



Associations Between Pornography Use Through Different Media and Sexual and Relationship Satisfaction Among Cohabiting Couples

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Received: 21 October 2023 / Revised: 1 April 2024 / Accepted: 10 May 2024

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Abstract

Pornography can be used through multiple media and its associations with couples' relationship and sexual satisfaction are mixed. The aims of this study were to examine the proportion of use of different pornographic media (i.e., videos, pictures, audio material, and written material), including different contents (i.e., sexual activities and nudity), gender-based differences in the frequency of use of these media, and the associations between an individual's frequency of use of different pornographic media and their own and their partner's sexual and relationship satisfaction, considering potential gender differences. A sample of 706 adult couples (1368 participants; $M_{age} = 32.19$ years) completed online self-report questionnaires. Results of actor-partner interdependence models indicated that video use was associated with lower relationship and sexual satisfaction, and partners' lower sexual satisfaction. Picture use was associated with lower relationship satisfaction and partners' lower sexual satisfaction. Written material use was associated with lower sexual satisfaction. Cisgender women's audio use was associated with their own higher sexual satisfaction, whereas cisgender men's audio use was associated with their partner's lower sexual satisfaction. These findings suggest different associations with sexual and relationship satisfaction depending on the pornographic media.

Keywords Pornography · Media · Sexual satisfaction · Relationship satisfaction · Couples

Introduction

Pornography use, which encompasses intentionally looking at, reading, or listening to videos, pictures, audio material (e.g., audio erotic stories, sexual activity sounds), or written material depicting nude individuals or people having sex (Kohut et al., 2020), is now considered a normative sexual activity, including for partnered individuals (Herbenick et al., 2020; Willoughby & Leonhardt, 2018). Estimates of pornography use among individuals in mixed-sex couples range from 71 to 92% for men and from 34 to 83% in women

(Vaillancourt-Morel et al., 2019; Willoughby et al., 2016). This use is mostly solitary, with 80% of men and 68% of women reporting that more than 50% of their pornography use occurred without their partner (Willoughby & Leonhardt, 2018). Although theoretical models and frameworks contend that pornography use may impact romantic relationships, mostly negatively (Campbell & Kohut, 2017; Willoughby et al., 2020), studies have attempted to clarify the associations between pornography use and a wide range of relational processes and well-being indicators, including relationship and sexual satisfaction, with mixed findings (Wright et al., 2017). Some studies have reported negative or non-significant associations between pornography use frequency and sexual and relationship satisfaction, while others have reported positive associations (Dwulit & Rzymiski, 2019; Grubbs et al., 2019; Vaillancourt-Morel et al., 2019).

These mixed results have led scholars to stress the importance to examine the context in which pornography use may affect romantic relationships (Campbell & Kohut, 2017; Willoughby et al., 2020). This context includes the types of media used to look at, listen, or read pornography, which may be at play for the contradictory results (Campbell &

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Kohut, 2017). However, the current literature has focused primarily on overall pornography use frequency without examining if the associations with relationship and sexual satisfaction differ according to the media used. Moreover, the media included in the definitions of pornography may vary (e.g., videos and pictures only vs also including audio and written material), which might explain the discrepancy in findings. The present study sought to address this limitation by examining the associations between the use of pornography through different media and relationship and sexual satisfaction among couples.

Pornography Use Frequency and Sexual and Relationship Satisfaction

Burgeoning, mostly cross-sectional, intra-individual literature has examined the associations between pornography use frequency and romantic relationship well-being. Relationship satisfaction, the subjective evaluation of one's relationship (Keizer, 2014), and sexual satisfaction, the subjective evaluation of the positive and negative aspects related to one's sexual relationship (Lawrance & Byers, 1995), are key components of couples' overall well-being and happiness (Dyrda et al., 2011; Joel et al., 2020). While most popular media contend that pornography use is a threat to romantic relationships (Montgomery-Graham et al., 2015), qualitative studies have shown that most individuals perceived no negative impacts of pornography use on their romantic relationship, and some even reported positive effects, such as increased satisfaction with a partner, and increased erotic climate in a relationship (Kohut et al., 2017; Shuler et al., 2021).

Quantitative studies on the associations between pornography use frequency and relationship and sexual satisfaction have reported mixed findings. In a review of 30 nationally representative cross-sectional studies, pornography use was either weakly related to lower relationship satisfaction for men and women or unrelated to relationship satisfaction (Perry, 2020). A meta-analysis of 50 studies combining both relationship and sexual satisfaction showed that men's pornography use was related to lower satisfaction, whereas women's use was unrelated to satisfaction (Wright et al., 2017). In a sample of 1234 unmarried heterosexual individuals followed five times over 20 months, using more pornography alone over time was associated with lower relationship satisfaction for men, but higher relationship satisfaction for women (Huntington et al., 2021). In a sample of 617 mixed-sex couples, men's pornography use was related to their own lower sexual satisfaction, while women's use was related to their own higher sexual satisfaction (Poulsen et al., 2013).

As pornography use may evoke specific feelings in couples (e.g., partner's feelings of inadequacy, unrealistic expectations, betrayal; Shuler et al., 2021), it appears relevant to not only examine how one's pornography use is associated

with their own sexual and relationship satisfaction (i.e., actor effects), but also how one's pornography use is related to their partner's sexual and relationship satisfaction (i.e., partner effects). Some cross-sectional, longitudinal, and daily diaries studies found no significant partner effects between a person's pornography use and their partner's relationship and sexual satisfaction (Bóthe et al., 2022a; Muusses et al., 2015; Vaillancourt-Morel et al., 2020; Willoughby & Leonhardt, 2018; Yucel & Gassanov, 2010). Other studies have reported gender differences, with men's pornography use being either unrelated to their partners' satisfaction or associated with their partners' lower relationship and sexual satisfaction (Bridges & Morokoff, 2011; Poulsen et al., 2013), and women's use being related to their partners' higher relationship satisfaction (Bridges & Morokoff, 2011; Poulsen et al., 2013). Thus, there seem to be gender differences for both actor and partner effects, with men's use being more often associated with negative outcomes than women's use. These differences could be explained by the way men and women use pornography, such as the media used.

