Partner Knowledge of Solitary Pornography Use: Daily and Longitudinal Associations with Relationship Quality

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Abstract

Pornography use is a common sexual activity engaged in mostly alone, including for partnered individuals. Evidence concerning the benefits and costs of solitary pornography use for romantic relationship quality is mixed and may vary depending on the circumstances of pornography use, including partner knowledge of one's solitary use. Adopting a dyadic daily diary and longitudinal design, we examined the associations between knowledge of a partner's solitary pornography use and one's own and the partner's relationship satisfaction and intimacy on the same day, and trajectories over one year. A convenience sample of 217 couples completed daily surveys over 35 days and self-reported measures three times over one year. Each participant reported if they used pornography today and whether their use was known by their partner. Findings showed that when an individual's solitary pornography use was unknown by their partner, they reported lower same-day relationship satisfaction and intimacy as well as a lower initial level of relationship satisfaction. When an individual's solitary pornography use was known, they reported higher intimacy over one year and their partner reported lower intimacy over one year. Findings underscore the complexity of the relational context surrounding solitary pornography use in couples, in particular the partner's knowledge of pornography use.

Keywords: known pornography use; unknown pornography use; romantic relationships; relationship satisfaction; intimacy; dyadic daily diary; longitudinal design.

Pornography, including all sexually explicit material used for sexual gratification, is readily accessible online and frequently viewed (Regnerus et al., 2016). Pornography use is not only common among single people, it is also a normative sexual activity for individuals involved in a romantic relationship. Indeed, many partnered individuals use pornography (71 to 97% of men, 34 to 67% of women) or are in a relationship with someone who uses pornography (Carroll et al., 2017; Willoughby & Leonhardt, 2020). Moreover, most of this use occurs alone (i.e., without the partner, solitary pornography use) as 80% of men and 68% of women reported that more than 50% of their pornography use was without their partner (Willoughby & Leonhardt, 2020). A burgeoning, mostly cross-sectional, intra-individual literature has focused on the association between pornography use and relationship quality (Vaillancourt-Morel et al., 2019; Wright et al., 2017), with many media outlets and scholars claiming that it has negative implications for romantic relationships (Manning, 2006; Montgomery-Graham et al., 2015).

Yet, scientific evidence concerning the benefits and costs of solitary pornography use for romantic relationship quality is still mixed (Campbell & Kohut, 2017; Vaillancourt-Morel et al., 2019). This discrepancy in findings has led to the development of conceptual frameworks that emphasize the need to take into account the relational context of pornography use (Campbell & Kohut, 2017; Willoughby et al., 2020). In their recent theoretical model, Willoughby et al. (2020) stressed the need to consider how elements of couple processes may influence or alter how pornography is used and affects intimate relationships, including how a couple negotiates, communicates, and uses pornography individually and jointly within their relationship. Based on Willoughby et al.'s (2020) organizing framework, the potential effects of pornography use on relationship quality may differ depending on the circumstances of the pornography use, including an open dialogue between partners versus secrecy surrounding pornography. Yet,

knowledge of a partner's pornography use – whether they communicate about their solitary pornography use or not – has received little scientific attention even if it may help couples determine the best approach to pornography use, in a way that promotes, rather than hinders, their romantic relationship.

However, the only two cross-sectional studies assessing this contextual variable relied on vague, retrospective, global assessments of partner knowledge of pornography use (i.e., not asking the user directly if their pornography use was known by their partner), examined only intra-individual associations, and yielded contradictory findings (Resch & Alderson, 2014; Willoughby & Leonhardt, 2020). As partner knowledge may vary from one pornography use occasion to another, daily diaries, considered the gold standard for the assessments of sexual behavior (Graham et al., 2003), may produce a more accurate and detailed examination of the effects of partner knowledge on relationship quality, whereby the user directly reports if their partner knew of their solitary pornography use today. Moreover, even if relationship quality typically declines over the course of a relationship (McNulty et al., 2016), whether partner knowledge of pornography use is related to the rate of change in relationship quality over time remains unknown. Stronger study designs can lead to enhanced knowledge concerning the optimal and detrimental relational contexts surrounding solitary pornography use, including partner knowledge. The present study examined the associations between partner knowledge of solitary pornography use, relationship satisfaction, and intimacy using both dyadic daily diary and longitudinal data.

Pornography Use and Relationship Quality

Several studies have examined whether pornography use is related to various aspects of relationship quality. Relationship quality involves a range of positive feelings, including

satisfaction, intimacy, nurturance, understanding, validation, and care (Farooqi, 2014). Thus, among others, relationship quality encompasses relationship satisfaction, the subjective evaluation of one's relationship (Keizer, 2014), and intimacy, a dynamic process in which self-disclosure and partner responsiveness lead to greater closeness between partners (Laurenceau et al., 1998; Reis & Shaver, 1988). Relationship satisfaction and intimacy are key components of the quality and stability of romantic relationships (Impett et al., 2001; Joel et al., 2020). Most cross-sectional studies indicate that pornography use is associated with lower relationship and sexual satisfaction (Bridges & Morokoff, 2011; Yucel & Gassanov, 2010), lower intimacy (Jafarzadeh Fadaki & Amani, 2015), more negative relationship communication (Maddox et al., 2011), lower couple commitment (Lambert et al., 2012), higher probability of extradyadic sexual behaviors (Doran & Price, 2014), and a higher probability of divorce (Perry & Schleifer, 2018). However, qualitative studies showed that most individuals perceived no negative impacts of pornography use on their romantic relationship and some even reported positive effects including improved sexual communication, increased intimacy, better mood, and enhanced sexual comfort (Kohut et al., 2017; Shuler et al., 2021).

The media and some clinicians/researchers contend that pornography use may lead to changes in attitudes about emotional intimacy, disenchantment and distance between partners, and dissatisfaction with partner appearance and the romantic relationship in general – all of which suggest that pornography use would be related to lower relationship satisfaction and lower intimacy (Montgomery-Graham et al., 2015; Wright, 2011). However, cross-sectional and longitudinal non-dyadic studies focusing specifically on the associations between pornography use and the user's own relationship satisfaction and intimacy report contradictory findings. In a cross-sectional study among 2,284 coupled Croatian adults, pornography use was unrelated to

relationship satisfaction and emotional intimacy (Veit et al., 2016). Drawing on data from 30 nationally-representative cross-sectional surveys, pornography use was either unrelated to relationship satisfaction or weakly related to lower relationship satisfaction for men and women (Perry, 2020). Among a national sample of 3,750 individuals in committed relationships, high use of pornography (i.e., around 3 to 5 days a week or more) was related to higher relationship satisfaction (Willoughby et al., 2021). A meta-analysis combining fifty studies collectively, including more than 50,000 participants showed that men's pornography use was related to lower relationship satisfaction in cross-sectional surveys, longitudinal surveys, and experimental studies, whereas women's pornography use was unrelated to relationship satisfaction (Wright et al., 2017). Among a sample of 1,234 heterosexual unmarried participants who completed five time points over 20 months, an increase in using pornography alone over time was related to lower relationship satisfaction and emotional intimacy for men, but higher relationship satisfaction and emotional intimacy for women (Huntington et al., 2021). Using nationally representative longitudinal data, men's higher frequency of pornography use in 2006 was related to their lower relationship satisfaction six years later. For women's pornography use, this association was not significant (Perry, 2017).

These findings all pertain to how a person's pornography use may affect their own relationship satisfaction and intimacy. Studies assessing how women are affected by their male partner's pornography use also reported that men's perceived pornography use was related to their female partner's lower relationship satisfaction and intimacy (Adamson et al., 2021; Wright & Tokunaga, 2017). However, these negative partner associations were not systematically supported in the handful of studies using dyadic designs (i.e., including both members of the couple). Indeed, a three-year longitudinal study reported that pornography use was unrelated to a

partner's relationship satisfaction regardless of gender (Muusses et al., 2015). In other dyadic cross-sectional studies, men's pornography use was related to their female partner's lower relationship satisfaction (Poulsen et al., 2013; Willoughby & Leonhardt, 2020), whereas women's pornography use was related to their male partner's higher relationship satisfaction (Bridges & Morokoff, 2011; Poulsen et al., 2013).

Thus, despite an apparent trend in which women's pornography use is associated with more positive relational outcomes than men's use, these mixed findings, even in dyadic and longitudinal studies, may suggest that the associations between pornography use and relationship quality are complex and involve multiple factors, including the context of use. Recent theoretical propositions organizing the study of pornography within romantic relationships have suggested that couple process may explain how pornography is used and how pornography may affect romantic relationships (Campbell & Kohut, 2017; Leonhardt et al., 2019; Willoughby et al., 2020). The knowledge of partner solitary pornography use has been noted as a particularly important omission in the current scholarship (Campbell & Kohut, 2017). Further nuanced exploration of this association is important to understand what contextual factors may lead to either positive, negative, or nonsignificant associations between pornography use and couples' relationship quality.

