Sexuality Research and Social Policy
https://doi.org/10.1007/s13178-025-01179-4

Curves and Pixels: Longitudinal Associations Between Frequency of Pornography Use and Body Dissatisfaction in a Sample of Young Hungarian Adults

Süleyman Agah Demirgül[1,2,3,4] · Marie-Michèle Paquette[5] · Sophie Bergeron[5,6] · Borbála Paksi[7] · Andrea Czakó[1,8] · Zsolt Demetrovics[1,8,9] · Beáta Bőthe[5,6]

Accepted: 6 August 2025

Abstract

Introduction Despite unrealistic body portrayals commonly seen in pornographic materials, only a few studies have examined the association between pornography use frequency (PUF) and body dissatisfaction (BD) over time and most of these studies have been limited in scope (e.g., only focused on women) and included several limitations (e.g., cross-sectional designs). The present study sought to address these gaps by investigating the associations between PUF and BD over a one-year period, while also considering gender-related differences.

Method We used an autoregressive cross-lagged analysis with a multi-group approach among 3,733 young adults (M_{age} = 23, SD_{age} = 4.74, 48.2% men and 51.8% women). Data for the first wave were collected between March and July 2019, and for the second wave between June and September 2020.

Results Findings showed that higher levels of PUF were cross-sectionally associated with higher levels of BD among men and women as well. Longitudinally, a bidirectional association was present between PUF and BD in men but not in women. Men's higher levels of PUF at baseline were associated with greater BD one year later, and higher levels of BD at baseline were associated with increased PUF one year later.

Conclusions Findings indicate that pornography use is positively linked to BD in men both short- and longer-term, but only in short-term among women. Adults who consume pornography might be influenced by the unrealistic and idealized body portrayals, resulting in body concerns.

Policy Implications Mental health professionals should consider pornography consumption when treating individuals experiencing body dissatisfaction. Policymakers can integrate media literacy education that addresses the unrealistic expectations fostered by pornography into their sexual education curricula.

Keywords Pornography · Body image · Body dissatisfaction · Adults · Longitudinal design

✉ Süleyman Agah Demirgül
demirgulsuleyman@gmail.com

[1] Institute of Psychology, ELTE Eötvös Loránd University, Budapest, Hungary

[2] Doctoral School of Psychology, ELTE Eötvös Loránd University, Budapest, Hungary

[3] Trauma Intervention and Research Center/Global and Regional Studies Center, Psychology Department, Necmettin Erbakan University, Konya, Türkiye

[4] Department of Psychology, Faculty of Economic Administrative and Social Sciences, Hasan Kalyoncu University, Şahinbey, Türkiye

[5] Département de Psychologie, Université de Montréal, Montreal, Canada

[6] Centre de Recherche Interdisciplinaire Sur Les Problèmes Conjugaux Et Les Agressions Sexuelles (CRIPCAS), Montreal, Canada

[7] Institute of Education, ELTE Eötvös Loránd University, Budapest, Hungary

[8] Centre of Excellence in Responsible Gaming, University of Gibraltar, British Overseas Territory, Gibraltar, Spain

[9] College of Education, Psychology and Social Work, Flinders University, (CRIPCAS), Adelaide, Australia

Published online: 25 August 2025

The potential impact of pornography on individuals has gained significant attention in recent years, particularly due to the widespread use of technology for sexual purposes (Ševčíková et al., 2018) and the rapid rise in pornography use in the past two decades (Cooper et al., 1999; Grubbs et al., 2019). For example, the number of online pornography users in the general population has increased by 310%, from 2.76 million to 8.54 million in Poland between October 2004 and October 2016 (Lewczuk et al., 2019). On an international level, Pornhub reports receiving more clicks than renowned platforms such as Amazon, Instagram, and eBay, with 3.4 billion monthly clicks (Wright et al., 2023a). Moreover, XVideos and XNXX, two of the most popular pornography sites, collectively receive over 5.8 billion visits per month (Statista, 2021), which is more visitors than TikTok has per month (Wright et al., 2023a).

The term 'pornography' does not possess a single, universally agreed upon definition. It can be defined in several ways depending on cultural perceptions, research objectives, and other factors (Lawless et al., 2023). Most often, pornography is defined as a material that "(i) creates or elicits sexual feelings or thoughts and (ii) contains explicit exposure or descriptions of sexual acts involving the genitals, such as vaginal or anal intercourse, oral sex, or masturbation" (Reid et al., 2011). Although there is no unified definition of pornography, most include the notion that its intended use is to arouse sexual gratification through the portrayal of sexual activity.

Significant gender differences exist in pornography use. According to recent nationally representative studies from Sweden (Malki et al., 2021), Australia (Rissel et al., 2017), and the US (Grubbs et al., 2019), men are more likely to consume pornography than women (68–76% of men vs. 27–41% of women). In addition, men have greater pornography use frequency (PUF) than women daily (27% vs.1.2%) and weekly (1–2 d/23.7% of men vs. 8.6% of women) as well. These studies highlight significant gender differences in PUF, with a clear emphasis on men's dominance over women's participation in this activity. Furthermore, sexual minority individuals exhibit differences in their PUF when compared to their heterosexual counterparts. According to previous studies' findings, sexual minority men reported greater pornography use than heterosexual men (Downing et al., 2017; Gewirtz-Meydan & Spivak-Lavi, 2023; Rissel et al., 2017). Furthermore, given its growing prevalence, researchers have concentrated on its problematic use as well. According to a recent large-scale study conducted across 42 countries, the prevalence of problematic pornography use varied between 3.2% and 16.6% among different subpopulations (Bőthe et al., 2024).

The potential associations of PUF with mental health outcomes have been examined in prior work. Recent studies have documented several potential positive associations of PUF with different outcomes, including increased sexual arousal among men and more sexual knowledge among women (Esplin et al., 2021; Gewirtz-Meydan et al., 2025; Sadeghi & Kilavuz, 2022). However, in addition to its potential positive effects, PUF may be linked to lower self-esteem (Kvalem et al., 2016) and depression among men (Borgogna et al., 2018a, b; Kraus et al., 2015; Perry, 2018) and higher anxiety among women (Borgogna et al., 2018a, b; Harper & Hodgins, 2016), Moreover, it may contribute to marital dissatisfaction (Perry & Whitehead, 2019) and occupational problems (Kumar et al., 2021) among men.

In addition to these common adverse mental health outcomes**,** as pornography usually depicts idealized and exaggerated body representations by featuring performers who are thinner women and larger than average men, it may contribute to body dissatisfaction (BD) (Rothman, 2021). A recent systematic review on PUF and BD have reported that PUF may negatively relate to individuals' body image perception (Paslakis et al., 2022) among individuals who may conflate these representations in pornography with reality (Griffiths et al., 2018; Vogels, 2018). It may not only be positively associated with overall BD among men specifically (Peter & Valkenburg, 2014; Whitfield et al., 2018), but also with dissatisfaction with specific body parts as they are often prominently featured in pornography including women genitals (Dogan & Yassa, 2019), breasts (Cranney, 2015; Peter & Valkenburg, 2014), and penises (Sharp & Oates, 2019). However, some studies did not observe positive associations between PUF and BD (Duggan & McCreary, 2013; Sevic et al., 2020; Vogels, 2018). Therefore, the evidence concerning PUF and BD remains inconsistent, as studies have produced mixed results and include several limitations. For example, previous studies have predominantly used cross-sectional designs and have focused primarily on men.

