavior, 2*(3), 22–27.
- Elaut, E., Buysse, A., De Sutter, P., De Cuyper, G., Gerris, J., Deschepper, E., & T'Sjoen, G. (2012). Relation of androgen receptor sensitivity and mood to sexual desire in hormonal contraception users. *Contraception, 85*(5), 470–479. <https://doi.org/10.1016/j.contraception.2011.10.007>
- Else-Quest, N. M., Hyde, J. S., & DeLamater, J. D. (2005). Context counts: Long-term sequelae of premarital intercourse or abstinence. *The Journal of Sex Research, 42*(2), 102–112. <https://doi.org/10.1080/00224490509552263>
- Eplov, L., Giraldi, A., Davidsen, M., Garde, K., & Kamper-Jørgensen, F. (2007). Sexual desire in a nationally representative Danish population. *Journal of Sexual Medicine, 4*(1), 47–56. <https://doi.org/10.1111/j.1743-6109.2006.00396.x>
- Fine, M., & McClelland, S. (2006). Sexuality education and desire: Still missing after all these years. *Harvard Educational Review, 76*(3), 297–338. <https://doi.org/10.17763/haer.76.3.w5042g23122n6703>
- Fine, M. (1988). Sexuality, schooling, and adolescent females: The missing discourse of desire. *Harvard Educational Review, 58*(1), 29–54. <https://doi.org/10.17763/haer.58.1.u0468k1v2n2n8242>
- Fortenberry, J. D. (2014). Sexual learning, sexual experience, and healthy adolescent sex. In E. S. Lefkowitz & S. A. Vasilenko (Eds.), *New directions for child and adolescent: Vol. 144. Positive and negative outcomes of sexual behaviors development* (pp. 71–86). Jossey-Bass/Wiley.
- Goldey, K. L., & van Anders, S. M. (2012). Sexual arousal and desire: Interrelations and responses to three modalities of sexual stimuli. *The Journal of Sexual Medicine, 9*(9), 2315–2329. <https://doi.org/10.1111/j.1743-6109.2012.02845.x>
- Griffee, K., O'Keefe, S. L., Beard, K. W., Young, D. H., Kommor, M. J., Linz, T. D., Swindell, S., & Stroebel, S. S. (2014). Human sexual development is subject to critical period learning: Implications for sexual addiction, sexual therapy, and for child rearing. *Sexual Addiction & Compulsivity, 21*(2), 114–169. <https://doi.org/10.1080/10720162.2014.906012>
- Hägström-Nordin, E., Hanson, U., & Tydén, T. (2005). Associations between pornography consumption and sexual practices among adolescents in Sweden. *International Journal of STD & AIDS, 16*(2), 102–107. <https://doi.org/10.1258/0956462053057512>
- Hald, G. M. (2006). Gender differences in pornography consumption among young heterosexual Danish adults. *Archives of Sexual Behavior, 35*(5), 577–585. <https://doi.org/10.1007/s10508-006-9064-0>
- Hearn, K. D., O'Sullivan, L. F., & Dudley, C. D. (2003). Assessing reliability of early adolescent girls' reports of romantic and sexual behavior. *Archives of Sexual Behavior, 32*(6), 513–521. <https://doi.org/10.1023/A:1026033426547>
- Hedricks, C. A. (1994). Female sexual activity across the human menstrual cycle. *Annual Review of Sex Research, 5*(1), 122–172. <https://doi.org/10.1080/10532528.1994.10559895>