Partner Knowledge of an Individual's Pornography Use

Pornography may be used in secret, or at least not openly discussed, either because the user fears their partner's response, is ashamed or embarrassed, or simply because sexuality is not spoken about in the relationship (Droubay et al., 2021; Kohut et al., 2017). A few studies have shown that when partners, particularly women, discover their partner's solitary pornography use, they feel anger, shame, resentment, and betrayal, which may affect intimacy between partners as

it could lead to suspiciousness, disconnection between partners and poorer couple satisfaction (Bergner & Bridges, 2002; Kohut et al., 2017; Zitzman & Butler, 2009). Thus, it would not be the actual pornography use but the secrecy surrounding it, and sometimes even the lies or perception of deceit, that would cause potential harm to the relationship (Manning, 2006). This hypothesis is in line with Reis & Shaver's (1988) Interpersonal process model of intimacy in which self-disclosure and partner disclosure contribute to feelings of intimacy on a daily basis. Indeed, using pornography without a partner's knowledge suggests low self-disclosure and it may give the impression that the user is emotionally withdrawn, which is thought to lead to lower emotional intimacy and relationship satisfaction (Bergner & Bridges, 2002; Manning, 2006). Solitary pornography use that is known by the partner, which would implicitly suggest a degree of self-disclosure, honesty and openness in the relationship, may facilitate more confidence and trust, which would enrich intimacy between partners and lead to higher relationship satisfaction (Kohut et al., 2017).

Sexual communication between partners in general, not specifically related to pornography use, is associated with positive relationship indicators (Jones et al., 2018). However, to our knowledge, only two studies specifically examined disclosure, honesty, knowledge, or communication about pornography use. In a cross-sectional survey among 340 heterosexual women, Resch and Alderson (2014) examined honesty around pornography use by asking women if their male partner was honest with them about their pornography use. Surprisingly, 84% of women reported that their male partners were honest about their pornography use. Women who thought that their partners were honest regarding their pornography use reported higher relationship satisfaction than women who reported that their partners were more deceitful (Resch & Alderson, 2014). In another cross-sectional survey among

a sample of 240 heterosexual couples, Willoughby and Leonhardt (2020) examined partner knowledge of pornography use by a difference score between the perceived use of the partner and their actual self-reported use in the past 12 months, which was then dichotomized into *some use was unknown* vs. *all use was known*. Pornography use was unknown for 43% of men and 40% of women. The associations between known and unknown pornography use and relationship outcomes were mostly nonsignificant, although known pornography use was related to the user's lower relationship satisfaction, whereas unknown use was unrelated to relationship satisfaction (Willoughby & Leonhardt, 2020).

One major limitation that could explain the contradictory findings is the retrospective global assessment of knowledge of pornography use. Knowledge of pornography use is likely not a dichotomous construct: sometimes pornography use may be known by the partner, and other times not. Thus, partner knowledge may vary from day to day. Dyadic daily diary methods provide a more precise and fine-grained assessment, which allows us to compare, within an individual, days on which pornography was used without the partner's knowledge and days on which the partner had such knowledge. Moreover, no past study asked the user if their partner knew of their pornography use, even though the user is the one who is more aware of their own pornography use and the potential secrecy surrounding it. These studies also relied solely on cross-sectional data despite documented changes over time in relationship quality (McNulty et al., 2016). Thus, whether partner knowledge of solitary pornography use is related to same day and trajectories over time of relationship satisfaction and intimacy remains unexamined. Finally, as known pornography use may be confounded with dyadic pornography use (i.e., using with the partner), which should always be known by the partner and is generally associated with more

positive relational outcomes (Huntington et al., 2021; Kohut et al., 2018), it is necessary to examine uniquely the potential role of solitary pornography use.

Current Study

Adopting a dyadic daily diary and longitudinal design, the present study examined whether an individual's known and unknown solitary pornography use were associated with their own and their partner's relationship satisfaction and intimacy on the same day and their trajectories over one year. We hypothesized that on days when individuals reported solitary pornography use that was unknown by their partner, they and their partners would report lower relationship satisfaction and intimacy, whereas on days when individuals reported solitary pornography use that was known by their partner, they and their partners would report greater relationship satisfaction and intimacy. We further hypothesized that individuals' higher frequency of unknown solitary pornography use during the 35-day diaries would be related to lower initial levels and sharper decreases in their own and their partner's relationship satisfaction and intimacy over one year, whereas higher frequency of known solitary pornography use would be related to higher initial levels and increases over time in their own and their partner's relationship satisfaction and intimacy. We also examined gender as a potential moderator in an exploratory manner.

Method

Participants

A convenience sample of 217 couples was recruited between March 2017 and June 2018 through online advertisements, email lists, and flyers distributed in various public locations in two large metropolitan Canadian cities. To ensure sufficient diversity in the sample, part of the study's recruitment targeted the LGBTQ+ community (e.g., posting on LGBTQ+ Facebook

groups). To be eligible, 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 not eligible if one partner was pregnant or breastfeeding or was unable to understand either French or English. Couples were also ineligible if one partner reported that a severe mental/physical illness was interfering with their sexuality or that they took prescribed medications regularly that were affecting their sexuality (i.e., no specific mental/physical illness or medication was excluded; to be excluded, participants had to report that it was affecting their sexual function). Of the 519 couples who contacted the research team about this study, 254 (48.9%) could not be reached after initial contact (n = 135), were not interested after hearing more about the study (n = 75), or were not eligible (n = 44), 30 (5.8%) dropped out during the background survey, five (1.0%) failed two out of three attention-testing questions in the baseline survey, one (0.2%) asked to remove their data from the study, 11 (2.1%) dropped out before starting the daily diaries or during the first two days, and one (0.2%) was excluded because of an error in data collection; resulting in a final sample of 217 couples (434 participants).

This sample included 228 cis and trans women (52.5%), 182 cis and trans men (41.9%), and 24 nonbinary, queer, or gender fluid individuals (5.5%). These individuals formed 133 woman-man couples (61.3%) and 84 couples were sexually or sex/gender diverse (38.7%). Participants ranged in age from 18 to 70 years (M = 30.39, SD = 8.47). Most of them described their cultural identity as Canadian (74.9%; n = 325), followed by American (11.1%; n = 48), European (5.0%; n = 22), and a range of other cultural identities (9.0%; n = 39; First Nations, African, Asian, Middle Eastern, Latin American, or Caribbean). On average, participants reported 16.71 years of education (SD = 2.84), which corresponds to a college undergraduate degree. Most participants reported an average annual personal income of less than $40,000 CAD

(61.0%; *n* = 265); $40,000 to $69,999 CAD (27.9%; *n* = 121); and more than $70,000 CAD (11.1%; *n* = 48). About half of participants defined their sexual orientation as heterosexual (56.0%; *n* = 243), with 11.1% (*n* = 48) identifying as bisexual, 18.0% (*n* = 78) gay/lesbian, 8.8% (*n* = 38) queer, 3.9% (*n* = 17) pansexual, and 2.3% (*n* = 10) "other" (i.e., homoromantic demisexual, mostly straight, homoflexible, irrelevant, and dyke). Couples had been in their current relationship from 1 to 37.83 years (*M* = 5.90, *SD* = 5.05). Most couples were living together without being married (71.9%; *n* = 156) and 28.1% were married (*n* = 61). A total of 78.8% (*n* = 171) of couples had no children, with others reporting between one and five children (*M* = 0.45, *SD* = 1.01).

For the longitudinal analyses, 18 couples out of the 217 had separated and were excluded as their missing data could not be handled using the missing-at-random assumption, resulting in a sample size of 199 couples (398 participants). Couples who separated were significantly younger (*M* = 26.64 years, *SD* = 6.84) than intact couples (*M* = 30.3 years, *SD* = 8.53), $t(432) = 2.80$, $p = .005$, but there were no significant differences on other sociodemographic variables.

Procedure

Data were collected as part of a larger daily diary and longitudinal study among couples. All procedures were approved by Université de Montréal and Dalhousie University's Institutional Review Boards. Recruitment advertisements informed potential participants about the broader research's objective, an online study on how sex and intimacy contribute to the well-being of couples. Other published papers involving only the daily diaries examined the associations between pornography use and couple or sexual outcomes without considering partner knowledge (Vaillancourt-Morel et al., 2021; Vaillancourt-Morel et al., 2020). Another

published paper using both the daily and longitudinal datasets examined the associations between sexual desire discrepancy and sexual distress (Jodouin et al., 2021).

Interested participants were contacted by a research assistant for a brief telephone interview. Then, 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 distributed within the Time 1 survey, and participants failing two out of three of these were excluded from the study and their data were deleted. When both partners had completed the Time 1 survey, they were contacted by a research assistant to explain the procedure of the daily diaries and set a start date. Each partner accessed a unique hyperlink received via email each evening to complete a brief survey for 35 consecutive days. Six and twelve months after the completion of the Time 1 survey, couples were contacted by email to complete the follow-up surveys. Each partner received a $10 CAD gift card after completing the baseline, 6-month, and 12-month follow-up surveys. For the daily diaries, compensation was prorated based on how many diaries participants completed, with a maximum of $50 CAD each in gift cards for completing at least 85% of their diaries (30 entries out of 35). For the daily diaries, the 434 participants individually completed a total of 13,134 diaries out of 15,190 (434 partners, 35 days) with a completion rate of 86.5% (M = 30.26 diaries out of 35). For the longitudinal follow-ups, out of the 398 participants that were still together, 377 participated in Time 2 (94.7%) and 367 participated in Time 3 (92.2%).