Pornography Use Through Different Media

Studies showed that pornography is used via multiple media. In a sample of 221 single and dating Spanish adults, 77.1% reported pornography use via the Internet; 12.7% via literature; 3.2% via magazines, drawings or images; and 3.2% via offline videos or movies (Sánchez-Lamadrid et al., 2022). Among 821 non-monogamous men who have sex with men, 96.4% used pornography via the Internet, 57.3% via digital video discs (DVDs), 18.1% via magazines, and 1.7% via other media (Stein et al., 2012). Few studies have examined gender differences in the use of pornography use through different media. In a sample of 1001 undergraduate men and women, women reported greater literary pornography use than men, whereas men reported more visual (i.e., pictures and videos) pornography use than women (Goldsmith et al., 2017). Among 1392 single and dating adults in the United States, men's pornography use included a larger proportion of video use than women's (men $M = 74.89\%$, $SD = 27.97$; women $M = 56.13\%$, $SD = 39.05$), while women reported a larger proportion of written pornography use (men $M = 5.89\%$, $SD = 13.26$; women $M = 28.17\%$, $SD = 34.82$) and other pornography modalities than men (men $M = 1.75\%$, $SD = 12.43$; women $M = 5.40\%$, $SD = 21.67$); however, no gender differences were found for picture use (men $M = 17.11\%$, $SD = 21.82$; women $M = 9.91\%$, $SD = 18.40$; Solano et al., 2018). In a sample of 430 individuals in romantic relationships, among those who used pornography alone since the beginning of the relationship (85.6%, $n = 368$), men were more likely to report using videos (98.5%) and pictures (48.0%), than women (respectively 92.0% and 28.7%), whereas women were significantly more likely to report using

written material (48.9%) than men (24.5%; Kohut et al., 2017). A total of 2% of pornography users used audio material, with no gender differences (Kohut et al., 2017). These limited results suggest significant gender differences in the media used.

In parallel, most current pornography studies do not include a definition of pornography (Marshall & Miller, 2019; Short et al., 2012). Available definitions vary widely in the media included, with some encompassing only videos and pictures (Szymanski & Stewart-Richardson, 2014; Willoughby & Leonhardt, 2018; Wright & Herbenick, 2022; Yucel & Gassanov, 2010), others including written material (Poulsen et al., 2013) and others including pictures, videos, written material, and audio material (Vaillancourt-Morel et al., 2020). This disparity in the media included in the definitions could explain some of the differing results. A similar disparity can be found around the type of contents included, as some include nudity (e.g., Kohut et al., 2017; Short et al., 2012), others specify that pornography excludes nudity unless it is accompanied by sexual behavior (e.g., Hald & Malamuth, 2008), and some do not specify any type of content (e.g., Huntington et al., 2021; Poulsen et al., 2013).

Pornography Use Through Different Media and Relationship and Sexual Satisfaction

According to the sexual script theory, how sexuality unfolds is socially constructed through personal experiences, media, and values (Frith & Kitzinger, 2001; Simon & Gagnon, 1986). Sexual scripts are messages that define how to act during sexual activities and what is considered “good” sex (Frith & Kitzinger, 2001). The acquisition, activation, application (3AM) theory drew from the sexual scripts theory and applied it specifically to pornography use (Wright, 2011). The 3AM theory suggests that sexual scripts may be acquired through pornography use, activated in certain situations, and applied in sexual activities, and that multiple factors could influence the acquisition, activation, and application of pornography sexual scripts (Wright, 2011). One of the factors that could be associated with the acquisition of sexual scripts from pornography is the media used. As different media present different levels of explicitness, they might have different effects on users’ sexual scripts, and on expectations surrounding performance and appearance. Less explicit pornographic media (e.g., audio material, written material) may leave more space for the imagination and impose less restrictive sexual scripts. Pornography use via pictures and videos might bring more precise sexual expectations or sexual scripts, leaving less space for sexual fantasies and be associated with dissatisfaction with the relationship and the couple’s sexual life when specific expectations are not met.

In a sample of 1001 undergraduate men and women, visual pornography use (i.e., pictures and videos) was

associated with sexual insecurities and expectations for partner performance, whereas literary pornography use was not (Goldsmith et al., 2017). These results support the 3AM theory as more explicit media have more negative effects on sexuality, including sexual expectations. Among 221 single and dating Spanish adults, Sánchez-Lamadrid et al. (2022) observed statistical differences in sexual and relationship satisfaction depending on pornography used format (i.e., Internet, literature, magazines, drawings or images, offline videos or movies). Although this study highlights that the media used are related to relationship and sexual satisfaction, it does not consider that participants can use pornography via multiple media and at different frequencies. Moreover, the authors did not report specific data regarding the observed differences. Therefore, studying how pornography use frequency via different media may be associated with sexual and relationship satisfaction could help understanding the mixed findings regarding the link between frequency of pornography use and intimate relationships.

Study Aims

This study aim was to describe the proportion of use of different pornography media (i.e., videos, pictures, audio material, written material), including different contents (i.e., sexual activities and nudity), and to examine gender-based differences in the frequency of use of these media. It is expected that cisgender men will present a higher frequency of video and picture use than cisgender women, and that cisgender women will present a higher frequency of written material use than cisgender men. No differences are expected for audio material use. Moreover, this study examined the associations between an individual’s frequency of use of different pornographic media and their own and their partner’s sexual and relationship satisfaction, while considering potential gender differences. The following hypothesis was proposed: the frequency of use of videos and pictures will be related to actor and partner’s lower sexual and relationship satisfaction, while the frequency of use of pornography via audio and written material will be related to actor and partner’s higher sexual and relationship satisfaction. No gender-based differences are expected as past results suggesting gender-based differences in the association between pornography use and sexual and relationship satisfaction would be better explained by the types of media used. This study included data from two different research projects which were conducted during the COVID-19 pandemic. Therefore, sample in which the participant was recruited (i.e., Zephyr Project or Calypso Project) and COVID-19-related stress were included as control variables in all models. Moreover, relationship duration was included as a control variable in all models

to rule out the role of this potentially confounding variable, as it has been associated with variations in sexual satisfaction (Bühler et al., 2021; Schmiedeberg & Schröder, 2016).

