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# Sexual Satisfaction Predicts Future Changes in Relationship Satisfaction and Sexual Frequency: New Insights From Within-Person Associations Over Time

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## Abstract

Considerable research demonstrates a positive association between sexual satisfaction and relationship satisfaction, but longitudinal evidence on the direction of this link remains inconclusive. To address this research gap, the present research provided a stringent test of the within-person associations between sexual and relationship satisfaction over time by analyzing 4-year longitudinal data from a nationally representative sample of newlywed couples in the United States (N = 2,104). The results indicated that within-person changes in sexual satisfaction predicted future changes in relationship satisfaction, whereas changes in relationship satisfaction did not predict future changes in sexual satisfaction. These results remained consistent when accounting for changes in couples' sexual frequency, which showed significant associations with sexual satisfaction but non-significant associations with relationship satisfaction over time. All

associations were consistent across gender. Overall, the current findings inform theory and practice on the roles of sexual dynamics in shaping overall perceptions of intimate relationships.

## Keywords

sexual satisfaction, relationship satisfaction, sexual frequency, longitudinal methods, marriage

## Non-Technical Summary

**What is the study's background?**

Research has shown that couples who are happy with their relationship are more likely to be satisfied with their sex life. But does a happier relationship lead to more satisfying sex, or does one become happier with the relationship when they are sexually satisfied?

**Why was this study done?**

Although this question is critical in helping us understand how to improve couples' well-being, a long-standing debate on the direction of this link remains largely unresolved. Further, couples' evaluations of their sexual and overall relationships are strongly tied to how often they engage in sex. However, it remains unclear whether more frequent sex leads to greater satisfaction or whether greater satisfaction leads to more frequent sex. There are also conflicting opinions and findings about whether these associations differ between women and men.

**What did the researchers do and find?**

To address these research gaps, we analyzed data collected over four years from a large national sample of 2,104 mixed-gender newlywed couples from the United States to examine how changes in sexual satisfaction, relationship satisfaction, and sexual frequency were interrelated over time. We employed a rigorous data analysis method to test how improvements in one domain could lead to subsequent improvements in the other within each person above and beyond differences observed across individuals. The results showed that while changes in sexual satisfaction, relationship satisfaction, and sexual frequency often co-occurred, higher sexual satisfaction led to future improvements in relationship satisfaction and sexual frequency rather than the other way around. This was true for both women and men.

**What do these findings mean?**

Hence, our findings suggest that (1) a satisfying sex life leads to a happier relationship rather than the reverse, (2) simply having more sex may not lead to greater satisfaction, but rather, greater sexual enjoyment leads to more frequent sex, (3) an enjoyable sex life can be more important than the mere frequency of sex for a happier relationship, and lastly, (4) there are no gender differences in these associations. By demonstrating that improvements in sexual satisfaction predict future increases in relationship satisfaction and sexual frequency, the current findings highlight the importance of focusing on the quality of a couple's sexual

relationship to improve their overall relationship satisfaction. It also suggests the need to reconsider traditional beliefs that prioritize men's sexual pleasure over women's and recognize the importance of addressing the sexual needs of both women and men.

### Relevance Statement

Drawing on a large, nationally representative dataset of 2,104 U.S. couples, we demonstrated that changes in sexual satisfaction predicted future changes in relationship satisfaction (and sexual frequency) but not the reverse.

### Key Insights

- Sexual satisfaction predicts future relationship satisfaction, but not the reverse.
- Sexual satisfaction leads to future increases in sexual frequency.
- The results did not differ for men and women.

Sexual interactions are one of the defining features of intimate relationships (Bradbury & Karney, 2019), as many romantic partners rely on each other to meet their sexual needs (Blanchflower & Oswald, 2004). A robust body of research has demonstrated a strong positive association between sexual satisfaction and relationship satisfaction (see review by Muise et al., 2016). Yet, a long-standing debate about the directionality of this link—whether a satisfying sexual relationship precedes a happier relationship or having a positive relationship leads to greater sexual satisfaction—remains largely unresolved. The lack of a clear conclusion on this question has led to a gap between research studies that assume opposing directional models (e.g., Gadassi et al., 2016; Yucel & Gassanov, 2010), inhibiting cumulative scientific understanding on the interconnection between sexual and relationship satisfaction. Also, based on conflicting theoretical perspectives and inconsistent evidence, the clinical implications derived from this association are mixed; some studies recommend focusing on improving sexual relationships to enhance relationship satisfaction (e.g., Fallis et al., 2016), whereas others propose prioritizing the overall relationship to promote sexual well-being (e.g., Vowels & Mark, 2020).

In light of these inconsistencies, the present research suggests the critical importance of considering within-person changes—as opposed to between-person differences—in investigating the link between sexual and relationship satisfaction. The link between sexual and relationship satisfaction is primarily conceptualized as a within-person dynamic (i.e., changes in a person's satisfaction in one domain predicts subsequent changes in the other domain). However, past research has mostly focused on this link at the between-person level (e.g., Quinn-Nilas, 2020) or failed to disaggregate between-person differences and within-person changes (e.g., Yeh et al., 2006), rendering our understanding incomplete. The current study employs a rigorous analytical approach in a repre-

sentative longitudinal sample of couples to provide the first empirical insight into the within-person associations between sexual and relationship satisfaction over time.

## Overview of Past Inconsistencies

### Sexual Satisfaction and Relationship Satisfaction

While prominent theories in relationship research suggest that sexual satisfaction and relationship satisfaction may be causally associated, there are mixed perspectives on the directionality of this link. Several theories, such as interdependence theory (Rusbult et al., 2012) and attachment theory (Hazan & Shaver, 1994), consider sexual gratification to be a form of social reward or a basic need upon which relationship satisfaction is dependent. Conversely, theoretical models such as the interpersonal exchange model of sexual satisfaction (IEMSS; Lawrance & Byers, 1995) propose a reverse causal link by conceptualizing relationship satisfaction as one of the central components that uniquely influence sexual satisfaction.

Based on these conflicting perspectives, several researchers have attempted to empirically tackle this question by investigating temporal associations between sexual and relationship satisfaction over time. However, existing longitudinal evidence is still inconsistent. While some studies found that earlier sexual satisfaction predicted subsequent relationship satisfaction but not the reverse (Fallis et al., 2016; Yeh et al., 2006), others showed that earlier relationship satisfaction predicted subsequent sexual satisfaction but not the other way around (Vowels & Mark, 2020). Meanwhile, some studies also found support for bidirectional associations (McNulty et al., 2016; Quinn-Nilas, 2020; Zhao et al., 2022), whereas others found limited evidence for long-term associations in either direction (Byers, 2005; Sprecher, 2002).