Body image is a complex and multifaceted phenomenon that encompasses perceptions, thoughts, and feelings regarding one's physical appearance (Grogan, 2021). These perceptions may include a range of aspects, such as body weight, size, shape, skin color, and facial features (Grogan, 2021). Schilder (2013) emphasized that body image extends beyond mere perception, functioning as a mirror of one's attitudes and interactions with others. Body image perception can be experienced at different levels, ranging from positive to negative. Individuals with BD often report feeling dissatisfied with their appearance, which can lead to a sense of discrepancy between their actual physical appearance and ideal self-appearance (Bucchianeri & Neumark-Sztainer, 2014; Grogan, 2006). Research has established a link between BD and various adverse mental health outcomes such as elevated levels of depression (Kogure et al., 2019), increased anxiety, and emotional distress (Al-Musharaf et al., 2022). Body image concerns are frequently accompanied by social

physique anxiety (Barnes et al., 2020), which is experienced when one believes being judged or observed by others because of their physical appearance (Hart et al., 1989). These findings underscore the significant emotional and mental impacts of BD on individuals.

Objectification theory, as proposed by Fredrickson (1997), focuses on the consequences of viewing and treating individuals as objects. This theory posits that constant objectification and evaluation based on appearance leads to the internalization of this perspective resulting in negative psychological and emotional outcomes. One of the central tenets of objectification theory is the idea of self-objectification, which takes place when individuals begin to view themselves from an outsider's perspective, frequently monitoring and evaluating their own physical appearance and therefore those with a high level of self-objectification prioritize their body's appearance over its function (McKinley & Hyde, 1996). The pervasive presence of objectification in media extends to both women and men, who, upon exposure to such objectifying content, may encounter the phenomenon of self-objectification (Daniel et al., 2014; Ward, 2016). As pornography usually portrays irrational and idealized bodies, one may internalize these irrational and idealized bodies and if their own appearance does not align with these idealized bodies, they may experience BD (Sevic et al., 2020). According to objectification theory, because women are sexually objectified and their body parts are separated from themselves and considered as a physical object, they might be more prone to experience BD (Fredrickson & Roberts, 1997). Previous studies have reported greater BD among women, with rates ranging from 9 to 28% in men and 13% to 32% in women (Fallon et al., 2014). However, as individuals age, the significance they place on their physical appearance tends to diminish, both for men and women (Esnaola et al., 2010; Quittkat et al., 2019).

Apart from individual demographic differences, body image perception is shaped not only by individual demographic differences but also by cultural differences and the media. For example, in Western societies the ideal body for women tends to be thin, whereas men are typically portrayed as muscular or lean. This can lead to pressure on both men and women to conform to these ideals (Yean et al., 2013). In addition to sociocultural factors, online media can also affect an individual's perception of an ideal body type by promoting unrealistic beauty standards (Huang et al., 2021). When individuals internalize body ideals, they are more likely to become concerned about their physical appearance, engage in body-monitoring behaviors (Bucchianeri & Neumark-Sztainer, 2014; Fitzsimmons-Craft et al., 2012), and experience dissatisfaction with their physical appearance (Huang et al., 2021).

In addition to objectification theory, social comparison theory (Festinger, 1954) may also provide an explanation for body image concerns arising from pornography use. According to this theory, individuals tend to compare their abilities, opinions, and physical features with those of others when objective standards are lacking. Individuals often engage in comparisons to gain a deeper understanding of themselves relative to others. Social comparison is characterized by two directions known as upward and downward. Upward social comparison is the act of evaluating oneself against someone who is perceived to be superior on a particular aspect, which is associated with negative feelings, such as anger (Park & Park, 2024). Downward comparison refers to the act of evaluating oneself against someone who is perceived to be inferior on a particular aspect, resulting in more positive feelings (Wills, 1981). The use of negative upward comparison can intensify an individual's perceived inadequacies, as it frequently results in the belief that others possess physical features or abilities that the individual does not possess (Swallow & Kuiper, 1988). For instance, in the context of pornography as it portrays unrealistic bodies (Kvalem et al., 2016), individuals may be more likely to perceive shortcomings in their own physical appearance, which may result in BD as a result of upward comparison (Gewirtz-Meydan et al., 2024).

Moreover, internalizing body standards can result in a discrepancy between the actual and ideal selves. The self-discrepancy theory emphasizes the two domains of the self (actual, ideal) and differentiates between two perspectives on the self (own and significant others). The actual self encompasses the beliefs a person holds about their attributes, and the ideal self represents the characteristics they strive to possess (Higgins, 1987). Individuals tend to align their current self with their internalized ideals about body image, which serve as their personal self-guide in this context. However, the discrepancy between an individual's current state and their desired state leads to an increase in dissatisfaction (Higgins et al., 1986). Considering this self-discrepancy between the actual self and the ideal self as a significant contributor to BD one can turn to the virtual realm (i.e., pornography) over real life sexual experiences.

Although multiple previous studies have explored the relationship between PUF and BD, their findings have been inconsistent. Only one longitudinal study examined the link between BD and pornography use in adult samples and found no evidence of a significant association between pornography exposure and BD in women (Peter & Valkenburg, 2014). However, Laemmle (2019) reported that women who consume pornography experience negative outcomes in relation to PUF, including overall body concerns. The associations of PUF with different outcomes are not limited to overall BD; PUF has been linked to concerns about smaller breast size (Peter & Valkenburg, 2014) and lower genital self-image (Dogan & Yassa, 2019), resulting in greater interest in genital cosmetic surgery (Kalaaji et al., 2019; Sharp et al.,

2015; Truong et al., 2017). Moreover, Dawson's et al. (2020) study showed that pornography not only contributes to BD in women but can also result in self-judgment, as it distorts societal norms regarding women's physical appearance (Dawson et al., 2020; Paslakis et al., 2022). In sum, while the available evidence is not entirely consistent, it suggests that PUF may be negatively associated with body image and physical self-esteem among women (Doornwaard et al., 2014).

Some studies have established a link between PUF and BD among men as well, as greater pornography consumption was associated with greater overall BD in this population (Goldsmith et al., 2017; Peter & Valkenburg, 2014). It is important to note that pornography's potential association with body image may not be limited to overall BD, but can also extend to negative genital self-perception, as studies have demonstrated that increased PUF may be associated with dissatisfaction with one's penis size (Cranney, 2015; Sharp & Oates, 2019). Furthermore, the association between pornography use and BD has been also examined among sexual minority men. According to previous studies sexual minority men reported greater BD symptoms than heterosexual men resulting from their pornography use (Gewirtz-Meydan & Spivak-Lavi, 2023; Gleason & Sprankle, 2019; Griffiths et al., 2018). Thus, it is possible that pornography use may contribute to the development of both genital and overall BD among heterosexual and minority men, though no longitudinal studies corroborated this assumption.