- Heiman, J. R., Gladue, B. A., Roberts, C. W., & LoPiccolo, J. (1986). Historical and current factors discriminating sexually functional from sexually dysfunctional married couples. *Journal of Marital and Family Therapy, 12*(2), 163–174. <https://doi.org/10.1111/j.1752-0606.1986.tb01633.x>
- Heywood, W., Patrick, K., Smith, A. M., & Pitts, M. K. (2015). Associations between early first sexual intercourse and later sexual and reproductive outcomes: A systematic review of population-based data. *Archives of Sexual Behavior, 44*(3), 531–569. <https://doi.org/10.1007/s10508-014-0374-3>
- Hoehn, E. F., FitzGerald, M. R., Bhatt, S. R., Robinson, V. M., Lippe, J. E., & Reed, J. L. (2016). Do adolescents with higher knowledge of HIV have lower sexual risk behaviors? *Pediatric Emergency Care, 32*(12), 846–850. <https://doi.org/10.1097/PEC.0000000000000612>
- Hoffmann, H., Janssen, E., & Turner, S. L. (2004). Classical conditioning of sexual arousal in women and men: Effects of varying awareness and biological relevance of the conditioned stimulus. *Archives of Sexual Behavior, 33*(1), 43–53. <https://doi.org/10.1023/B:ASEB.0000007461.59019.d3>
- Hoffmann, H., Peterson, K., & Garner, H. (2012). Field conditioning of sexual arousal in humans. *Socioaffective Neuroscience & Psychology, 2*(1), 17336. Article 17336. <https://doi.org/10.3402/snp.v2i0.17336>
- Holland, J., Ramazanoglu, C., Sharpe, S., & Thomson, R. (2010). Deconstructing virginity—young people's accounts of first sex. *Sexual and Relationship Therapy, 25*(3), 351–362. <https://doi.org/10.1080/14681994.2010.496970>

- Horne, S., & Zimmer-Gembeck, M. J. (2005). Female sexual subjectivity and well-being: Comparing late adolescents with different sexual experiences. *Sexuality Research and Social Policy*, 2(3), 25–40. <https://doi.org/10.1525/srsp.2005.2.3.25>
- Jones, B. C., Hahn, A. C., Fisher, C. I., Wang, H., Kandrik, M., & DeBruine, L. M. (2018). General sexual desire, but not desire for uncommitted sexual relationships, tracks changes in women's hormonal status. *Psychoneuroendocrinology*, 88, 153–157. <https://doi.org/10.1016/j.psyneuen.2017.12.015>
- Kaestle, C. (2009). Sexual insistence and disliked sexual activities in young adulthood: Differences by gender and relationship characteristics. *Perspectives on Sexual and Reproductive Health*, 41(1), 33–39. <https://doi.org/10.1363/4103309>
- Kagan, J. (1955). Differential reward value of incomplete and complete sexual behavior. *Journal of Comparative and Physiological Psychology*, 48(1), 59–64. <https://doi.org/10.1037/h0043461>
- Kagerer, S., Wehrum, S., Klucken, T., Walter, B., Vaitl, D., Stark, R., & Hoffmann, H. Sex attracts: Investigating individual differences in attentional bias to sexual stimuli. (2014). *PLoS ONE*, 9(9), e107795. <https://doi.org/10.1371/journal.pone.0107795>
- Kalmbach, D. A., Ciesla, J. A., Janata, J. W., & Kingsberg, S. A. (2015). The validation of the Female Sexual Function Index, Male Sexual Function index, and Profile of Female Sexual Function for use in healthy young adults. *Archives of Sexual Behavior*, 44(6), 1651–1662. <https://doi.org/10.1007/s10508-014-0334-y>
- Kaplan, H. S. (1974). *The new sex therapy*. Brunner-Mazel.