### Gender Differences and Partner Effects

There are also mixed viewpoints and findings regarding the role of gender in the sexual and relationship satisfaction link. In line with the notion that sexual satisfaction might be more important for men than women in shaping their overall relationship perception (e.g., Buss & Schmitt, 1993; Simon & Gagnon, 2003), some studies have shown that sexual satisfaction predicts relationship satisfaction more strongly among men than women (Cao et al., 2019; Fallis et al., 2016). Conversely, other studies failed to find such gender differences (McNulty et al., 2016; Yeh et al., 2006), supporting the notion that the presumed gender asymmetries in the literature might be negligible or out-of-date (e.g., gender similarity hypothesis; Hyde, 2005).

Furthermore, romantic relationships involve dyadic interactions and interdependence between partners, in which a partner's satisfaction may also play a significant role in shaping one's relationship evaluations. Although several studies have emphasized the importance of examining the partner effects between sexual and relationship satisfaction, again, the existing findings are largely inconsistent. While the general pattern is that

the partner effects tend to be weaker than actor effects, some studies failed to find significant partner effects (Cao et al., 2019; Fallis et al., 2016), whereas others found that a partner's relationship satisfaction predicted one's sexual satisfaction both positively (Yucel & Gassanov, 2010) and negatively (McNulty et al., 2016) over time. Given that most studies do not provide a strong explanation for their findings, more concrete evidence is needed to reconcile these inconsistencies.

### Sexual Frequency

Based on the findings that sexual frequency is robustly associated with both sexual and relationship satisfaction (see review by Muise et al., 2016), it would be important to examine the extent to which sexual and relationship satisfaction are associated above and beyond the influence of sexual frequency. However, past research has often overlooked the potential role of sexual frequency in the link between sexual and relationship satisfaction (cf., McNulty et al., 2016) with mixed perspectives on whether sexual frequency serves as a predictor or an outcome of sexual (or relationship) satisfaction. Some studies assume that sexual and relationship satisfaction lead to greater sexual frequency (e.g., DeLamater & Moorman, 2007) as couples might be more (or less) inclined to continue having sex when their sexual or overall relationships become more (or less) satisfying. Conversely, other studies presume that changes in sexual frequency would lead to changes in sexual and relationship satisfaction (e.g., Kim & Jeon, 2013) as more frequent sexual encounters could create opportunities for connection. However, limited research has rigorously investigated the precise temporal sequence of the intertwined associations among these variables.

## The Research Gap and Overview of the Present Study

As a potential explanation for the inconsistent findings in the literature, the present study highlights the importance of distinguishing between-person differences and within-person changes as separate sources of long-term variability in the two constructs. Between-person associations suggest that people who are more sexually satisfied than *others* are more likely to become more satisfied with their relationship than *others*, or vice versa. In contrast, within-person associations imply that when a given person becomes more sexually satisfied than *they* normally are, they will become more satisfied with the relationship than *they* typically would be, or vice versa.

While these two levels of associations are conceptually distinct, past studies on the link between sexual and relationship satisfaction have often failed to disaggregate the within- and between-person sources of variance in the data, blurring the distinction between initial differences across individuals, changes in relative rankings across individuals, and changes that occur within individuals over time. Consequently, their results provide a "mishmash" of the within- and between-person effects into a single estimate that is difficult to interpret (Hamaker et al., 2015; Johnson, Lavner, Mund, et al.,

2022), and may lead to inconsistent findings (e.g., Berry & Willoughby, 2017; Mund & Nestler, 2019). In fact, some recent studies that exclusively focused on between-person associations have provided relatively consistent findings on the temporal associations between sexual and relationship satisfaction (i.e., bidirectional associations; McNulty et al., 2016; Quinn-Nilas, 2020), which demonstrates that appropriately disaggregating the true sources of variance in data can lead to more reliable results. Still, although these findings can be valuable in understanding how individual differences in one construct are associated with corresponding differences in another, they provide limited insights into how changes in these constructs are interrelated *within* a given individual. Given that the link between sexual and relationship satisfaction is often conceptualized as a within-person dynamic to suggest that *improvements* in one domain could lead to subsequent *improvements* in the other for a given individual, a more stringent test of their within-person associations is needed to further clarify the directional nature of this link.

Towards this aim, the current study draws on four annual waves of nationally representative data provided by a sample of 2,104 mixed-gender newlywed couples in the United States to provide the first empirical test of the intraindividual associations between sexual satisfaction and relationship satisfaction over time. Specifically, the current study employs the Latent Curve Model with Structural Residuals (LCM-SR; Curran et al., 2014) as an alternative, more refined statistical approach for capturing within-person associations. Recent studies have shown that this rigorous approach can provide markedly different results from those obtained using conventional methods (e.g., Berry & Willoughby, 2017; Johnson, Lavner, Mund, et al., 2022) to suggest that the associations observed strictly at the within-person level might provide a clearer understanding of the directional association between sexual and relationship satisfaction.

# Method

## Procedures

The data for this study come from the Couple Relationships and Transition Experiences (CREATE) study, a nationally representative study of newlywed couples in the United States (James et al., 2022; Yorgason et al., 2020). Given that couples experience greater variability in their perceptions of the relationship in early marriage (Totenhagen et al., 2016), a newlywed sample provides an optimal setting to study intraindividual fluctuations in sexual and relationship satisfaction over time (McNulty et al., 2016). Partners were surveyed at four annual waves between 2016 and 2020, a design feature that permits the identification of possible nonlinear temporal trends.

At baseline (Wave 1), participants were recruited using a two-stage cluster stratification sample design, with the first stage involving a sample of counties and the second

stage involving a sample of recent marriages within those selected counties. Counties were selected based on a probability proportion to size (PPS) design. The selection was based on county population size, marriage, divorce, poverty rates, and the racial-ethnic distribution of the county. This design yielded a final sampling frame of 11,960 marriages across 239 counties.

Based on the Dillman et al. (2009) survey method, potential participants were first contacted in September 2015 by mailed letters with an invitation to participate and instructions on how to enroll in the study. For those who did not respond to the initial invitation, follow-up postal mailings, email invitations, and phone calls were made. Recruitment for Wave 1 closed in February 2017 with a final sample of 2,181 marriages. Participants were asked to read and then acknowledge consent to participate in the study. For subsequent waves, participants were reinvited to complete the survey approximately one year after they completed the prior wave. After four waves of data, three couples asked to be removed from the study, bringing the sample to 2,178 couples. The Dillman survey method was also used in subsequent waves, with multiple contacts (text message, email, U.S. mail, phone calls) made across time. Participants were compensated with a $50.00 gift card ($100 per couple) upon completing the online survey at the first wave, with increases at each wave. The study was approved by all appropriate Institutional Review Boards and relevant state agencies. The CREATE data are not publicly available due to participants not having given permission for it to be shared publicly. The codebook can be accessed through direct correspondence with the study organizers (Yorgason et al., 2020).