Method

Participants

A convenience sample of 706 adult couples (1368 participants) was recruited through online advertisements and email lists between January 2021 and August 2022. Out of the couples, 93.2% ($n = 617$) were mixed-gender couples and 6.8% ($n = 45$) were same-gender couples. A total of 94.3% ($n = 666$) were cisgender couples and 5.6% ($n = 40$) were sexual and gender diverse couples. They were together between six months and 49 years ($M = 6.92$ years, $SD = 6.54$). In addition, all couples were cohabiting and 16.9% ($n = 119$) were married. Participants were aged 18–71 years ($M_{age} = 32.19$, $SD = 8.75$). Regarding biological sex, 53.3% ($n = 736$) of participants were female, and 46.2% ($n = 632$) were male. In terms of gender identity, 51.8% ($n = 707$) of participants identified as women, 45.6% ($n = 622$) as men, and 2.6% ($n = 36$) reported having a native or cultural gender identity or gender experience, being non-binary, gender fluid, or agender, or questioning their gender identity. Participants were predominantly Caucasian (92.0%, $n = 1258$). A total of 69.3% ($n = 948$) of the participants reported being employed, 19.0% ($n = 260$) being students, 4.5% being on maternity leave ($n = 62$), 3.8% ($n = 52$) being unemployed or on sick leave, 2.3% ($n = 31$) being a homemaker, and 1.1% ($n = 15$) being retired. As for their highest completed education degree, 2.9% ($n = 40$) reported having a primary school degree, 7.4% ($n = 101$) a secondary school degree, 10.5% ($n = 143$) a vocational degree, 26.8% ($n = 366$) a college degree, 32.2% ($n = 441$) a bachelor's degree, 15.4% ($n = 210$) a master's degree, 3.1% ($n = 43$) a doctorate degree, and 0.3% ($n = 4$) a post-doctoral degree.

Procedure

The data used in the present study were collected as part of two different research projects conducted in 2021 and 2022; the Zephyr project and the Calypso project. These projects were advertised as self-report surveys on couples' sexual and relational well-being. For both projects, to be eligible, both partners had to be at least 18 years old and living together for at least six months. Interested participants who entered their contact information online were contacted by a research assistant for a brief telephone screening interview. Eligible couples were then independently directed

to an anonymous survey hosted on the Qualtrics Research Suite, which included the study description and informed consent form. Three attention-testing questions were included in the questionnaires. Participants who failed at least two of these questions were excluded from the study, and their data were deleted.

In the Zephyr project, of the 1249 interested couples, 401 completed the screening. Of these, 372 (744 participants) were eligible and provided informed consent; thus, they were directed to the online survey. Of the 696 participants who started the survey, two failed the attention-testing questions, and their data were deleted. In the Calypso project, of the 1072 interested couples, 398 completed the screening and 382 were eligible to participate. A total of 704 participants started the survey, of which, nine failed the attention-testing questions. Eleven duplicates were removed because some couples participated in both studies. Thus, the final sample used in the present study included 706 couples (1368 individuals). Each partner received CAN\$10 after completing the survey.

Measures

Sex and Gender Identity

Participants were asked about their biological sex ("What sex were you assigned at birth on your original birth certificate?"; "male/man", "female/woman") and their gender identity ("What gender or gender identity do you identify with?"; "man", "woman", "non-binary, genderfluid, multi-gender, or genderqueer", "Indigenous or other cultural gender minority identity (e.g., two-spirit)", "agender or no gender", "prefer not to say", "some gender not listed here; if you wish, tell us how you personally describe your gender:"). For the analyses, participants were divided into three groups to increase the statistical power and simplify the analysis. Participants reporting a female biological sex and woman gender identity formed the cisgender women group (51.5%, $n = 703$), those reporting a male biological sex and a man gender identity formed the cisgender men group (45.1%, $n = 616$), and those who had other combinations of biological sex and gender formed the sex/gender-diverse individuals group (3.4%, $n = 46$). Three participants reported that they preferred not to say their gender identity; thus, they were not included in any of the three gender categories and were coded as missing.

Frequency of Pornographic Media Use

Before answering any pornography-related questions, we provided the following definition to participants: Using pornography means to intentionally look at, read, or listen to: (a) pictures, videos, or films that depict nude individuals or people having sex; or (b) written or audio material that describes

nude individuals or people having sex. Using pornography does not involve viewing or interacting with actual, live, nude individuals, or participating in interactive sexual experiences with other human beings in person or online. For example, participating in live sex chat or a camshow or getting a “lap-dance” in a strip club are not considered pornography use (Kohut et al., 2020).

First, participants were asked about their lifetime pornography use (“Have you ever used pornography in your life?”; 0 = *no*, 1 = *yes*). A total of 93.0% of participants ($n = 1270$) reported lifetime pornography use. If they had viewed pornography in their lifetime, they were asked about their overall frequency of use in the past three months (“In the last THREE months, how often did you use pornography while alone (i.e., without your partner)?”; 0 = *never in the last three months* to 7 = *many times per day*). Participants’ naturally “missing” answers who had not used pornography in their life ($n = 96$, 7.0%) were recoded as 0 (*never*) for further analyses (Böthe et al., 2022b).

Participants were then asked about their frequency of use of pornographic videos, pictures, written material and audio material using eight items (“In the last THREE months, how often did you use the following types of pornography while alone [i.e., without your partner]?”; “Videos of films that depict nude individuals [not having sex]”, “Videos or films that depict people having sex”, “Pictures that only depict nude individuals [not having sex]”, “Pictures that depict people having sex”, “Audio material that only depict nude individuals [not having sex]”, “Audio material that depict people having sex”, “Written material that only depict nude individuals [not having sex]” and “Written material that depict people having sex”). Each item was rated on an eight-point Likert scale (0 = *never in the last three months* to 7 = *many times per day*). As pornography was defined as the use of each media depicting either nude individuals or people having sex, and to avoid underestimating a media use frequency for people using only one content, the highest score between the nudity and the sexual activity item was picked for each media score. Considering the skewed distribution of the audio and written material variables, they were coded as dichotomous variables (0 = *no use in the past three months*, 1 = *use in the past three months*).

