



Intimacy Promotes Couples' Sexual Well-Being on a Daily Basis and Over One Year: The Role of Positive Sexual Cues

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Abstract

There is growing interest in identifying factors that promote sexual well-being in romantic relationships. One such factor is intimacy—a process involving self-disclosure and empathic response that is positively associated with sexuality outcomes. However, most work among community couples examined cross-sectional associations in mixed-sex/gender couples using a single sexual outcome, which may not capture daily variations in intimacy and different dimensions of sexual well-being among a diversity of unions over time. Additionally, potential mediating mechanisms of the intimacy-sexual well-being association, such as attention to positive sexual cues (i.e., sexual thoughts and feelings), have been neglected. Adopting daily diary and longitudinal designs, the present study examined whether greater intimacy was associated with higher levels of positive sexual cues and, in turn, higher sexual well-being (sexual desire, satisfaction and distress). A convenience sample of 211 couples ($M_{\text{age}} = 30.2$ years; $SD = 8.3$; 75 sexually diverse couples) completed a survey on days of sexual activity with their partner, over a 35-day period and 12 months later. Daily results showed that intimacy was related to greater attention to positive sexual cues for both partners, which in turn was associated with their greater sexual desire and satisfaction and lower sexual distress. Longitudinal results showed that a person's greater daily intimacy was linked to their own greater sexual desire and satisfaction 12 months later via their own higher positive sexual cues, but not to their partner's cues or well-being. Findings extend interpersonal models of sexual well-being and support the role of intimacy and positive sexual cues therein.

Keywords Intimacy · Sexual well-being · Positive sexual cues · Couples · Dyadic

Introduction

Sexual well-being is associated with unique positive benefits, including better physical and mental health (Rosen & Bachmann, 2008) and greater relationship quality (Joel et al., 2020). Yet over 50% of individuals from general population samples report being dissatisfied with the sexual aspects of their relationship (Diamond & Huebner, 2012) and sexual satisfaction tends to decline over time (Schmiedeberg & Schroder, 2016). As sexual well-being becomes higher on

the public health agenda (Mitchell et al., 2021), there is growing interest in identifying factors that may promote its maintenance in romantic relationships (Muisse et al., 2016). One such factor is intimacy, which may facilitate experiences of closeness and open communication in the face of sexual challenges (Bergeron et al., 2021a, 2021b; Manne et al., 2018). Intimacy is a recursive process that involves both disclosure and empathic responses (Reis & Shaver, 1988). It is widely considered to be a core element of the quality and longevity of romantic relationships (Reis, 2017). Greater levels of intimacy could create a secure environment within which couples attend more easily to positive thoughts and feelings during sexual activity, i.e., positive sexual cues, resulting in greater sexual well-being. Although intimacy has been shown to be positively associated with sexual well-being (e.g., Beaulieu et al. (2022)), most work in this area has examined short-term, proximal associations among mixed-sex/gender couples using a single sexual outcome, which may not capture long-term variations and different dimensions of sexual well-being among a diversity of unions. Importantly,

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potential mediating mechanisms of these associations, such as attention to positive sexual cues, have yet to be examined. Identifying such mechanisms could serve to promote couples' sexual well-being.

Adopting daily diary and longitudinal designs to address methodological and conceptual gaps in the literature, the present study aimed to investigate intimacy and attention to positive sexual cues among a diverse sample of community couples in relation to their sexual desire, satisfaction, and distress. Our overarching hypothesis was that higher levels of daily self-reported intimacy in couples would lead to greater attention to positive sexual cues during sexual activity, which in turn would foster greater sexual well-being on a daily basis and 12 months later.

Interpersonal Process Model of Intimacy (IPMI)

Intimacy is believed to be a central dyadic process within romantic relationships and is associated with greater relationship satisfaction in community couples (Laurenceau et al., 2005a, 2005b). It is thought to contribute to a fulfilling sex life and is thus targeted in sex and couple therapy (Schnarch, 1991). According to the well validated IPMI (Laurenceau et al., 1998, 2005a), intimacy develops through a dynamic and reciprocal process. It has two main components: disclosure and empathic response. The IPMI defines disclosure as the verbal and non-verbal communication of personal facts, thoughts and emotions. Empathic response refers to the verbal and non-verbal responses from a partner that are interpreted by the discloser as understanding, validating and caring. In the context of negotiating their sexuality, committed couples must nurture the positive aspects of their sexual activity with a view to satisfying both individuals. This process may be facilitated by couples' greater levels of intimacy, which could foster responsiveness to each another's sexual needs, thus creating an environment conducive to experiencing more positive thoughts and feelings during sex.

Associations Between Intimacy and Sexual Well-Being Among Partnered Individuals

A handful of studies examined the role of intimacy in individuals' sexual desire. In a cross-sectional study among 10,202 participants in a relationship, greater intimacy was associated with higher levels of sexual desire (van Lankveld et al., 2021). Using experience sampling at 10 quasi-random moments per day during seven consecutive days, 134 participants involved in a relationship reported their feelings of emotional intimacy and sexual desire. Findings showed that an increase in intimacy at one time point was associated with higher sexual desire at the next one, suggesting proximal associations between intimacy and desire (van Lankveld et al., 2018). Lastly, intimacy was positively associated with

sexual desire and satisfaction among 506 partnered heterosexual men (Štulhofer et al., 2014). These studies however were cross-sectional, did not involve couples, and focused on sexual desire, precluding the examination of both partners' intimacy in their own and the other's sexual well-being.

Associations Between Intimacy and Sexual Well-Being in Couples

Two cross-sectional studies focused on self-disclosure, a component of intimacy, in relation to community couples' sexual satisfaction. Disclosure about sexual preferences was associated with greater sexual satisfaction among 91 heterosexual couples in long-term relationships (Rehman et al., 2011). In a sample of 104 heterosexual couples in long-term relationships, MacNeil and Byers (2009) found that women and men who reported greater sexual self-disclosure also reported more sexual satisfaction. Disclosure about sexual likes and dislikes may help couples negotiate mutually satisfying sexual scripts.