- Kilimnik, C. D., Boyd, R. L., Stanton, A. M., & Meston, C. M. (2018). Identification of nonconsensual sexual experiences and the sexual self-schemas of women: Implications for sexual functioning. *Archives of Sexual Behavior*, 47(6), 1633–1647. <https://doi.org/10.1007/s10508-018-1229-0>
- Klucken, T., Schweckendiek, J., Merz, C. J., Tabbert, K., Walter, B., Kagerer, S., Vaitl, D., & Stark, R. (2009). Neural activations of the acquisition of conditioned sexual arousal: Effects of contingency awareness and sex. *The Journal of Sexual Medicine*, 6(11), 3071–3085. <https://doi.org/10.1111/j.1743-6109.2009.01405.x>
- Koch, P. B. (1988). The relationship of first intercourse to later sexual functioning concerns of adolescents. *Journal of Adolescent Research*, 3(3–4), 345–362. <https://doi.org/10.1177/074355488833009>
- Kontula, O., & Miettinen, A. (2016). Determinants of female sexual orgasms. *Socioaffective Neuroscience & Psychology*, 6(1), 31624. <https://doi.org/10.3402/snp.v6.31624>
- Laan, E., & Both, S. (2008). What makes women experience desire? *Feminism & Psychology*, 18(4), 505–514. <https://doi.org/10.1177/0959353508095533>
- Lippa, R. A. (2020). Interest, personality, and sexual traits that distinguish heterosexual, bisexual, and homosexual individuals: Are there two dimensions that underlie variations in sexual orientation? *Archives of Sexual Behavior*, 49(2), 607–622. <https://doi.org/10.1007/s10508-020-01643-9>
- López-Rodríguez, M. M., Aguilera-Vásquez, R. P., Fernández-Sola, C., Hernández-Padilla, J. M., Jiménez-Lasserrotte, M. M., & Granero-Molina, J. (2020). Sexual desire and excitement in relation to physical activity in young adults. *Revista Internacional de Medicina Y Ciencias de La Actividad Física Y El Deporte*, 20(77), 133–153. <https://doi.org/10.15366/rimcafd2020.77.009>
- Lorenz, T. K. (2020). Antidepressant use during development may impair women's sexual desire in adulthood. *Journal of Sexual Medicine*, 17(3), 470–476. <https://doi.org/10.1016/j.jsxm.2019.12.012>
- Martínez, I., & Paredes, R. G. (2001). Only self-paced mating is rewarding in rats of both sexes. *Hormones and Behavior*, 40(4), 510–517. <https://doi.org/10.1006/hbeh.2001.1712>
- Masters, W. H., & Johnson, A. M. (1966). *Human sexual response*. Little, Brown.
- Maurice, W. L. (1999). *Sexual medicine in primary care*. Mosby.
- McCabe, M. P., Sharlip, I. D., Lewis, R., Atalla, E., Balon, R., Fisher, A. D., Laumann, E., Lee, S. W., & Seagraves, R. T. (2016). Incidence and prevalence of sexual dysfunction in women and men: A consensus statement from the Fourth International Consultation on Sexual Medicine 2015. *The Journal of Sexual Medicine*, 13(2), 144–152. <https://doi.org/10.1016/j.jsxm.2015.12.034>
- McClelland, S. I. (2014). “What do you mean when you say that you are sexually satisfied?” A mixed methods study. *Feminism & Psychology*, 24(1), 74–96. <https://doi.org/10.1177/0959353513508392>
- Mitchell, K. R., Mercer, C. H., Wellings, K., & Johnson, A. M. (2009). Prevalence of low sexual desire among women in Britain: Associated factors. *The Journal of Sexual Medicine*, 6(9), 2434–2444. <https://doi.org/10.1111/j.1743-6109.2009.01368.x>
- Mitchell, K. R., Mercer, C. H., Wellings, K., & Johnson, A. M. (2009). Prevalence of low sexual desire among women in Britain: Associated factors. *Journal of Sexual Medicine*, 6(9)(9907), 2434–2444. <https://doi.org/10.1111/j.1743-6109.2009.01368.x>
- Murray, S. H., & Milhausen, R. R. (2012). Sexual desire and relationship duration in young men and women. *Journal of Sex & Marital Therapy*, 38(1), 28–40. <https://doi.org/10.1080/0092623X.2011.569637>
