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ABSTRACT

Pornography offers a wide variety of sexual contents and has documented potential positive (e.g., higher sexual satisfaction) and negative associations (e.g., lower sexual function) with sexuality. The aims of this study were to describe the proportion of use of five different contents of pornography (i.e. group sex, passion and romance, gender-bending, taboo transgression and forbidden sex, power, control, and rough sex pornography), to examine gender-based differences in the frequency of use of these contents, and to examine the associations between the frequency of use of these contents and sexual satisfaction and function, considering potential differences among genders and individuals with and without a romantic or sexual partner, and controlling for frequency of masturbation. A sample of 827 young adults (503 women; M_{age} = 23.44) completed online self-report questionnaires. Results of path analysis indicated that, controlling for frequency of masturbation, the use of passion and romance pornography was associated with higher sexual satisfaction, whereas the use of power, control, and rough sex pornography was associated with lower sexual satisfaction. Cisgender men's use of power, control, and rough sex pornography was also associated with lower sexual function. These findings suggest different associations between pornography use and sexual satisfaction and function depending on the pornographic contents used.

Pornography is now easily accessible and offers a wide variety of sexual contents. In nationally representative and large-scale studies, 63% to 68% of adolescents (Bőthe et al., 2020; Wright et al., 2020) and 70% to 94% of adults (Grubbs, Kraus, et al., 2019; Herbenick et al., 2020; Lewczuk et al., 2020; Rissel et al., 2017) reported lifetime pornography use, while 23% to 40% of adolescents (Lobe et al., 2011; Wolak et al., 2007) and 33% to 63% of young adults reported past-year use (Regnerus et al., 2016). Pornography users steadily increased in number during the past decades (Perry & Schleifer, 2019; Price et al., 2016) and are over-represented by young male adults who report using it at least once a month (Herbenick et al., 2020). Women also report using pornography, although at lower rates and frequency than men (Carroll et al., 2017; Poulsen et al., 2013). Thus, pornography use is part of most young adults' sexuality.

In parallel, sexual dysfunctions and dissatisfaction also rose in young adults in the last decades (Martins & Abdo, 2010; Mialon et al., 2012; Mulhall et al., 2008), prompting some researchers and several popular media outlets to tie it to pornography's growing popularity (Montgomery-Graham et al., 2015; Park et al., 2016). However, scientific results are divergent, with some studies suggesting that pornography use is related to lower sexual satisfaction and function, and others, to higher sexual satisfaction and function (Dwulit & Rzymski, 2019; Hoagland & Grubbs, 2021; Vaillancourt-Morel et al.,

2019; Wright et al., 2017). This suggests that contextual factors may be at play to account for the mixed sexual outcomes of pornography use. The content of pornography used is one of the multiple factors suggested in recent conceptual frameworks that may help contextualize pornography use and disentangle its links with sexuality (Campbell & Kohut, 2017; Willoughby et al., 2020). However, how pornographic content used is related to sexual satisfaction and function remains unknown. The main goal of this study was to examine the associations between pornography content and sexual satisfaction and function in young adults.

Pornography Use and Sexual Satisfaction and Function

The evaluation of one's sexual life includes cognitive and affective aspects (Byers & Rehman, 2014) such as sexual satisfaction (i.e., the subjective evaluation of positive and negative aspects of one's sexuality; Lawrance et al., 2019) and sexual function (i.e., desire, arousal, orgasm, pain, overall satisfaction, intercourse satisfaction; Rosen et al., 2000; Rosen et al., 1997). A mostly cross-sectional literature has examined the associations between pornography use and sexuality, while focusing on frequency of overall pornography use. These studies have shown that pornography use frequency is negatively associated with men's sexual satisfaction, with small effect sizes, whereas

in women, it is rather unrelated or positively related to sexual satisfaction (e.g., Bridges & Morokoff, 2011; Leonhardt & Willoughby, 2019; Muusses et al., 2015; Poulsen et al., 2013; Wright et al., 2017; Yucel & Gassanov, 2010). As for sexual function, qualitative studies showed that most pornography users report no impacts or positive effects of their pornography use, whereas some users reported negative effects. For instance, some users report how pornography use decreases their desire for partnered sexual activities, along with difficulties achieving and maintaining sexual arousal or reaching orgasm, whereas others reported that pornography use increases their sexual desire and enhances their orgasm (Grov et al., 2011; Kohut et al., 2016). Quantitative studies also report mixed findings for sexual function, with some studies reporting that pornography use is unrelated to erectile dysfunction, cross-sectionally (Landripet & Štulhofer, 2015; Prause & Pfaus, 2015) and over a one-year period (Grubbs & Gola, 2019), and others showing that pornography use is associated with higher sexual desire and sexual function in both men and women with small effect sizes (Blais-Lecours et al., 2016; Bőthe et al., 2021; Willoughby et al., 2020). As all these studies examined the frequency of pornography use without considering the content, they might have failed to capture the potential differential effects of the pornographic contents used on sexuality.

Contents of Pornography Used

The Antecedents-Context-Effects theoretical model (Campbell & Kohut, 2017) contends that pornography use is driven by multiple antecedents that determine its context (e.g., frequency of use, solitary use, joint use, hidden use, content of use), which in turn may have a variety of consequences (Campbell & Kohut, 2017). Among different contexts of pornography use, the pornographic content might represent an important variable in relation with sexuality.

Several studies showed that the contents of popular pornographic videos are highly diverse (Gorman et al., 2010; Hald & Štulhofer, 2016b), and that users, especially young adults, report a broad range of searches among all pornography contents (Ballester-Arnal et al., 2022; Ogas & Gaddam, 2011). Gorman et al. (2010) described that the content of 45 randomly selected online videos depicted a variety of themes (e.g., showed domination 33% of the time, exploitation 22%, reciprocity 20%, and autoeroticism 22%) and sexual behaviors (i.e., 90% involved genital stimulation, 79% fellatio, 68% vaginal penetration, 50% kissing, 38% female masturbation, 37% cunnilingus, 32% anal penetration, and 13% male masturbation). Other studies have highlighted different levels of violence (Shor & Seida, 2019), sexism (Klaassen & Peter, 2015), and racism (Shor & Golriz, 2019) depicted in pornographic videos. A large-scale study conducted among 2,337 frequent pornography users from Croatia who reported their arousal level toward 27 pornographic contents showed that heterosexual men and women were more aroused by "vanilla" sexual themes (e.g., oral sex, vaginal sex, and masturbation), group sex themes (e.g., threesomes, orgies, and gang bangs), and, for heterosexual men specifically, by female-specific sexual themes (e.g., big breasts, mature/'mother I would like to fuck' (MILF)

women, Lolita/teen; Hald & Štulhofer, 2016a, 2016b). This variability in the content of pornography highlights the limitations of past studies focusing on the frequency of pornography use and not differentiating between types of content, which hinders the possibility to identify specific contents associated with more negative outcomes than others. Moreover, while these studies highlighted the variety of existing pornography contents (Gorman et al., 2010; Klaassen & Peter, 2015; Shor & Golriz, 2019; Shor & Seida, 2019) or reported levels of arousal to different contents (Hald & Štulhofer, 2016a, 2016b), proportion of use were rarely reported, and potential gender differences in the frequency of use of these contents have not been examined thoroughly.