Other couples' research focused on another facet of intimacy—empathic response. A first cross-sectional study examined associations between responses to disclosure of a positive or negative personal event and sexual desire using an observational design among 178 heterosexual couples (Birnbaum et al., 2016). Results showed that men's empathic response, as observed by external coders, was positively associated with women's sexual desire. For both men and women, their perception of their partner's empathic response was positively associated with their own sexual desire. In a second related daily diary study among 100 heterosexual couples, the authors found that this association was mediated by feeling special and by perceptions of partner mate value (Birnbaum et al., 2016). However, dyadic analyses were not conducted in these studies. In another cross-sectional study investigating responses to disclosure of a positive event in relation to sexual well-being among 151 community mixed-sex/gender and same-sex/gender couples, results indicated that one's higher levels of self-reported and partner-perceived positive responses during a laboratory-based discussion were associated with one's own greater sexual satisfaction, but not the partner's (Bosisio et al., 2022).

A recent study examined prospective associations between intimacy and sexual satisfaction in 145 long-term mixed-gender/sex couples. Participants' self-reported greater intimacy at baseline predicted their own higher sexual satisfaction four months later, but not their partners' (Beaulieu et al., 2022). A 21-day daily diary study among 67 heterosexual committed couples also showed that day-to-day changes in intimacy for both partners predicted greater daily frequency of sexual activity and sexual satisfaction (Rubin & Campbell, 2012).

Some studies focused on intimacy in couples in which the woman presented with genito-pelvic pain—a sexual dysfunction. Results indicated that women’s self-reported intimacy was associated with their greater sexual satisfaction (Bois et al., 2013) and that observed and reported empathic response were associated with both partners’ better sexual satisfaction and lower sexual distress (Bois et al., 2016). In addition, daily greater perceived empathic response was associated with greater sexual satisfaction and function in both members of the couple (Bergeron et al., 2021a, 2021b). Intimacy may promote greater sexual well-being in couples with sexual difficulties.

Overall, studies to date support short term, proximal associations between components of the intimacy process and sexual satisfaction and desire (only one clinical study included distress), yet they did not focus on underlying mechanisms (see Birnbaum et al. (2006) for an exception) nor distal associations, and involved primarily mixed sex/gender couples. Further, very few studies moved beyond single-occasion measures, which may not capture daily variations in intimacy (Birnbaum et al., 2016; Rubin & Campbell, 2012).

Proposed Mediator: Attention to Positive Sexual Thoughts and Feelings

One mechanism via which intimacy may be associated with sexual well-being involves the processing of cognitions and emotions during sexual activity (Impett et al., 2005), specifically, greater attention directed toward the positive aspects of couples’ sexual interactions. In a dyadic daily diary study, perceptions of increased intimacy were associated with greater positive affect about the relationship—such as how excited participants felt in their relationship since their last diary entry—above and beyond perceptions of couple conflict (Laurenceau et al., 2005a, 2005b). This could also translate to the realm of sexuality, whereby those who perceive greater intimacy may be more likely to attend to positive thoughts and feelings during sexual activity, such as their partner’s enjoyment. The recursive self-disclosure and responsiveness characterizing intimacy may allow couples to be more responsive to each other’s sexual needs, while tolerating the vulnerability inherent to sharing sexual pleasure, thereby generating greater positive sexual thoughts and feelings. This attentional focus may in turn enable couples to create a more positive environment for sexual activity, contributing to each partner’s greater sexual well-being. Indeed, in a daily diary study among couples coping with genito-pelvic pain, participants’ greater attention to positive sexual cues was associated with both partners’ greater sexual function (Rosen et al., 2018). Examining the mediating role of attention to positive sexual cues is important because it suggests a pathway by which intimacy is linked to sexual well-being and could therefore provide an important target for intervention.

The Present Study

There is evidence that intimacy is associated proximally with some aspects of sexual well-being among couples. However, most studies involving community couples used cross-sectional designs, only included one component of intimacy and focused on short-term associations, when in fact intimacy is conceptualized as a dynamic and reciprocal process that evolves over time (Reis & Shaver, 1988). In addition, most examined only one indicator of sexual well-being among mixed sex/gender couples, neglecting the inclusion of minoritized couples. Adopting dyadic longitudinal and daily diary designs, which capture couples’ intimacy and sexual activity in their natural environment with minimal recall bias, the present study examined whether greater intimacy was associated with higher levels of positive sexual cues during sexual activity and sexual well-being in a diverse sample of cohabiting community couples, whereby a third identified as a sexual and/or gender minority. We hypothesized that on days of partnered sexual activity when individuals reported greater intimacy, they and their partners would attend more to their own and their partner’s positive cues during sex, which would lead both partners to report greater sexual desire and satisfaction, and lower sexual distress on that day. We further hypothesized that attending to positive sexual cues at the daily level would mediate the prospective association between daily intimacy and sexual well-being at 12-month follow-up (see Fig. 1 for hypothesized model). Given the lack of evidence of gender and/or sexual orientation differences in the experience of intimacy, we did not test for them.