## Participants

The current study used data from 2,104 mixed-gender couples who were sexually active at baseline. Of the total sample of couples who participated in the CREATE study from baseline, 97% were identified as mixed-gender (total $N$ = 2,111) and 3% as same-gender (total $N$ = 67) couples. Given that 3% of the sample limits separate analyses, our analyses only included mixed-gender couples to treat the sample as distinguishable dyads and directly test potential gender differences. Given the current study's focus on couples' sexual satisfaction, seven couples from the remaining sample who indicated that they never had sex with their partner at baseline were also excluded from the analyses.

In terms of demographics, wives were 27.88 years old ($SD$ = 4.97), on average, and husbands were 29.75 years old ($SD$ = 5.64) at baseline. The majority of the couples reported being of European American descent (65.4% women, 65.5% men), with the remaining couples being African American (8.7% women, 11% men), Hispanic (13.1% women, 12.7% men), Asian American (4.7% women, 3.1% men), Native American (0.7% women, 0.7% men), interracial (5.9% women, 5.4% men), and "other" (1.4% women, 1.6% men) descent. In terms of education, 44.2% of women and 35.5% of men had a bachelor's degree or higher. Approximately 22% of couples reported an annual income less than $29,999, 35%

reported an annual income between $30,000–$59,999, 28% reported an annual income between $60,000–$99,999, and 15% reported an annual Income greater than $100,000.

## Measures

Descriptive statistics and correlations among all study variables are available in Table 1. For all multi-item self-report measures included in the study, measurement invariance tests were conducted prior to the main analyses (detailed in the Supplementary Materials). All constructs demonstrated strong measurement invariance across gender and at least partial strong measurement invariance across time. These analyses provide confidence that the study results reflect the true associations between constructs and are not driven by inconsistent measurement (Little, 2013).

### Sexual Satisfaction

Sexual satisfaction was assessed at each wave using four items adapted from the Golombok Rust Inventory of Sexual Satisfaction scale (GRISS; Rust & Golombok, 1985). The four items were "How satisfied are you with the amount of love and affection there is in your sexual relationship with your partner?", "How satisfied are you with the amount of creativity and variety in your sexual relationship with your partner?", "How satisfied are you with how often you currently have sex with your partner?", and "How satisfied are you with the pattern of who initiates sex in your relationship?" Items were measured on a 5-point scale (1 = *very dissatisfied* to 5 = *very satisfied*), and mean scores were computed for each partner (Cronbach's $\alpha$ = .83–.84 for wives and .85–.87 for husbands). This measurement has been validated as an adequate indicator of the same latent construct as the Global Measure of Sexual Satisfaction Scale employed in previous studies (Lawrance & Byers, 1995) (see Supplementary Materials for details).

### Relationship Satisfaction

Relationship satisfaction was assessed at each wave using four items from the Couple Satisfaction Index (CSI-4; Funk & Rogge, 2007). Three items (e.g., "In general, how satisfied are you with your relationship?") were measured on a 6-point scale (0 = *not at all* to 5 = *completely*), and the fourth ("Please select the answer that describes the degree of happiness, all things considered, of your relationship") was measured on a 7-point scale (0 = *extremely unhappy* to 6 = *perfect*). Given that the coding instruction for the CSI-4 recommend using sum scores, we took an average of the four items to create a composite score (Cronbach's $\alpha$ = .94–.95 for wives and .94–.95 for husbands).

**Table 1**

*Correlations Among Sexual Satisfaction, Relationship Satisfaction, and Sexual Frequency*

| Variable | Wave | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Wives SexSat | 1 | — | | | | | | | | | | | | | | | | | | | |
| 2. Wives SexSat | 2 | .58 | — | | | | | | | | | | | | | | | | | | |
| 3. Wives SexSat | 3 | .44 | .54 | — | | | | | | | | | | | | | | | | | |
| 4. Wives SexSat | 4 | .50 | .55 | .60 | — | | | | | | | | | | | | | | | | |
| 5. Husbands SexSat | 1 | .50 | .36 | .29 | .31 | — | | | | | | | | | | | | | | | |
| 6. Husbands SexSat | 2 | .36 | .45 | .33 | .33 | .56 | — | | | | | | | | | | | | | | |
| 7. Husbands SexSat | 3 | .30 | .33 | .48 | .34 | .49 | .62 | — | | | | | | | | | | | | | |
| 8. Husbands SexSat | 4 | .26 | .32 | .37 | .46 | .51 | .57 | .64 | — | | | | | | | | | | | | |
| 9. Wives RelSat | 1 | .55 | .37 | .25 | .29 | .35 | .21 | .18 | .19 | — | | | | | | | | | | | |
| 10. Wives RelSat | 2 | .42 | .56 | .32 | .35 | .28 | .33 | .20 | .23 | .60 | — | | | | | | | | | | |
| 11. Wives RelSat | 3 | .34 | .36 | .52 | .39 | .22 | .25 | .35 | .28 | .46 | .59 | — | | | | | | | | | |
| 12. Wives RelSat | 4 | .37 | .37 | .40 | .53 | .20 | .23 | .25 | .36 | .47 | .56 | .66 | — | | | | | | | | |
| 13. Husbands RelSat | 1 | .39 | .27 | .20 | .24 | .51 | .30 | .26 | .27 | .62 | .44 | .34 | .32 | — | | | | | | | |
| 14. Husbands RelSat | 2 | .31 | .37 | .25 | .28 | .36 | .53 | .33 | .33 | .42 | .59 | .42 | .39 | .56 | — | | | | | | |
| 15. Husbands RelSat | 3 | .28 | .30 | .40 | .31 | .32 | .39 | .56 | .43 | .35 | .43 | .60 | .46 | .48 | .56 | — | | | | | |
| 16. Husbands RelSat | 4 | .27 | .27 | .30 | .40 | .30 | .37 | .40 | .55 | .34 | .42 | .48 | .62 | .44 | .53 | .68 | — | | | | |
| 17. Sexual Frequency | 1 | .57 | .40 | .30 | .31 | .52 | .34 | .27 | .27 | .29 | .23 | .16 | .15 | .28 | .24 | .17 | .17 | — | | | |
| 18. Sexual Frequency | 2 | .38 | .54 | .35 | .36 | .35 | .52 | .32 | .35 | .17 | .30 | .18 | .20 | .19 | .34 | .21 | .21 | .59 | — | | |
| 19. Sexual Frequency | 3 | .29 | .35 | .54 | .36 | .29 | .35 | .52 | .38 | .11 | .13 | .25 | .18 | .12 | .18 | .30 | .20 | .51 | .61 | — | |
| 20. Sexual Frequency | 4 | .29 | .37 | .39 | .54 | .29 | .32 | .35 | .54 | .12 | .18 | .21 | .34 | .15 | .19 | .25 | .34 | .47 | .60 | .63 | — |
| *M* | | 3.74 | 3.47 | 3.48 | 3.47 | 3.70 | 3.41 | 3.36 | 3.30 | 4.24 | 3.93 | 3.90 | 3.89 | 4.25 | 3.97 | 3.90 | 3.96 | 4.17 | 3.77 | 3.68 | 3.56 |
| *SD* | | .89 | .95 | .94 | .92 | .92 | .96 | 1.00 | 1.00 | 1.06 | 1.22 | 1.18 | 1.25 | 1.00 | 1.12 | 1.12 | 1.15 | 1.30 | 1.17 | 1.15 | 1.20 |