Associations Between Pornography Contents Used and Sexuality

Research on the associations between violent pornography and sexually violent behaviors has been extensive (Ferguson & Hartley, 2020), but only a handful of studies investigated the associations between the pornographic contents used and sexual satisfaction and function. According to the sexual scripts theory, how sexuality unfolds is socially constructed through personal experiences, media, and values (Frith & Kitzinger, 2001; Simon & Gagnon, 1986). Sexual scripts are messages defining how to act during sexual activities and what is considered good sex (Frith & Kitzinger, 2001). As pornography use is associated with sexual scripts, particularly among adolescents and young adults (Braithwaite et al., 2015; Bridges et al., 2016; Marshall et al., 2021; Štulhofer et al., 2010), the contents of pornography used could be closely related to expectations around sexual activity that may affect their sexual satisfaction and function. Some types of pornographic contents may elicit script expectations that are difficult, if not impossible, to enact in real-life (e.g., illegal acts) or more susceptible to affect partnered sexual activity (e.g., higher sexual objectification), which may lead to sexual dissatisfaction or difficulties in sexual response. Moreover, as sexual scripts are typically gendered (i.e., men and women are expected to have different roles or characteristics in their sexuality; Frith & Kitzinger, 2001), they may be associated differently with sexuality, depending on gender.

In a probability-based sample of 4160 Norwegian adults, both a higher frequency of pornography use and a preference for non-mainstream pornography (i.e., bizarre, bondage, fetish, sadomasochism, and violent sex) were associated with higher odds of reporting both positive and mixed or negative self-assessed effects of pornography use (Koletić et al., 2021). In a sample of 858 individuals in a committed romantic relationship, mainstream pornography use was associated with lower satisfaction with variety of partnered sexual activities and time spent on intercourse among men, whereas it was unrelated to all components of sexual satisfaction among women. Provocative sexual media use (i.e., not depicting explicit sexual act) was associated with lower satisfaction with love and affection in the sexual relationship for both men and women, and with lower overall sexual satisfaction, satisfaction with sexual variety, and satisfaction with time spent on intercourse among women (Leonhardt & Willoughby, 2019). In

a study among 650 young Croatian men aged 18 to 25, the pornographic content used (i.e., paraphilic vs mainstream) moderated the association between early exposure to pornography and sexual satisfaction, as early exposure to pornography was associated with lower sexual satisfaction only among paraphilic pornography users (Štulhofer et al., 2010). The results of these three studies suggest that the use of different contents of pornography could be associated differently with some components of sexuality. However, these studies are limited by the number and the nature of contents examined, and restricted to dichotomous categorizations (i.e., mainstream vs. nonmainstream pornography, explicit vs. nonexplicit), which do not reflect the diversity of contents available.

To our knowledge, only one study examined multiple contents of pornography in relation to sexuality. A study conducted among 1,197 German university students examined the associations between the appreciation of 11 different pornographic contents and real-life sexual practices (Martyniuk et al., 2019). Findings showed that the contents participants reported to like in pornography were related to their respective real-life experiences, which supports the sexual scripts theory, as liking these contents might be related to script expectations and therefore sexual practices. However, despite these associations, a considerable proportion of participants did not experience activities they liked in pornography, in particular for unconventional activities (e.g., of those who like group sex, leather clothing, and sadomasochism in pornography, only 9.4% to 20.4% experienced it; Martyniuk et al., 2019). Although this study did not examine the associations with sexual satisfaction and function, these results show that different pornographic contents can be associated differently with sexuality. Therefore, studying how the use of different contents of pornography may be associated with sexual satisfaction and function could bring light to the mixed findings regarding the link between frequency of pornography use and sexuality.

Aims of the Current Study

The first aim of this study was to describe the proportion of use of different contents of pornography and to examine gender-based differences in the frequency of use of these contents. The second aim of this study was to examine the associations between the frequency of use of different contents of pornography and sexual satisfaction and function, considering potential differences among genders and individuals with and without a romantic or sexual partner. Indeed, as pornography use may have specific connotations for partners (e.g., betrayal, feelings of inadequacy; Shuler et al., 2021), and considering the role of having a romantic or sexual partner for sexual satisfaction and function, differences among individuals with and without a romantic or sexual partner were examined. Moreover, previous studies highlighted that pornography use often occurs in conjunction with masturbation (Prause, 2019), and that negative outcomes of pornography use might be better explained by masturbation frequency as the associations between pornography use and sexual and relational outcomes are usually lower when masturbation is considered (Miller et al., 2019; Perry, 2020). Therefore, frequency of masturbation was included as

a control variable in all models to rule out the role of this potential confounding variable. However, given the potential shortcomings of using control variables in pornography studies (Wright, 2021), we reported our findings with and without the inclusion of this control variable for full transparency. As previous empirical findings are scarce regarding the use of different pornographic contents, and even more so regarding their associations with sexual satisfaction and function, this study was exploratory, and no a priori hypotheses were formulated.

Method

Participants

A convenience sample of 827 young adults was recruited through university e-mail lists, Kijiji ads, and social networking sites (e.g., paid advertisings targeting men and women on Facebook and Instagram, advertisements published in small ads Facebook groups, Instagram publications through the project's account). Participants were aged 17 to 30 years old ($M_{age} = 23.44$, $SD = 3.14$). Sociodemographic data for the total sample are presented in Table 1.

Procedure

This study was part of a larger longitudinal study advertised as a survey about digital technologies and intimate relationships in adolescents and young adults across all recruitment

Table 1. Sociodemographic data for the total sample ($N = 827$).