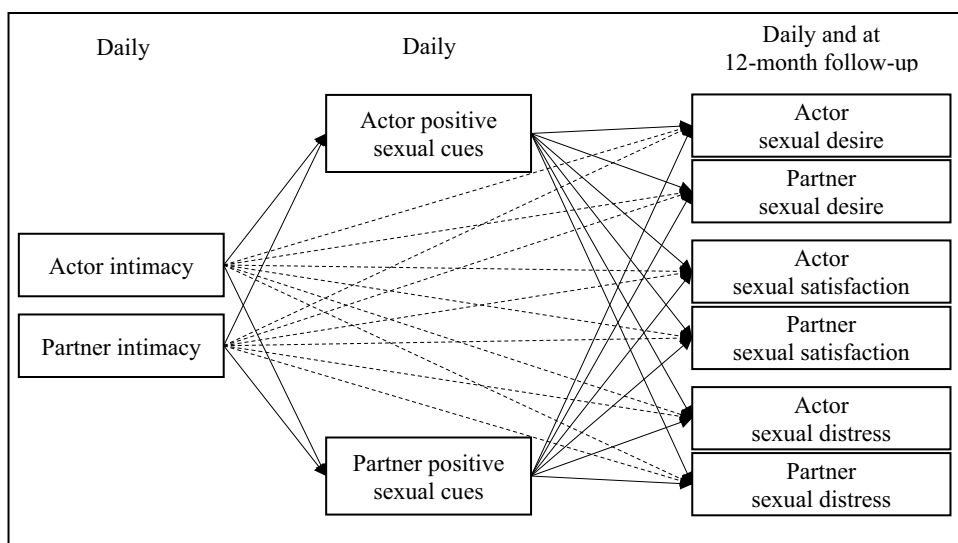
Method

Participants

Participants were recruited between April 2017 and June 2018 through online advertisements, email lists, and flyers distributed in public spaces in two large metropolitan Canadian cities. Advertisements described an online study on how sex and intimacy contribute to couples’ well-being. Interested participants were contacted by a research assistant for a brief telephone eligibility interview. Inclusion criteria were the following: both partners had to be at least 18 years of age, living together for at least 12 months, and sexually active at least once a month over the past three months. Couples were ineligible if one partner was pregnant or breastfeeding, unable to read either French or English, reported a severe mental/physical illness or took prescribed medications that affected their sexuality. Pregnancy at the 12-month follow-up was assessed and included as a covariate.

Of the 519 couples who contacted the research team to inquire about this study, 254 (48.9%) could not be reached,

Fig. 1 Visual depiction of the hypothesized mediation models



were not eligible, or had one or both partners who were not interested in participating, 30 (5.8%) dropped out during the baseline survey, five (1.0%) failed two out of three attention-testing questions at baseline, one (0.2%) asked that their data be removed from the study, 11 (2.1%) dropped out before starting the daily diaries or during their first two days, one (0.2%) was excluded because of an error in data collection, and six (1.2%) were excluded as they reported no days of partnered sexual activity during the daily diaries. This resulted in a final sample of 211 couples (422 participants).

This sample included 220 cis or trans women (52.1%), 179 cis or trans men (42.4%), and 23 nonbinary, queer, or gender fluid individuals (5.5%). These individuals formed 136 woman-man couples (64.5%), 36 woman-woman couples (17.1%), 18 man-man couples (8.5%), and 21 women, men, nonbinary, queer, or gender fluid individuals partnered with a nonbinary, queer, or gender fluid individual (10.0%). Participants ranged in age from 18 to 70 years ($M = 30.17$, $SD = 8.34$). The majority of participants identified as Canadian (74.4%; $n = 314$), followed by American (11.1%; $n = 47$), European (5.2%; $n = 22$), and a range of other cultural identities (9.2%; $n = 39$; First Nations, African, Asian, Middle Eastern, South American, Caribbean, New Zealander, Jewish, mixed cultural identity, and none). On average, participants reported 16.65 years of education ($SD = 2.82$) which corresponds to a college undergraduate degree. More than half of participants reported an average annual income of less than \$40,000 CAD (62.6%; $n = 264$); \$40,000 to \$69,999 (27.0%; $n = 114$); and more than \$70,000 (10.4%; $n = 44$). About half of participants defined their sexual orientation as heterosexual (57.1%; $n = 241$), with 11.4% ($n = 48$) identifying as bisexual, 16.8% ($n = 71$) as gay/lesbian, 8.5% ($n = 36$) as queer, 4.0% ($n = 17$) as pansexual, 0.2% as asexual ($n = 1$), 0.7% as uncertain or confuse ($n = 3$) and 1.2% ($n = 5$) as

“other” (i.e., homoromantic demisexual, mostly straight, homoflexible, irrelevant, and dyke). Couples had been in their current relationship from one to 37.83 years ($M = 5.77$, $SD = 4.08$). Most were living together without being married (72.5%; $n = 153$) and 27.5% were married ($n = 58$). A total of 78.7% ($n = 166$) of couples had no children, with others reporting between one and five children ($M = 0.46$, $SD = 1.02$).

Procedure

Data were collected as part of a larger daily diary and longitudinal study among couples. Other published papers involving only the daily diaries examined the associations between pornography use and relationship or sexual outcomes (Vaillancourt-Morel et al., 2023a). Another paper examined the associations between sexual desire discrepancy and sexual distress using both the daily and longitudinal datasets (Jodouin et al., 2021), one compared the frequency of talk during sexual activity according to gender/sex and dyad type using the daily data (Merwin et al., 2022), and another examined the associations between childhood maltreatment and perceived partner responsiveness using both the daily and longitudinal data (Vaillancourt-Morel et al., 2023b). The data and materials used in the current study can be found on the OSF page: https://osf.io/r62wm/?view_only=206d60343fd34c78ba6bb8eac3119a4a. All procedures were approved by the two universities’ Institutional Review Boards. For the baseline survey, eligible couples independently accessed a unique hyperlink to complete a consent form and self-report questionnaires hosted on Qualtrics. Three simple attention-testing questions were included in this survey, and participants failing two out of three of these were

excluded from the study and their data deleted. When both partners completed the baseline survey, the research team contacted them to set a start date for the daily diaries. Each partner accessed a unique hyperlink received via email each evening to complete a brief survey, during 35 consecutive days. Twelve months after the completion of the baseline survey, couples were contacted by email to complete a follow-up survey. Each partner received a CDN\$10 gift card after completing the baseline and 12-month follow-up surveys. For the daily diaries, compensation was prorated based on how many diaries participants completed, with a maximum of Can\$50 each in gift cards for completing at least 85% of their diaries (30 entries out of 35).