- O’Keefe, S. L., Beard, K. W., Stroebel, S. S., Berhie, G., Bickham, P. J., & Robinett, S. R. (2009). Correlates of inserted object-assisted sexual behaviors in women: A model for development of paraphilic and non-paraphilic urges. *Sexual Addiction & Compulsivity*, 16(2), 101–130. <https://doi.org/10.1080/10720160902724418>
- Palmer, M. J., Clarke, L., Ploubidis, G. B., Mercer, C. H., Gibson, L. J., Johnson, A. M., Copas, A. J., & Wellings, K. (2017). Is “sexual competence” at first heterosexual intercourse associated with subsequent sexual health status? *The Journal of Sex Research*, 54(1), 91–104. <https://doi.org/10.1080/00224499.2015.1134424>
- Peixoto, M. M., Gomes, H., Correia, A., Pires, I., Pereira, T., & Machado, P. P. (2020). Translation and validation of the Portuguese version of the Sexual Desire Inventory-2: Assessing gender differences. *Sexual and Relationship Therapy*, 35(1), 89–102. <https://doi.org/10.1080/14681994.2018.1472374>
- Petersen, J. L., & Hyde, J. S. (2010). A meta-analytic review of research on gender differences in sexuality, 1993–2007. *Psychological Bulletin*, 136(1), 21–38. <https://doi.org/10.1037/a0017504>
- Pfau, J. G., Kippin, T. E., Coria-Avila, G. A., Gelez, H., Afonso, V. M., Ismail, N., & Parada, M. (2012). Who, what, where, when (and maybe even why)? How the experience of sexual reward connects sexual desire, preference, and performance. *Archives of Sexual Behavior*, 41(1), 31–62. <https://doi.org/10.1007/s10508-012-9935-5>
- Pfau, J. G. (1999). Revisiting the concept of sexual motivation. *Annual Review of Sex Research*, 10(1), 120–156. <https://doi.org/10.1080/10532528.1999.10559777>
- Pinkerton, S. D., Bogart, L. M., Cecil, H., & Abramson, P. R. (2003). Factors associated with masturbation in a collegiate sample. *Journal of Psychology & Human Sexuality*, 14(2–3), 103–121. https://doi.org/10.1300/J056v14n02_07
- Pulverman, C. S., Kilimnik, C. D., & Meston, C. M. (2018). The impact of childhood sexual abuse on women's sexual health: A comprehensive review. *Sexual Medicine Reviews*, 6(2), 188–200. <https://doi.org/10.1016/j.sxmr.2017.12.002>
- Rapsey, C. M. (2014). Age, quality, and context of first sex: Associations with sexual difficulties. *The Journal of Sexual Medicine*, 11(12), 2873–2881. <https://doi.org/10.1111/jsm.12690>
- Reissing, E. D., Andruff, H. L., & Wentland, J. J. (2012). Looking back: The experience of first sexual intercourse and current sexual adjustment in young heterosexual adults. *The Journal of Sex Research*, 49(1), 27–35. <https://doi.org/10.1080/00224499.2010.538951>
- Rettenberger, M., Klein, V., & Briken, P. (2016). The relationship between hypersexual behavior, sexual excitation, sexual inhibition, and personality traits. *Archives of Sexual Behavior*, 45(1), 219–233. <https://doi.org/10.1007/s10508-014-0399-7>

- Richters, J., de Visser, R., Rissel, C., & Smith, A. (2006). Sexual practices at last heterosexual encounter and occurrence of orgasm in a national survey. *The Journal of Sex Research*, 43(3), 217–226. <https://doi.org/10.1080/00224490609552320>
- Rosen, C., Brown, J., Heiman, S., Leiblum, C., Meston, R., Shabsigh, D., Ferguson, R., & D'Agostino, R. (2000). The Female Sexual Function Index (FSFI): A multidimensional self-report instrument for the assessment of female sexual function. *Journal of Sex & Marital Therapy*, 26(2), 191–208. <https://doi.org/10.1080/009262300278597>