Besides pornography use's well-documented positive association with masturbation (e.g., (Perry, 2020; Prause, 2019), previous studies indicated that masturbation frequency may also be associated with BD. Prior study revealed that greater levels of BD in women with eating disorders (i.e., bulimia nervosa) were associated with a reduced likelihood of masturbation and a later onset of masturbation frequency (Wiederman & Pryor, 1997). Specifically among women, these studies indicated that masturbation may result in increased bodily response, pleasure, a sense of control, and well-being, ultimately reducing BD (Bowman, 2014; Shulman & Horne, 2003). Moreover, higher levels of BD have been found to be correlated with diminished orgasmic pleasure during masturbation, which may result in decreased engagement in solo sexual activities (Horvath et al., 2020). Therefore, it is essential to consider the potential associations of masturbation with both PUF and BD, when examining the association between BD and PUF.

In sum, high consumption of pornography has been associated with a greater desire for muscularity (Morrison et al., 2007; Tylka & Kroon Van Diest, 2015), increased concerns about one's own body when having sex (J. Goldsmith & Burton, 2017), greater internalization of body ideals (Sevic et al., 2020), greater body monitoring behavior (Doornwaard et al., 2014), higher negative body perception (Whitfield et al., 2018), and greater body disapproval (O'Brien et al., 2015) among men and women. However, studies examining the relationship between PUF and BD are limited. First, there is a dearth of longitudinal studies examining changes over time that could show whether pornography use might have a longer-term association with one's body image, as only one study has examined PUF and BD among adults using a longitudinal design (Peter & Valkenburg, 2014). Second, the available studies had small sample sizes and focused on specific samples (e.g., men who have sex with men); therefore, they were not necessarily representative of the general population (Borgogna et al., 2018a, b; Dawson et al., 2020; Dogan & Yassa, 2019; Laemmle-Ruff et al., 2019; Leickly et al., 2017; Sharp & Oates, 2019; Truong et al., 2017; Tylka, 2015; Tylka & Kroon Van Diest, 2015). Moreover, given that pornography frequently co-occurs with masturbation (Wordecha et al., 2018), and in some studies masturbation has been positively linked to positive body image, due to increased familiarity with bodily responses (Bowman, 2014; Shulman & Horne, 2003), masturbation frequency should have been measured and accounted for in previous studies when examining the associations between PUF and BD (Perry, 2020; Prause, 2019).

The Present Study

This study aimed to investigate the cross-sectional and longitudinal relationships between PUF and BD in a young adult sample, considering gender-based differences and controlling for masturbation frequency (Perry, 2020; Prause, 2019). We hypothesized that PUF would be positively associated with BD cross-sectionally and one year later. Moreover, our study aimed to explore potential differences between men and women in this relationship, as previous studies have reported significant gender differences (Cranney, 2015; Peter & Valkenburg, 2014). Moreover, we also aimed to examine the potential bidirectionality of the associations between PUF and BD in an exploratory manner.

Methods

Participants

A total of 3,733 participants completed the self-report surveys (M_{age} = 23 years, SD = 4.74). Regarding gender, 1,801 (48.24%) were men and 1,932 (51.75%) were women. Concerning marital status, 2,103 (56.33%) of the participants reported being single, 1,504 (40.28%) were married, 10 were widows (0.26%) and 86 (2.30%) were divorced. Further descriptive statistics of the sample are presented in Table 1.

Table 1 Sociodemographic characteristics of participants

Characteristics	*N*	%	*M*	*SD*
Total sample	3733	100		
Gender	1801	48.24		
Men	1932	52.75		
Women				
Marital Status				
Single	2103	56.33		
Married	1504	40.28		
Widow	10	0.26		
Divorced	86	2.30		
Age				
23–29	957	25.2	23	4.74
29–33	1133	29.8		
34–39	1683	44.3		
Highest level of education				
Primary school	3	1		
Vocational school 1–3 grades	144	3.8		
Vocational school 4–5 grades	779	20.5		
Vocational high school	1161	30.5		
High school	701	18.4		
Higher vocational education after high school graduation,	291	7.7		
Higher vocational education, higher technical school (not college)	114	3.0		
College, BA/BSc education	425	11.2		
College, MA/MSc or undivided (integrated) education	128	3.4		
Post-graduate education, doctoral school (PhD, DLA)	17	4		

M = mean, SD = standard deviation, N = sample size, % = percentage

Procedure

We used data from the Budapest Longitudinal Study (BLS). The BLS is a longitudinal study investigating constructs related to various addictions and problematic behaviors, including gaming disorder, gambling disorder, compulsive sexual behaviors, and other substance use disorders (e.g., alcohol and exercise) among young adults (18–34 years) in the capital (Budapest) of Hungary. BLS was promoted through social media platforms such as Instagram and Facebook, as well as through a dedicated website created to provide information about BLS.

The data for waves 1 and 2 were collected between March and July 2019 and between June and September 2020, respectively. The data were collected through face-to-face interviews in both waves, which included sociodemographic questions and screening for addictive behaviors. To gather data on substance use, problematic behaviors, and psychological information, self-report methods were used. In wave 2, participants had the option to participate by completing online interviews or self-report questionnaires. The final weighted sample by layer categories included 3910 participants. In our study, we included 3733 participants, as they were the only individuals who could be matched across both data collection waves (the remaining participants could not be matched because of issues such as non-matching identification numbers). At Time 1, the sample comprised 3733 individuals, whereas at Time 2, 2832 participants completed the survey, indicating a 28% attrition rate between Times 1 and 2. A random stratified sampling procedure was performed according to age group and neighborhood. Prior to the data acquisition, informed consent was obtained to ensure voluntary participation. The BLS study protocol received approval from Research and Ethical Committee of the Medical Research Council (no. 60471–2/2018/EKU).

Measures

Sociodemographic Information

Information on gender, age, highest level of education, and marital status was collected using a researcher-derived questionnaire. Detailed sociodemographic characteristics of the participants are presented in Table 1.

Frequency of Pornography Use

Participants responded to one question about their past-year PUF: "During the last year, how often did you watch pornographic videos/films?" They indicated their answers on a 10-point scale ranging from 0 *not once in the last year* to 10 *more than seven times a week*.

Masturbation Frequency

In the present study, masturbation frequency was measured using one item "In the last year (during the past 12 months), how often did you masturbate?" Participants indicated their answers on a 10-point scale ranging from 0 *not once in the last year* to 10 *more than seven times a week*.

Body Dissatisfaction

Body image was assessed using the BD subscale of the Body Attitude Test (BAT; Probst et al., 1995). This subscale comprises four items rated on a five-point Likert scale, ranging from 1 *never* to 5 *always.* An example item is "When I look at myself in the mirror, I am dissatisfied with my own body." In the present study, the internal consistency (Cronbach's alpha) of this subscale was α = .86. Higher scores on the scale indicate higher levels of BD.