On average, participants completed 30.26 out of 35 possible daily surveys, for a completion rate of 86.5%. Positive sexual cues and daily sexual well-being measures were completed only on days of sexual activity with the partner. Thus, in the present study we included only days on which one partner reported sexual activity with their current partner in the last 24 h or since they last completed a diary. Sexual activity included fondling, caressing, foreplay, vaginal penetration, anal penetration, manual stimulation, and oral sex. Of the 13,134 individual diary entries completed, 2,996 included sexual activity with the partner, with 2,492 (83.2%) being reported by both partners, 174 (5.8%) where one partner reported sexual activity with the partner that day and the other partner did not complete the diary that day, and 330 (11.0%) where one partner reported sexual activity with the partner that day, but the other partner reported no sexual activity. Thus, even if partners' reports of sexual activity were highly correlated ($r = 0.85$, $p < 0.001$), on some days there was a discrepancy, which is in line with daily reports of past studies ($r = 0.88$; Schoenfeld et al. (2017)). Same-day diaries between partners were matched to form 1750 sex days (i.e., at least one partner reported sexual activity with their current partner). The 211 couples engaged in sexual activity 8.29 ($SD = 5.08$) days (out of 35 days), ranging from one to 26 days.

At the 12-month follow-up, 16 couples had separated and were excluded from these analyses as their missing data could not be handled using the missing-at-random assumption; this resulted in a sample size of 195 couples (390 participants) for the analyses including the 12-month follow-up. Couple who separated were significantly younger ($M = 25.31$ years, $SD = 4.89$) than intact couples ($M = 30.56$ years, $SD = 8.44$), $t(420) = 5.45$, $p < 0.001$, but there were no other significant differences on sociodemographic variables. Out of 390 participants, 362 participated in the 12-month follow-up (92.8% retention rate).

Measures

All measures are available on the study OSF page.

Daily Measures

Intimacy. Daily relational intimacy was assessed using eight items capturing perceived empathic response (4 items), partner disclosure (2 items), and self-disclosure between partners (2 items), as per Reis and Shaver's IPMI (Bois et al., 2013; Reis & Shaver, 1988). This measure was used in other daily diaries studies (Bergeron et al., 2021a, 2021b; Laurenceau et al., 2005a, 2005b). Items were rated on a seven-point scale (1 = *not at all*, 7 = *a lot*), which were summed to provide a daily score ranging from 8 to 56, with higher scores indicating greater perceived intimacy on that day. In the present study, Cronbach's α was 0.92 and reliability of within-person change was 0.87.

Positive sexual cues. Participants reported on their positive feelings and thoughts during sexual activity by rating how true they believed each of six statements (e.g., "During sexual activity, my partner was responsive to my needs"; "Overall, I had great fun during sex") to be on a seven-point scale (1 = *not at all true*, 7 = *very true*). This measure was used in prior daily diary studies among community and clinical samples to capture cognitive and affective processes occurring during sexual activity (Birnbaum et al., 2006; Rosen et al., 2018). Ratings were summed to provide a daily score ranging from 6 to 42, with higher scores indicating more attention to positive cues during sexual activity with the partner that day. In the present study, Cronbach's α was 0.88 and reliability of within-person change was 0.86.

Sexual desire. Two items from the Dyadic Sexual Desire subscale of the Sexual Desire Inventory-2 (Spector et al., 1996) were used to assess participants' level of interest in sexual activity with their current partner over the past 24 h: "How often did you feel sexual desire for your partner today?" and "Did you initiate or express interest in sexual activity with your partner today?" These items were rated on a seven-point scale (1 = *not at all*, 7 = *a lot*), and summed to provide a daily score ranging from 2 to 14, with higher scores indicating greater dyadic sexual desire. Cronbach's α was 0.82 and reliability of within-person change was 0.76.

Sexual satisfaction. The Global Measure of Sexual Satisfaction (Lawrance et al., 2019) was used to evaluate participants' subjective global satisfaction with sexual activity on that day. This measure includes five items rated on seven-point bipolar scales. Total scores range from 5 to 35, with higher scores indicating greater sexual satisfaction. In the present study, Cronbach's α was 0.95 and reliability of within-person change was 0.92.

Sexual distress. The Female Sexual Distress Scale-Revised, also validated in men and used in prior daily

research (Derogatis et al., 2008; Muise et al., 2018; Santos-Iglesias et al., 2018), was used to assess participants' level of sexual distress. Muise et al. (2018) selected the three face valid items with high factor loadings from the original scale to create the adaptation for daily diaries. Participants rated these three items on a five-point Likert scale (0 = *never*, 4 = *always*), answering how often during the past 24 h they felt (1) distressed about their sex life, (2) inferior because of sexual problems, and (3) worried about sex. Total scores range from 0 to 12, with higher scores indicating greater sexual distress. In the present study, Cronbach's α was 0.89 and reliability of within-person change was 0.80.

Baseline and 12-Month Follow-Up Measures

Sexual desire. The seven-item Dyadic Sexual Desire subscale of the Sexual Desire Inventory-2 (Spector et al., 1996) was used to assess participants' desire for their partner. These items were rated on a seven-point scale (1 = *not at all*, 7 = *a lot*). Ratings were summed to provide a score ranging from 7 to 49, with higher scores indicating greater dyadic sexual desire. In the present study, Cronbach's α were 0.86 at baseline and 0.89 at follow-up.

Sexual satisfaction. See Daily Measures above. In the present study, Cronbach's α were 0.92 at baseline and 0.95 at follow-up.

Sexual distress. The Female Sexual Distress Scale-Revised, also validated in men (Derogatis et al., 2008; Santos-Iglesias et al., 2018), assessed participants' level of sexual distress. The items on the scale load onto a single factor regardless of gender and degree of sexual function (Santos-Iglesias et al., 2018). Participants rated 13 items on a five-point Likert scale (0 = *never*, 4 = *always*). Total scores range from 0 to 56, with higher scores indicating greater sexual distress. Cronbach's α were 0.93 at baseline and at 12-month follow-up.