*Note.* All correlations are statistically significant ($p < .05$). SexSat = sexual satisfaction; RelSat = relationship satisfaction. Possible ranges were from 1 to 7 for sexual satisfaction, from 0 to 6.25 for relationship satisfaction, and from 1 to 7 for sexual frequency.

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### Sexual Frequency

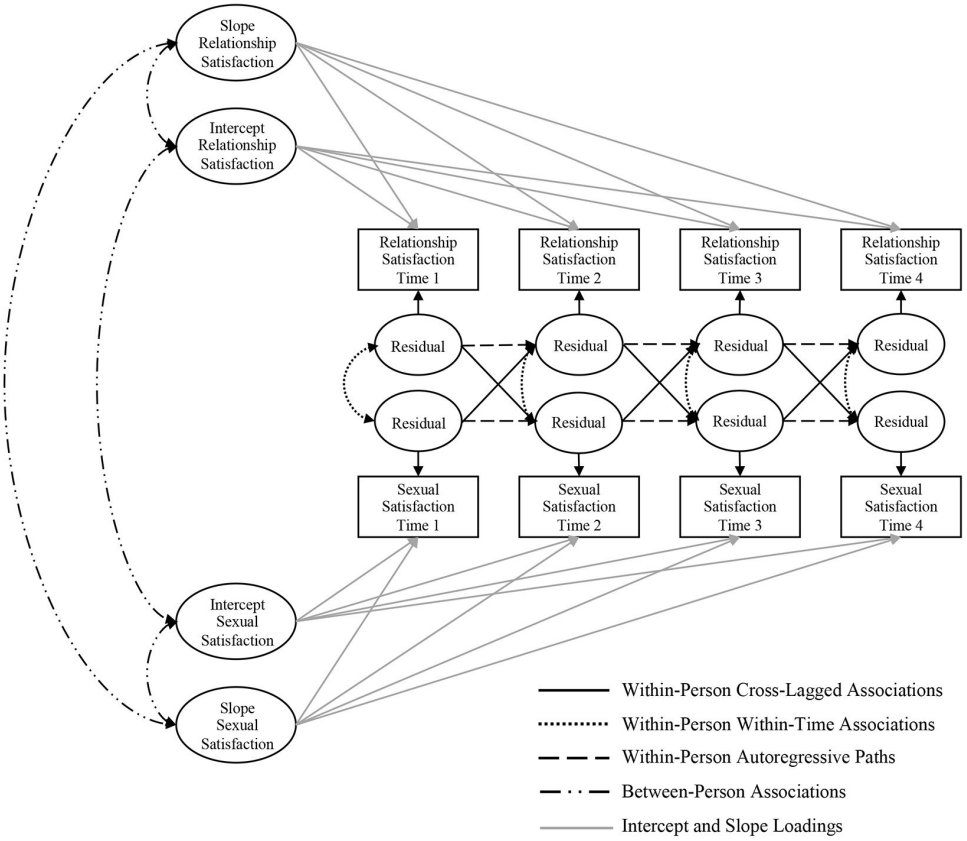
Given that the frequency of couples' sexual activity tends to fluctuate over time and is uniquely associated with both sexual and relationship satisfaction (McNulty et al., 2016), we included sexual frequency as a within-person covariate in the analyses. Reports of sexual frequency were obtained at each wave by asking, "How often do you currently have sex with your partner?" measured on a 7-point scale (1 = *Never*, 2 = *Less than once a month*, 3 = *One to three times a month*, 4 = *About once a week*, 5 = *Two to four times a week*, 6 = *Five to seven times a week*, 7 = *More than once a day*). Given that partnered sex is a dyadic variable, in which—in theory—both partners' reported frequency should be the same (in our sample, *rs* at each timepoint ranged from .70–.79, $p < .001$), responses at each wave were averaged across partners for improved reliability (e.g., Park et al., 2023; Schoenfeld et al., 2017).

## Analysis Plan

The current study employed LCM-SR modeling (Curran et al., 2014) to examine the longitudinal associations of within-person fluctuations in the core constructs (see also Mund & Nestler, 2019 for comparisons between LCM-SR and other conventional methods). Figure 1 depicts a prototype bivariate analytic model that includes sexual satisfaction and relationship satisfaction (note that the bivariate model is presented for demonstrative purposes, and our final model was multivariate, including dyadic reports of sexual satisfaction and relationship satisfaction). The central feature of this approach is that it allows the partitioning of between-person differences and within-person fluctuations as separate sources of variance. Specifically, the latent growth constructs (intercept and slope) capture between-person differences: the intercept term captures between-person differences in the baseline levels, and the slope term captures between-person differences in the average trajectories of individual change. Here, covariances among the intercepts and slopes (dashed-dotted lines in Figure 1) reflect between-person associations: whether individuals who report higher sexual satisfaction than others also report higher relationship satisfaction than others and vice versa, and whether those who experience a greater average decrease (or increase) in sexual satisfaction than others also experience a greater average decrease (or increase) in relationship satisfaction than others, and vice versa.

**Figure 1**

*Prototype Bivariate Latent Curve Model With Structured Residuals (LCM-SR) Depicting the Longitudinal Interrelation of Sexual Satisfaction and Relationship Satisfaction*




*Note.* The solid lines (within-person cross-lagged associations) and dashed lines (within-person within-time associations) are the key paths of interest for the present study. The figure is for demonstrative purposes, and our final model was multivariate, including both partners' reports of sexual satisfaction and relationship satisfaction.