Data Analysis

We computed descriptive statistics, Cronbach's alphas and McDonald's omegas, independent samples t-tests, and correlations using SPSS 26. As Cronbach's alpha coefficient is not considered an optimal measure of reliability (Hayes & Coutts, 2020), we measured reliability using two different methods (i.e., McDonald's omega and Cronbach's alpha), see Table 2.

The main analyses were conducted using MPlus 8.7. The Robust Maximum Likelihood Estimator (MLR) was used to conduct auto-regressive cross-lagged models to investigate the relationship between PUF and BD. To test the adequacy of the model fit, we used commonly used goodness of fit indices (Brown, 2015), including the Comparative Fit Index (CFI; ≥ 0.90 for acceptable; ≥ 0.95 for excellent), Root-Mean-Square Error of Approximation (RMSEA; ≤ 0.06 for good, ≤ 0.08 for acceptable), and Tucker Lewis Index (TLI; ≥ 0.95 for good, ≥ 0.90 for acceptable (Brown, 2015). We used the Full Information Maximum Likelihood method to handle missing data (Enders & Bandalos, 2001; Newman, 2014). In interpreting our findings, we relied on Cohen's (1988) effect size criteria.

Following the procedure of previous work in the field of sex research (Girouard et al., 2021; Paquette et al., 2022), first, we investigated the relationship between PUF and BD with a saturated model in the overall sample, excluding the control variable (Model A). Next, we included the control variable (masturbation frequency) in the model (Model B). Subsequently, we incorporated gender as a grouping variable (i.e., men vs. women) into the model and employed a multi-group analysis to assess whether there were any differences across genders with respect to the relationship between PUF and BD (Model C). Following this, we tested the path coefficients between PUF and BD and constrained them to be

Table 2 Reliability indices, comparisons of Men's and Women's pornography use frequency, masturbation frequency, and body dissatisfaction

Measures	Range	ω	α	Total sample (N = 3733) M (SD)	(1) Men (n = 1801) M (SD)	(2) Women (n = 1932) M (SD)	t	Cohen's d	p
1. Pornography use frequency T1[a]	0–10			1.60 (2.33)	2.33 (2.49)	0.92 (1.93)	18.3	0.63	< .001
2. Pornography use frequency T2[a]	0–10			0.71 (1.78)	1.21 (2.21)	0.26 (1.08)	14.1	0.55	< .001
3.Masturbation frequency T1[a]	0–10			2.19 (2.70)	3.04 (2.75)	1.40 (2.39)	18.6	0.63	< .001
4.Masturbation frequency T2[a]	0–10			1.27 (2.37)	1.85 (2.70)	0.76 (1.90)	11.7	0.46	< .001
5. Body dissatisfaction T1[b]	0–5	.84	.84	3.93 (4.51)	2.91 (3.70)	4.86 (4.97)	−12.8	0.44	< .001
6. Body dissatisfaction T2[b]	0–5	.92	.92	3.25 (4.36)	2.82 (4.11)	3.65 (4.55)	−4.72	0.19	< .001

a = 0 = not once in the last year, 1 = 1 time, 2 = 2–6 times last year, 3 = 7–11 times last year, 4 = 1 time per month, 5 = 2–3 times a month, 6 = 1 time per week, 7 = 2–3 times a week 8 = 4–5 times a week, 9 = 6–7 times a week, 10 = more than 7 times a week; b = 0 = never, 1 = rarely, 2 = sometimes, 3 = often, 4 = usually, 5 = always, M = mean; SD = standard deviation, t = t test value, p = significance test value; α = Cronbach's alpha; ω = McDonald's omega. *p < .05. ** p < 01, T1 represents the first data collection wave and T2 represents the second data collection wave

the same across groups (Model D). Finally, we compared the differences between Model C and D (i.e., unconstrained, and constrained models) to explore if gender differences were significant, by examining changes in chi-square, CFI, TLI, and RMSEA values.

Results

Descriptive Statistics of PUF and BD And Comparisons of Men and Women

We conducted independent samples *t* tests to investigate gender-based differences in PUF, BD, and masturbation frequency. The results demonstrated that men had significantly higher levels of T1 PUF ($M = 2.33$, $SD = 2.49$) and T2 PUF ($M = 1.21$, $SD = 2.21$) compared to women (T1 PUF $M = 0.92$, $SD = 1.93$ and T2 PUF $M = 0.26$, $SD = 1.08$). Similarly, men's T1 ($M = 3.04$, $SD = 2.75$) and T2 ($M = 1.85$, $SD = 2.70$) masturbation frequencies were found to be significantly higher than women's T1 ($M = 1.40$, $SD = 2.39$) and T2 (M = 0.76, SD = 1.90) masturbation frequencies. Conversely, women had significantly higher levels of T1 BD ($M = 4.86$, $SD = 4.97$) and T2 BD ($M = 3.65$, $SD = 4.55$) compared to men's T1 BD ($M = 2.91$, $SD = 3.70$) and T2 BD ($M = 2.82$, $SD = 4.11$). These findings indicate that PUF (T1 and T2), masturbation frequency (T1 and T2), and BD (T1 and T2) all showed gender-based differences with small to medium effect sizes, see Table 2.

The correlations between the variables are presented in Table 3. Pearson correlation coefficients showed that all associations between PUF and BD were significant, positive, and weak (*r* ranging between .09 to .10 ps < .001). Additionally, masturbation frequency as a control variable was positively associated with PUF at T1 and T2 as well (*r* ranging between .58 to .72 ps < .001). Furthermore, all associations between masturbation frequency and BD were significant, positive, and weak (*r* ranging between .09 to .14 ps < .001).

Cross-Sectional and Longitudinal Associations Between PUF and BD

All the models demonstrated an excellent fit to the data as the models were fully saturated (see Table 4 for details).

Table 3 Descriptive statistics, correlation between pornography use frequency, masturbation frequency and body dissatisfaction

Measures	*(Skew)* *(SE)*	Kurt *(SE)*	Range	M *(SD)*	1	2	3	4	5	6
1. Pornography use frequency T1[a]	1.21 (0.04)	0.10 (0.08)	0 –10	1.60 (2.33)	1					
2. Pornography use frequency T2[a]	2.62 (0.04)	6.07 (0.09)	0 –10	0.70 (1.77)	.15**	1				
3. Masturbation frequency T1[a]	0.68 (0.04)	−1.14 (0.08)	0 –10	2.19 (2.70)	.72**	.13**	1			
4. Masturbation frequency T2[a]	1.55 (0.04)	0.80 (0.09)	0 –10	1.26 (2.37)	.07**	.58**	.16**	1		
5. Body dissatisfaction T1[b]	1.21 (0.04)	1.02 (0.08)	0 –10	3.91 (4.51)	.10**	.00	.14**	.00	1	
6. Body dissatisfaction T2[b]	1.46 (0.04)	1.63 (0.09)	0 – 10	3.27 (4.37)	.07**	.09**	.06**	.09**	.25**	1