	%	n
Biological sex		
Women	62.5	517
Men	37.5	310
Gender identity		
Women	60.7	503
Men	37.0	306
Native or cultural gender identity or gender experience, non-binary, gender fluid, or questioning their gender identity	2.1	18
Occupation		
Employed	73.2	605
Highest completed education degree		
Primary school degree	2.3	19
Secondary school degree	14.0	116
Vocational degree	3.9	32
College degree	42.2	349
Bachelor's degree	28.7	237
Master's degree	7.9	65
Doctorate degree	1.1	9
Sexual orientation		
Heterosexual	77.1	719
Heteroflexible	5.7	53
Bisexual	5.4	50
Gay or lesbian	5.1	48
Pansexual or omnisexual	2.6	24
Queer	1.3	12
Asexual	0.6	6
Homoflexible	0.4	4
Demisexual	0.2	2
Uncertain or questioning their sexual orientation	1.6	15
Relationship status		
In an exclusive romantic relationship (without any other sexual or romantic partner)	69.2	646
Single without any sexual partner	18.7	171
Single with one sexual partner	5.6	52
Single with multiple sexual partners	3.4	32
In a romantic relationship with other sexual or romantic partners	3.1	29

methods. Other published papers using the data from the Time 1 examined the associations between attachment, sexting, and sexual satisfaction (Lefebvre et al., 2022), and the associations between dating app use and risky sexual behaviors (Mignault et al., 2022). Data used in the present study were collected via a self-report survey at the second wave of data collection. To be eligible, interested participants had to be aged between 16 and 29 years old at Time 1 and understand French. A hyperlink led interested participants to an eligibility survey in which, if they were eligible, they gave their name, phone number, and e-mail address. Before sending the survey link to eligible participants, research assistants made sure that no participant duplicated an already existing participant. This link directed participants to an anonymous survey hosted on the Qualtrics Research Suite, which included the study description and an informed consent form. Three attention-testing questions were included in the survey battery. Based on recent recommendations to detect invalid responses due to carelessness (Curran, 2016), participants failing at least two of the three attention-testing questions (e.g., I am assessing your level of attention, answer "Never" to this question) were excluded from the study.

At the beginning of the study (i.e., Time 1), of the 1508 interested participants that started the eligibility survey, 1384 were eligible and gave their informed consent, and thus were directed to the online survey. Of these participants, 364 did not complete enough of the survey to be included (i.e., they did not complete any of the first two attention-testing questions scattered throughout the whole survey), and 19 failed the attention-testing questions (e.g., I am assessing your level of attention, answer "Never" to this question). Thus, 1001 participants were included in the first data collection wave and invited for the second wave. Of these, 939 participated in the survey at Time 2, but 5 were excluded (i.e., 3 did not complete enough of the survey to be included and 2 failed the attention-testing questions), leaving a sample size of 934 participants. As dyads (i.e., both members of a couple) were also included in the study (i.e., the larger project examined individuals and dyads as well), one member from each of the 107 dyads was randomly removed. Thus, the final sample used in the present study included 827 participants. Participants received CAN$10 after completing the survey. This study was approved by our universities' Institutional Review Boards.

Measures

Sociodemographic Questionnaire
Items regarding participants' sociodemographic characteristics were used to gather information about occupation ("Do you currently have a job?"; answer options: yes, no), education ("What is your highest level of education completed?"; answer options: Primary school degree, Secondary school degree, Vocational degree, College degree, Bachelor's degree, Master's degree, Doctorate degree) and sexual orientation ("People describe their sexual orientation in different ways. Which expression best describes your current sexual orientation?"; answer options: Heterosexual, Heteroflexible, Bisexual, Gay or lesbian, Pansexual or omnisexual, Queer, Asexual, Homoflexible, Demisexual, Uncertain or questioning their sexual orientation).

The presence of a romantic or sexual partner was assessed with one question ("What relationship status best defines you right now?"; answer options: "I am single and I do not have any sexual partner"; "I am single and I have multiple sexual partners without commitment"; "I have a romantic partner and other sexual or romantic partners [non-exclusive relationship]"; "I have an exclusive romantic partner [without other romantic or sexual partner]"). Participants were regrouped into two groups for moderation analyses, 0 = *I do not have any sexual or romantic partner*; 1 = *I have a sexual or romantic partner*.

Participants were also asked about their biological sex ("What is your biological sex, that is, what sex were you assigned at birth (on your original birth certificate)?"; "male sex", "female sex") and their gender identity ("What gender or sex is yours or do you feel is yours (your gender identity)?"; "female/women", "male/man", "indigenous or other cultural gender minority identity (e.g., "two-spirit", "non-binary, genderfluid, multi-gender, or gender queer)", "other"). To increase the statistical power and simplify the analysis, participants were regrouped into three groups for analyses. Participants reporting a female biological sex and female/woman gender identity formed the cisgender women group (60.7%, *n* = 502). Participants reporting a male biological sex and a male/man gender identity formed the cisgender men group (36.4%, *n* = 301). Finally, participants who had other combinations of biological sex and gender formed the gender-/sex-diverse individuals group (2.9%, *n* = 24).

Frequency of Use of Different Contents of Pornography
Before answering any pornography-related questions, we provided the following definition to participants: "For the following questions, the term 'pornography' is used to refer to intentionally looking at or listening to (1) pictures or videos of nude individuals, (2) pictures or videos in which people are having sexual activities" (Kohut et al., 2020). First, participants answered one question about their lifetime pornography use ("Have you ever watched pornography in your life?"; 0 = *no*, 1 = *yes*). A total of 91.3% of participants (*n* = 755) 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 ("On average, in the past THREE months, how often have you watched pornography?"; 0 = *never*, 1 = *less than once a month*, 2 = *once a month*, 3 = *2–3 times a month*, 4 = *once a week*, 5 = *many times per week*, 6 = *once a day*, 7 = *many times per day*). Those participants naturally "missing" answers who had not used pornography in their life (*n* = 72, 8.7%) were recoded as 0 (*never*) for further analyses (Bőthe et al., 2022).

Then, a list of pornographic contents based on popular sexual fantasies (Joyal et al., 2015) and pornographic categories frequently used by individuals according to a popular pornographic website (Pornhub, 2019) was developed for the purpose of the study. This list was reviewed by our team only which included an expert in sexual fantasies and an expert in pornography use (all items are presented in Appendix S1 in the supplemental material). Each item, referring to one content of pornography, was rated on a six-point Likert scale (0 = *never* to 5 = *always*), providing information about how often

participants used a given content when they used pornography in the last three months. Participants naturally "missing" answers who reported no pornography use in the past three months ($n = 188$, 22.8%) were recoded as 0 (*never*) for all pornographic contents.