With the between-person variances parsed out, the construct residuals at each time point capture within-person deviations from one's average trajectory. That is, these construct residuals correspond to the degree to which the individuals' scores at each timepoint are higher or lower compared to their own average levels as predicted by the intercept and slope. The within-person associations between sexual and relationship satisfaction are examined through the directional paths and covariances between these construct residuals. First, the autoregressive paths (the dashed lines in Figure 1) describe the

temporal continuity of how one's prior within-person fluctuations predict subsequent fluctuations. Given that the effects of stable individual differences (e.g., personality, income) would be relatively consistent across time on a given construct, these coefficients are expected to account for the potential influences of stable individual differences (Allison, 2009). Second, the within-time covariances (the dotted lines in Figure 1) reflect the concurrent associations among the within-person fluctuation in the two constructs. Last, the cross-lagged paths (the solid lines in Figure 1) test one of the core research questions for this study: whether within-person deviations in sexual satisfaction predict future within-person changes in relationship satisfaction and vice versa.

To compute the LCM-SR, we followed the guidelines recommended by Curran et al. (2014). First, we identified the best-fitting growth curve for each construct: men's sexual satisfaction, women's sexual satisfaction, men's relationship satisfaction, and women's relationship satisfaction. Specifically, we compared different growth models with fixed (vs. random) intercept and slope coefficients and linear (vs. curvilinear) change patterns. Chi-square difference testing was used for all model comparisons. Second, we estimated construct residuals and added auto-regressive paths across time. Once we identified the best-fitting growth curve models for each construct, these models were combined to compute the final LCM-SR model that includes both partners' sexual satisfaction and relationship satisfaction. All associations among the time-specific construct residuals were set to equality across waves. Last, to examine whether the within-person associations between sexual and relationship satisfaction hold above and beyond the influences of within-couple fluctuations in sexual frequency, we included the best-fitting growth curve of couples' sexual frequency in the model (in the same way sexual and relationship satisfaction were modeled) as a robustness check.

When computing the final dyadic LCM-SR model, Heywood cases (non-significant negative slope variance estimates) arose for both partners' sexual satisfaction and couples' sexual frequency. Hence, the model was modified by fixing the sexual satisfaction and sexual frequency slope variances to zero, which allowed the models to converge normally. As a result, no between-person associations were computed for rates of change for sexual satisfaction and sexual frequency. Still, it must be noted that our final LCM-SR model adequately accounts for between-person variances in baseline levels by specifying the intercept across all constructs while also accounting for average trajectories through the specification of slope terms. All plans for analyses were preregistered on the Open Science Framework (see Supplementary Materials). All necessary materials, including items, response options, and analysis code, are also available on the OSF within the preregistration and the output syntax.

### Missing Data

We used full-information maximum likelihood estimation (FIML) to handle missing data. This approach estimates using all available data in the variance/covariance matrix and

ensures maximum retention of the original sample (Enders, 2011). Among the 2,104 couples, 22.4% were lost to attrition and 4.1% ended their relationship across the duration of the study (see Supplementary Materials for details). Hence, to aid with the precise estimation of missing values, we included a variable that indicated whether the couple separated as an auxiliary variable (Graham, 2003).

### Deviation from Preregistration

While all plans for analyses were preregistered on the OSF, our final analyses had a few corrections that deviated from the preregistration. First, given the complexity of the LCM-SR model, our initial plan was to test separate bivariate LCM-SR models for women and men to facilitate model convergence. Specifically, we planned to compute two separate models to test the actor effects of women and men separately and two additional models to test the partner effects of women and men separately. However, it has been noted that running these separate models precludes direct comparisons across gender and cross-construct associations. Hence, we conducted a full dyadic model to simultaneously include both partners' reports as in the Actor-Partner Interdependence Model (Kenny et al., 2006). This allowed us to directly compare the magnitude of different associations and draw a more reliable conclusion about potential gender differences (e.g., whether the associations between sexual satisfaction and relationship satisfaction are stronger among men than women) and the directional associations between constructs (e.g., whether the cross-lagged effects from sexual satisfaction to relationship satisfaction differ from the cross-lagged effects from relationship satisfaction to sexual satisfaction).

Second, to provide a more conservative test of the link between sexual and relationship satisfaction, we initially planned to account for couples' sexual frequency in the model by including couples' reports from each wave as separate observed variables. However, it was later brought to our attention that we need to disaggregate the between- and within-couple variances in sexual frequency (as we did for other focal variables) in order to adequately account for their influence at two different levels. Hence, we corrected our analyses to include sexual frequency in the model the same way sexual and relationship satisfaction were included (by identifying a best-fitting growth curve) to account for the link between sexual frequency and satisfaction variables at the within- and between-person levels. Also, while we initially planned to test equality constraints to evaluate the stability of associations across time, most associations (i.e., 30 out of 35) were shown to be equal across time. Hence, all associations were set to equality across time for the ease of reporting and interpretation, and there were no significant differences in the results based on these constraints. The full results of our original preregistered analyses are available in the Supplementary Materials.

# Results

## Initial Growth Curve Fitting

We fitted a series of growth curve models for both partners' sexual satisfaction, relationship satisfaction, and couples' sexual frequency to identify the best-fitting growth model for each. The latent basis model showed the best fit for husbands' sexual satisfaction and couples' sexual frequency. The fixed quadratic slope model fit the data best for all remaining constructs. Both models capture patterns of nonlinear change over time, and the slope coefficients showed that sexual satisfaction, relationship satisfaction, and sexual frequency all tended to decline at the beginning of the study and became more stable towards the end.

## LCM-SR Models

### Within-Person Concurrent Associations

Table 2 contains the concurrent (i.e., within-time) associations of within-person fluctuations in sexual satisfaction and relationship satisfaction (e.g., the dotted lines in Figure 1). Application of equality constraints demonstrated there were no significant differences across gender for all associations. Overall, the results showed that intraindividual deviations in sexual satisfaction and relationship satisfaction were robustly associated within the same time point for both partners. Partners were more satisfied with their relationship than typical at times when they, $b = .23$, $p < .001$, 95% CI [.216, .251], or their partners, $b = .15$, $p < .001$, 95% CI [.127, .163], were more sexually satisfied than usual (or conversely, both partners were more sexually satisfied than average at times when they or their partners were more satisfied with the relationship than typical). These associations remained consistent when controlling for sexual frequency.