Skew. = Skewness; Kurt. = Kurtosis; a = 0 = not once in the last year, 1 = 1 time, 2 = 2–6 times last year, 3 = 7–11 times last year, 4 = 1 time per month, 5 = 2–3 times a month, 6 = 1 time per week, 7 = 2–3 times a week 8 = 4–5 times a week, 9 = 6–7 times a week, 10 = more than 7 times a week; b = 0 = never, 1 = rarely, 2 = sometimes, 3 = often, 4 = usually, 5 = always; M = mean; SD = standard deviation

Table 4 Examination of the relationship between pornography use frequency and perceived body dissatisfaction across men and women individuals controlling for masturbation frequency

Models	χ^2 (df)	CFI	TLI	RMSEA	RMSEA (90% CI)
Model A: Fully saturated model, no control variable (total sample)	0.000 (0)	1.000	1.000	0.000	0.000–0.000
Model B: Model with control variable (total sample)	0.000 (0)	1.000	1.000	0.000	0.000–0.000
Model C: Fully saturated model, with control variable and grouping by gender	0.000 (0)	1.000	1.000	0.000	0.000–0.000
Model D: Same as Model C, parameters constrained to be equal between groups	382.189 (15)	0.602	0.364	0.115	0.105–0.125

$\chi 2$ = Chi-square test; df = degrees of freedom; CFI = comparative fit index; TLI = Tucker–Lewis Index; RMSEA = root-mean-square error of approximation; 90% CI = 90% confidence interval of RMSEA

To examine whether the relationship between PUF and BD differed across genders (i.e., men and women), we compared the constrained model (Model D) to the unconstrained model (Model C). (ΔCFI = 0.398, ΔTLI = 0.636, ΔRMSEA =—0.115). Moreover, the corrected chi-square difference test result was significant ($\Delta\chi^2 = 382.189$; $p < .001$). These results indicated that the associations between PUF and BD differ significantly between men and women. Therefore, the results of Model C are reported in Figs. 1 and 2 and described below.

Among men, higher levels of T1 BD were associated with higher levels of T1 PUF (*r* = .21, 95% CI [.15, .26], $p < .001$) with a weak effect size. T2 BD was not significantly associated with T2 PUF (*r* = .05, 95% CI [-.02, .11], $p = .187$). Longitudinally, higher levels of T1 PUF were associated with higher levels of T2 PUF ($\beta = .15$, 95% CI [.06, .22], $p < .001$) and higher levels of T1 BD were associated with higher levels of T2 BD ($\beta = .18$, 95% CI [.10, .25], $p < .001$), with weak effect sizes. Concerning the cross-lagged longitudinal associations, higher levels of T1 PUF were associated with higher levels of T2 BD ($\beta = .13$, 95% CI [.04, .21], $p = .002$). Higher levels of T1 BD were associated with higher levels of T2 PUF ($\beta = .09$, 95% CI [.01, .15], $p = .019$). These associations were also weak in terms of effect size.

Among women, cross-sectionally, higher levels of T1 BD were associated with higher levels of T1 PUF (*r* = .18, 95% CI [.12, .23], $p < .001$). Higher levels of T2 PUF were associated with higher levels of T2 BD (*r* = .24, 95% CI [.17, .29], $p < .001$). Longitudinally, T1 PUF was not significantly associated with the T2 PUF ($\beta = < 0.01$, 95% CI [-.05, .05], $p = .944$). Higher levels of T1 BD were associated with higher levels of T2 BD ($\beta = .25$, %95 CI [.18, .30], $p < .001$). Concerning the cross-lagged longitudinal associations, T1 PUF was not significantly associated with T2 BD ($\beta = < 0.01$, 95% CI [-.08, .08], $p = .940$). T1 BD was not significantly associated with T2 PUF ($\beta = 0.04$, 95% CI [-.00, .09], $p = .090$). All significant associations were weak in terms of effect size.

Discussion

A recent systematic review has documented a significant, positive association between PUF and BD (Paslakis et al., 2022). Yet, noticeable knowledge gaps exist when examining PUF and BD associations given the limitations of previous studies (e.g., use of cross-sectional designs, focus on homogenous). Our study aimed to bridge these gaps by examining the cross-sectional and longitudinal associations between PUF and BD among a young adult sample, considering potential gender-based differences. In the present study, men's greater PUF were positively associated with greater BD one year later, and higher levels of BD were associated with greater PUF one year later. However, among women, neither a unidirectional nor a bidirectional association between PUF and BD over time was observed.

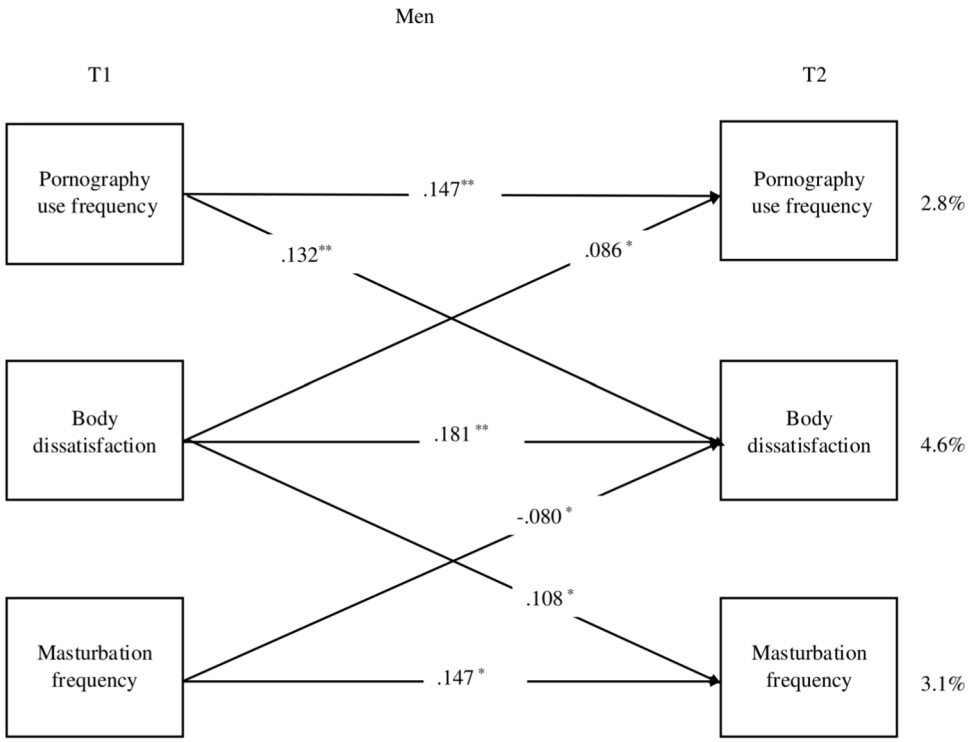

Fig. 1 Associations between pornography use frequency and body dissatisfaction among Men controlling for masturbation frequency. *Note.* Correlations between the variables are not presented to ensure clarity. Only significant associations between T1 pornography use frequency, body dissatisfaction, and masturbation frequency and T2 pornography use frequency, body dissatisfaction, and masturbation are presented for the sake of clarity. Coefficients are standardized regression coefficients. Explained variances of the outcomes are presented on the right side of each variable. T1 represents the first data collection wave and T2 represents the second data collection wave, *$p < 0.05$, **$p < 0.01$