Sexual Satisfaction

Satisfaction with one’s sexual relationship with their partner was measured using the Global Measure of Sexual Satisfaction (Lawrance & Byers, 1995). The five items were rated on seven-point bipolar scales (good-bad, pleasant-unpleasant, positive-negative, satisfying-unsatisfying, valuable-worthless). The sum scores ranged from 5 to 35, with higher scores indicating higher sexual satisfaction. This measure

showed excellent internal consistency in the present sample ($\alpha = 0.93$).

Relationship Satisfaction

Satisfaction with one’s relationship with their partner was measured using a four-item version of the Dyadic Adjustment Scale (Sabourin et al., 2005; Spanier, 1976). The four items were rated on six or seven-point Likert scales (0 = *all the time*, 5 = *never*; 0 = *extremely unhappy*, 6 = *perfectly happy*). Sum scores ranged from zero to 21, with higher scores indicating higher relationship satisfaction. This measure showed excellent internal consistency in the present sample ($\alpha = 0.76$).

Control Variables

A variable was created to differentiate the participants belonging to the two samples (0 = Zephyr Project, 1 = Calypso Project). COVID-19-related stress was assessed using the following question: “In the last THREE months, how would you rate the amount of stress in your life related to the COVID-19 pandemic?”. Participants indicated their level of stress on a seven-point Likert scale (1 = *no stress*, 7 = *extreme stress*). Relationship duration was measured using the following question: “How long have you been in your current romantic relationship?”. The mean score of both partners’ responses was used to determine relationship duration.

Statistical Analyses

SPSS 28 and Mplus 8.6 (Muthén & Muthén, 2017) were used for statistical analyses. Descriptive statistics on the frequency of use of each pornographic medium (i.e., videos, pictures, audio material, and written material) and content (i.e., nudity and sexual activities) were calculated for the total sample and for each gender. Cisgender women, cisgender men, and gender/sex diverse individuals were compared in terms of frequency of use of different pornography media using linear regression, in which media use frequency and dummy-coded gender variables’ means and intercepts were constrained to be equal between each partner to account for data nonindependence.

To examine the associations between each partner’s frequency of use of different pornographic media (i.e., videos, pictures, written material and audio material) and sexual and relationship satisfaction, controlling for sample in which the participant was recruited, relationship duration, and COVID-19-related stress, four actor-partner interdependence models (APIM; Kenny et al., 2020) were used. The APIM allows to examine the associations between one’s individual scores and their own outcomes (actor effects), controlling for partner effects, as well as the associations between one’s scores and their partner’s scores (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 partners within all dyads), the dyads were considered indistinguishable. Thus, we randomly assigned each partner to “partner 1” and “partner 2”, and all parameters were constrained to be equal between partners (i.e., means, variances, actor effects, and partner effects). Then, we examined the potential moderating role of gender (with dummy coded gender variables) in the associations between frequency of a media use and relationship and sexual satisfaction in four subsequent models (i.e., gender*video use, gender*picture use, gender*audio material use, and gender*written material use). Simple slope tests were used to report the association for each gender when the association between the interaction and outcome was significant. All models were tested using the robust maximum-likelihood (MLR) estimator. Using Little’s test for MCAR, no discernible pattern of missing data was found in the data, $\chi^2(65) = 40.40, p = 0.993$. Thus, missing data were handled using full information maximum likelihood (FIML; Newman, 2014). Commonly used goodness-of-fit indices

were examined to evaluate models (Brown, 2015): Comparative Fit Index (CFI ≥ 0.95 for good, ≥ 0.90 for acceptable); Tucker–Lewis Index (TLI; ≥ 0.95 for good, ≥ 0.90 for acceptable), and Root-Mean-Square Error of Approximation (RMSEA; ≤ 0.06 for good, $\leq .08$ for adequate).

Results

Proportion of Use of Pornography Through Different Media and Gender Differences in the Frequency of Use

Descriptive statistics related to the proportion of overall and pornographic media use in the last three months are shown in Table 1. In total, 73.70% of participants reported pornography use in the past three months. Among all genders, the most popular pornographic medium was videos (86.99% of cisgender men, 57.33% of cisgender women, and 82.22% of gender-diverse individuals). The second most popular medium was pictures for cisgender men (54.15%),

Table 1 Proportion of pornography use via different media among cisgender men, cisgender women, gender/sex-diverse individuals and the total sample