Daily Measures

Pornography Use. Pornography use was defined to participants as "intentionally looking at or listening to (1) pictures or videos of nude individuals, (2) pictures or videos in which people are engaging in sexual activities, or (3) written or audio material that describes people engaging

in sexual activities" (Kohut et al., 2017). One item was used to assess pornography use: "Did you use pornography in the last 24 hours?". If pornography use was reported that day, one item assessed partner knowledge of this use: "Does your partner know you used pornography?" and one item assessed whether they used pornography with their partner: "Did you use pornography with your partner?". We recoded these items as 0 = no solitary pornography use, 1 = known solitary pornography use, and 2 = unknown solitary pornography use, which was used as two dummy coded variables entered simultaneously in all analyses (i.e., known solitary pornography use: 0 = *no* solitary *pornography use* and 1 = *known* solitary *pornography use*; unknown pornography solitary use: 0 = *no* solitary *pornography use* and 1 = *unknown* solitary *pornography use*). Thus, days that included pornography use with one's partner were coded as *no solitary pornography use* (n = 74 days).

Intimacy. Relationship intimacy over the past 24 hours was measured each day using the diary measure of Laurenceau et al. (1998), which is based on Reis and Shaver's (1988) model of intimacy. This eight-item scale asks both partners to rate today in the relationship the degree to which they disclosed (1) thoughts and (2) feelings to their partner; perceived that their partner disclosed (3) thoughts and (4) feelings; and felt (5) understood, (6) validated, (7) accepted, and (8) cared for by their partner. Items were rated on a seven-point Likert scale (1 = *not at all*, 7 = *a lot*) and were summed to provide a daily total score ranging from 8 to 56, with higher scores indicating greater intimacy on a given day. This scale achieved good internal consistency (Cronbach's α = .91 and .92; Bois et al., 2013) and good construct validity, predicting intimacy across a range of social relationships (Laurenceau et al., 1998; 2005). In the present study, Cronbach's α was .93 and reliability of within-person change was .65.

Relationship Satisfaction. The Kansas Marital Satisfaction Scale (Schumm et al., 1983), was used to assess relationship satisfaction over the past 24 hours. This three-item scale included: "how satisfied are you with your relationship with your partner today?", "how satisfied are you with your partner today?", and "how satisfied are you with your overall couple relationship today?". These questions are appropriate for persons from all genders and sexual orientations and were previously adapted to be inclusive of couples with varying relationship statuses. Items were rated on a seven-point Likert scale (1 = *extremely dissatisfied*, 7 = *extremely satisfied*), which were summed to provide a daily total score ranging from 3 to 21, with higher scores indicating greater relationship satisfaction. This scale achieved good internal consistency and good concurrent and discriminant validity (Schumm et al., 1983; Schumm et al., 1986). In the present study, Cronbach's α was .97 and reliability of within-person change was .94.

Longitudinal Measures

Sociodemographic Characteristics. At Time 1, items regarding participants' sociodemographic characteristics were used to gather information about sex, gender, age, cultural identity, number of years of schooling, personal annual income, sexual orientation, relationship status, relationship duration, and number of children. Participants self-reported their gender using a single item with multiple response choices: man, woman, trans-identify as man, trans-identify as woman, agender, and other (specify if you wish). For gender, we created three groups: cis and trans men, cis and trans women, and non-binary individuals (i.e., agender and all other categories reported). In the analysis, we used two dummy coded variables with men being the reference category (i.e., variable one: 0 = "*not being a woman*", 1 = "*being a woman*"; variable two: 0 = "*not being a non-binary individual*", 1 = "*being a non-binary individual*").

Intimacy. At Time 1, 2, and 3, the same eight items as in the daily measures were used to assessed relationship intimacy in general in the relationship (Bois et al., 2013; Laurenceau et al., 1998). In the present study, Cronbach's α was .90 at Time 1 and Time 2, and .93 at Time 3.

Relationship Satisfaction. At Time 1, 2, and 3, the Couple Satisfaction Index (CSI; Funk & Rogge, 2007) was used to assess one's subjective global evaluation of one's relationship. One global item used a seven-point scale, whereas the other 31 items used a variety of six-point scales. All items were summed to obtain a total score ranging from 0 to 161, with higher scores indicating greater relationship satisfaction. The CSI demonstrated good internal consistency (Cronbach's α = .84 to .98; Graham et al., 2011). In the present study, Cronbach's α was .98 at all time points.

Statistical Analyses

Descriptive statistics and Cronbach alphas were calculated in SPSS 25.0 and all other analyses were conducted in M*plus* 8.3 (Muthén & Muthén, 2017). All models were estimated using the robust maximum likelihood method (MLR). Using Little's test for MCAR, no discernible pattern of missing data was found in the daily, $\chi^2(5) = 8.139$, $p = .149$, and the longitudinal data, $\chi^2(19) = 23.167$ $p = .230$. Thus, score-level missing data (ranging from 0% to < 0.1% in the daily diary sample and from 0% to 7.8% in the longitudinal sample) were handled using full information maximum likelihood (FIML). First, to compare an individual's frequency of known and unknown solitary pornography use during the 35 days of the daily diaries between genders, we conducted two-level regressions in the multilevel modeling framework (partners nested within the couple), using gender as predictors of the aggregated measures of known and unknown solitary pornography use frequency.

Second, to examine the daily associations between partners' known and unknown solitary pornography use and same day relationship satisfaction and intimacy, we followed prior recommendations for daily dyadic data (Laurenceau & Bolger, 2012) and used two-level multilevel models with daily reports (Level 1) being nested within couples (Level 2). Both partners' scores were modeled simultaneously as multivariate outcomes and residuals were allowed to correlate between partners. In line with the actor-partner partner interdependence model (Kenny et al., 2006), we examined actor effects (e.g., associations between one's own known solitary pornography use and own intimacy), controlling for partner effects (e.g., associations between one's own known solitary pornography use and their partner's intimacy); and partner effects, controlling for actor effects. As the sample included both mixed-gender and sexually or sex/gender diverse couples (i.e., gender or sex could not distinguish all dyads), dyads were considered indistinguishable. We randomly assigned each partner to "partner 1" and "partner 2" and added equality constraints on all parameters between partners (i.e., variance, means, intercepts, actor effects, and partner effects). In the daily models, we controlled for linear time over the 35 days, and the between-person effects by including the sum of days a person reported known and unknown solitary pornography use over the diary period as level-2 predictors of relationship satisfaction and intimacy. This approach allowed the effects of daily known and unknown solitary pornography use to be interpreted as pure within-person effects rather than as the association with known/unknown solitary pornography use frequency. As level-1 predictors (i.e., known solitary pornography use, unknown solitary pornography use) were dummy coded binary variables, the reported unstandardized coefficients represent the change in relationship satisfaction and intimacy when using known or unknown solitary pornography compared to days without solitary pornography use. In subsequent models (i.e.,

four separate models: gender*known use, gender*unknown use), we also tested the potential moderating role of gender in the daily associations. When an interaction term was significant, simple slope tests were used to report the association at the different levels of the moderators.

Third, to examine the longitudinal associations between partners' known and unknown solitary pornography use and relationship satisfaction and intimacy over time, we used dyadic latent growth curve models (LGCM) within a structural equation model (Kenny et al., 2006). These dyadic LGCMs were modeled for indistinguishable dyads and included both actor and partner effects. Commonly used goodness-of-fit indices were used to evaluate models (Browne & Cudeck, 1993; Marsh et al., 2005; Schermelleh-Engel et al., 2003): Comparative Fit Index (CFI; ≥ .90 adequate; ≥ .95 good), Tucker–Lewis index (TLI; ≥ .90 adequate; ≥ .95 good), and Root-Mean-Square Error of Approximation (RMSEA; ≤ .08 adequate; ≤ .06 good) with its 90% confidence interval. As a preliminary step, two unconditional dyadic LGCMs were estimated to examine fixed- and random-estimates of intercept (i.e., level of scores at the beginning of the study) and slope (i.e., the trajectory of scores from Time 1 to Time 3) for relationship satisfaction and intimacy. Next, two conditional dyadic LGCMs were performed, one for each outcome. These LGCMs examined the sum of days a person reported using pornography alone (known or unknown use) over the diary period as time-invariant predictors of one' own and their partner's intercept (initial levels) and slope (trajectories) variance. Lastly, we tested the potential moderating role of gender in the longitudinal associations.