Further, the inclusion of sexual frequency in the model revealed that within-couple fluctuations in sexual frequency were concurrently associated with both sexual satisfaction, $b = .25$, $p < .001$, 95% CI [.234, .272], and relationship satisfaction, $b = .19$, $p < .001$, 95% CI [.167, .214]. That is, couples had more frequent sex than typical at times when either partner reported higher sexual satisfaction or relationship satisfaction, and vice versa.

**Table 2**

*Summary of Within-Person Concurrent Associations Among Sexual Satisfaction, Relationship Satisfaction, and Sexual Frequency*

| Within-person results | *b* | β | *p* | 95% CI |
|---|---|---|---|---|
| **Without Controlling for Sexual Frequency** | | | | |
| Sexual Satisfaction ↔ Relationship Satisfaction | | | | |
| Actor Paths | .23 | .43–.51 | < .001 | [.216, .251] |
| Partner Paths | .15 | .26–.33 | < .001 | [.127, .163] |
| **Controlling for Sexual Frequency** | | | | |
| Sexual Satisfaction ↔ Relationship Satisfaction | | | | |
| Actor Paths | .24 | .42–.51 | < .001 | [.218, .254] |
| Partner Paths | .15 | .27–.33 | < .001 | [.131, .167] |
| Sexual Satisfaction ↔ Sexual Frequency | .25 | .47–.49 | < .001 | [.234, .272] |
| Relationship Satisfaction ↔ Sexual Frequency | .19 | .29–.34 | < .001 | [.167, .214] |

*Note.* Unstandardized estimates (*b*) and standardized estimates (β). The within-person paths were constrained to equality across waves and gender.

## Within-Person Time-Lagged Associations Between Sexual Satisfaction and Relationship Satisfaction

Table 3 contains the results of the longitudinal within-person cross-lagged paths between sexual satisfaction and relationship satisfaction (e.g., the solid lines in Figure 1). Again, no significant differences were observed across gender. The results showed that within-person changes in sexual satisfaction predicted future changes in relationship satisfaction for oneself, $b$ = .08, $p$ = .002, 95% CI [.029, .123], and one's partner, $b$ = .05, $p$ = .045, 95% CI [.001, .095]. This suggests that when either partner was more sexually satisfied than usual, both partners became more satisfied with their relationship than typical in the future. In contrast, within-person changes in relationship satisfaction failed to predict future changes in sexual satisfaction either for oneself, $b$ = .02, $p$ = .225, 95% CI [-.013, .055], or one's partner, $b$ = -.01, $p$ = .580, 95% CI [-.044, .025]. Application of equality constraints demonstrated that the time-lagged effects from sexual satisfaction to relationship satisfaction were significantly different from the reverse effects from relationship satisfaction to sexual satisfaction, $\chi^2_{diff}$ [1] = 4.00, $p$ = .046 for actor effects; $\chi^2_{diff}$ [1] = 4.44, $p$ = .035 for partner effects.

When controlling for sexual frequency (the bottom portion of Table 3), all patterns of results remained consistent except for the partner effects from sexual satisfaction to relationship satisfaction. Specifically, within-person changes in one's sexual satisfaction no longer predicted one's partner's relationship satisfaction, $b$ = .04, $p$ = .143, 95% CI [-.012, .086], when accounting for couples' sexual frequency. This suggests that the actor effects from sexual satisfaction to relationship satisfaction were more robust than the partner effects, and the partner effects were accounted for by couples' sexual frequency.

**Table 3**

*Summary of Within-Person Cross-Lagged Effects for Sexual Satisfaction and Relationship Satisfaction*

| Within-person results | *b* | β | *p* | 95% CI |
|---|---|---|---|---|
| **Without Controlling for Sexual Frequency** | | | | |
| **Sexual Satisfaction $_{W-1}$ → Relationship Satisfaction** | | | | |
| **Actor Paths** | **.08** | **.06–.08** | **.002** | **[.029, .123]** |
| **Partner Paths** | **.05** | **.04–.05** | **.045** | **[.001, .095]** |
| Relationship Satisfaction $_{W-1}$ → Sexual Satisfaction | | | | |
| Actor Paths | .02 | .02–.03 | .225 | [-.013, .055] |
| Partner Paths | -.01 | -.01 | .580 | [-.044, .025] |
| **Controlling for Sexual Frequency** | | | | |
| **Sexual Satisfaction $_{W-1}$ → Relationship Satisfaction** | | | | |
| **Actor Paths** | **.07** | **.05–.07** | **.007** | **[.019, .118]** |
| Partner Paths | .04 | .03–.04 | .143 | [-.012, .086] |
| Relationship Satisfaction $_{W-1}$ → Sexual Satisfaction | | | | |
| Actor Paths | .02 | .02–.03 | .237 | [-.014, .055] |
| Partner Paths | -.01 | -.01 | .583 | [-.044, .025] |

*Note.* Unstandardized estimates (*b*) and standardized estimates (β). The within-person paths were constrained to equality across waves and gender. Significant effects are shown in bold for emphasis. $_{W-1}$ = preceding wave.

## Within-Person Time-Lagged Associations of Sexual Frequency With Sexual Satisfaction and Relationship Satisfaction

Although our primary (preregistered) research question was focused on the link between sexual and relationship satisfaction, the inclusion of sexual frequency in the model also allowed us to test the within-person lagged associations of sexual frequency with sexual satisfaction and relationship satisfaction (Table 4). Again, no significant differences were observed across gender for all associations. Regarding the time-lagged effects between sexual frequency and sexual satisfaction (the top portion of Table 4), the results showed that within-person changes in sexual satisfaction predicted future changes in sexual frequency, $b$ = .05, $p$ = .024, 95% CI [.007, .095], whereas within-couple fluctuations in sexual frequency failed to predict future changes in either partners' sexual satisfaction, $b$ = .02, $p$ = .219, 95% CI [-.014, .063]. However, we did not observe a significant decrease in model fit, $\chi^2_{diff}$ [1] = .81, $p$ = .368, when these two effects were constrained to quality, $b$ = .04, $p$ = .017, 95% CI [.006, .065]. Hence, we did not find strong statistical evidence to support their difference.

In contrast, the results showed non-significant cross-lagged associations between relationship satisfaction and sexual frequency (the bottom portion of Table 4). Within-person changes in either partner's relationship satisfaction failed to predict future changes in couples' sexual frequency, $b$ = .01, $p$ = .630, 95% CI [-.040, .046]. Similarly,

within-couple changes in sexual frequency did not predict future changes in either partner's relationship satisfaction, $b$ = .02, $p$ = .503, 95% CI [-.032, .066].