| <i>(n = 703)</i> | A. Cisgender men <i>(n = 615)</i> | | B. Cisgender women | | C. Gender/sex-diverse individuals <i>(n = 45)</i> | | Total <i>(N = 1366)</i> | |
|-----------------------------------|--------------------------------------|----------------|--------------------|----------------|--|----------------|-------------------------|----------------|
| | Mean (SD) | % (<i>n</i>) | Mean (SD) | % (<i>n</i>) | Mean (SD) | % (<i>n</i>) | Mean (SD) | % (<i>n</i>) |
| Overall pornography use frequency | 3.64 (2.00) | 87.80 (540) | 1.56 (1.70) | 60.31 (424) | 3.09 (1.95) | 88.88 (40) | 2.55 (2.11) | 73.72 (1007) |
| Overall video use | 3.48 (1.97) | 86.99 (535) | 1.44 (1.63) | 57.33 (403) | 2.73 (1.98) | 82.22 (37) | 5.00 (2.00) | 71.60 (978) |
| Sexual activities videos | 3.43 (1.99) | 85.85 (528) | 1.43 (1.63) | 56.47 (397) | 2.69 (2.00) | 82.22 (37) | 2.39 (2.06) | 70.64 (965) |
| Nudity videos | 1.32 (1.96) | 40.81 (251) | 0.19 (0.70) | 9.96 (70) | 0.51 (1.14) | 22.22 (10) | 0.71 (1.53) | 24.38 (333) |
| Videos only | | 31.38 (193) | | 26.17 (184) | | 17.78 (8) | | 28.18 (385) |
| Overall picture use | 1.95 (2.22) | 54.15 (333) | 0.33 (0.90) | 16.93 (119) | 1.11 (1.72) | 44.44 (20) | 2.67 (2.52) | 34.70 (474) |
| Pictures only | | 0.65 (4) | | 0.57 (4) | | 6.52 (3) | | 0.81 (11) |
| Sexual activities pictures | 1.55 (2.12) | 43.90 (270) | 0.23 (0.76) | 11.66 (82) | 1.07 (1.74) | 40.0 (18) | 0.86 (1.69) | 27.23 (372) |
| Nudity pictures | 1.65 (2.13) | 48.62 (299) | 0.20 (0.73) | 10.95 (77) | 0.58 (1.12) | 31.11 (14) | 0.87 (1.70) | 28.70 (392) |
| Overall audio use | 0.07 (0.26) | 7.32 (45) | 0.07 (0.26) | 7.25 (51) | 0.16 (0.37) | 15.56 (7) | 0.33 (0.58) | 7.61 (104) |
| Audio only | | 0.00 (0) | | 0.00 (0) | | 0.00 (0) | | 0.00 (0) |
| Sexual activities audio | 0.07 (0.25) | 6.67 (41) | 0.07 (0.26) | 7.11 (50) | 0.13 (0.34) | 13.33 (6) | 0.07 (0.04) | 7.17 (98) |
| Nudity audio | 0.05 (0.23) | 5.37 (33) | 0.03 (0.16) | 2.70 (19) | 0.04 (0.21) | 4.44 (2) | 0.04 (0.20) | 4.03 (55) |
| Overall written material use | 0.22 (0.42) | 22.11(136) | 0.29 (0.45) | 28.59 (201) | 0.44 (0.50) | 44.44 (20) | 1.00 (0.00) | 26.35 (360) |
| Written only | | 0.16 (1) | | 4.27 (30) | | 0.00 (0) | | 2.27 (31) |
| Sexual activities written | 0.21 (0.41) | 21.30 (131) | 0.28 (0.45) | 27.60 (194) | 0.44 (0.50) | 44.44 (20) | 0.25 (0.44) | 25.48 (348) |
| Nudity written | 0.12 (0.32) | 11.71 (72) | 0.09 (0.29) | 9.25 (65) | 0.11 (0.32) | 11.11 (5) | 0.11 (0.31) | 10.54 (144) |

Possible values on all variables range from 0 to 7. Videos only, pictures only, audio only and written only refer to the proportion of participants in each group who reported using pornography only via this media. Nudity videos, nudity pictures, nudity audio and nudity written refer to the frequency of use of pornography via the media, depicting nudity only. Sexual activities videos, sexual activities pictures, sexual activities audio and sexual activities written refer to the frequency of use of pornography via the media, depicting people having sexual activities. Overall video use, overall picture use, overall audio use, and overall written material use refer to the highest value between the frequency of use of a media depicting nudity and the same media depicting people having sexual activities. Total sample size here is smaller than the whole sample ($n = 1368$) as two participants did not answer any of the pornography use questions, but they were included as members of the dyads in other analyses

and written material for cisgender women (28.59%). Written material was as popular as pictures for gender-diverse individuals (44.44%). The third most popular medium was written material for cisgender men (22.11%), and pictures for cisgender women (16.93%). The least popular medium was audio material for all genders (7.32% of cisgender men, 7.25% of cisgender women, 15.56% of gender-diverse individuals). A total of 26.28% of the participants reported no pornography use in the past three months, 31.26% reported only one medium use, and the remaining 42.5% used at least two types of pornographic media. Regarding the content of use, for each medium, depictions of sexual activities were systematically used more frequently than depictions of nudity. Frequency of use of videos across all groups was similar to overall pornography use frequency (e.g., 73.72% of the total sample used pornography, and 71.60% used it through videos).

Using linear regression, potential gender differences in the frequency of use of pornographic videos, pictures, audio, and written materials were examined. No significant gender differences were found in the frequency of audio material use. Significant differences were observed across genders in pornographic videos, pictures, and written material use frequency. Cisgender men used videos and pictures most frequently, followed by gender/sex-diverse individuals (videos: $B = -0.82$, $SE = 0.28$, $p = 0.003$; pictures: $B = 0.85$, $SE = 0.26$, $p = 0.100$), and cisgender women (videos: $B = -2.04$, $SE = 0.09$, $p < 0.001$; pictures: $B = -1.62$, $SE = 0.09$, $p < .001$). Gender/sex diverse individuals showed the most frequent use of pornographic written material ($B = 0.21$, $SE = 0.07$, $p = 0.002$), followed by cisgender women ($B = 0.07$, $SE = 0.02$, $p = 0.002$) and cisgender men.

Associations Between the Frequency of Pornographic Media Use and Sexual and Relationship Satisfaction

Descriptive statistics and correlations between frequency of use of different pornographic media, sexual and relationship satisfaction, relationship duration, COVID-19-related stress, and sample in which the participant was recruited are shown in Table 2. Significant moderate to strong positive associations were observed between one's frequency of use of a pornographic medium and the frequency of use of other media, and weak to strong positive associations between one's frequency of use of a pornographic medium and their partner's frequency of use the same medium. Video use had weak negative associations with participants' relationship satisfaction and partner's sexual satisfaction. Picture use had a weak negative association with participants' own sexual satisfaction and moderate negative associations with own relationship satisfaction and partner's sexual satisfaction. Audio material use had no significant association with their own sexual and relationship satisfaction, while their written material use had a weak negative association with their own sexual satisfaction. COVID-19-related stress had a moderate, negative association with video use and weak negative associations with picture use and sexual satisfaction. COVID-19 related stress had weak to moderate positive associations with partner's video use, picture use, and audio material use, weak negative association with partner's sexual satisfaction, and moderate negative association with partner's relationship satisfaction. Relationship duration had weak negative associations with video use, sexual satisfaction, relationship satisfaction, and COVID-19-related stress. Belonging to the Calypso project had a weak negative association with video use, moderate positive association with sexual satisfaction,