Results

Descriptive Analyses

Means (*M*), standard deviations (*SD*), and bivariate correlations for daily measures aggregated within-person across all diaries and longitudinal measures (T1, T2, and T3) are

shown in Table 1. At the aggregate level, correlations showed that individuals' known solitary pornography use was unrelated to their own relationship satisfaction and intimacy both daily and over time. However, their unknown solitary pornography use was associated with their own lower relationship satisfaction at the daily level and over time, but was unrelated to their own intimacy both daily and over time. Regarding partner effects, an individual's known solitary pornography use was unrelated to their partner's relationship satisfaction and intimacy at the daily level and over time, and their unknown solitary pornography use was also unrelated to their partner's relationship satisfaction both daily and over time. However, an individual's unknown solitary pornography use was associated with their partner's lower daily intimacy, but not with intimacy over time.

Gender Differences in Known and Unknown Solitary Pornography Use Frequency

Solitary pornography use frequency by gender from the aggregated within-person 35-day daily diary data are shown in Table 2. On average, participants reported known solitary pornography use for 0.63 days out of the 35 days (*SD* = 2.20, range = 0-20). Women's known solitary pornography use frequency was significantly lower than non-binary individuals' and men's (B = -2.79, $p < .001$). On average, participants reported unknown solitary pornography for 1.87 days out of the 35 days (*SD* = 3.76, range = 0-30). Again, women's unknown solitary pornography use frequency was significantly lower than non-binary individuals' and men's (B = -0.78; $p < .001$). As presented in Table 2, of the total sample, 6.58% of women, 6.59% of men, and 4.17% of non-binary individuals reported only known solitary pornography use during the 35 days, whereas 40.66% of men, 29.17% of non-binary individuals, and 20.18% of women reported only unknown solitary pornography use. Interestingly, 25.00% of non-binary individuals, 19.78% of men, and 4.39% of women reported known solitary pornography use on

some days and unknown solitary use on others. Concerning the proportion of known and unknown solitary pornography use among pornography users, non-binary individuals had the highest known solitary pornography use proportion (23.01%), followed by women (18.11%), and men (18.10%, see Table 2).

Daily Associations Between Known and Unknown Solitary Pornography Use and Relationship Satisfaction

Results for the associations between an individual's known and unknown solitary pornography use and their own and their partner's daily relationship satisfaction are presented in Table 3. Results showed that an individual's unknown solitary pornography use that day was negatively associated with their own relationship satisfaction on the same day. The association between an individual's known solitary pornography use and their own relationship satisfaction was moderated by gender, as the dummy coded non-binary individuals (B = -1.25, SE = 0.53, p = .019) interaction term was significant. The simple slopes test reported in Table 3 indicated that non-binary individuals' known solitary use was negatively related to their own relationship satisfaction. Men and women's known solitary use was unrelated to their own relationship satisfaction.

Daily Associations Between Known and Unknown Solitary Pornography Use and Intimacy

Results for the associations between an individual's known and unknown solitary pornography use and their own and their partner's daily intimacy are presented in Table 4. Results showed that an individual's unknown solitary pornography use was negatively related to their own intimacy on the same day. The association between an individual's known solitary pornography use and their partner's intimacy was moderated by gender, as the dummy coded women interaction term was significant (B = 1.88, SE = 0.93, p = .043). The simple slopes test

reported in Table 4 indicated that men's known solitary pornography use was negatively associated with their partner's intimacy whereas for non-binary individuals and women, known solitary use was unrelated to their partner's intimacy.

Longitudinal Associations Between Known and Unknown Solitary Pornography Use and Relationship Satisfaction

First, an unconditional dyadic LGCM with fixed and random estimates of intercept and slope was computed and had excellent model fit, $\chi^2(13) = 7.35$, $p = .884$; CFI = 1.00; TLI = 1.00; RMSEA = 0.00, 90%CI = [0.00, 0.03]. This model showed that relationship satisfaction started at 133.15 ($p < .001$, variance = 478.40, $p < .001$) and declined significantly by -0.34 between each time point ($p = .001$, variance = 1.21, $p = .058$). The model for the associations between an individual's known and unknown solitary pornography use and their own and their partner's initial level and rate of change in relationship satisfaction over time had excellent fit to the data, $\chi^2(35) = 33.67$, $p = .532$; CFI =1.00; TLI = 1.00; RMSEA = 0.000, 90%CI = [0.00, 0.05]. Results are presented in Table 5 and showed that an individual's unknown solitary pornography use was related to their own lower initial relationship satisfaction. The association between an individual's unknown solitary pornography use and their partner's initial level of relationship satisfaction was moderated by gender, as the dummy coded non-binary individuals interaction term was significant (B = -9.02, SE = 3.46, $p = .20$). The simple slopes tests reported in Table 5 indicated that non-binary individuals' unknown solitary pornography use was related to their partner's lower initial level of relationship satisfaction whereas women and men's unknown solitary use was unrelated to their partner's initial level of relationship satisfaction. An individual's known and unknown solitary pornography were not significantly related to slopes of their own and their partner's relationship satisfaction.

Longitudinal Associations Between Known and Unknown Solitary Pornography Use and Intimacy

First, an unconditional dyadic LGCM with fixed and random estimates of intercept and slope was computed and had excellent model fit, $\chi^2(13) = 11.73$, $p = .550$; CFI = 1.00; TLI = 1.00; RMSEA = 0.00, 90%CI = [0.00, 0.06]. This model showed that intimacy started at 47.00 ($p < .001$, variance = 40.37, $p < .001$) and declined significantly by -0.08 between each time point ($p = .012$, variance = 0.10, $p = .094$). The model for the associations between an individual's known and unknown solitary pornography use and their own and their partner's initial level and rate of change in intimacy over time had excellent fit to the data, $\chi^2(35) = 41.09$, $p = .221$; CFI = 0.99; TLI = 0.99; RMSEA = 0.03, 90%CI = [0.00, 0.61]. Results are presented in Table 6 and showed that an individual's known solitary pornography use was unrelated to their own initial level of intimacy but was related to an increase in their own intimacy over time and decrease in their partner's intimacy over time. The association between an individual's unknown solitary pornography use and their partner's initial level of intimacy was moderated by gender, as the dummy coded non-binary individuals' interaction term was significant (B = -2.86, SE = 1.10, $p = .009$). The simple slopes tests reported in Table 6 indicated that non-binary individuals' unknown solitary pornography use was related to their partner's lower initial level of intimacy whereas women and men's unknown solitary use was unrelated to their partner's initial level of intimacy.

Discussion

Pornography use is a common sexual activity for partnered individuals (Carroll et al., 2017; Willoughby et al., 2016), but a person's solitary pornography use may not always be known by their romantic partner. Among a non-representative convenience sample of 217

couples, we used a dyadic daily diary and longitudinal design to examine whether an individual's known and unknown solitary pornography use were associated with their own and their partner's relationship satisfaction and intimacy on the same day and change over one year. Findings showed that a person's unknown solitary pornography use was associated with their own lower relationship satisfaction and intimacy on the same day as well as with a lower initial level of their own relationship satisfaction. A person's known solitary pornography use was related to an increase in their own intimacy over one year and a decrease in their partner's intimacy over one year. The present findings extend our understanding of the link between pornography use and relationship quality, showing that partner knowledge of one's solitary pornography use may partly explain past mixed results.

Occurrence of Known and Unknown Solitary Pornography Use

Among our convenience sample of 217 couples in which 33% of men, 42% of non-binary individuals, and 69% of women did not report solitary pornography use during the 35-day period, only 4% of non-binary individuals and 7% of men and women reported that all their solitary pornography use was known by their partner. Indeed, among individuals who used pornography during the 35 days, 52% of women's pornography use and 64% of men's and non-binary individuals' pornography use was unknown by their partner. These numbers are in stark contrast with the high proportion (i.e., 84%) of the 340 heterosexual women who thought their male partners were honest about their pornography use (Resch & Alderson, 2014). Our numbers are also lower than the 56% of men and 60% of women among a sample of 240 heterosexual couples for whom pornography use was considered all known using a difference score between the perceived use of the partner and the user's self-reported frequency of use (Willoughby & Leonhardt, 2020). However, none of these studies asked pornography users whether their solitary

use was known or unknown by their partner, even though they are the ones aware of their pornography use frequency and their level of disclosure about it. However, our estimates of known solitary pornography use may also be lower than the ones reported in past studies as we assessed whether their pornography use today was known by their partner on the same day, whereas general pornography use frequency may be known, but not the specific use that occurred today, or pornography use may be revealed later, on another day. Interestingly, our results showed that for 25% of non-binary individuals, 20% of men, and 4% of women, solitary pornography use was known on some days and not on others, showing the inaccuracy of general retrospective reports classifying use as unknown when a mismatch in the user and their partner's estimates occurred, whereas some use was probably known (Willoughby & Leonhardt, 2020). Our results highlight the need to assess the variability in partner knowledge surrounding solitary pornography use from one use to another.