Data Analyses

Descriptive analyses and bivariate correlations were computed using SPSS 27.0 and mediation analyses were performed using Mplus 8.5 (Muthén & Muthén, 1998–2017). A visual depiction of all included associations in the mediation model is presented in Fig. 1. To examine the mediational model using the daily sexual outcomes, we used multilevel modeling for dyadic diary data which is a two-level model with random intercepts where days are nested directly within couples and both partners' scores are modeled simultaneously as multivariate outcomes (Laurenceau & Bolger, 2012). Following the guidelines for a 1–1–1 mediation (Zhang et al., 2009), we group mean centered the Level 1 predictors and introduced the cluster mean as a Level 2 predictor (grand mean centered). Thus, we examined the within-person mediation model (i.e., 1–1–1 model) controlling

for the between-person mediation model (i.e., 2–2–2 model). These analyses accounted for between-person differences in intimacy and positive sexual cues and assess whether changes from a participant's own mean in intimacy and positive sexual cues were associated with changes in sexual well-being on days of partnered sexual activity. As positive sexual cues and sexual outcomes were only assessed on days where couples reported sexual activity, the analyses only included sexual activity days. Relationship length was included as a Level 2 covariate given its associations with lower sexual desire (McNulty et al., 2019) and satisfaction (Schmiedeborg & Schroder, 2016). To test the significance of the indirect effects, we used the Monte Carlo Method for Assessing Mediation (MCMAM; Selig & Preacher, 2008, June) with 20,000 resamples and 95% confidence intervals (CIs).

To examine the mediational model using the residualized change in sexual outcomes at the 12-month follow-up, we used each individual's average intimacy and positive sexual cues on days of partnered sexual activity across the 35-day diaries as predictors of the 12-month follow-up sexual outcomes controlling for baseline sexual outcomes. To account for interdependence between partners, we used path analyses to test the actor-partner interdependence model (APIM; Kenny et al., 2006). Relationship length was included as a covariate and as eight couples became pregnant during the longitudinal follow-up, we controlled for pregnancy (0 = not pregnant; 1 = pregnant). To test the significance of the indirect effects, we used 95% bias-corrected bootstrapping CIs with 20,000 resamples (Preacher & Hayes, 2008).

As this sample included both same- and mixed-gender/sex couples, gender/sex could not distinguish all dyads and no other variable could, thus in both models dyads were conceptually considered indistinguishable with each partner being randomly assigned to "partner 1" and "partner 2" and adding equality constraints on all parameters between partners (Kashy et al., 2008). Both models tested both actor effects (e.g., association between one's own intimacy and own positive sexual cues; Kenny et al. (2006)) and partner effects. As partners were indistinguishable, there was just one intercept, one slope for each actor effect, and one slope for each partner effect. All analyses were performed with the maximum likelihood parameter estimates with robust standard errors and chi-square test (MLR). Attrition not due to separation and score-level missing data were handled using full information maximum likelihood (Muthén & Muthén, 1998–2017).

Results

Descriptive Statistics

Table 1 presents the means, SDs, and bivariate correlations of all daily measures aggregated within-person across all sex days and baseline and 12-month follow-up measures.

Within-Person Mediation with Daily Sexual Well-Being

Results of the within-person mediation model (i.e., the 1–1–1 model) for the daily sexual outcomes are presented in Table 2 and the 95% CIs of the indirect effects are reported in Table 3. This model included the between-person mediation model (i.e., the 2–2–2 model) and relationship length as a control variable. At the within-person level (i.e., 1–1–1), on days of partnered sexual activity, a person’s higher intimacy was related to their own higher sexual desire and satisfaction and lower sexual distress via their own higher positive sexual cues. A person’s higher intimacy was also related to their own higher sexual satisfaction and lower sexual distress via their partner’s higher positive sexual cues. This indirect effect via partner’s positive sexual cues was nonsignificant for sexual desire. A person’s higher intimacy was related to their partner’s higher sexual desire and satisfaction and lower sexual distress via their partner’s higher positive sexual cues. A person’s higher intimacy was also related to their partner’s higher sexual satisfaction and lower sexual distress via their own higher positive sexual cues. Again, this indirect effect via their own positive sexual cues was nonsignificant for sexual desire. This within-person model explained 14.1% of the within-person variance of sexual desire, 29.0% of sexual satisfaction, 4.1% of sexual distress, and 7.8% of positive sexual cues.

Directionality of the Daily Associations

To bolster our confidence in our findings, we conducted additional analyses to address the directionality of our associations. We tested a multilevel model including both partners’ sexual well-being (sexual desire, satisfaction, and distress) and positive sexual cues on days of partnered sexual activity as predictors of the next day’s intimacy while controlling for intimacy on the previous day. No significant associations were found, indicating that both partners’ sexual well-being and positive sexual cues on one day of partnered sexual activity were not associated with a person’s own or their partner’s intimacy on the next day.

Table 1 Descriptive statistics and within-person correlations among aggregated daily and follow-up variables

	<i>n</i>	<i>M</i> (<i>SD</i>)	Range	1	2	3	4	5	6	7	8	9	10	11
1. Daily intimacy	421	44.89 (7.79)	11–56	.61***	.57***	.20***	.54***	-.16***	.14**	.43***	-.30***	.14***	.35***	-.31***
2. Daily positive sexual cues	420	35.01 (5.83)	7–42	.31***	.32***	.28***	.69***	-.33***	.32***	.54***	-.42***	.38***	.51***	-.38***
3. Daily sexual desire	421	8.08 (2.26)	2–14	.13**	.12*	.13*	.29***	-.12*	.40***	.17***	-.16***	.36***	.13*	-.12*
4. Daily sexual satisfaction	420	30.69 (4.29)	6–35	.33***	.35***	.16**	.38***	-.31***	.32***	.53***	-.42***	.30***	.53***	-.37***
5. Daily sexual distress	421	1.03 (1.67)	0–11	-.09	-.20***	-.05	-.21***	.21***	-.09	-.42***	.57***	-.15*	-.30***	.49***
6. Baseline sexual desire	422	36.89 (8.67)	6–54	.04	-.003	-.04	.11*	-.11*	.02	.35***	-.30***	.68***	.24***	-.23***
7. Baseline sexual satisfaction	422	29.96 (5.22)	5–35	.30***	.30***	.07	.38***	-.17***	.18***	.38***	-.62***	.29***	.54***	-.44***
8. Baseline sexual distress	422	12.43 (10.45)	0–50	-.25***	-.26***	-.08	-.31***	.30***	-.17***	-.36***	.48***	-.31***	-.43***	.69***
9. Follow-up sexual desire	359	34.16 (9.82)	0–54	.03	.03	-.08	.15**	-.19***	-.02	.16**	-.18***	.11*	.45***	-.31***
10. Follow-up sexual satisfaction	354	29.52 (5.74)	5–35	.25***	.29***	.02	.34***	-.25***	.14*	.37***	-.37***	.29***	.49***	-.54***
11. Follow-up sexual distress	355	11.10 (10.00)	0–41	-.25***	-.24***	-.06	-.28***	.29***	-.16**	-.31***	.45***	-.23***	-.42***	.54***