Table 2 Correlations and descriptive statistics on pornographic media use, COVID-19-related stress, relationship duration and sample for the total sample (N = 1368)

| | Range | Mean (SD) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|----------------------------------|-------------------|--------------|-------------|--------------|---------------|---------------|---------------|---------------|---------------|-------|
| 1. Pornographic video | 0–7 | 2.41 (2.06) | -.05 | .54*** | .13*** | .23*** | -.05 | -.10*** | -.11*** | |
| 2. Pornographic pictures | 0–7 | 1.09 (1.84) | -.13*** | -.06* | .19*** | .27*** | -.06* | -.12*** | -.06* | |
| 3. Pornographic audio material | 0, 1 | 0.08 (0.27) | .03 | .11*** | .13*** | .30*** | -.01 | -.03 | .01 | |
| 4. Pornographic written material | 0, 1 | 0.26 (0.44) | .15*** | .17*** | .10*** | .19*** | -.06* | -.05 | .04 | |
| 5. Sexual satisfaction | 5–35 | 28.76 (6.23) | -.08** | -.11*** | -.04 | -.01 | .52*** | .49*** | -.06* | |
| 6. Relationship satisfaction | 0–21 | 16.47 (3.07) | .00 | -.04 | -.01 | .00 | .32*** | .53*** | -.10*** | |
| 7. COVID-19-related stress | 1–7 | 3.31 (1.51) | .11*** | .14*** | .06* | .05 | -.08** | -.11*** | .27*** | |
| 8. Relationship duration | 0.5–49 | 6.93 (6.58) | -.10*** | -.00 | .02 | -.01 | -.10*** | -.08** | -.08** | |
| 9. Sample ^a | 0, 1 ^a | 0.51 (0.50) | -.06* | -.05 | .05 | -.01 | .10*** | .04 | -.17*** | .10** |

Correlations above de diagonal in bold are actor associations while correlations on the diagonal and under refer to partner associations

SD = Standard deviation

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

^a0 refers to the Zephyr project and 1 refer to the Calypso project

and moderate negative association with COVID-19-related stress.

Four models (i.e., video, picture, audio material, written material) were estimated using the APIM, including the frequency of use of a pornographic medium as a predictor, sexual and relationship satisfaction as the outcomes, and COVID-19-related stress, relationship duration, and sample in which the participant was recruited as control variables. The results are presented in Table 3. For the video use model, a person's frequency of video use was associated with their own lower sexual satisfaction ($\beta = -0.06, p = 0.019$), their partner's lower sexual satisfaction ($\beta = -0.10, p = 0.001$), and their own lower relationship satisfaction ($\beta = -0.11, p < 0.001$). Gender did not moderate any of the associations (all $ps > 0.052$). This model explained 3.7% of the variance in sexual satisfaction and 3.9% of the variance in relationship satisfaction, and demonstrated excellent fit to the data ($\chi^2[27, N = 706] = 23.02, p = 0.722$; CFI = 1.00; TLI = 1.00; RMSEA = 0.00; 90% CI [0.00, 0.02]).

For the picture use model, a person's frequency of picture use was associated with their partner's lower sexual satisfaction ($\beta = -0.11, p < 0.001$) and their own lower relationship satisfaction ($\beta = -0.12, p < 0.001$). Gender did not moderate any of the associations (all $ps > 0.053$). This model explained 4.0% of the variance in sexual satisfaction and 4.2% of the variance in relationship satisfaction, and demonstrated excellent fit to the data ($\chi^2[27, N = 706] = 18.08,$

$p = 0.901$; CFI = 1.00; TLI = 1.00; RMSEA = 0.00; 90% CI [0.00, 0.01]).

For the audio material use model, audio use was not significantly associated with their own and their partner's sexual and relationship satisfaction when examining these associations in the entire sample. This model demonstrated excellent fit to the data ($\chi^2[27, N = 706] = 19.03, p = 0.869$; CFI = 1.00; TLI = 1.00; RMSEA = 0.00; 90% CI [0.00, 0.02]). However, the association between one's audio use and their own sexual satisfaction was moderated by gender, as the dummy coded women interaction term ($B = 3.26, SE = 1.52, p = 0.032$) was significant. The simple slope test indicated that cisgender women's audio use was associated with their own higher sexual satisfaction ($B = 1.93, SE = 0.82, p = 0.019$), whereas this association was not significant for cisgender men's audio use ($B = -1.33, SE = 1.19, p = 0.263$) or gender/sex diverse individuals' audio use ($B = -1.59, SE = 2.70, p = 0.557$). Moreover, the association between a person's audio use and their partner's sexual satisfaction was moderated by gender, as the dummy coded women interaction term ($B = 4.03, SE = 1.59, p = 0.011$) was significant. The simple slopes test indicated that cisgender men's audio use was associated with their partner's lower sexual satisfaction ($B = -2.79, SE = 1.27, p = 0.028$), whereas this association was not significant for cisgender women's use ($B = 1.24, SE = 0.87, p = 0.154$) and gender/sex diverse individuals' use ($B = -0.35, SE = 2.35, p = 0.880$). This model explained 6.00% of the variance in

Table 3 Associations between actor and partner pornography media use and relationship and sexual satisfaction

| | β | B | SE | 95% CI | <i>p</i> |
|-----------------------------------|-------------|--------------|-----|---------------------|-----------------|
| Video use model | | | | | |
| Sexual satisfaction—actor | -.06 | -0.19 | .08 | -0.36, -0.03 | .019 |
| Sexual satisfaction—partner | -.10 | -0.29 | .08 | -0.45, -0.13 | .001 |
| Relationship satisfaction—actor | -.11 | -0.17 | .04 | -0.25, -0.08 | <.001 |
| Relationship satisfaction—partner | -.01 | -0.02 | .04 | -0.10, 0.07 | .704 |
| Picture use model | | | | | |
| Sexual satisfaction—actor | -.06 | -0.19 | .10 | -0.39, -0.00 | .054 |
| Sexual satisfaction—partner | -.11 | -0.38 | .11 | -0.59, -0.17 | <.001 |
| Relationship satisfaction—actor | -.12 | -0.20 | .05 | -0.30, -0.11 | <.001 |
| Relationship satisfaction—partner | -.04 | -0.06 | .05 | -0.16, 0.03 | .205 |
| Audio material use model | | | | | |
| Sexual satisfaction—actor | -.00 | -0.01 | .72 | -1.41, 1.39 | .990 |
| Sexual satisfaction—partner | -.04 | -0.85 | .76 | -2.34, 0.63 | .261 |
| Relationship satisfaction—actor | -.02 | -0.27 | .35 | -0.96, 0.42 | .445 |
| Relationship satisfaction—partner | .00 | 0.05 | .35 | -0.65, 0.74 | .894 |
| Written material use model | | | | | |
| Sexual satisfaction—actor | -.06 | -0.84 | .39 | -1.61, -0.07 | .033 |
| Sexual satisfaction—partner | -.01 | -0.11 | .40 | -0.89, 0.68 | .791 |
| Relationship satisfaction—actor | -.04 | -0.30 | .19 | -0.68, 0.08 | .126 |
| Relationship satisfaction—partner | .01 | 0.07 | .20 | -0.32, 0.45 | .735 |