An exploratory factor analysis (EFA; principal axis factoring method, Promax rotation) was conducted on all items and selection of the optimal number of factors was based on eigenvalues greater than 1.0 and the scree test (Watkins, 2018). Results revealed a five-factor solution, with eigenvalues between 1.04 and 4.84, factor loadings varying from .475 to .912 (all factor loadings of the EFA are presented in Table S1 in the supplemental material), and accounting for 68.84% of the variance. The five underlying latent factors of pornographic contents were theoretically sound (Lehmiller, 2018) and represent: *power, control, and rough sex pornography* (four items, i.e., sadomasochism, bondage and domination, spanking, and rape/sexual assault; α = .81), *passion and romance pornography* (four items, i.e., romantic place [e.g., beach], romantic sex or couple having sex, massage, and mutual masturbation; α = .75), *taboo and forbidden sex pornography* (three items, i.e., teen, MILF ["mother I'd like to fuck"], and fake incest [e.g., step mom, step dad, step brother, mom]; α = .72), *gender-bending pornography* (two items, i.e., transgender/"shemale'," and male or female transvestites; α = .78) and *multipartner sex pornography* (three items, i.e., orgy, gangbang, and threesome; α = .82). The exact wording of the selected items are presented in Appendix 1 of the supplemental material. Theoretically, the obtained factors replicated five out of seven popular sexual fantasies themes extracted from a survey among 4,175 American adults (Lehmiller, 2018). Mean scores ranged from zero to five, with higher scores indicating a more frequent use of the given content of pornography. The five subscales showed adequate internal consistencies.

Sexual Satisfaction

Satisfaction with one's sexual life 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*). Sum scores ranged five to 35, with higher scores indicating higher sexual satisfaction. This measure showed excellent internal consistency in the present sample (α = .91).

Sexual Function

Participants were first asked to decide if they wanted to complete a questionnaire related to female or male anatomy, or if they wanted to skip the sexual function measure. A total of 5.5% ($n = 45$) chose to skip the sexual function measure. For the male anatomy questionnaire, the International Index of Erectile Function (IIEF; Rosen et al., 1997) was used to assess erectile function, orgasmic function, sexual desire, intercourse satisfaction, and overall satisfaction. The 15 items (e.g., "Over the past 4 weeks, how often were you able to get an erection during sexual activity?") were rated on five- and six-point scales (e.g., 1 = *Almost never or never* to 5 = *Almost always or always*). As two items refer to overall sexual satisfaction, there is a small overlap with the sexual satisfaction measure. Items were summed to provide a total score, ranging from 15 to 75, with a higher score indicating better sexual function. The IIEF demonstrated good reliability in the present sample (α = .86).

For the female anatomy questionnaire, the Female Sexual Function Index (FSFI; Rosen et al., 2000) was used to assess subjective desire, arousal, lubrication, orgasm, pain/discomfort, and satisfaction. The 19 items (e.g., "Over the past 4 weeks, how would you rate your level (degree) of sexual desire or interest?") were rated on five- and six-point scales (e.g., 1 = *Very low or absent* to 5 = *Very high*). Scores obtained in the sexual domains were summed and multiplied by a respective factor that homogenizes the influence of each dimension to form a total score, with a higher score indicating better sexual function. As three items refer to overall sexual satisfaction, there is a small overlap with the sexual satisfaction measure. The FSFI demonstrated acceptable internal consistency in the present sample (α = .75). For both the IIEF and the FSFI, to avoid biasing the total scores toward dysfunction, the "no sexual activity" answer option was recoded into a missing value based on Meyer-Bahlburg and Dolezal's (2007) and Meston et al.'s (2020) recommendations. Moreover, scores on the FSFI were rescaled to match men's scores on the IIEF using the following formula: (score − 2) × (75/34) (Corsini-Munt et al., 2017). Scores ranged from 15.88 to 75.00, with higher scores indicating higher sexual function.

Frequency of Masturbation

Frequency of masturbation in the past three months was assessed through the following question "Over the past three months, how often did you masturbate?." Participants indicated their response on an eight-point scale (1 = *not at all*; 8 = *more than once a day*).

Statistical Analysis

For statistical analyses, *SPSS* 28 and M*plus* 8.6 (Muthén & Muthén, 2017) were used. Cisgender women, cisgender men, and gender-/sex-diverse individuals were compared on their frequency of use of different contents of pornography using Welch-corrected ANOVAs and Games-Howell post-hoc tests, as the assumptions (e.g., homogeneity of variances) of the one-way ANOVAs were not met.

Path analyses were used to examine the associations between the frequency of use of different contents of pornography (i.e., *multipartner sex*, *gender-bending*, *power, control, and rough sex*, *taboo and forbidden sex*, and *passion and romance*) and sexual function and sexual satisfaction in separate models, while controlling for frequency of masturbation. Multigroup path analysis was used to examine potential gender differences (i.e., differences between cisgender women and cisgender men) as well as differences between people with a sexual or romantic partner and those without a sexual or romantic partner by constraining all path coefficients to be equal across groups. When the constrained model was significantly different from the unconstrained model based on the Satorra-Bentler Scaled chi-square difference test, the model including the grouping variable was considered the best

model. When the constrained model was not significantly different from the unconstrained model, group invariance was assumed. Following the principle of parsimony, the grouping variable was dropped and the total sample was used. Analyses were conducted using the robust maximum-likelihood (MLR) estimator that provides robust standard errors and fit statistics. Missing data were handled using full information maximum likelihood (FIML). As all models were fully saturated, commonly used fit indices (CFI, TLI, or RMSEA) were not applicable.

Despite efforts to include gender-/sex-diverse individuals in all the analyses, only 24 gender-/sex-diverse individuals participated in the study, which was too small a group size to include them in the multi-group path analysis. However, in light of recent ethical considerations (Frohard-Dourlent et al., 2017; Sharman & Johnson, 2012) and to avoid excluding these participants from the sample, they were included in the group comparisons and models that were invariant between women and men, and descriptive and correlational results are reported for this subsample, providing preliminary results.

Results

Proportion of Use of Different Contents of Pornography and Gender Differences in the Frequency of Use

Descriptive statistics related to the prevalence of use of each pornography content are shown in Table 2. *Passion and romance* pornography was the most popular pornography content for ciswomen and gender-/sex-diverse individuals, and widely used across all genders (56.97% of ciswomen, 83.06% of cismen, and 83.33% of gender-/sex-diverse individuals). *Multipartner sex* pornography was also frequently used across genders (45.41% of ciswomen, 78.07% of cismen, 75.00% of gender-/sex-diverse individuals), and *Taboo and forbidden sex* pornography was the most popular pornography content among cismen (31.47% of ciswomen, 84.05% of cismen, 75.00% of gender-/sex-diverse individuals). As for *power, control and rough sex pornography*, its popularity appeared moderate in comparison to other types of content (29.28% of ciswomen, 39.20% of cismen, 62.50% of gender-/sex-diverse individuals). *Gender-bending* pornography's prevalence was low for ciswomen and cismen, and moderate for gender-diverse individuals (5.78% of ciswomen, 13.29% of cismen, 54.16% of gender-/sex-diverse individuals).