Unknown Solitary Pornography Use and Relationship Quality

In our sample, on days people reported solitary pornography use that was unknown by their partner, they reported lower relationship satisfaction and intimacy that day. Despite some inherent limitations in our design, these findings contextualize past mixed results in which frequency of pornography use was unrelated to relationship satisfaction and intimacy or positively related in women and negatively related in men (Huntington et al., 2021; Veit et al., 2016). Although the only study examining the association between unknown pornography use and the user's relationship satisfaction reported a nonsignificant association (Willoughby & Leonhardt, 2020), research outside the pornography field suggests that concealing information can be cognitively, emotionally, and physically taxing, that keeping sex secrets from a partner is related to lower relationship satisfaction, and that on days participants reported withholding

information from their partner, they also reported lower relationship satisfaction, lower commitment, and more conflicts (Ritter et al., 2021; Slepian et al., 2017; Uysal et al., 2012). However, we did not assess whether solitary pornography use was actively concealed, and even lied about, or just a sexual activity that was considered in the private domain and that should not be necessarily disclosed every day it happens, as general frequency of solitary use may have been known. Using pornography alone without telling one's partner that day may represent "turning away" from the partner, instead of "turning towards", which may be negatively related to the couple's emotional connection and cohesion, which are important components of relationship satisfaction and intimacy (Gottman & Declaire, 2017; Manning, 2006). Moreover, in line with Reis & Shaver's (1988) Interpersonal process model of intimacy, unknown solitary pornography use suggests lower self-disclosure, which is an important component of the development of daily intimacy.

In our sample, individuals who reported a higher frequency of solitary pornography use that was unknown by their partner during the 35-day period, also reported lower initial levels of their own relationship satisfaction using retrospective reports over the last three months, which mimics the daily association. Importantly, unknown solitary use was not significantly related to change in relationship satisfaction and intimacy over one year. Taking the daily and longitudinal results together, particularly the non-significant associations with relationship satisfaction and intimacy over time, findings suggest that the negative association between unknown solitary pornography use and relationship quality is short-term, perhaps even concurrent or reciprocal, and that we should be cautious not to suggest that unknown solitary pornography use will damage the relationship quality over time. As daily links and associations with initial levels are

cross-sectional, it is also plausible that when a person feels less intimate or satisfied by their relationship, they tend to use more pornography alone without telling their partner.

Known Solitary Pornography Use and Relationship Quality

In our sample, participants who reported higher frequency of solitary pornography use that was known by their partner during the 35-day period, reported an increase in their intimacy over one year. This finding expands past cross-sectional results reporting an association between women's frequency of pornography use and higher intimacy (Huntington et al., 2021), showing that it is specifically in the context of known solitary pornography use that it is related to an increase in intimacy over one year – and in the present study this association involves all participants, not only women. Moreover, in line with qualitative findings (Kohut et al., 2017), our results suggest that using pornography in an open manner may create an opportunity for sex-related discussions and an honest climate in which self-disclosure of taboo subjects is encouraged, which may lead to higher feelings of intimacy over time for the user. Indeed, as personal self-disclosure is a critical part of intimacy in Reis & Shaver's (1988) Interpersonal process model of intimacy, learning and talking about solitary pornography use may create a climate in which the disclosing partner feels closer, and intimacy is built upon and increases over time. Research on the impact of disclosing sexual secrets or sexual problems in romantic relationships, not necessarily pornography use, has shown that outcomes for disclosure are mostly positive and almost never result in relationship dissolution (Merwin et al., 2017; Ritter et al., 2021). As relationship satisfaction is less proximal to self-disclosure, in addition to it representing a more global evaluation of the relationship as a whole, its evolution over time may be less affected by this specific sexual disclosure and may be more related to other relationship factors. However, surprisingly, but in line with Willoughby and Leonhardt's (2020) results, in

non-binary individuals, on days when they reported known solitary pornography use, they reported lower relationship satisfaction. This result should be interpreted with caution given the small sample size (n = 24) of non-binary individuals in this study and should be replicated in future studies.

Associations with Partner's Relationship Quality

Although in this sample, most partner associations were nonsignificant in the daily and longitudinal data, higher frequency of a person's known solitary pornography use was related to a decrease in their partner's intimacy over one year. Moreover, on days men reported known solitary pornography use, their partner reported lower intimacy that day. These findings are in line with results of qualitative studies describing that women in committed relationships who discovered their male partners used pornography reported lower levels of trust and lower psychological and emotional closeness and intimacy (Bergner & Bridges, 2002; Zitzman & Butler, 2009). These results also expand past cross-sectional partner associations between a person's frequency of pornography use and their partner's lower reported intimacy (Adamson et al., 2021), showing that for this partner effect to occur, solitary pornography needs to be known by the partner. Importantly, this effect may be maintained over one year, pointing toward potential longer-term changes in relationship quality. When a person learns that their partner used pornography alone, they may feel their partner is turning away from them instead of turning towards them to meet their sexual needs; they may also interpret it as a sign of their own inability to meet their partner's needs or they may worry that their partner is now seeing them as a sexual object, which could affect how they feel intimately connected to their partner. Moreover, higher frequency of non-binary individuals' unknown solitary pornography use was related to lower initial levels of their partner's relationship satisfaction and intimacy. When a person uses

pornography without telling their partner, the feeling that the user is turning away from their partner and that something is avoided may jeopardize partners' trust, leading to the partner's lower relationship satisfaction and intimacy (Uysal et al., 2012). However, as this is the first study using dyadic data to examine partner knowledge of pornography use and that some limitations tempered the generalizability of our findings, these results should not be over-interpreted. We need future dyadic studies to determine what processes may explain associations between a person's known and unknown solitary pornography use and their partner's relationship quality.

Limitations

Our findings should be interpreted in light of some limitations. The correlational design and the lack of statistical control for other potential third variables related to known and unknown solitary pornography use (e.g., religiosity, trust, partners' acceptance of pornography use, masturbation) makes it impossible to determine causal relations. The generalizability of our results is limited by our convenience sample recruited on social media groups of relatively young couples, reporting frequent partnered sexual activity and high relationship satisfaction, with a low ethnic or racial diversity, and a small sample size of non-binary individuals. Moreover, couples who volunteer for sex research are known to report more positive sexual attitudes and greater sexual experience (Dawson et al., 2019). Thus, our sample may not be representative of the population as it may represent a more sex positive, open, or sexually-oriented subgroup, involved in a romantic relationship that is going relatively well. The couples were followed 35 days and at three time points over one year. During the 35 days, a significant proportion of couples did not report solitary pornography use (i.e., 33-69% of participants). Future studies should examine daily solitary pornography use over longer periods and associations over more

than one year as more changes in relationship quality may arise over time or during critical periods. Even if daily diaries have many strengths over retrospective reports spanning a longer period (e.g., three months, last year), all our data stem solely from self-report measures, which are subject to biases and shared-method variance. Although we used daily diaries to minimize recall biases, self-report measures, in particular on sensitive issues including pornography use, are subject to under- or over-reporting related to social desirability. Diverse factors (e.g., sexual openness, gender, sexual desire), for which we did not control for in this study, may alter the willingness of a person to accurately disclose and describe their solitary pornography use. Moreover, the present study focused only on solitary pornography use, yet pornography use with the partner was reported on some days (n = 74 days). As we did not assess whether both solitary and dyadic pornography use happened on the same day, these 74 days were coded as no solitary pornography use. Thus, our results may be more conservative as the differences between days without solitary use and those with solitary known or unknown use may be reduced if solitary use also occurred on these dyadic pornography use days. It would also be interesting to know more about what content was shared about solitary pornography use (e.g., content of pornography, masturbation) as the level of disclosure was not assessed in our study.

Conclusions and Implications for Practice

As suggested by conceptual frameworks (Campbell & Kohut, 2017; Willoughby et al., 2020), our findings underscore the importance of considering the complexity of the relational context surrounding solitary pornography use in couples, in particular the partner's knowledge of pornography use. The current study findings suggest the need for couple and sex therapists to consider how solitary pornography use was negotiated and disclosed within each relationship. This assessment may establish the basis of ongoing communication about pornography use and

partners' attitudes and feelings about this activity to clarify their boundaries and expectations. An open dialogue around solitary pornography use may help set an honest basis for pornography use that may protect against its potential negative effects.

Table 1

Descriptive Statistics of Daily Known and Unknown Solitary Pornography Use Frequency, Daily Dyadic Pornography Use, Daily and Over Time Relationship Satisfaction, and Daily and Over Time Intimacy

	M (SD)	Range	1	2	3	4	5	6	7	8	9	10
1. Known solitary pornography use	0.63 (2.20)	0-20	**.38****	-.01	.01	.06	<-.01	.06	.05	.01	.03	.03
2. Unknown solitary pornography use	1.87 (3.76)	0-30	.15*	**.03**	-.09	-.11*	<.01	.01	-.02	-.05	-.07	-.05
3. Daily relationship satisfaction	17.78 (2.32)	7-21	.07	-.11*	**.66****	.58**	.54**	.50**	.46**	.52**	.53**	.46**
4. Daily intimacy	42.78 (8.25)	15-56	.07	-.09	.76**	**.65****	.47**	.46**	.41**	.50**	.52**	.45**
5. Time1 relationship satisfaction	132.94 (23.22)	40-161	.02	-.12**	.67**	.59**	**.58****	.52**	.50**	.52**	.48**	.46**
6. Time 2 relationship satisfaction	132.08 (25.11)	32-161	.02	-.14**	.68**	.57**	.76**	**.53****	.50**	.48**	.52**	.42**
7. Time 3 relationship satisfaction	128.97 (28.73)	15-161	.05	-.08	.63**	.52**	.66**	.75**	**.64****	.43**	.48**	.61**
8. Time 1 intimacy	46.96 (7.16)	16-56	.04	-.08	.61**	.64**	.78**	.58**	.51**	**.51****	.52**	.43**
9. Time 2 intimacy	46.73 (7.32)	21-56	.03	-.09	.67**	.67**	.67**	.80**	.63**	.71**	**.57****	.43**
10. Time 3 intimacy	45.94 (8.81)	14-56	.06	-.06	.61**	.58**	.55**	.59**	.84**	.57**	.67**	**.61****

Note. *M* = mean; *SD* = standard deviation. For descriptive statistics, daily measures were aggregated within-person across all diaries. Correlations presented below the diagonal represent the actor associations (i.e., the association between an individual X and their own Y), correlations presented above the diagonal represent the partner associations (i.e., the association between an individual X and their partner Y), and correlations in bold represent between partners correlations.