Coefficients in bold are significant at $p < .05$

β standardized coefficient; B unstandardized coefficient; SE standard error

sexual satisfaction and 4.7–5.0% of the variance in relationship satisfaction.

For the written material use model, a person's written material use was associated with their own lower sexual satisfaction ($\beta = -0.06$, $p = 0.032$). Gender did not moderate any of the associations (all $ps > 0.080$). This model explained 2.9% of the variance in sexual satisfaction and 2.9% of the variance in relationship satisfaction, and demonstrated excellent fit to the data ($\chi^2[27, N = 706] = 33.70$, $p = 0.175$; CFI = 0.99; TLI = 0.99; RMSEA = 0.02; 90% CI [0.00, 0.04]).

Discussion

This study examined the proportion of use of different pornographic media (i.e., videos, pictures, audio material, and written material), including different contents (i.e., sexual activities and nudity), gender-based differences in the frequency of use of these media, and the associations between an individual's frequency of use of different pornographic media and their own and their partner's sexual and relationship satisfaction, considering potential gender differences. The results indicated multiple gender-based differences, as well as different associations with relationship and sexual satisfaction depending on the pornographic media used.

Gender Differences in the Proportion of Use of Pornography Through Different Media

In line with previous studies (Kohut et al., 2017), our results demonstrated that videos were the most used pornographic medium in our sample. Videos stand out from other media; they were used twice as much as pictures and were used by almost everyone who reported pornography use. This result supports definitions of pornography focusing on videos (e.g., Wright et al., 2014). Moreover, the results indicated that cis men used pornography via videos and pictures more often than cis women, and that cis women reported higher written material use than cis men. These results perfectly replicate Kohut and his colleagues' (2017) results on the differences between men and women and other studies showing that women report greater literary pornography use than men, whereas men report more visual (i.e., pictures and videos) pornography use than women (Goldsmith et al., 2017). Cis women may use pornographic videos less frequently than cis men as many women find it risky as they fear of being involuntarily exposed to contents they consider problematic (e.g., inconsiderate of the actors' well-being, violence or abuse toward women, creating unrealistic expectations for their body image and sexual behaviors; Chadwick et al., 2018). Women may find written material safer, as it does not imply the work of actors or direct social comparisons to

bodies or performance, while being distracting and relaxing (Kraxenberger et al., 2021). Alternatively, the higher popularity of written material among cis women could be explained by women's higher book-reading frequency compared to men (Pew Research Center, 2016). Furthermore, the results showed that gender/sex-diverse individuals had the highest proportion of written material use. As gender/sex-diverse individuals may find mainstream pornographic videos harmful to their community (i.e., reinforcing negative stereotypes, and contributing to transgender-based violence; Dawson et al., 2020), they may use written material to find a more positive representation of themselves or because it leaves more space for imagination and identification with characters. Indeed, some past findings on erotic fanfictions suggested that these contents, produced by and for women and LGBTIQ+ individuals, could provide users sexual confidence and identity validation (Döring, 2021). The absence of significant differences between genders in audio material use replicates past results (Kohut et al., 2017). However, it could be explained by the small number of participants reporting using audio material.

Pornography Use Through Different Media and Relationship and Sexual Satisfaction

Our results indicated that a person's pornographic video use was negatively associated with their own sexual and relationship satisfaction, whereas a person's pornographic pictures use was negatively associated with their own relationship satisfaction. These associations did not differ between genders. These findings expand on past results suggesting that overall pornography use is usually associated with lower sexual and relationship satisfaction in men and either unrelated to women's satisfaction or related to women's higher sexual and relationship satisfaction (Huntington et al., 2021; Perry, 2020; Poulsen et al., 2013; Wright et al., 2017). Indeed, in line with our hypothesis, our results showed that it is specifically when pornography is used via explicit media (i.e., videos and photos), that it is related to lower sexual and relationship satisfaction. As suggested by the 3AM theory (Wright, 2011), sexual scripts may be acquired through pornography. The sexual scripts depicted in pornographic videos and photos are more visually explicit which may limit the reliance on one's own fantasies and imagination, while also failing to accurately represent reality. This could interfere with sexual and relationship satisfaction as idealized sexual scripts expectations are impossible to meet in partnered sexual activities. In addition, the use of these media could be associated with lower sexual and relationship satisfaction because of the higher exposure to explicit unrealistic standards, as previous findings have shown that individuals who use more visual pornography have more body- and performance-related insecurities during sex (Goldsmith et al., 2017), and a lower

body image (Paslakis et al., 2022). Alternatively, these results could suggest that less-satisfied individuals use these media to cope with their dissatisfaction.

Moreover, the results also showed that a person's use of pornography via videos and pictures use was associated with their partner's lower sexual satisfaction, regardless of their gender which is consistent with our hypothesis. These results help contextualise the mixed findings on the associations between a person's pornography use and their partner's sexual satisfaction (Muusses et al., 2015; Poulsen et al., 2013; Vaillancourt-Morel et al., 2020; Willoughby & Leonhardt, 2018; Yucel & Gassanov, 2010) by highlighting that it is more specifically the use of more explicit media (i.e., pictures and videos) that are associated with partner lower sexual satisfaction. With prior findings showing that visual pornography use is associated with higher expectations of partner performance and attractiveness (Goldsmith et al., 2017), these results could be explained by the unrealistic partner expectations that these media potentially bring given their explicitness, which could affect the partners themselves. In line with the 3AM theory, these more explicit media may more strongly influence the acquisition of pornographic sexual scripts that are not necessarily in line with the expected scripts of the partner, thus being less satisfying for the partner.