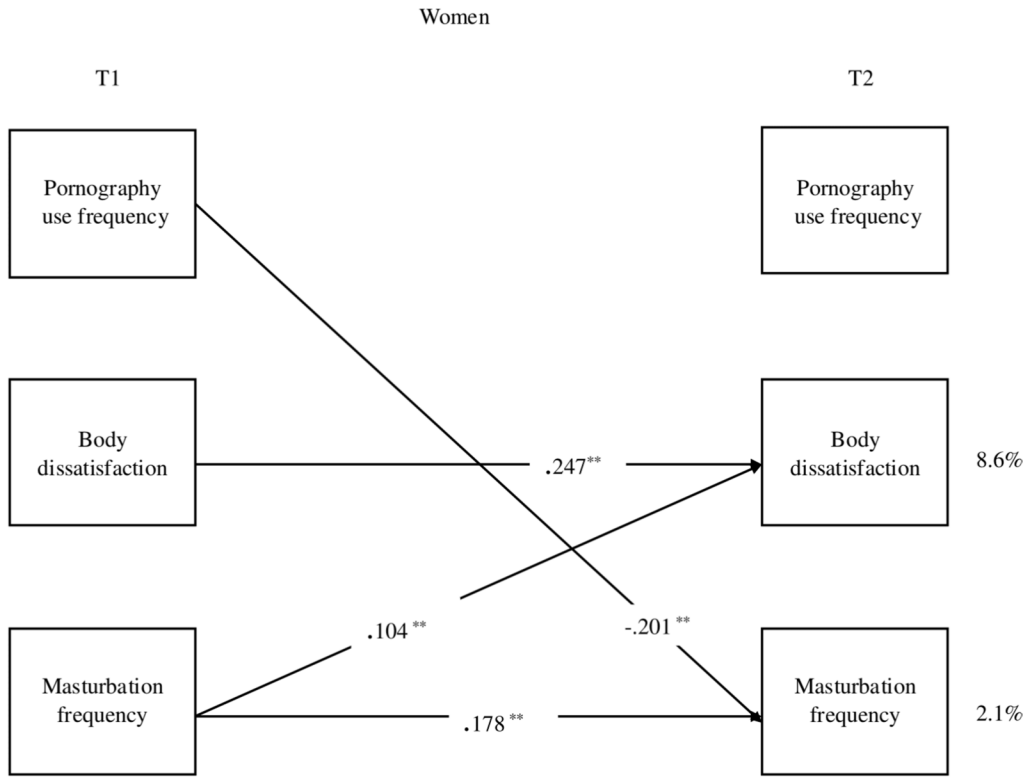

Fig. 2 Associations between pornography use frequency and body dissatisfaction among women controlling for masturbation frequency *Note*. Correlations between the variables are not presented to ensure clarity. Only significant associations between T1 pornography use frequency, body dissatisfaction, and masturbation frequency and T2 pornography use frequency, body dissatisfaction, and masturbation are presented for the sake of clarity. Coefficients are standardized regression coefficients. Explained variances of the outcomes are presented on the right side of each variable. T1 represents the first data collection wave and T2 represents the second data collection wave, $*p < 0.05$, $**p < 0.01$

Our findings indicate that, in both short- and longer-term, men consistently scored higher on PUF and masturbated more frequently compared to women. However, women consistently scored higher on BD than men. A potential explanation for men's higher levels of pornography use and masturbation frequency is that pornography is known to facilitate masturbation among men thus they frequently cooccur (Carvalheira et al., 2017; Kraus et al., 2016). Higher levels of pornography consumption and masturbation by men may be attributed to their higher sexual drive (Baughman et al., 2014). Regarding higher levels of BD among women, unlike men, women may tend to place a greater emphasis on their physical appearance, regardless of age, whereas this tendency decreases in men as they age (Öberg & Tornstam, 1999; Quittkat et al., 2019). These findings are in line with previous studies that have demonstrated that men typically have higher levels of PUF (Dawson et al., 2020; Grubbs et al., 2019; Rissel et al., 2017) and masturbation frequency (Cervilla & Sierra, 2022; Gerressu et al., 2008), while women generally exhibit higher levels of body dissatisfaction compared to men (Frederick & Essayli, 2016; Quittkat et al., 2019).

Regarding the cross-sectional associations between our study variables, among men, baseline PUF and BD were positively and weakly associated with each other; however, this association was not significant between T2 PUF and BD. Among women, PUF and BD were positively and weakly associated with each other at T1 and T2 as well. Given the prominence and conspicuous portrayal of enhanced muscularity and unrealistic genitalia in pornography (McKee et al., 2008), it can be hypothesized that pornography may exacerbate BD regardless of gender in the short term. Overall, our findings are in accordance with those of previous studies demonstrating pornography-related desire for muscular (Duggan & McCreary, 2013; Morrison et al., 2007) and mesomorphic bodies (Tylka, 2015), along with increased body surveillance (Doornwaard et al., 2014) and dissatisfaction (Dogan & Yassa, 2019; Griffiths et al., 2018; O'Brien et al., 2015; Whitfield et al., 2018). While comparing our findings to those of previous studies, it is crucial to consider the limited generalizability of past results due to small sample sizes and the lack of heterogeneity. The present findings extend prior research by showing that PUF and BD are positively

associated with each other among a large sample of Hungarian young adults.

Concerning longitudinal findings, significant gender differences were observed. Based on the present study's findings, although effect sizes were small, we observed that more frequent pornography consumption was associated with greater BD among men over one year. This finding could relate to the representation of bodies in pornography, given that it typically exhibits larger penises and more muscular physiques than what is considered average (McKee et al., 2008). This representation may skew the perception of men's typical penises and body size (Sharp & Oates, 2019). Overall, our findings extend upon those of previous cross-sectional (Borgogna et al., 2018a, b; Kvalem et al., 2016; Laemmle-Ruff et al., 2019; Tylka, 2015) and short-term prospective studies (Peter & Valkenburg, 2014), by showing that PUF may be positively associated with BD over one year among young men, but not women, among a large young adult sample.