Using Welch-corrected ANOVAs with Games-Howell post-hoc tests, potential gender differences on frequency of use of different pornographic contents were examined. As shown in Table 2, significant between-group differences were found on all variables. All contents of pornography were used more frequently by cisgender men than by cisgender women, except for power, control, and rough sex pornography, on which cisgender men and women did not differ. As for gender-/sex-diverse individuals, they showed similar levels of *multipartner sex* pornography use as cisgender men, while they tended to use *gender-bending* and *power, control, and rough sex* pornography more often than cisgender men and women. Their use of *taboo and forbidden sex* pornography was higher than that of cisgender women but lower than that of cisgender men. They did not show significant differences with cisgender men and women on *passion and romance* pornography use. Nevertheless, given the small sample size of the gender-/sex-diverse group, the results should be considered as preliminary findings.

Associations Between Frequency of Use of Different Contents of Pornography and Sexual Satisfaction and Function

Descriptive statistics and correlations between frequency of use of different pornographic contents, overall pornography use frequency, frequency of masturbation, and sexual satisfaction and function are shown in Table 3. Sexual function was positively and moderately related to *taboo and forbidden sex* pornography, *passion and romance* pornography, and overall pornography use, whereas sexual satisfaction was negatively and weakly related to *taboo and forbidden sex* pornography, *gender-bending* pornography, and *power, control, and rough sex* pornography. Masturbation frequency had weak-to-moderate positive associations with all pornography contents, a weak and positive association with sexual function, and a weak and negative association with sexual satisfaction, supporting the need to include it as a covariate.

The sexual satisfaction model was first estimated among the total sample, including sexual satisfaction as the outcome, and frequency of masturbation as a control variable. Second, the same model was estimated using gender (i.e., cisgender women and cisgender men) as a grouping variable. To test if the path coefficients were significantly different between cisgender men and women, the paths between the contents of pornography and sexual satisfaction were constrained to be equal across the two groups. The chi-square test results ($\Delta\chi^2 = 4.62$, $\Delta df = 5$, $p = .464$) indicated no significant differences between the

Table 2. Gender differences between cisgender women, cisgender men, and gender-/sex-diverse individuals on frequency of use of different contents of pornography ($N = 827$).

	A. Cisgender women (n = 502)		B. Cisgender men (n = 301)		C. Gender-/sex-diverse individuals (n = 24)		
	Mean (SD)	% (n)	Mean (SD)	% (n)	Mean (SD)	% (n)	Welch ANOVAs
Contents of pornography							
1. Multipartner sex	0.59 (0.84)[b, c]	45.41 (228)	1.01 (0.82)[a]	78.07 (235)	1.26 (0.99)[a]	75.00 (18)	F(2,824) = 26.98, p < .001
2. Taboo and forbidden sex	0.30 (0.56)[b, c]	31.47 (158)	1.21 (0.84)[a, c]	84.05 (253)	0.79 (0.72)[a, b]	75.00 (18)	F(2.824) = 138.90, p < .001
3. Gender-bending	0.05 (0.24)[b, c]	5.78 (29)	0.14 (0.43)[a, c]	13.29 (40)	0.79 (1.01)[a, b]	54.16 (13)	F(2,823) = 11.64, p < .001
4. Power, control, and rough sex	0.29 (0.61)[c]	29.28 (147)	0.27 (0.46)[c]	39.20 (118)	0.76 (0.86)[a, b]	62.50 (15)	F(2,824) = 3.81, p = .028
5. Passion and romance	0.71 (0.84)[b]	56.97 (286)	0.89 (0.70)[a]	83.06 (250)	0.82 (0.68)	83.33 (20)	F(2,823) = 5.59, p = .006

Superscript letters indicate significant ($p < .05$) difference between the given group and the indexed group within the same variable.

Table 3. Correlations and descriptive statistics on frequency of use of different contents of pornography, masturbation frequency, sexual function, and sexual satisfaction for the total sample (*N* = 827).

	Range	Mean	SD	Skewness	Kurtosis	1	2	3	4	5	6	7
1. Multipartner sex pornography	0–5	0.76	0.87	0.95	0.09	–						
2. Taboo and forbidden sex pornography	0–5	0.65	0.81	1.10	0.23	.45***	–					
3. Gender-bending pornography	0–5	0.11	0.38	4.52	23.05	.21***	.19***	–				
4. Power, control, and rough sex pornography	0–5	0.30	0.58	2.66	9.28	.50***	.27***	.26***	–			
5. Passion and romance pornography	0–5	0.78	0.79	0.98	0.66	.35***	.29***	.08*	.21***	–		
6. Masturbation frequency	0–8	4.08	2.15	−0.38	−0.91	.39***	.47***	.20***	.26***	.31***	–	
7. Sexual function	15.88–75.00	58.80	10.51	−0.96	0.62	.06	.15***	.01	−.05	.11**	.17***	–
8. Sexual satisfaction	5–35	26.62	6.28	−0.78	0.35	−.03	−.09*	−.07*	−.09*	.03	−.10**	.66***

SD = Standard deviation.
*p < .05.**p < .01.***p < .001.

constrained and unconstrained models including only cisgender men and women, suggesting that path coefficients were consistent across cisgender men and women. Third, the same procedure was followed to test if the path coefficients were significantly different between individuals with a romantic or sexual partner and individuals without a romantic or sexual partner, and no differences were found ($\Delta\chi^2$ = 1.59, Δdf = 5, p = .902). Therefore, the models including the grouping variables were rejected, and the first model among the total sample (i.e., cisgender women, cisgender men and gender-/sex-diverse individuals), including frequency of masturbation as a control variable, was selected for the sake of parsimony. Results from the final model are depicted in Figure 1. Based on this model, *power, control, and rough sex* pornography was weakly and negatively associated with sexual satisfaction (β = −.09, p = .033), and *passion and romance* pornography was weakly and positively associated with sexual satisfaction (β = .08, p = .039). This model explained 2.6% of the variance in sexual satisfaction. Results from this model without any control variable are also presented in Figure 1 and showed that *power, control, and rough sex* pornography was still weakly and negatively associated with sexual satisfaction (β = −.09, p = .026). Even if the strength of the association remains similar, *passion and romance* pornography was not significantly related to sexual satisfaction when masturbation frequency was not in the model (β = .07, p = .078). *Taboo and forbidden sex* pornography use was associated with lower sexual satisfaction when

masturbation frequency was not in the model (β = −.09, p = .022).