- Rosen, N. O., Dubé, J. P., Corsini-Munt, S., & Muise, A. (2019). Partners experience consequences, too: A comparison of the sexual, relational, and psychological adjustment of women with sexual interest/arousal disorder and their partners to control couples. *Journal of Sexual Medicine*, 16(1), 83–95. <https://doi.org/10.1016/j.jsxm.2018.10.018>
- Rowland, D., Donarski, A., Graves, V., Caldwell, C., Hevesi, B., & Hevesi, K. (2019). The experience of orgasmic pleasure during partnered and masturbatory sex in women with and without orgasmic difficulty. *Journal of Sex & Marital Therapy*, 45(6), 550–561. <https://doi.org/10.1080/0092623X.2019.1586021>
- Santos-Iglesias, P., Sierra, J. C., & Vallejo-Medina, P. (2013). Predictors of sexual assertiveness: The role of sexual desire, arousal, attitudes, and partner abuse. *Archives of Sexual Behavior*, 42(6), 1043–1052. <https://doi.org/10.1007/s10508-012-9998-3>
- Santtila, P., Mokros, A., Hartwig, M., Varjonen, M., Jern, P., Witting, K., Von der Pahlen, B., & Sandnabba, N. K. (2010). Childhood sexual interactions with other children are associated with lower preferred age of sexual partners including sexual interest in children in adulthood. *Psychiatry Research*, 175(1–2), 154–159. <https://doi.org/10.1016/j.psychres.2008.10.021>
- Schwartz, I. M., & Coffield, E. (2020). A two dimension approach to understanding negative and positive affective reactions to first coitus. *Sexuality & Culture*, 24(5), 1189–1206. <https://doi.org/10.1007/s12119-019-09693-5>
- Smith, C. V., & Shaffer, M. J. (2013). Gone but not forgotten: Virginity loss and current sexual satisfaction. *Journal of Sex & Marital Therapy*, 39(2), 96–111. <https://doi.org/10.1080/0092623X.2012.675023>
- Spector, I. P., Carey, M. P., & Steinberg, L. (1996). The Sexual Desire Inventory: Development, factor structure, and evidence of reliability. *Journal of Sex & Marital Therapy*, 22(3), 175–190. <https://doi.org/10.1080/00926239608414655>
- Sprecher, S., Barbee, A., & Schwartz, P. (1995). “Was it good for you, too?": Gender differences in first sexual intercourse experiences. *The Journal of Sex Research*, 32(1), 3–15. <https://doi.org/10.1080/00224499509551769>
- Sprecher, S., O'Sullivan, L. F., Drouin, M., Verette-Lindenbaum, J., & Willetts, M. C. (2019). The significance of sexual debut in women's lives. *Current Sexual Health Reports*, 11(4), 265–273. <https://doi.org/10.1007/s11930-019-00228-5>
- Sprecher, S. (2014). Evidence of change in men's versus women's emotional reactions to first sexual intercourse: A 23-year study in a human sexuality course at a Midwestern university. *The Journal of Sex Research*, 51(4), 466–472. <https://doi.org/10.1080/00224499.2013.867923>
- Stroebel, S. S., O'Keefe, S. L., Beard, K. W., Robinett, S. R., Kommor, M. J., & Swindell, S. (2010). Correlates of inserted object-assisted sexual behaviors in men: A model for development of paraphilic and non-paraphilic urges. *Sexual Addiction & Compulsivity*, 17(2), 127–153. <https://doi.org/10.1080/10720161003795943>
- Suleiman, A. B., Galván, A., Harden, K. P., & Dahl, R. E. (2017). Becoming a sexual being: The ‘elephant in the room’ of adolescent brain development. *Developmental Cognitive Neuroscience*, 25, 209–220. <https://doi.org/10.1016/j.dcn.2016.09.004>
- Tanner, A. E., Hensel, D. J., & Fortenberry, J. D. (2010). A prospective study of the sexual, emotional, and behavioral correlates associated with young women's first and usual coital events. *Journal of Adolescent Health*, 47(1), 20–25. <https://doi.org/10.1016/j.jadohealth.2009.12.031>