Although women's bodies have been prominently featured in pornography since its inception as a popular medium (Cowan et al., 1988; Klaassen & Peter, 2015), we did not observe a significant association between PUF and BD among women over time in our study. According to the literature, this might be explained by the degree to which pornography is perceived as real. Specifically, individuals who perceive pornographic content as more realistic may be less critical of it (Wright et al., 2023b). Given that men tend to perceive sex portrayed in media as more realistic than women (Punyanunt-Carter, 2006), PUF's associations with BD might not be as prominent among women as among men. It may also be possible that frequent pornography use may lead women to gain a more accurate understanding of its content (Vogels, 2018) thereby reducing body image concerns related to pornography (Davis et al., 2019). In the previous studies, the associations between pornography use and BD were mediated by perceived realism. For example, in one study, pornography use had a positive, indirect association with body image through perceived realism for men and women as well (Vogels, 2018). However, in another study, perceived realism did not have any statistical effect on the association between pornography use and BD among heterosexual and homosexual men (Gewirtz-Meydan et al., 2024). This difference may be explained by the different sampling methods used in the studies (Atkinson, 2000; Dickinson, 2002; Gewirtz-Meydan et al., 2024).

Another possible explanation is that PUF and BD disparity between women and men can be attributed to increased media literacy in women as it serves as a protective factor, mitigating the negative impact of media on body image (Tylka, 2011). Moreover, women may be exposed to idealized bodies more frequently than men in other forms of media (e.g., television, magazines, or social media). As idealized bodies featured in pornography are extremely different than the bodies featured in other forms of media, women may not consider bodies presented in pornography as a rational basis for comparisons (Levine & Harrison, 2009; Peter & Valkenburg, 2014). Findings from the current study, when considered alongside those from a previous study by Peter and Valkenburg (2014), suggest that prolonged consumption of pornography among women may not relate negatively to their body image over the course of one year. Finally, another explanation may relate to the forms of pornography consumed by men and women. For example, women are more likely to consume written pornography than men (Solano et al., 2018); therefore, they might be less influenced by the bodies presented in video pornography.

Moreover, a bidirectional association was observed between PUF and BD in men over time. This bidirectional association suggests that pornography use may contribute to men's BD and conversely, BD may contribute to greater engagement in pornography use one year later. A potential explanation for these results is that messages within pornography, rooted in masculine gender role ideology, could shape men's body-related, relational, and psychological well-being, (Tylka, 2015). As a result, men may experience distressing sexual difficulties, thus withdrawing from real-life sexual experiences due to perceived BD and increased cognitive distortion related to sexual performance (Carvalheira et al., 2017). A further explanation relates to the potential consequences of social isolation and low self-esteem stemming from social physique anxiety (Barnes et al., 2020) in response to BD (Ruscio et al., 2008). Accordingly, men with BD may turn to pornography as a means of fulfilling sexual gratification rather than seeking out real-life sexual experiences. Although a significant longitudinal association was observed between baseline PUF and BD six months later among men in a previous study (Peter & Valkenburg, 2014), no bidirectional association was found. To our knowledge, our findings are the first supporting bidirectional associations between PUF and BD among men. However, it needs to be noted that the observed associations were small, suggesting that other factors may play more crucial roles in men's BD than PUF.

Our findings provide compelling evidence for the positive association between PUF and body image concerns with significant gender differences. Mental health professionals may consider integrating strategies to assess pornography consumption alongside available interventions for body-related problems. For example, they could use a combination of assessment tools focusing on PUF and BD. They may also develop treatment plans using multifaceted approaches such as combining therapy with psychoeducation to enhance individual's ability to critically evaluate the bodies depicted in pornography.

Strengths, Limitations, and Future Directions

The present study investigated the longitudinal association between PUF and BD in a large sample of young adults over a period of one year. Furthermore, our study's strengths include the consideration of masturbation frequency as a potential control variable and the use of a large sample of men and women, as previous studies primarily focused on more homogenous samples of adolescents, women, and sexual minority individuals (Cranney, 2015; Duggan & McCreary, 2013; Paquette et al., 2023). Nonetheless, our study is not without limitations. First, even though a longitudinal design was applied, the cause-effect relationships between the variables cannot be determined. Second, this study did not measure the types of pornographic material that individuals used, as it might be possible that individuals' BD perceptions might differ based on professional and amateur pornography (Griffiths et al., 2018; Kvalem et al., 2016). Third, despite previous studies suggesting that the associations between PUF and BD might differ among sexual minority individuals compared to their heterosexual counterparts, the present study did not include a measure of sexual orientation (Griffiths et al., 2018). Fourth, in our study, we did not provide a definition for pornography and relied on self-report measures that might have resulted in biases (i.e., recall bias or under- or over-reporting), (Štulhofer et al., 2021). Fifth, as our study was part of a larger, ongoing longitudinal study, we had limited space to ask about pornography use related behaviors as well as about body concerns and used single-item or brief assessment tools. This may limit the understanding of the complex nature of pornography use and its association with potential outcomes (Kohut et al., 2020). Sixth, as we used single-item measures to assess both PUF and masturbation frequency, there is a need for a wider range of assessment tools to enable a more reliable, systematic, and standardized evaluation of these constructs. Seventh, to measure BD, we used the BD subscale of Body Attitude Test (BAT; Probst et al., 1995). BD is a complex construct that encompasses various dimensions, such as appearance, weight, and muscularity. Thus, the use of this brief measure limits the more nuanced understanding of BD's association with PUF in the present study. Future studies should delve deeper into BD, including different aspects of BD. Additionally, although the association between PUF and BD can be explained by the social comparison, self-objectification and self-discrepancy theories, we did not assess these constructs. Future research should consider how pornography use relates to the BD, considering these notions. Moreover, future studies should also examine gender minority individuals as well as more diverse samples of adults, as our sample included adults from a Western, educated, industrialized, rich, and democratic (WEIRD) country, which hinders the generalizability of the results to other populations. Lastly, future studies should consider additional constructs associated with body image such as age and the internalization of sociocultural appearance ideals (e.g., thin-ideal or muscular-ideal internalization) in examining the association between PUF and BD.

Conclusions

Even though preliminary cross-sectional evidence suggests positive associations between PUF and BD, previous studies had several shortcomings. These limitations included the sole reliance on cross-sectional designs and small sample sizes (Griffiths et al., 2018; Kvalem et al., 2016; Laemmle-Ruff et al., 2019; Peter & Valkenburg, 2014) limiting the generalizability of findings and the exploration of the directionality of the associations between PUF and BD. Considering these limitations, we examined the cross-sectional and longitudinal associations between PUF and BD in a sample of young adult women and men over one year. Our findings suggested that PUF and BD were positively and weakly associated cross-sectionally and longitudinally among men but only cross-sectionally among women. This short-term association may have been due to developing more realistic perception of pornographic material over time by women (Vogels, 2018). Although a longitudinal study design was employed, it is not possible to establish causal relationships between the variables and our results should be interpreted with caution. Therapists working with individuals with body image concerns may incorporate queries about their clients' pornography consumption into therapy sessions, and adding psychoeducational elements to interventions to critically assess the unrealistic physical depictions presented in pornographic content might be beneficial.

Author Contribution Suleyman Agah Demirgul: collected, analyzed and interpreted the data. He also wrote the manuscript. Marie-Michèle Paquette and Sophie Bergeron conceptualized the study and did the editing. Borbála Paksi and Andrea Czakó did the data curation and project administration. Zsolt Demetrovics and Beáta Bőthe supervised the project and edited the manuscript.