**Table 4**

*Summary of Within-Person Cross-Lagged Effects for Sexual Frequency With Sexual Satisfaction and Relationship Satisfaction*

| Within-person results | *b* | β | *p* | 95% CI |
|---|---|---|---|---|
| **Sexual Satisfaction $_{W-1}$ → Sexual Frequency** | **.05** | **.04–.05** | **.024** | **[.007, .095]** |
| Sexual Frequency $_{W-1}$ → Sexual Satisfaction | .02 | .02 | .219 | [-.014, .063] |
| Relationship Satisfaction $_{W-1}$ → Sexual Frequency | .01 | .01 | .630 | [-.040, .046] |
| Sexual Frequency $_{W-1}$ → Relationship Satisfaction | .02 | .03 | .503 | [-.032, .066] |

*Note.* Unstandardized estimates (*b*) and standardized estimates (β). The within-person paths were constrained to equality across waves and gender. Significant effects are shown in bold for emphasis. $_{W-1}$ = preceding wave.

## Between-Person Associations

Table 5 contains the between-person associations among the focal variables. As discussed earlier in the analytic strategy, the latent growth constructs (i.e., intercept and slope) in the LCM-SRM model capture between-person differences, and covariances among the intercepts and slopes reflect between-person associations. Overall, consistent with past studies that exclusively focused on between-person associations (e.g., McNulty et al., 2016; Quinn-Nilas, 2020), our results showed robust between-person associations among sexual satisfaction, relationship satisfaction, and sexual frequency.

First, the intercept term captures between-person differences in the baseline levels of each construct. Therefore, the covariances among the intercept terms in our model test the cross-sectional links among sexual satisfaction, relationship satisfaction, and sexual frequency (left column in Table 5). The results showed that people who were more sexually satisfied (or had partners who were more sexually satisfied) than others at baseline were also more satisfied with their relationship at baseline than others. These associations remained consistent when controlling for sexual frequency. Also, the results showed that couples who had more frequent sex than others at baseline also reported higher sexual satisfaction and relationship satisfaction than others at baseline. Overall, these results demonstrate that stable individual differences in sexual satisfaction, relationship satisfaction, and sexual frequency are cross-sectionally associated with each other.

Second, the slope term captures between-person differences in the average trajectories (i.e., rates) of individual change. Hence, the intercept-to-slope associations test whether people vary in the rate of change in one construct as a function of their baseline level of another construct (right column in Table 5). The results showed that those who were more sexually satisfied (or had partners who were more sexually satis-

fied) than others at baseline had less steep declines in relationship satisfaction than others over time. These associations remained consistent when controlling for sexual frequency. Further, the results showed that couples who had higher sexual frequency than others at baseline had less steep declines in relationship satisfaction than others. As aforementioned, due to Heywood cases, no between-person associations were computed for relationship satisfaction intercepts to rates of change for sexual satisfaction and sexual frequency.

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2023, Vol. 4, Article e11869
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**Table 5**

*Summary of Cross-Construct Between-Person Associations Among Sexual Satisfaction, Relationship Satisfaction, and Sexual Frequency*

| | Intercept ↔ Intercept | | | | Intercept ↔ Slope | | | |
|---|---|---|---|---|---|---|---|---|
| **Between-person results** | ***b*** | **β** | ***p*** | **95% CI** | ***b*** | **β** | ***p*** | **95% CI** |
| **Without Controlling for Sexual Frequency** | | | | | | | | |
| Sexual Satisfaction ↔ Relationship Satisfaction | | | | | | | | |
| Actor Paths | .30 | .57–.59 | < .001 | [.264, .339] | .11 | .28 | < .001 | [.078, .148] |
| Partner Paths | .23 | .42–.47 | < .001 | [.193, .268] | .08 | .19–.22 | < .001 | [.047, .116] |
| **Controlling for Sexual Frequency** | | | | | | | | |
| Sexual Satisfaction ↔ Relationship Satisfaction | | | | | | | | |
| Actor Paths | .30 | .57–.59 | < .001 | [.265, .340] | .11 | .28 | < .001 | [.078, .147] |
| Partner Paths | .23 | .42–.48 | < .001 | [.196, .271] | .08 | .19–.22 | < .001 | [.048, .117] |
| Sexual Frequency ↔ Sexual Satisfaction | .34 | .57–.63 | < .001 | [.297, .383] | — | — | — | — |
| Sexual Frequency ↔ Relationship Satisfaction | .18 | .26–.31 | < .001 | [.127, 224] | .09 | .17–.19 | < .001 | [.045, .136] |

*Note.* Unstandardized estimates (*b*) and standardized estimates (β). The intercept term captures between-person differences in the baseline levels, and the slope term captures between-person differences in the average trajectories of individual change. The between-person paths were constrained to equality across gender. Slope variances for sexual satisfaction and frequency were fixed to 0, so no correlations were estimated.

# Discussion

## Summary of Findings

In a large national sample of couples from the U.S., the present study employed a rigorous analytical method to evaluate the within-person associations between sexual and relationship satisfaction during the early years of marriage. The results demonstrated that while within-person fluctuations in sexual and relationship satisfaction often co-occur, improvements in sexual satisfaction can lead to future improvements in relationship satisfaction, rather than the reverse. Further, within-person changes in sexual satisfaction predicted future changes in sexual frequency, whereas relationship satisfaction was not associated with sexual frequency over time. While the magnitudes of these longitudinal effects were smaller than the concurrent associations, the effect sizes observed in this study were comparable to those found in recent studies investigating within-person effects in couples' relationship dynamics (e.g., Johnson, Lavner, Mund, et al., 2022; Johnson, Lavner, Muise, et al., 2022).

## Interpretation and Implications

The current findings have significant theoretical and practical implications. First, our longitudinal results suggest that sexual satisfaction has a more enduring impact on relationship satisfaction than vice versa. Couples' overall perception of their relationship quality often hinges on the extent to which their relationship needs are fulfilled. Since a satisfying sexual relationship can fulfill various relationship needs, such as intimacy and closeness (Muise et al., 2016), our findings support the notion that sexual satisfaction contributes to a happier relationship over time (Hazan & Shaver, 1994; Rusbult et al., 2012). However, our findings suggest that an increase in overall relationship satisfaction does not guarantee subsequent improvement in sexual satisfaction over time. While sexual satisfaction also relies on the fulfillment of sexual needs, these needs often involve factors that are more specific to the unique dynamics within the sexual realm, such as sexual preferences and sexual compatibility (e.g., Mark et al., 2013), rather than the broader context of the relationship. Hence, enhancing couples' sexual satisfaction may require a more focused understanding of these specific sexual needs beyond the general dynamics of the relationship. While the current findings can inform practitioners and couples seeking to enhance their intimate relationships, future research is needed to expand our understanding of the unique roles of sexual relationships in promoting overall satisfaction in intimate relationships.