As for the sexual function model, the chi-square difference test between the unconstrained and constrained models indicated significant differences between cisgender men and women ($\Delta\chi^2$ = 11.33, Δdf = 5, p = .045), but not between individuals with a romantic or sexual partner and individuals without a romantic or sexual partner ($\Delta\chi^2$ = 5.06, Δdf = 5, p = .409). Thus, the model including gender as a grouping variable was used. Results from the final sexual function model are depicted in Figure 2. Based on this model including frequency of masturbation as a control variable, only *power, control, and rough sex* pornography was associated with lower sexual function for cisgender men (β = −.26, p = .006), but this association was not significant for cisgender women (β = .01, p = .846). This model explained 2.6% of the variance in sexual function for cisgender women and 8.8% for cisgender men. Results from this model without any control variable are also presented in Figure 1 and showed that *power, control, and rough sex* pornography was still associated with lower sexual function for cisgender men (β = −.26, p = .006), but this association was still not significant for cisgender women (β = .03, p = .661). Moreover, when masturbation frequency was not in the model, *passion and romance* pornography was significantly related to higher sexual function in cisgender women (β = .12, p = .028), but this association was not significant for cisgender men (β = −.02, p = .819).
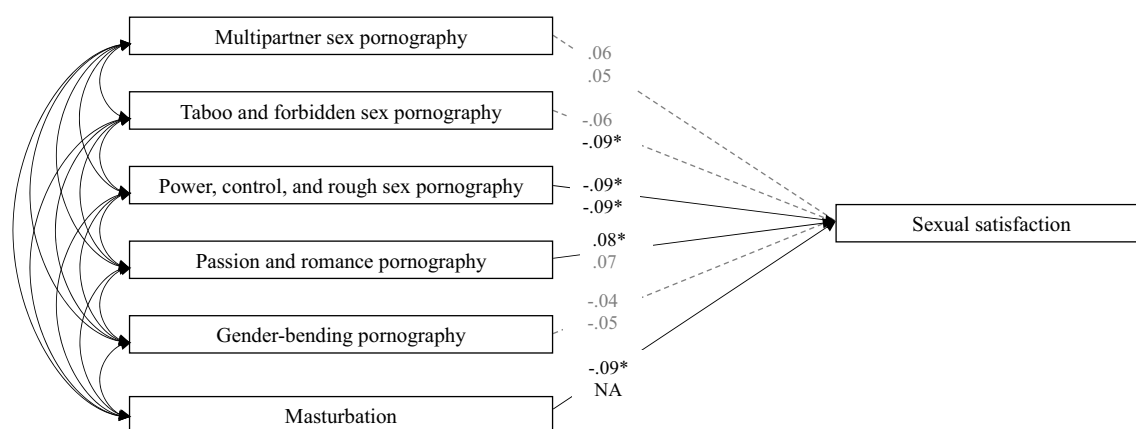

Figure 1. Final model of the associations between frequency of use of different contents of pornography and sexual satisfaction (*N* = 827). *Note*. Significant associations are depicted with solid black arrows and two-headed arrows represent estimated covariances. For the sake of clarity, the covariances coefficients are not depicted. Coefficients from the model including masturbation as a control variable are above and coefficients from the model without any control variable are under. Coefficients are standardized regression coefficients. *p < .05.
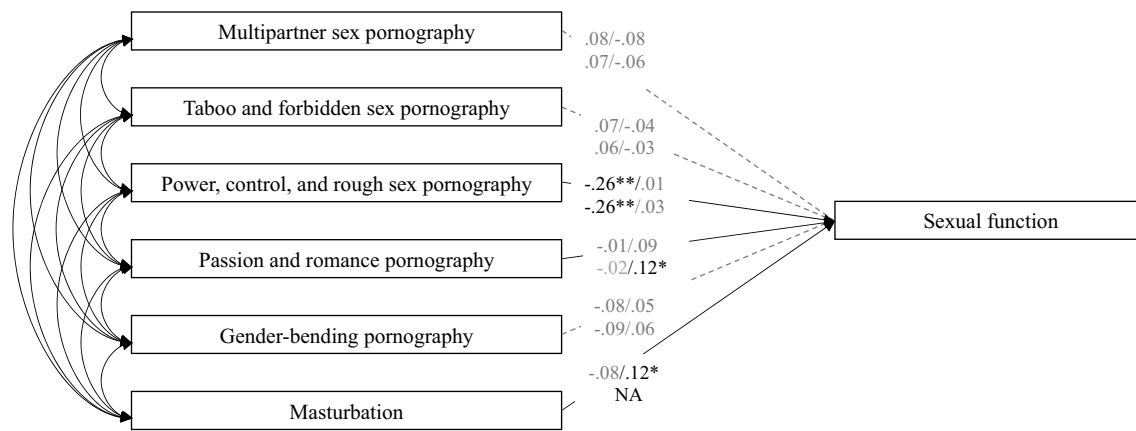
Figure 2. Final model of the associations between frequency of use of different contents of pornography and sexual function among cisgender men and women (*n* = 803). *Note.* Significant associations are depicted with solid black arrows and two-headed arrows represent estimated covariances. For the sake of clarity, the covariances coefficients are not depicted. Coefficients are standardized regression coefficients. Coefficients from the model including masturbation as a control variable are above and coefficients from the model without any control variable are under. The first number on the arrow indicates the path coefficient for cisgender men, and the second number indicates the path coefficient for cisgender women. *$p < .05$. **$p < .01$.

Preliminary Results Among Gender-/Sex-Diverse Individuals

As only 24 gender-/sex-diverse individuals were included in the sample, it was not possible to include them in the multi-group analysis. Therefore, correlations between the frequency of use of different contents of pornography, sexual satisfaction, and sexual function were examined to provide preliminary results (Table 4). However, because of the underpowered nature of the data, most correlations were not significant. Thus, preliminary results will be discussed based on their effect sizes (i.e., $\leq |.10|$ is weak, $\leq |.30|$ is moderate and $\leq |.50|$ is strong; Cohen, 1992), and should be interpreted with caution. The associations between the frequency of use of all five contents of pornography were positive and moderate, except for the correlation between *taboo and forbidden sex* pornography and *power, control, and rough sex* pornography, which was positive and small. Sexual function had small and negative associations with *multipartner sex*, and *taboo and forbidden sex*, and a small and positive association with *passion and romance* pornography. Sexual satisfaction had a moderate, negative, and significant association with *multipartner sex* pornography, small and negative associations with *taboo and forbidden sex*, *gender-bending*, and *power, control, and rough sex* pornography, and a small and positive association with *passion and romance* pornography. Masturbation frequency had a moderate and positive association with *gender-bending* pornography.

Discussion

Pornographic contents used have been suggested as a key variable to untangle mixed findings regarding the associations between pornography use and sexual satisfaction and function (Dwulit & Rzymski, 2019; Hoagland & Grubbs, 2021; Vaillancourt-Morel et al., 2019; Wright et al., 2017), but have received little scientific attention until now. The goals of this study were to describe the proportion of use of different contents of pornography, to examine gender-based differences in their frequency of use, and to examine their associations with sexual satisfaction and function among a large sample of young adults.