Contrary to our expectations that using written material would be related to positive outcomes, results showed that a person's written material use was associated with their own lower sexual satisfaction regardless of their gender. This finding contradicted previous studies suggesting that the use of written material was not significantly related to sexual expectations and insecurities (Goldsmith et al., 2017). The descriptions of emotional affect in written material could create an idealized vision of how one should feel during sexual activities, which could explain lower sexual satisfaction when confronted with reality. It is also possible that written material is used to cope with sexual dissatisfaction. However, it is still noteworthy that written material use, in contrast to video and picture use, was not significantly related to partner outcomes and was only related to users' sexual satisfaction.

As for audio material use, women's use was related to their own higher sexual satisfaction. These findings highlight a more complex relationship than the expected positive relationship between audio pornography use and sexual and relationship satisfaction, as these associations depend on gender. These results support previous findings suggesting that pornography use is associated with more positive outcomes in women and that men's pornography use is related to more negative outcomes for their partner (Bridges & Morokoff, 2011; Poulsen et al., 2013; Wright et al., 2017). A possible reason for these differences is that audio pornography might serve a different purpose for different genders. For cis women, using audio pornography might be a way to find sexual excitement without being exposed to risky sexual

contents as it might imply less objectification, questions surrounding the work conditions of female actors, etc. Moreover, the absence of visual stimuli eliminates any potential comparisons to beauty standards. It might also reduce the odds of acquiring specific sexual scripts that are unrealistic of partnered sexual activity. Surprisingly, we also found that cis men's use of audio pornography was associated with their partners' lower sexual satisfaction, which was contrary to our hypothesis. As audio pornography use has never been studied previously, this result should be corroborated and clarified by future research examining the contexts in which cis men's audio pornography use is related to their partners' lower sexual satisfaction. Results related to audio pornography use should be interpreted with caution and will need to be replicated, as the proportion of audio material use was low.

Limitations and Future Studies

Although this study has strengths such as the use of a dyadic design that allowed the examination of both actor and partner effects, our results should be considered alongside some limitations. The cross-sectional nature of the data limits the causal inferences drawn from our findings. Longitudinal studies are required to clarify the directionality of these associations. Some biases might also be induced by the self-reported nature of our instruments (e.g., social desirability and memory bias) and self-selection (i.e., our convenience sample), which may limit the validity of our findings. The use of daily diaries and representative samples could reduce these biases. Although we included sex/gender-diverse individuals in our sample, their number was small, which led us to group them into one gender category for the analysis. As previous studies have reported gender-based differences in the associations between pornography use and sexual and relationship satisfaction (Vaillancourt-Morel et al., 2019; Wright et al., 2017), it is possible that people with different gender identities (e.g., transgender women, transgender men, non-binary individuals) have different experiences in relation to their pornography use. Future studies should oversample sex/gender-diverse individuals to deepen our findings. Future research should also consider other contextual factors that could help nuance these associations (Campbell & Kohut, 2017). For instance, we only considered frequency of use via each medium and did not assess the actual duration of each use. Media use motivations might also help clarify the associations between a media use and sexual and relationship satisfaction, as some motivations might be more related to specific media, and previous findings suggested that pornography use motivations were related to effects of pornography use (Böthe et al., 2022a). Moreover, given the limited number of participants, our study examined the different media in separate models, making it impossible to determine which media was more strongly related to relational outcomes over

and above the others. Future studies should include more couples to include simultaneously all media in one model and identify which one drives the associations. Finally, our findings should be interpreted considering the modest amount of variance in relationship and sexual satisfaction explained by our models. Unsurprisingly, other variables than frequency of media use, COVID-19-related stress, sample membership, and relationship duration may explain sexual and relationship satisfaction.

Conclusions and Implications

This study highlights the importance of considering contextual aspects of pornography use when examining its associations with romantic relationships (Campbell & Kohut, 2017). Our results suggest that pornography use through different media is variably associated with sexual and relationship satisfaction, indicating that the media used should be included in theoretical models on the potential effects of pornography use. Our findings bring support to the 3AM theory as it suggests that how sexual scripts are acquired may be related to couples' relationship and sexual satisfaction (Wright, 2011). Moreover, similar associations found for video and picture use support the definitions of pornography including videos and pictures only (Szymanski & Stewart-Richardson, 2014; Willoughby & Leonhardt, 2018; Wright & Herbenick, 2022; Yucel & Gassanov, 2010). Although including all media that could be considered pornography in one definition might be more inclusive, lumping all media into one concept does not consider the differential associations that media can have with romantic relationships. Furthermore, the small number of gender differences found in our data suggests that it is more specifically the media used that is associated with pornography outcomes than overall pornography use frequency itself. These findings highlight the need for clinicians to consider that pornography can be used through different media, and to assess for the types of media used when asking about the frequency of pornography use to individuals and couples consulting for relationship or sexual issues. Although past studies have highlighted that pornography has different connotations when used in a relationship (Shuler et al., 2021; Willoughby & Leonhardt, 2018), reactions and attitudes toward pornography may differ depending on the media used.

Funding This study was supported by grants from the Social Sciences and Humanities Research Council (SSHRC) and the Fonds de recherche du Québec—Société et culture to Marie-Pier Vaillancourt-Morel. Marie-Chloé Nolin is supported by a fellowship from the SSHRC. Marie-Pier Vaillancourt-Morel is supported by a Research Chair from the Université du Québec à Trois-Rivières and a career award from the Fonds de recherche du Québec—Santé (FRQ-S). The data, material, and code related to this study are available upon request to the last author.

Declarations

Conflicting Interests The authors declared no conflicts of interest with respect to the authorship or the publication of this article.

Ethical Approval This study was approved by the Université du Québec à Trois-Rivières' Institutional Review Board.

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