Second, our results show little support for gender differences or partner effects in the link between sexual and relationship satisfaction. The absence of significant gender differences mirrors past findings (McNulty et al., 2016; Yeh et al., 2006) that are consistent with the gender similarity hypothesis (Hyde, 2005) to suggest that the domain of sexuality might be equally important for the relationship perceptions of women and

men. Hence, the present study highlights the need to reconsider heterosexual scripts that prioritize men's sexual pleasure over women's (e.g., sexual double standards; Endendijk et al., 2020), and acknowledge the importance of sexual needs among both women and men. Moreover, our results showed that the partner effects of sexual satisfaction on future relationship satisfaction largely disappeared when accounting for sexual frequency. These results are consistent with the notion that partner effects tend to be weaker than actor effects (e.g., Fallis et al., 2016) and suggest that perceptions of one's own sexual satisfaction might prevail over one's partner's sexual satisfaction in contributing to one's relationship satisfaction.

Last, our results showed that changes in sexual satisfaction predicted future changes in the frequency of sexual encounters, whereas the mere increase in sexual frequency did not predict greater sexual satisfaction for either partner over time. Hence, these results suggest that merely engaging in more frequent sex may not necessarily make it more enjoyable; rather, focusing on having more positive sexual encounters may foster increased engagement. However, these results should be interpreted with caution as the current results did not find strong statistical evidence for significant differences in the magnitude of these effects. Meanwhile, in line with some previous findings (e.g., McNulty et al., 2016; Schoenfeld et al., 2017), our results provide little evidence of direct associations between couples' relationship satisfaction and sexual frequency when accounting for sexual satisfaction. These findings suggest that sexual satisfaction might be more important than the mere frequency of sex for a happier relationship overall.

## Limitations and Future Directions

Study limitations and future directions must also be acknowledged. First, while we examined the link between sexual and relationship satisfaction at yearly intervals, past longitudinal studies have used different time lags, spanning from two months (e.g., Vowels & Mark, 2020) to 8–10 years (e.g., Quinn-Nilas, 2020). Although the optimal time lags for studying relationship development remain underexamined (Karney & Bradbury, 2020), it could be possible that the link is more bidirectional in shorter time frames (Zhao et al., 2022), but one direction of effect lasts longer than the other over time. Future research using different time lags could be informative in delineating the extent to which the temporal effects of sexual and relationship satisfaction could vary over different time intervals. Second, while the present study employed a sample of newlywed, mixed-gender couples, future research may benefit by testing whether the findings generalize to couples in the earlier (or much later) stages of their relationship, as well as in a wider array of relationship types (e.g., consensually non-monogamous), or same-gender couples.

## Conclusion

Notwithstanding these limitations, this study provides one of the most rigorous tests to date about the directional link between sexual and relationship satisfaction. Given the challenges associated with employing experimental methods in studying sexuality (e.g., Loewenstein et al., 2015), the current analyses of within-person associations reflect one of the strongest approaches for drawing causal inferences from correlational data. Overall, our findings suggest that (1) a satisfying sex life leads to a happier relationship rather than the reverse, (2) simply having more sex may not lead to greater satisfaction, but rather, greater sexual enjoyment leads to more frequent sex, (3) an enjoyable sex life can be more important than the mere frequency of sex for a happier relationship, and lastly, (4) there are no gender differences in these associations. By demonstrating that within-person changes in sexual satisfaction predict future changes in relationship satisfaction (and sexual frequency), the current findings highlight the importance of focusing on the quality of a couple's sexual connection in promoting their overall relationship.

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**Author Contributions:** *Haeyoung Gideon Park*—Idea, conceptualization | Design planning | Visualization (data presentation, figures, etc.) | Data analysis | Writing | Feedback, revisions | Project coordination, administration. *Nathan D. Leonhardt*—Idea, conceptualization | Design planning | Visualization (data presentation, figures, etc.) | Data analysis | Validation, reproduction, checking | Feedback, revisions. *Matthew D. Johnson*—Idea, conceptualization | Design planning | Data analysis | Validation, reproduction, checking | Writing | Feedback, revisions | Supervision, mentoring. *Amy Muise*—Idea, conceptualization | Design planning | Writing | Feedback, revisions | Supervision, mentoring. *Dean M. Busby*—Idea, conceptualization | Resource provision (materials, participants, etc.) | Research implementation (software, hardware, etc.) | Data collection | Data management (storage, curation, processing, etc.) | Feedback, revisions | Funding to conduct the work. *Veronica R. Hanna-Walker*—Idea, conceptualization | Resource provision (materials, participants, etc.) | Research implementation (software, hardware, etc.) | Data collection | Data management (storage, curation, processing, etc.) | Funding to conduct the work. *Jeremy B. Yorgason*—Idea, conceptualization | Resource provision (materials, participants, etc.) | Research implementation (software, hardware, etc.) | Data collection | Data management (storage, curation, processing, etc.) | Feedback, revisions | Project coordination, administration | Funding to conduct the work. *Erin K. Holmes*—Idea, conceptualization | Resource provision (materials, participants, etc.) | Research implementation (software, hardware, etc.) | Data collection | Data management (storage, curation, processing, etc.) | Funding to conduct the work. *Emily A. Impett*—Idea, conceptualization | Design planning | Writing | Feedback, revisions | Supervision, mentoring | Project coordination, administration.

**Ethics Statement:** The study was approved by the Institutional Review Boards of Brigham Young University and the University of Toronto.

**Data Availability:** The CREATE data are not publicly available due to participants not having given permission for it to be shared publicly. The data can be accessed through direct correspondence with the study organizers (Yorgason et al., 2020).

## Supplementary Materials

For this article, the following supplementary materials are available:

- Pre-registration (see Park & Impett, 2021)
- Pre-registration update (see Park & Impett, 2022)
- Mplus syntax and output for the final analysis, preregistration documents that include all measurement items, syntax, output, and description of results for supplementary analyses (see Park, 2021)

- Supplemental document that includes more details on measurement invariance testing, sexual satisfaction measurement validation, missing data, and preregistered-analyses results (see Park et al., 2023)

### Index of Supplementary Materials

Park, H. G. (2021). *Within-couple association between relationship and sexual satisfaction over time* [Mplus syntax and output, preregistration documents, supplementary analyses]. OSF. https://osf.io/eb4hz

Park, H. G., & Impett, E. (2021). *Within-couple association between relationship and sexual satisfaction over time* [Pre-registration]. OSF Registries. https://doi.org/10.17605/osf.io/jbrq4

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