Proportion of Use of Different Contents of Pornography and Gender Differences

In line with previous studies suggesting that men use pornography more often than women (Carroll et al., 2017; Peterson et al., 2017; Poulsen et al., 2013), all contents of pornography were used more frequently by cisgender men than by cisgender women, except for *power, control, and rough sex pornography*, on which cisgender men and women did not differ significantly. These results replicate those of previous research suggesting that men have higher levels of arousal than women for almost all types of pornography, except for *power, control, and rough sex* pornography, which was as arousing for women as for men

Table 4. Correlations and descriptive statistics on frequency of use of different contents of pornography, masturbation frequency, sexual function, and sexual satisfaction for gender-/sex-diverse individuals (*n* = 24).

	Range	Mean	SD	1	2	3	4	5	6	7
1. Multipartner sex pornography	0–5	1.26	0.99	–						
2. Taboo and forbidden sex pornography	0–5	0.79	0.72	0.39	–					
3. Gender-bending pornography	0–5	0.79	1.01	0.31	.38	–				
4. Power, control, and rough sex pornography	0–5	0.76	0.86	0.33	.32	.48*	–			
5. Passion and romance pornography	0–5	0.82	0.68	.69***	.50*	.24	.40	–		
6. Masturbation frequency	0–8	5.29	1.52	.30	.34	.43*	.28	.11	–	
7. Sexual function	15.88–75.00	56.30	14.27	−.21	.21	−.14	.06	−.09	−.31	–
8. Sexual satisfaction	5–35	24.21	6.41	−.41*	.18	−.17	−.06	−.12	−.49*	.70**

SD = Standard deviation.
*$p < .05$.**$p < .01$.***$p < .001$.

(Hald & Štulhofer, 2016a, 2016b). This finding challenges some scholars' speculation that the demand for more violent or aggressive contents is driven by a male audience (e.g., DeKeseredy & Corsianos, 2015). Our data rather suggests that interest for *power, control, and rough sex pornography* is not significantly different among cisgender men and women as there were no differences in the frequency of use of this content. Gender-/sex-diverse individuals presented multiple significant differences with cisgender men or women on their frequency of use of almost all pornographic contents, which could suggest a different pattern of pornography use for this group. However, given the small sample size (*n* = 24), we cannot overinterpret the results and further studies are needed to draw conclusions on contents of gender-/sex-diverse individuals' pornography use.

Passion and romance pornography was widely used across genders, and it was the most popular pornography content among women. This result is consistent with past findings suggesting that this type of content is the most arousing and commonly searched for, including for young adults (Ballester-Arnal et al., 2022; Hald & Štulhofer, 2016a, 2016b). *Passion and romance* pornography might be popular because it is more representative of partnered sexual activities and represents idealized sexual fantasies. Moreover, qualitative data suggests that many women use strategies like content selection to avoid problematic content (e.g., not women-friendly, inconsiderate of the actors' well-being, unrealistic; Chadwick et al., 2018), and *passion and romance* pornography might represent a low-risk content.

Multipartner sex was also frequently used across genders, which is consistent with past findings suggesting that sex involving more than two people is a highly prevalent sexual fantasy and among the most arousing pornography contents (Hald & Štulhofer, 2016a, 2016b; Joyal et al., 2015). *Taboo and forbidden sex* was the most prevalent content among men, which is in line with data suggesting that these themes were also among the most frequently searched for on pornography Websites (Ogas & Gaddam, 2011; Pornhub, 2019). As for *power, control and rough sex pornography*, its popularity appears moderate in comparison to other types of contents. While it is possible that some forms of violence are displayed in all the pornography contents we measured, the higher frequency of use of passion and romance pornography, multi-partner sex pornography and taboo and forbidden sex pornography nuances past results that suggest adolescents and young adults are using increasingly violent pornography (e.g., Romito & Beltramini, 2015). Although violent contents might be widely available and advertised in mainstream pornographic websites (Vera-Gray et al., 2021), as other studies have shown (Baer et al., 2015; Ballester-Arnal et al., 2022; Shor & Seida, 2019), *power, control, and rough sex* pornography was not the most frequently deliberately used content of pornography. Lastly, *gender-bending* pornography was used by gender-/sex-diverse individuals the most (54.16%), which could be explained by their higher identification with characters.

Pornographic Contents Used and Sexual Satisfaction

Among the whole sample, including individuals with and without a romantic or sexual partner and all genders, our results suggest that, controlling or not for frequency of masturbation, *power, control, and rough sex* pornography was associated with lower sexual satisfaction. While cross-sectional studies have shown that bondage-discipline/dominance-submission/sadomasochism (BDSM) interests and behaviors are associated with higher sexual satisfaction (Botta et al., 2019; Joyal & Carpentier, 2017; Strizzi et al., 2021), our results showed the opposite association for frequency of use of *power, control, and rough sex* pornography. This suggests that using pornography including a specific content involves different processes than fantasizing about or enacting those specific sexual behaviors in real life. Many people have masochistic (i.e., 27.8% of women, 19.2% of men) sexual fantasies that are associated with higher sexual satisfaction (Joyal & Carpentier, 2017). However, using pornography that includes this type of content might not be related to higher sexual satisfaction as users do not control the content of pornography used as much as their fantasies. Moreover, *power, control, and rough sex* pornography might depict sexual scripts that are less achievable with a consenting partner and sometimes illegal (i.e., rape), thus being related to lower overall sexual satisfaction. Users of *power, control, and rough sex* pornography might also experience moral incongruence between the use of these contents and their beliefs regarding these contents (e.g., rape is fundamentally wrong to me, but I use rape pornography), which could potentially lower sexual satisfaction (Grubbs, Perry, et al., 2019). This specific content may also instill more negative feelings (e.g., shame, betrayal of one's partner) regardless of a user's beliefs and be related to lower sexual satisfaction.

Our findings also showed that, controlling for frequency of masturbation, *passion and romance* pornography was associated with higher sexual satisfaction. In contrast with prior findings suggesting that overall pornography use frequency is associated with lower sexual satisfaction for men and unrelated to women's sexual satisfaction (e.g., Bridges & Morokoff, 2011; Leonhardt & Willoughby, 2019; Muusses et al., 2015; Wright et al., 2017), our results rather suggest that this association depends on the pornographic content used, without significant gender differences. As it includes more traditionally common or accepted sexual practices, *passion and romance* pornography might trigger more positive feelings, less moral incongruence, and therefore be related to higher sexual satisfaction. Moreover, *passion and romance* pornography might include more realistic sexual scripts that do not contrast as much with sexual practices and rather stimulate sexual activities by giving achievable ideas, which could explain the related higher sexual satisfaction. In contrast with previous work overlooking the specific content of pornography used, the lack of significant difference between cisgender men and women found in our study also shows that pornography use may be associated with positive outcomes, even for men. As ciswomen use *passion and romance* pornography the most, this could partially explain why some studies show that women's pornography use is associated with higher sexual satisfaction (Koletić et al., 2021). Alternatively, it is possible that sexually satisfied young adults use *passion and romance* pornography as its content is similar to their own sexual practices. Interestingly, the association between *passion and romance* pornography and sexual satisfaction was not significant when masturbation

frequency was not included in the model. Thus, *passion and romance* pornography may only be positively related to sexual satisfaction when its use is not paired with masturbation, which may be the case when using pornography with a romantic partner or just before a sexual activity with a partner (Vaillancourt-Morel et al., 2020, 2021).