*$p < .05$. ** $p < .01$.

Table 2

Aggregated Solitary Pornography Use Frequency by Gender from the 35-Days Daily Diary Data

	Gender		
	Men *n* = 182 *M (SD)* % (*n*)	Women *n* = 228 *M (SD)* % (*n*)	Non-binary individuals *n* = 24 *M (SD)* % (*n*)
Known solitary pornography use frequency	1.14 (3.16)	0.21 (0.71)	0.88 (1.87)
Unknown solitary pornography use frequency	3.22 (4.51)	0.74 (2.41)	2.38 (4.61)
No solitary pornography use	32.97% (60)	68.86% (157)	41.67% (10)
Only known solitary pornography use	6.59% (12)	6.58% (15)	4.17% (1)
Only unknown solitary pornography use	40.66% (74)	20.18% (46)	29.17% (7)
Known and unknown solitary pornography use	19.78% (36)	4.39% (10)	25.00% (6)
Proportion of known solitary pornography use frequency/total pornography use frequency [a]	18.10%	18.11%	23.01%
Proportion of unknown solitary pornography use frequency/total pornography use frequency [a]	64.34%	52.19%	64.49%

Note. *M* = mean; *SD* = standard deviation. [a] = Among those individuals who used pornography during the 35-day period. Non-binary individuals also include individuals who identified as queer or gender fluid.

Table 3

Daily Associations Between Actor and Partner Known and Unknown Solitary Pornography Use and Daily Relationship Satisfaction

	Relationship satisfaction				
Fixed effects	Estimate (*SE*)[a]	*Z*	*p*	95% CI Lower	95% CI Upper
Intercept	**17.93 (0.21)**	**87.65**	**< .001**	**17.53**	**18.34**
Actor's known solitary pornography use	-0.08 (0.13)	-0.58	.560	-0.34	0.19
Partner's known solitary pornography use	-0.08 (0.12)	-0.65	.517	-0.32	0.16
Actor's unknown solitary pornography use	**-0.22 (0.09)**	**-.2.38**	**.017**	**-0.41**	**-0.04**
Partner's unknown solitary pornography use	0.01 (0.09)	0.15	.882	-0.16	0.18
Simple slope tests for gender					
Actor women's known solitary pornography use	0.21 (0.23)	0.90	.369	-0.24	0.65
Actor non-binary individuals' known solitary pornography use	**-1.29 (0.51)**	**-2.53**	**.012**	**-2.28**	**-0.29**
Actor men's known solitary pornography use	-0.04 (0.15)	-0.66	.791	-0.32	0.25

Note. [a] = estimates are unstandardized regression coefficients, SE = standard error, Z = estimate divided by standard error, CI = confidence interval. Linear time and the sum of the number of days the participant and the partner used pornography during the 35-day period were included as control variables. Coefficients in bold are significant at $p < .05$. Non-binary individuals also include individuals who identified as queer or gender fluid.

Table 4

Daily Associations Between Actor and Partner Known and Unknown Solitary Pornography Use and Daily Intimacy

	Intimacy				
Fixed effects	Estimate (*SE*)[a]	*Z*	*p*	95% CI Lower	95% CI Upper
Intercept	**43.63 (0.67)**	**65.63**	**< .001**	**42.31**	**44.91**
Actor's known solitary pornography use	0.10 (0.33)	0.03	.975	-0.63	0.865
Partner's known solitary pornography use	-0.67 (0.40)	-1.66	.097	-1.45	0.12
Actor's unknown solitary pornography use	**-0.95 (0.25)**	**-384**	**< .001**	**-1.43**	**-0.46**
Partner's unknown solitary pornography use	-0.49 (0.26)	-1.85	.064	-1.00	0.03
Simple slope tests for gender					
Partner women's known solitary pornography use	0.75 (0. 76)	.91	.322	-0.74	2.24
Partner non-binary individuals' known solitary pornography use	-0.93 (1.32)	-0.71	.478	-3.51	1.64
Partner men's known solitary pornography use	**-1.13 (0.49)**	**-2.31**	**.021**	**-2.09**	**-0.17**

Note. [a] = estimates are unstandardized regression coefficients, SE = standard error, Z = estimate divided by standard error, CI = confidence interval. Linear time and the sum of the number of days the participant and the partner used pornography during the 35-day period were included as control variables. Coefficients in bold are significant at $p < .05$. Non-binary individuals also include individuals who identified as queer or gender fluid.

Table 5

Longitudinal Associations Between Actor and Partner Known and Unknown Solitary Pornography Use and Relationship Satisfaction Over Time.

	Intercept					Slope				
	B (*SE*)	*p*	*β*	95% CI Lower	Upper	B (*SE*)	*p*	*β*	95% CI Lower	Upper
Actor's known solitary pornography use	0.10 (0.25)	.696	.01	-0.40	0.59	0.03 (0.03)	.206	.09	-0.02	0.09
Partner's known solitary pornography use	-0.22 (0.32)	.499	-.03	-0.85	0.41	0.01 (0.03)	.828	.02	-0.05	0.06
Actor's unknown solitary pornography use	**-0.81 (0.31)**	**.008**	**-.15**	**-1.41**	**-0.21**	< 0.01 (0.02)	.976	<-.01	-0.03	0.03
Partner's unknown solitary pornography use	-0.17 (0.23)	.466	-.03	-0.61	0.28	0.01 (0.02)	.770	.02	-0.04	0.05
Simple slope tests for gender										
Partner women's unknown solitary pornography use	0.94 (1.04)	.365	-	-1.10	2.98	-	-	-	-	-
Partner non-binary individuals' unknown solitary pornography use	**-7.89 (3.17)**	**.013**	-	**-14.10**	**-1.68**	-	-	-	-	-
Partner men's unknown solitary pornography use	0.13 (1.32)	.920	-	-2.45	2.72	-	-	-	-	-

Note. B = unstandardized coefficient; *SE* = standard error; *β* = standardized coefficient. Coefficients in bold are significant at $p < .05$.

Non-binary individuals also include individuals who identified as queer or gender fluid.

Table 6

Longitudinal Associations Between Actor and Partner Known and Unknown Solitary Pornography Use and Intimacy Over Time.

	Intercept					Slope				
	B(*SE*)	*p*	*β*	95% CI		B(*SE*)	*p*	*β*	95% CI	
				Lower	Upper				Lower	Upper
Actor's known solitary pornography use	0.14 (0.09)	.107	.06	-.03	0.31	**0.02 (0.01)**	**.010**	**.18**	**0.01**	**0.04**
Partner's known solitary pornography use	-0.07 (0.13)	.568	-.03	-0.33	0.18	**-0.02 (0.01)**	**.027**	**-.16**	**-0.04**	**<-.01**
Actor's unknown solitary pornography use	-0.13 (0.07)	.077	-.08	-0.27	0.01	< -0.01 (0.01)	.521	-.04	-0.01	0.01
Partner's unknown solitary pornography use	-0.12 (0.08)	.165	-.08	-0.28	0.05	< 0.01 (0.01)	.724	.03	-0.01	0.01
Simple slope tests for gender										
Partner women's unknown solitary pornography use	-0.33 (0.58)	.572	-	-1.46	0.81	-	-	-	-	-
Partner non-binary individuals' unknown solitary pornography use	**-2.76 (1.00)**	**.006**	-	**-4.72**	**-0.81**	-	-	-	-	-
Partner men's unknown solitary pornography use	0.10 (0.43)	.825	-	-0.77	0.96	-	-	-	-	-

Note. B = unstandardized coefficient; *SE* = standard error; *β* = standardized coefficient. Coefficients in bold are significant at $p < .05$.

Non-binary individuals also include individuals who identified as queer or gender fluid.