- Taylor, J. F., Rosen, R. C., & Leiblum, S. R. (1994). Self-report assessment of female sexual function: Psychometric evaluation of the Brief Index of Sexual Functioning for Women. *Archives of Sexual Behavior*, 23(6), 627–643. <https://doi.org/10.1007/BF01541816>
- Thompson, S. (1990). Putting a big thing into a little hole: Teenage girls' accounts of sexual initiation. *The Journal of Sex Research*, 27(3), 341–361. <https://doi.org/10.1080/00224499009551564>
- Toates, F. (2009). An integrative theoretical framework for understanding sexual motivation, arousal, and behavior. *The Journal of Sex Research*, 46(2–3), 168–193. <https://doi.org/10.1080/0022449902747768>
- Tolman, D. L. (2002). Female adolescent sexuality: An argument for a developmental perspective on the new view of women's sexual problems. *Women & Therapy*, 24(1–2), 195–209. https://doi.org/10.1300/J015v24n01_21
- Tsui, L., & Nicoladis, E. (2004). Losing it: Similarities and differences in first intercourse experiences of men and women. *Canadian Journal of Human Sexuality*, 13(2), 95–106. <https://psycnet.apa.org/record/2005-00726-003>
- van Anders, S. M. (2012). Testosterone and sexual desire in healthy women and men. *Archives of Sexual Behavior*, 41(6), 1471–1484. <https://doi.org/10.1007/s10508-012-9946-2>
- van Stein, K. R., Strauß, B., & Brenk-Franz, K. (2019). Ovulatory shifts in sexual desire but not mate preferences: An LH-test-confirmed, longitudinal study. *Evolutionary Psychology*, 17(2), 147470491984811. <https://doi.org/10.1177/1474704919848116>
- Wallen, K., & Rupp, H. A. (2010). Women's interest in visual sexual stimuli varies with menstrual cycle phase at first exposure and predicts later interest. *Hormones and Behavior*, 57(2), 263–268. <https://doi.org/10.1016/j.yhbeh.2009.12.005>
- Walsh, J. L., Ward, L. M., Caruthers, A., & Merriwether, A. (2011). Awkward or amazing: Gender and age trends in first intercourse experiences. *Psychology of Women Quarterly*, 35(1), 59–71. <https://doi.org/10.1177/0361684310387781>
- WHO. (2006). *Defining sexual health: Report of a technical consultation on sexual health, 28–31 January 2002*. World Health Organization.
- Wignall, L., Portch, E., McCormack, M., Owens, R., Cascalheira, C. J., Attard-Johnson, J., & Cole, T. (2021). Changes in sexual desire and behaviors among UK young adults during social lockdown due to COVID-19. *The Journal of Sex Research*, 58(8), 976–985. <https://doi.org/10.1080/00224499.2021.1897067>
- Winters, J., Christoff, K., & Gorzalka, B. B. (2010). Dysregulated sexuality and high sexual desire: Distinct constructs? *Archives of Sexual Behavior*, 39(5), 1029–1043. <https://doi.org/10.1007/s10508-009-9591-6>
- Woo, J. S., & Brotto, L. A. (2008). Age of first sexual intercourse and acculturation: Effects on adult sexual responding. *The Journal of Sexual Medicine*, 5(3), 571–582. <https://doi.org/10.1111/j.1743-6109.2007.00740.x>
- Woods, K. N., Stroebel, S. S., O'Keefe, S. L., Griffiee, K., Harper-Dorton, K. V., Beard, K. W., Young, D. H., Swindell, S., Stroupe, W. E., Steele, K., Lawhon, M., & Shih-YaKuo. (2018). Conditioning by orgasm produced by heterosexual oral sex during the critical period. *Sexual Addiction & Compulsivity*, 25(1), 96–119. <https://doi.org/10.1080/10720162.2017.1403985>
- Woodson, J. C. (2002). Including ‘learned sexuality’ in the organization of sexual behavior. *Neuroscience and Biobehavioral Reviews*, 26(1), 69–80. [https://doi.org/10.1016/S0149-7634\(01\)00039-2](https://doi.org/10.1016/S0149-7634(01)00039-2)