Finally, our findings showed that, controlling for frequency of masturbation, *taboo and forbidden sex* pornography was not significantly related to sexual satisfaction, but it was related to lower sexual satisfaction in the model without masturbation frequency. This is in line with previous studies that showed that the associations between pornography use and sexual and relational outcomes are usually lower when masturbation is considered (Miller et al., 2019; Perry, 2020), suggesting that the negative associations between *taboo and forbidden sex* and lower sexual satisfaction is partly due to the negative associations between masturbation and sexual satisfaction. Thus, this negative association is better explained by the fact that this type of pornography is combined with masturbation.

Pornographic Contents Used and Sexual Function

Among both participants with and without a romantic or sexual partner, controlling or not for frequency of masturbation, *power, control, and rough sex* pornography was associated with lower sexual function for cisgender men only, which is in line with prior findings suggesting that men's overall pornography use frequency is associated with negative outcomes, while women's use is associated with more positive or neutral outcomes (Koletić et al., 2021; Vaillancourt-Morel et al., 2019; Wright et al., 2017). Using *power, control, and rough sex* pornography might be associated with lower sexual function in men by inducing specific sexual scripts that are less acceptable and achievable in real life. Not having the opportunity to enact these sexual scripts in real life might hinder men's sexual desire, their capacity to maintain erection or to reach orgasm as their sexual activities would not fit their idea of what is sexually pleasurable and exciting. While men might expect to enact their *power, control, and rough sex* sexual scripts, women might differentiate more between what excites them in pornography and what desires they have for their sexual activities. In a qualitative study, approximately half of women reporting submission fantasies specified that they would not wish their fantasy to materialize in real life (Joyal et al., 2015), indicating a distinction between sexual fantasies (and potentially pornography use) and sexual wishes that would be stronger for women than men. Alternatively, it is possible that men with a sexual dysfunction use *power, control, and rough sex* pornography to try to regulate their feelings of stress or emasculation (Sheng, 2021) by identifying with dominant characters, or to get a higher level of stimulation to attain sexual arousal or orgasm.

Finally, our findings showed that, controlling for frequency of masturbation, *passion and romance* pornography was not significantly related to sexual function for ciswomen and cismen, but it was related to higher sexual function in cisgender women in the model without masturbation frequency. Again, this result may suggest that this significant association is better explained by the frequency of masturbation that accompanies the use of *passion and romance* pornography. Cisgender women who masturbate more frequently while using this pornographic content may have higher sexual desire, or develop a better knowledge of their body, leading to easier arousal and orgasm.

Limitations and Future Studies

This study had some limitations that should be considered when interpreting these results. Causal inferences from our findings are limited by the cross-sectional nature of the data. While the ordering of our variables was based on past theoretical models suggesting that contents of pornography used may have effects on sexuality, it is also possible that sexuality has some effects on the frequency of use of different pornography contents. Thus, future studies should include multiple time points to test for the directionality of the associations. As this study was only a first step in examining the association between the use of different pornography contents and sexuality, our pornography contents measure was not meant to be exhaustive and it ended up including a two-item factor, which is acceptable (Raubenheimer, 2004; Yong & Pearce, 2013), but could be expanded. Future studies will be needed to explore the associations between more pornography contents and to confirm the factor structure of our measure. Although our sample included a diversity of sexual orientations and gender identities, the generalizability of the results is potentially limited by our convenience sample of young adults aged 17 to 30, with a majority of cisgender women. Results related to gender-/sex-diverse individuals should also be interpreted with caution considering the small subsample size. Future research should make substantial efforts to include more diversity in their samples. Some biases might also be induced by the self-report nature of our instruments and social desirability given the taboo surrounding sexuality, pornography use, and masturbation. This study also focused only on pornography contents, explaining only a modest amount of variance in sexual satisfaction and function. Evidently, other distal and proximal factors, not assessed in this study, may have an important contribution to sexuality that may increase the explained variance (e.g., relationship quality, body image, frequency of sexual activities, communication; Blunt-Vinti et al., 2019; Roels & Janssen, 2020; van den Brink et al., 2018). Future research should also further nuance these results by considering other contextual factors, to which associations between pornography use and sexual outcomes appear especially sensitive (Vaillancourt-Morel et al., 2019). For instance, if pornography is used alone or with a partner could clarify the associations between pornography contents used and sexuality as some contents might be more frequently used with a partner. It is also possible that some contents evoke specific feelings (e.g., shame, betrayal of one's partner), which could explain the related sexual outcomes. Moreover, although our models were invariant across relationship status, other relational factors including relationship quality may play a role in the associations between pornography use and sexuality. Finally, given that sexual function includes items related to overall sexual satisfaction, there is some degree of overlap between the two sexuality outcomes. Future studies could examine

more specifically how the use of different pornography contents might be related to different components of sexual function. Despite the limitations described above, this study was the first to include multiple pornography contents in relation to sexual satisfaction and function, which extends our understanding of the complex links between pornography use and sexuality.

Implications

As suggested in the Antecedents-Context-Effects theoretical model, our findings highlight the need to consider the context surrounding pornography use, such as pornographic contents used, to better understand the potential effects of pornography use (Campbell & Kohut, 2017). Future research in the field should include different types of pornography contents instead of lumping them all together by studying only overall pornography use frequency to grasp the complexity of the associations between pornography use and sexuality. This study was the first to examine whether the content of pornography is an important context to consider when studying the associations between pornography use and sexuality, which has been suggested by scholars (e.g., Campbell & Kohut, 2017). Our results showed the need to consider the pornographic contents used in future research and clinical work instead of only focusing on overall pornography use frequency. However, given the small effect sizes, we should remain modest on the practical implications of these results. The different associations with sexual satisfaction and function depending on pornography content suggest the need for clinicians to consider the contents of pornography used when assessing pornography use frequency. As educating adolescents and young adults about pornography has showed to countervail harmful sexual scripts (Vandenbosch & van Oosten, 2017), our findings could be used to support education on pornography use and its potential harms and benefits. Researchers have suggested that pornography literacy needs to be nuanced, including negative, neutral, and positive dimensions of pornography use (Dawson et al., 2020), which is supported by the complexity of our results.

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