Correlations above the diagonal are between each of the actor variables, correlations along (in bold) the diagonal are for actor and partner same variables, and correlations below the diagonal are between the actor and partner different variables. Daily variables were aggregated within-person across all days of partnered sexual activity

****p* < .001. ***p* < .01. **p* < .05

Table 2 Associations between daily intimacy, daily positive sexual cues, and daily and 12-month follow-up sexual well-being

	Positive sexual cues			Sexual desire			Sexual satisfaction			Sexual distress		
	β	<i>b</i> (SE)	<i>p</i>	β	<i>b</i> (SE)	<i>p</i>	β	<i>b</i> (SE)	<i>p</i>	β	<i>b</i> (SE)	<i>p</i>
Model 1. Daily sexual well-being (1–1–1 model)												
Actor intimacy	.24	0.25 (0.03)	<.001	.20	0.10 (0.01)	<.001	.14	0.09 (0.01)	<.001	-.03	-.01 (0.01)	.145
Partner intimacy	.09	0.09 (0.02)	<.001	.06	0.03 (0.01)	<.001	.01	0.01 (0.01)	.636	-.01	-.00 (0.00)	.781
Actor positive sexual cues	–	–	–	.24	0.12 (0.01)	<.001	.45	0.29 (0.02)	<.001	-.17	-0.03 (0.01)	<.001
Partner positive sexual cues	–	–	–	.01	0.01 (0.01)	.585	.08	0.06 (0.02)	.001	-.05	-0.01 (0.01)	.031
Model 2. 12-month follow-up sexual well-being												
Actor intimacy	.59	0.45 (0.05)	<.001	-.01	-.02 (0.08)	.791	.04	0.03 (0.04)	.515	-.05	-.07 (0.07)	.329
Partner intimacy	-.04	-.03 (0.04)	.423	-.02	-.06 (0.08)	.452	-.03	-.02 (0.04)	.572	-.003	-.004 (0.06)	.946
Actor positive sexual cues	–	–	–	.20	0.33 (0.09)	<.001	.26	0.26 (0.06)	<.001	-.07	-.12 (0.09)	.199
Partner positive sexual cues	–	–	–	-.01	-.01 (0.10)	.891	.03	0.03 (0.06)	.552	-.02	-.04 (0.09)	.662

β standardized coefficient, *b* Unstandardized coefficient, Model 1 is controlling for between-person variables and relationship length. Model 2 is controlling for baseline sexual outcomes, relationship length, and pregnancy
 Significant effects at *p* < .05 are in bold

Mediation with 12-month Follow-Up Sexual Well-Being

Results of the mediation model for the 12-month follow-up sexual outcomes are presented in Table 2 and the 95% CIs of the indirect effects are reported in Table 3. This model included becoming pregnant during the 12-month follow-up and relationship length as control variables. We also controlled for baseline sexual well-being to assess residualized change in sexual well-being. A person’s higher daily intimacy was related to their own higher sexual desire and satisfaction at 12-month follow-up via their own higher positive sexual cues. No other indirect effects were significant for sexual desire and satisfaction, and all indirect effects were nonsignificant for sexual distress. This model explained 47.0% of the variance of sexual desire, 36.2% of sexual satisfaction, 48.5% of sexual distress, and 33.2% of positive sexual cues.

Discussion

The present dyadic study examined whether greater intimacy was associated with higher levels of positive sexual cues and, in turn, sexual well-being on the same day and 12 months later in a diverse sample of cohabiting community couples. Daily results supported the overarching hypothesis that higher intimacy on days of sexual activity is associated with greater attention to positive sexual thoughts and feelings for both partners, which in turn is associated with both partners’ greater sexual satisfaction and lower sexual distress that day, in addition to a person’s greater sexual desire. Longitudinal results partially supported this hypothesis by showing that a person’s greater intimacy during the daily period was linked to their own greater sexual desire and satisfaction at 12-month follow-up via their own higher attention to positive sexual cues, but not to their partner’s sexual cues. A person’s intimacy was also not significantly related to their partner’s long-term sexual well-being. Taken together, findings support and extend interpersonal, systemic conceptualizations of sexual well-being (Dewitte, 2014; Prekatsounaki et al., 2022; Rosen & Bergeron, 2019; van Anders et al., 2022) by identifying a novel mechanism linking intimacy to sexual well-being, i.e., positive sexual thoughts and feelings during sexual activity, among a diverse sample of couples—a third of which identified as a sexual and/or gender minority. Conducting inclusive research is crucial to broaden our understanding of sexuality and relational processes as they unfold in couples of all genders and sexual identities (van Anders, 2022).