References

Adamson, S. J., Martin, A., Deering, D. E. A., & Boden, J. M. (2021). New Zealand women's experience of intimacy within heterosexual relationships: Influence of partners' perceived pornography use. *Jounral of Sex & Marital Therapy, 47*(7), 656-668. https://doi.org/10.1080/0092623X.2021.1937416

Bergner, R. M., & Bridges, A. J. (2002). The significance of heavy pornography involvement for romantic partners: Research and clinical implications. *Journal of Sex & Marital Therapy, 28*(3), 193-206. https://doi.org/10.1080/009262302760328235

Bois, K., Bergeron, S., Rosen, N. O., McDuff, P., & Gregoire, C. (2013). Sexual and relationship intimacy among women with provoked vestibulodynia and their partners: Associations with sexual satisfaction, sexual function, and pain self-efficacy. *Journal of Sexual Medicine, 10*(8), 2024-2035. https://doi.org/10.1111/jsm.12210

Bridges, A. J., & Morokoff, P. J. (2011). Sexual media use and relational satisfaction in heterosexual couples. *Personal Relationships, 18*(4), 562-585. https://doi.org/10.1111/j.1475-6811.2010.01328.x

Campbell, L., & Kohut, T. (2017). The use and effects of pornography in romantic relationships. *Current Opinion in Psychology, 13*, 6-10. https://doi.org/10.1016/j.copsyc.2016.03.004

Carroll, J. S., Busby, D. M., Willoughby, B. J., & Brown, C. C. (2017). The porn gap: Differences in men's and women's pornography patterns in couple relationships. *Journal of Couple & Relationship Therapy, 16*(2), 146-163. https://doi.org/10.1080/15332691.2016.1238796

Dawson, S. J., Huberman, J. S., Bouchard, K. N., McInnis, M. K., Pukall, C. F., & Chivers, M. L. (2019). Effects of individual difference variables, gender, and exclusivity of sexual

attraction on volunteer bias in sexuality research. *Archives of Sexual Behavior, 48*(8), 2403-2417. https://doi.org/10.1007/s10508-019-1451-4

Doran, K., & Price, J. (2014). Pornography and marriage. *Journal of Family and Economic Issues, 35,* 489-498. https://doi.org/10.1007/s10834-014-9391-6

Droubay, B. A., Shafer, K., Miles, R. J., Butters, R. P., & Grubbs, J. B. (2021). Secrecy and deception: Values, shame, and endorsement of hiding one's pornography viewing. *Sexual and Relationship Therapy*, 1-28. https://doi.org/10.1080/14681994.2021.1976403

Farooqi, S. R. (2014). The construct of relationship quality. *Journal of Relationships Research, 5*(E2). https://doi.org/10.1017/jrr.2014.2

Funk, J. L., & Rogge, R. D. (2007). Testing the ruler with item response theory: Increasing precision of measurement for relationship satisfaction with the Couples Satisfaction Index. *Journal of Family Psychology, 21*(4), 572-583. https://doi.org/10.1037/0893-3200.21.4.572

Gottman, J. M., & Declaire, J. (2017). *The relationship cure: A 5 step guide to strengthening your marriage, family, and friendships.* Harmony Books.

Graham, C. A., Catania, J. A., Brand, R., Duong, T., & Canchola, J. A. (2003). Recalling sexual behavior: A methodological analysis of memory recall bias via interview using the diary as the gold standard. *Journal of Sex Research, 40*(4), 325-332. https://doi.org/10.1080/00224490209552198

Graham, J. M., Diebels, K. J., & Barnow, Z. B. (2011). The reliability of relationship satisfaction: A reliability generalization meta-analysis. *Journal of Family Psychology, 25*(1), 39-48. https://doi.org/10.1037/a0022441.supp

Huntington, C., Markman, H., & Rhoades, G. (2021). Watching pornography alone or together: Longitudinal associations with romantic relationship quality. *Journal of Sex & Marital Therapy*, *47*(2), 130-146. https://doi.org/10.1080/0092623X.2020.1835760

Impett, E. A., Beals, K., & Peplau, L. A. (2001). Testing the investment model of relationship commitment and stability in a longitudinal study of married couples. *Current Psychology*, *20*(4), 312-326. https://doi.org/https://doi.org/10.1007/s12144-001-1014-3

Jafarzadeh Fadaki, S. M., & Amani, P. (2015). Relationship of love and marital satisfaction with pornography among married university students in Birjand, Iran. *Journal of Fundamentals of Mental Health*, *17*(5), 240-246.

Jodouin, J. F., Rosen, N. O., Merwin, K., & Bergeron, S. (2021). Discrepancy in dyadic sexual desire predicts sexual distress over time in a community sample of committed couples: A daily diary and longitudinal study. *Archives of Sexual Behavior*, *50*(8), 3637-3649. https://doi.org/10.1007/s10508-021-01967-0

Joel, S., Eastwick, P. W., Allison, C. J., Arriaga, X. B., Baker, Z. G., Bar-Kalifa, E., Bergeron, S., Birnbaum, G. E., Brock, R. L., Brumbaugh, C. C., Carmichael, C. L., Chen, S., Clarke, J., Cobb, R. J., Coolsen, M. K., Davis, J., de Jong, D. C., Debrot, A., DeHaas, E. C., Derrick, J. L., Eller, J., Estrada, M. J., Faure, R., Finkel, E. J., Fraley, R. C., Gable, S. L., Gadassi-Polack, R., Girme, Y. U., Gordon, A. M., Gosnell, C. L., Hammond, M. D., Hannon, P. A., Harasymchuk, C., Hofmann, W., Horn, A. B., Impett, E. A., Jamieson, J. P., Keltner, D., Kim, J. J., Kirchner, J. L., Kluwer, E. S., Kumashiro, M., Larson, G., Lazarus, G., Logan, J. M., Luchies, L. B., MacDonald, G., Machia, L. V., Maniaci, M. R., Maxwell, J. A., Mizrahi, M., Muise, A., Niehuis, S., Ogolsky, B. G., Oldham, C. R., Overall, N. C., Perrez, M., Peters, B. J., Pietromonaco, P. R., Powers, S. I., Prok, T.,

Pshedetzky-Shochat, R., Rafaeli, E., Ramsdell, E. L., Reblin, M., Reicherts, M., Reifman, A., Reis, H. T., Rhoades, G. K., Rholes, W. S., Righetti, F., Rodriguez, L. M., Rogge, R., Rosen, N. O., Saxbe, D., Sened, H., Simpson, J. A., Slotter, E. B., Stanley, S. M., Stocker, S., Surra, C., Ter Kuile, H., Vaughn, A. A., Vicary, A. M., Visserman, M. L., & Wolf, S. (2020). Machine learning uncovers the most robust self-report predictors of relationship quality across 43 longitudinal couples studies. *Proceedings of the National Academy of Sciences of the United States of America*, *117*(32), 19061-19071. https://doi.org/10.1073/pnas.1917036117

Jones, A. C., Robinson, W. D., & Seedall, R. B. (2018). The role of sexual communication in couples' sexual outcomes: A dyadic path analysis. *Journal of Marital and Family Therapy*, *44*(4), 606-623. https://doi.org/10.1111/jmft.12282

Keizer, R. (2014). Relationship satisfaction. In A. C. Michalos (Ed.), *Encyclopedia of quality of life and well-being research*. Springer. https://doi.org/https://doi.org/10.1007/978-94-007-0753-5_2455

Kohut, T., Balzarini, R. N., Fisher, W. A., & Campbell, L. (2018). Pornography's associations with open sexual communication and relationship closeness vary as a function of dyadic patterns of pornography use within heterosexual relationships. *Journal of Social and Personal Relationships*, *35*(4), 655-676. https://doi.org/10.1177/0265407517743096

Kohut, T., Fisher, W. A., & Campbell, L. (2017). Perceived effects of pornography on the couple relationship: Initial findings of open-ended, participant-informed, "bottom-up" research. *Archives of Sexual Behavior*, *46*(2), 585-602. https://doi.org/10.1007/s10508-016-0783-6

Kohut, T., Fisher, W. A., & Campbell, L. (2017). Perceived effects of pornography on the couple relationship: Initial findings of open-ended, participant-informed, « bottom-up" research. *Archives of Sexual Behavior, 46*(2), 585-602. https://doi.org/10.1007/s10508-016-0783-6

Lambert, N. M., Negash, S., Stillman, T. F., Olmstead, S. B., & Fincham, F. D. (2012). A love that doesn't last: Pornography consumption and weakened commitment to one's romantic partner. *Journal of Social and Clinical Psychology, 31*(4), 410-438. https://doi.org/10.1521/jscp.2012.31.4.410

Laurenceau, J.-P., & Bolger, N. (2012). Analyzing diary and intensive longitudinal data from dyads. In M. Mehl & T. Conner (Eds.), *Handbook of research methods for studying daily life* (pp. 407-422). Guilford Press.