Table 3 Indirect effects of the associations between daily intimacy, daily positive sexual cues, and daily and 12-month follow-up sexual well-being

	Indirect effect (SE)	95% CI
<i>Model 1: Daily sexual desire (1–1–1 model)</i>		
Actor intimacy→Actor positive sexual cues→Actor sexual desire	0.029 (0.004)	[0.022, 0.037]
Actor intimacy→Partner positive sexual cues→Actor sexual desire	0.001 (0.001)	[–0.001, 0.003]
Partner intimacy→Actor positive sexual cues→Actor sexual desire	0.010 (0.003)	[0.005, 0.016]
Partner intimacy→Partner positive sexual cues→Actor sexual desire	0.001 (0.003)	[–0.004, 0.007]
<i>Model 1: Daily sexual satisfaction (1–1–1 model)</i>		
Actor intimacy→Actor positive sexual cues→Actor sexual satisfaction	0.071 (0.009)	[0.055, 0.089]
Actor intimacy→Partner positive sexual cues→Actor sexual satisfaction	0.005 (0.002)	[0.002, 0.009]
Partner intimacy→Actor positive sexual cues→Actor sexual satisfaction	0.026 (0.006)	[0.013, 0.038]
Partner intimacy→Partner positive sexual cues→Actor sexual satisfaction	0.013 (0.004)	[0.005, 0.022]
<i>Model 1: Daily sexual distress (1–1–1 model)</i>		
Actor intimacy→Actor positive sexual cues→Actor sexual distress	–0.008 (0.002)	[–0.012, –0.005]
Actor intimacy→Partner positive sexual cues→Actor sexual distress	–0.001 (0.000)	[–0.002, –0.0001]
Partner intimacy→Actor positive sexual cues→Actor sexual distress	–0.003 (0.001)	[–0.005, –0.001]
Partner intimacy→Partner positive sexual cues→Actor sexual distress	–0.003 (0.001)	[–0.005, –0.0003]
<i>Model 2: 12-month follow-up sexual desire</i>		
Actor intimacy→Actor positive sexual cues→Actor sexual desire	0.147 (0.042)	[0.068, 0.240]
Actor intimacy→Partner positive sexual cues→Actor sexual desire	0.000 (0.003)	[–0.007, 0.016]
Partner intimacy→Actor positive sexual cues→Actor sexual desire	–0.011 (0.014)	[–0.047, 0.012]
Partner intimacy→Partner positive sexual cues→Actor sexual desire	–0.006 (0.043)	[–0.091, 0.082]
<i>Model 2: 12-month follow-up sexual satisfaction</i>		
Actor intimacy→Actor positive sexual cues→Actor sexual satisfaction	0.117 (0.029)	[0.061, 0.181]
Actor intimacy→Partner positive sexual cues→Actor sexual satisfaction	–0.001 (0.002)	[–0.015, 0.002]
Partner intimacy→Actor positive sexual cues→Actor sexual satisfaction	–0.008 (0.011)	[–0.035, 0.009]
Partner intimacy→Partner positive sexual cues→Actor sexual satisfaction	0.015 (0.025)	[–0.035, 0.068]
<i>Model 2: 12-month follow-up sexual distress</i>		
Actor intimacy→Actor positive sexual cues→Actor sexual distress	–0.054 (0.042)	[–0.139, 0.031]
Actor intimacy→Partner positive sexual cues→Actor sexual distress	0.001 (0.003)	[–0.004, 0.019]
Partner intimacy→Actor positive sexual cues→Actor sexual distress	0.004 (0.006)	[–0.003, 0.029]
Partner intimacy→Partner positive sexual cues→Actor sexual distress	–0.017 (0.039)	[–0.096, 0.063]

CI confidence interval, Indirect effects are unstandardized coefficients. Bold coefficients represent a significant mediation and is indicated when the confidence interval does not include zero

Intimacy, Positive Sexual Cues, and Daily Sexual Well-Being

As expected, on days of partnered sexual activity, a person's greater perceived intimacy with their partner was associated with their own greater sexual desire and satisfaction and lower distress via their own greater attention to positive sexual cues, as well as with their own higher sexual satisfaction and lower sexual distress via their partner's greater attention to positive sexual cues. Feeling understood, cared for and validated by one's partner in daily life (i.e., empathic response) has been linked to one's greater sexual satisfaction and function in a dyadic daily diary study among 160 couples coping with genito-pelvic pain (Bergeron et al., 2021a, 2021b). In another daily diary study among 67 heterosexual couples using a measure of intimacy focusing on self-disclosure, daily increases in intimacy were associated with greater

frequency of sexual intercourse and greater sexual satisfaction (Rubin & Campbell, 2012). Using a comprehensive, theoretically-grounded measure based on the Interpersonal Process Model of Intimacy (Reis & Shaver, 1988), our findings extend prior work by showing that intimacy could facilitate a greater focus on positive thoughts and feelings during sexual activity for both partners—a mechanism which in turn is related to a person's greater sexual desire and satisfaction and lower sexual distress on that day. Findings also corroborate and extend results of past studies showing associations between intimacy and sexual desire among individuals (e.g., van Lankveld et al. (2021)), and shed light on a neglected, clinically relevant indicator of sexual well-being—sexual distress.

A person's greater intimacy was also associated with their partner's greater sexual well-being that day via their partner's higher positive sexual cues, as well as with their partner's

higher sexual satisfaction and lower sexual distress via a person's higher positive sexual cues. These cross-partner effects are in line with findings from among couples coping with genito-pelvic pain, showing that one partner's report of greater mutual self-disclosure and empathic response was associated with the other partner's greater sexual satisfaction and lower sexual distress (Bois et al., 2016) and greater sexual function (Bergeron et al., 2021a, 2021b). The present findings extend past work by documenting these associations in an inclusive community sample of couples and identifying a dyadic pathway, namely, both partners' higher attention to positive sexual cues. Attention toward the more pleasurable dimensions of sexual activity had also been found to explain daily associations between higher approach sexual motivations (i.e., having sex in pursuit of positive relationship outcomes) in women with genito-pelvic pain and both partners' greater sexual function (Rosen et al., 2018).

The experience of intimacy may shift couples' perceptual focus toward the physical and emotional benefits of partnered sexual activity and lead them to be more attentive to the positive aspects of sexual activity on a given day. A person's perceived intimacy in daily life might also facilitate being responsive to their partner's sexual needs—a component of positive sexual thoughts and feelings that has been linked to sexual desire and satisfaction in both community (Shoikhedbrod et al., 2023) and clinical samples (Muise et al., 2018). Moreover, clinical conceptualizations such as the *Sexual Crucible Model* suggest that intimacy involves each partner's capacity to maintain a personal identity and recognize the other's identity, while simultaneously feeling connected to each other (Schnarch, 2009). This would allow the couple to tolerate the vulnerability inherent to sexual pleasure, thereby creating space and security for greater attention to positive thoughts and feelings to unfold during sexual activity.

Intimacy, Positive Sexual Cues, and 12-Month Sexual Well-Being

As hypothesized, a person's greater daily intimacy was associated with their own higher sexual desire and satisfaction at 12-month follow-up via their own higher daily perception of positive sexual cues. This novel finding suggests that proximal, daily dyadic interactions could have implications for maintaining sexual desire and satisfaction over time—a common challenge encountered by long-term couples (Schmiedeburg & Schroder, 2016). Engaging in a recursive relationship process of self-disclosure and empathic response over days and months may lead individuals to be more comfortable with, and open to, experiencing pleasure/orgasm during sexual activity, feel more desired, and be more passionate toward their partner—positive sexual thoughts and feelings associated with greater sexual desire and satisfaction (Rubin & Campbell, 2012; Schnarch, 2009; Sims & Meana, 2010). The

fact that a person's greater daily intimacy or positive sexual cues were not associated with their own long-term sexual distress may have to do with the more problem-focused, short-term aspect of this outcome, in addition to our relatively well functioning community sample. Indeed, whereas sexual satisfaction pertains to partners' subjective evaluation of the positive and negative dimensions of their sexual relationship more globally (Lawrance & Byers, 1995), sexual distress focuses on the negative feelings about one's sexual difficulties over the past month (Derogatis et al., 2002).

Contrary to expectations and the daily findings, a person's greater daily intimacy was not associated with their partner's sexual well-being one year later. Nevertheless, these results are in line with those of previous studies focusing on intimacy and sexuality in community couples, whereby only actor effects were found in the associations between intimacy and sexual satisfaction (Beaulieu et al., 2022; Bosisio et al., 2022). These findings are also consistent with results of a dyadic machine learning study among 11,196 romantic couples showing that partner reports had no predictive effects of one's own relationship quality beyond actor-reported relationship-specific variables (Joel et al., 2020). In sum, findings suggest that maintaining sexual desire and satisfaction over the long-term lies in the eyes of the beholder, i.e., in their own appreciation of the intimacy experience.

Strengths and Limitations

The present study boasted rigorous daily diary and longitudinal designs with high participant retention rates, in addition to theory-driven measurement of intimacy and a multidimensional view of sexual well-being including three distinct outcomes. It extended prior work among community couples by examining dyadic actor and partner effects in a large, inclusive sample of cohabiting couples, whereby approximately a third identified as sexual and/or gender minorities. This is important given that the historical lack of diversity in couples and sexuality research has contributed to bias and limits our understanding of all couples (van Anders, 2022). Moreover, couples were followed over time, both daily over 35 days in their natural environment with minimal recall bias, and prospectively over 12 months. To increase our confidence in the directionality of the associations, we conducted additional analyses that showed that both partners' sexual well-being and positive sexual cues on one day of partnered sexual activity were not significantly associated with a person's own or their partner's intimacy on the next day. Importantly, this study focused on a mediating mechanism, attention to positive sexual cues, to explain daily and prospective associations between intimacy and sexual well-being, which could be targeted in sex and couple therapy interventions.

Nevertheless, results need to be interpreted in light of limitations. The selection criteria focusing on the need to

have been sexually active at least once a month over the past three months—although necessary for our study questions—may have limited the generalizability of the results by excluding couples who may not have been engaging in sexual activity because of greater relationship distress and/or sexual difficulties and related avoidance behaviors. In addition, it is possible that some participants downplayed the negative aspects of their sexual activities while emphasizing their positive aspects due to social desirability and repeated measurements over 35 days. Our sample also lacked cultural and ethnic diversity, such that findings may only apply to Western couples. Although our sample involved a high proportion of sexual/gender diverse dyads, we did not examine whether dyad type moderated the associations between intimacy, sexual cues and sexual well-being. Further, our hypotheses were not preregistered; analyses and results need to be replicated in future studies including preregistration of the analysis plan. Lastly, we established temporal precedence from intimacy and positive sexual cues to sexual well-being 12 months later, but not from intimacy to positive sexual cues—both measured at the daily level.

Conclusions and Clinical Implications

Daily diary findings supported the overarching hypothesis that recursive dyadic experiences of intimacy foster greater attention to positive sexual thoughts and feelings during sexual activity for both partners, which in turn is associated with their greater sexual desire and satisfaction and lower sexual distress. Longitudinal results partially supported this hypothesis by showing that a person's greater daily experience of intimacy was linked to their own greater sexual desire and satisfaction at 12-month follow-up via their own higher positive sexual cues, but not to their partner's sexual cues or well-being. Results may promote couples' sexual well-being and inform clinical targets for those seeking sex and couple therapy. Developing couples' self-disclosure and empathy skills could enhance their capacity to embrace the positive aspects of their sexual interactions, which in turn would foster their sexual well-being. Interventions aimed at facilitating attention toward positive thoughts and feelings during sexual activity, such as sensate focus and mindfulness, may also be beneficial for both partners' greater sexual desire and satisfaction, and lower sexual distress (Brotto & Basson, 2014). Lastly, sex and couple therapy focusing on improving emotion regulation during sexual activity through acceptance and compassion-based strategies may bolster both intimacy and attention to positive sexual cues (Bergeron et al., 2021a, 2021b; Huynh et al., 2022), contributing in turn to couples' enhanced sexual well-being.

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Data Availability The data and materials used in the current study can be found at https://osf.io/r62wm/?view_only=206d60343fd34c78ba6b88eac3119a4a.

Code Availability https://osf.io/r62wm/?view_only=206d60343fd34c78ba6b88eac3119a4a.

Declarations

Conflicts of interest The authors have no conflicts of interest to declare.

Ethical Approval All procedures performed in the study involving human participants were in accordance with the ethical standards of the institutional research committee of the Université de Montréal and Dalhousie University, and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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