Laurenceau, J. P., Barrett, L. F., & Pietromonaco, P. R. (1998). Intimacy as an interpersonal process: The importance of self-disclosure, partner disclosure, and perceived partner responsiveness in interpersonal exchanges. *Journal of Personality and Social Psychology, 74*(5), 1238-1251. https://doi.org/10.1037//0022-3514.74.5.1238

Laurenceau, J. P., Barrett, L. F., & Rovine, M. J. (2005). The interpersonal process model of intimacy in marriage: A daily-diary and multilevel modeling approach. *Journal of Family Psychology, 19*(2), 314-323. https://doi.org/10.1037/0893-3200.19.2.314

Leonhardt, N. D., Spencer, T. J., Butler, M. H., & Theobald, A. C. (2019). An organizational framework for sexual media's influence on short-term versus long-term sexual quality. *Archives of Sexual Behavior, 48*(8), 2233-2249. https://doi.org/10.1007/s10508-018-1209-4

Maddox, A. M., Rhoades, G. K., & Markman, H. J. (2011). Viewing sexually-explicit materials alone or together: Associations with relationship quality. *Archives of Sexual Behavior, 40*(2), 441-448. https://doi.org/10.1007/s10508-009-9585-4

Manning, J. C. (2006). The Impact of Internet pornography on marriage and the family: A review of the research. *Sexual Addiction & Compulsivity, 13*(2-3), 131-165. https://doi.org/10.1080/10720160600870711

McNulty, J. K., Wenner, C. A., & Fisher, T. D. (2016). Longitudinal associations among relationship satisfaction, sexual satisfaction, and frequency of sex in early marriage. *Archives of Sexual Behavior, 45*(1), 85-97. https://doi.org/10.1007/s10508-014-0444-6

Merwin, K. E., O'Sullivan, L. F., & Rosen, N. O. (2017). We need to talk: Disclosure of sexual problems is associated with depression, sexual functioning, and relationship satisfaction in women. *Journal of Sex & Marital Therapy, 43*(8), 786-800. https://doi.org/https://doi.org/10.1080/0092623X.2017.1283378

Montgomery-Graham, S., Kohut, T., Fisher, W., & Campbell, L. (2015). How the popular media rushes to judgment about pornography and relationships while research lags behind. *The Canadian Journal of Human Sexuality, 24*(3), 243-256. https://doi.org/10.3138/cjhs.243-A4

Muusses, L. D., Kerkhof, P., & Finkenauer, C. (2015). Internet pornography and relationship quality: A longitudinal study of within and between partner effects of adjustment, sexual satisfaction and sexually explicit Internet material among newly-weds. *Computers in Human Behavior, 45*, 77-84. https://doi.org/10.1016/j.chb.2014.11.077

Perry, S. L. (2017). Does viewing pornography reduce marital quality over time? Evidence from longitudinal data. *Archives of Sexual Behavior, 46*(2), 549-559. https://doi.org/10.1007/s10508-016-0770-y

Perry, S. L. (2020). Pornography and relationship quality: Establishing the dominant pattern by examining pornography use and 31 measures of relationship quality in 30 national surveys. *Archives of Sexual Behavior, 49*(4), 1199-1213. https://doi.org/10.1007/s10508-019-01616-7

Perry, S. L., & Schleifer, C. (2018). Till porn do us part? A longitudinal examination of pornography use and divorce. *Journal of Sex Research, 55*(3), 284-296. https://doi.org/10.1080/00224499.2017.1317709

Poulsen, F. O., Busby, D. M., & Galovan, A. M. (2013). Pornography use: Who uses it and how it is associated with couple outcomes. *The Journal of Sex Research, 50*(1), 72-83. https://doi.org/10.1080/00224499.2011.648027

Regnerus, M., Gordon, D., & Price, J. (2016). Documenting pornography use in America: A comparative analysis of methodological approaches. *Journal of Sex Research, 53*(7), 873-881. https://doi.org/10.1080/00224499.2015.1096886

Reis, H. T., & Shaver, P. (1988). Intimacy as an interpersonal process. In S. W. Duck (Ed.), *Handbook of personal relationships* (pp. 367-389). Wiley.

Resch, M. N., & Alderson, K. G. (2014). Female partners of men who use pornography: Are honesty and mutual use associated with relationship satisfaction? *Journal of Sex & Marital Therapy, 40*(5), 410-424. https://doi.org/10.1080/0092623X.2012.751077

Ritter, L. J., Martin, T., Fox, K., Knox, D., & Milstein, S. (2021). "Thanks for telling me": The impact of disclosing sex secrets on romantic relationships. *Sexuality & Culture*, 1-16. https://doi.org/10.1007/s12119-020-09812-7

Schumm, W. R., Nichols, C. W., Schectman, K. L., & Grigsby, C. C. (1983). Characteristics of responses to the Kansas Marital Satisfaction Scale by a sample of 84 married mothers. *Psychological Reports, 53*, 567-572. https://doi.org/10.2466/pr0.1983.53.2.567

Schumm, W. R., Paff-Bergen, L. A., Hatch, R. C., Obiorah, F. C., Copeland, J. M., Meens, L. D., & Bugaighis, M. A. (1986). Concurrent and discriminant validity of the Kansas Marital Satisfaction Scale. *Journal of Marriage and Family*, *48*(2), 381-387. https://doi.org/10.2307/352405

Shuler, J., Brosi, M., Spencer, T., & Hubler, D. (2021). Pornography and romantic relationships: A qualitative examination of individual experiences. *Journal of Sex & Marital Therapy, 47*(6), 605-620. https://doi.org/10.1080/0092623X.2021.1930308

Slepian, M. L., Chun, J. S., & Mason, M. F. (2017). The experience of secrecy. *J Pers Soc Psychol, 113*(1), 1-33. https://doi.org/10.1037/pspa0000085

Uysal, A., Lin, H. L., Knee, C. R., & Bush, A. L. (2012). The association between self-concealment from one's partner and relationship well-being. *Personality and Social Psychology Bulletin, 38*(1), 39-51. https://doi.org/10.1177/0146167211429331

Vaillancourt-Morel, M.-P., Daspe, M.-È., Charbonneau-Lefebvre, V., Bosisio, M., & Bergeron, S. (2019). Pornography use in adult mixed-sex romantic relationships: Context and correlates. *Current Sexual Health Reports, 11*(1), 35-43. https://doi.org/10.1007/s11930-019-00190-2

Vaillancourt-Morel, M.-P., Rosen, N. O., Štulhofer, A., Bosisio, M., & Bergeron, S. (2021). Pornography use and sexual health among same-sex and mixed-sex couples: An event-level dyadic analysis. *Archives of Sexual Behavior*. https://doi.org/10.1007/s10508-020-01839-z

Vaillancourt-Morel, M.-P., Rosen, N. O., Willoughby, B. J., Leonhardt, N. D., & Bergeron, S. (2020). Pornography use and romantic relationships: A dyadic daily diary study. *Journal of Social and Personal Relationships, 37*(10-11), 2802-2821. https://doi.org/10.1177/0265407520940048

Veit, M., Štulhofer, A., & Hald, G. M. (2016). Sexually explicit media use and relationship satisfaction: A moderating role of emotional intimacy? *Sexual and Relationship Therapy, 32*(1), 58-74. https://doi.org/10.1080/14681994.2016.1193134

Willoughby, B., Leonhardt, N., & Augustus, R. (2020). Untangling the porn web: Creating an organizing framework for pornography research among couples. *The Journal of Sex Research, 57*(6), 709-721. https://doi.org/10.1080/00224499.2019.1698003

Willoughby, B. J., Carroll, J. S., Busby, D. M., & Brown, C. C. (2016). Differences in pornography use among couples: Associations with satisfaction, stability, and relationship processes. *Archives of Sexual Behavior, 45*(1), 145-158. https://doi.org/10.1007/s10508-015-0562-9

Willoughby, B. J., & Leonhardt, N. D. (2020). Behind closed doors: Individual and joint pornography use among romantic couples. *The Journal of Sex Research, 57*(1), 77-91. https://doi.org/10.1080/00224499.2018.1541440

Willoughby, B. J., Leonhardt, N. D., & Augustus, R. A. (2021). Curvilinear associations between pornography use and relationship satisfaction, sexual satisfaction, and relationship

stability in the United States. *Computers in Human Behavior, 125*. https://doi.org/10.1016/j.chb.2021.106966

Wright, P. J. (2011). Mass media effects on youth sexual behavior: Assessing the claim for causality. *Communication Yearbook, 35*, 343-386.

Wright, P. J., & Tokunaga, R. S. (2017). Women's perceptions of their male partners' pornography consumption and relational, sexual, self, and body satisfaction: Toward a theoretical model. *Annals of the International Communication Association, 42*(1), 55-73. https://doi.org/10.1080/23808985.2017.1412802

Wright, P. J., Tokunaga, R. S., Kraus, A., & Klann, E. (2017). Pornography consumption and satisfaction: A meta-analysis. *Human Communication Research, 43*(3), 315-343. https://doi.org/10.1111/hcre.12108

Yucel, D., & Gassanov, M. A. (2010). Exploring actor and partner correlates of sexual satisfaction among married couples. *Social Science Research, 39*(5), 725-738. https://doi.org/10.1016/j.ssresearch.2009.09.002

Zitzman, S. T., & Butler, M. H. (2009). Wives' experience of husbands' pornography ese and concomitant deception as an attachment threat in the adult pair-bond relationship. *Sexual Addiction & Compulsivity, 16*(3), 210-240. https://doi.org/10.1080/10720160903202679