Funding Open access funding provided by Eötvös Loránd University. SAD's contribution was supported by the Hungarian National Research, Development, and Innovation Office (KKP126835, FK134807, K138976).

The authors declare that no funds, grants, or other support were received during the preparation of this manuscript.

No funding was received for conducting this study.

Data Availability The data are available upon request from the corresponding author.

Code Availability The codes are available upon request from the corresponding author.

Declarations

Ethics Approval This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by Research and Ethical Committee of the Medical Research Council (no. 60471–2/2018/EKU).

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

Competing interests The authors have no relevant financial or non-financial interests to disclose.

References

Al-Musharaf, S., Rogoza, R., Mhanna, M., Soufia, M., Obeid, S., & Hallit, S. (2022). Factors of body dissatisfaction among Lebanese adolescents: The indirect effect of self-esteem between mental health and body dissatisfaction. *BMC Pediatrics, 22*(1), 1–11. https://doi.org/10.1186/s12887-022-03373-4

Atkinson, F. (2000). Survey design and sampling. *The Research Process in Nursing (4th ed.) Cornwall: Blackwell Publishing*. https://doi.org/10.1177/10547738211064739

Barnes, M., Abhyankar, P., Dimova, E., & Best, C. (2020). Associations between body dissatisfaction and self-reported anxiety and depression in otherwise healthy men: A systematic review and meta-analysis. *PLoS One,15*(2), e0229268. https://doi.org/10.1371/journal.pone.0229268

Baughman, H. M., Jonason, P. K., Veselka, L., & Vernon, P. A. (2014). Four shades of sexual fantasies linked to the dark triad. *Personality and Individual Differences, 67*, 47–51. https://doi.org/10.1016/j.paid.2014.01.034

Borgogna, N. C., Duncan, J., & McDermott, R. C. (2018a). Is scrupulosity behind the relationship between problematic pornography viewing and depression, anxiety, and stress? *Sexual Addiction & Compulsivity,25*(4), 293–318. https://doi.org/10.1080/10720162.2019.1567410

Borgogna, N. C., Lathan, E. C., & Mitchell, A. (2018b). Is women's problematic pornography viewing related to body image or relationship satisfaction? *Sexual Addiction & Compulsivity, 25*(4), 345–366. https://doi.org/10.1080/10720162.2018.1532360

Bőthe, B., Nagy, L., Koos, M., Demetrovics, Z., Potenza, M. N., International Sex Survey Consortium, Kraus, S. W., Demirgül, S. A., Gaudet, É., & Ballester-Arnal, R. (2024). Problematic pornography use across countries, genders, and sexual orientations: Insights from the international sex survey and comparison of different assessment tools. *Addiction, 119*(5), 928–950. https://doi.org/10.1111/add.16431

Bowman, C. P. (2014). Women's masturbation: Experiences of sexual empowerment in a primarily sex-positive sample. *Psychology of Women Quarterly, 38*(3), 363–378. https://doi.org/10.1016/j.paid.2014.01.034

Brown, T. A. (2015). *Confirmatory factor analysis for applied research* (2nd ed., pp. 110–115). Guilford publications.

Bucchianeri, M. M., & Neumark-Sztainer, D. (2014). Body dissatisfaction: An overlooked public health concern. *Journal of Public Mental Health, 13*(2), 64–69. https://doi.org/10.1108/JPMH-11-2013-0071

Carvalheira, A., Godinho, L., & Costa, P. (2017). The impact of body dissatisfaction on distressing sexual difficulties among men and women: The mediator role of cognitive distraction. *The Journal of Sex Research, 54*(3), 331–340. https://doi.org/10.1080/00224499.2016.1168771

Cervilla, O., & Sierra, J. C. (2022). Masturbation parameters related to orgasm satisfaction in sexual relationships: Differences between men and women. *Frontiers in Psychiatry, 13*, Article 903361. https://doi.org/10.3389/fpsyt.2022.903361

Cohen, J. (2013). *Statistical power analysis for the behavioral sciences* (2nd ed., pp. 112–116). Routledge. https://doi.org/10.4324/9780203771587

Cooper, A., Scherer, C. R., Boies, S. C., & Gordon, B. L. (1999). Sexuality on the internet: From sexual exploration to pathological expression. *Professional Psychology: Research and Practice, 30*(2), 154. https://doi.org/10.1037/0735-7028.30.2.154

Cowan, G., Lee, C., Levy, D., & Snyder, D. (1988). Dominance and inequality in x-rated videocassettes. *Psychology of Women Quarterly,12*(3), 299–311. https://doi.org/10.1111/j.1471-6402.1988.tb00945.x

Cranney, S. (2015). Internet pornography use and sexual body image in a Dutch sample. *International Journal of Sexual Health, 27*(3), 316–323. https://doi.org/10.1080/19317611.2014.999967

Daniel, S., Bridges, S. K., & Martens, M. P. (2014). The development and validation of the Male Assessment of Self-Objectification (MASO). *Psychology of Men & Masculinity,15*(1), 78. https://doi.org/10.1037/a0031518

Davis, A. C., Wright, C. J., Temple-Smith, M. J., Hellard, M. E., & Lim, M. S. (2019). A health education website developed to meet young people's information needs about web-based pornography and sharing of sexually explicit imagery (SCOPE): Usability study. *JMIR Formative Research,3*(3), Article e12824. https://doi.org/10.2196/12824

Dawson, K., Nic Gabhainn, S., & MacNeela, P. (2020). Toward a model of porn literacy: Core concepts, rationales, and approaches. *The Journal of Sex Research, 57*(1), 1–15. https://doi.org/10.1080/00224499.2018.1556238

Dickinson, H. O., Wiley-Blackwell. (2002). Use and abuse of statistics in nursing research. *Journal of Advanced Nursing*. https://doi.org/10.1046/j.1365-2648.2002.02334.x

Dogan, O., & Yassa, M. (2019). Major motivators and sociodemographic features of women undergoing labiaplasty. *Aesthetic Surgery Journal, 39*(12), NP517–NP527. https://doi.org/10.1093/asj/sjy321

Doornwaard, S. M., Bickham, D. S., Rich, M., Vanwesenbeeck, I., van den Eijnden, R. J., & Ter Bogt, T. F. (2014). Sex-related online behaviors and adolescents' body and sexual self-perceptions. *Pediatrics, 134*(6), 1103–1110. https://doi.org/10.1542/peds.2014-0592

Downing, M. J., Schrimshaw, E. W., Scheinmann, R., Antebi-Gruszka, N., & Hirshfield, S. (2017). Sexually explicit media use by sexual identity: A comparative analysis of gay, bisexual, and heterosexual men in the United States. *Archives of Sexual Behavior, 46*(6), 1763–1776. https://doi.org/10.1007/s10508-016-0837-9

Duggan, S. J., & McCreary, D. R. (2013). Body image, eating disorders, and the drive for muscularity in gay and heterosexual men: The influence of media images. In *Eclectic views on gay male pornography* (pp. 45–58). Routledge. https://doi.org/10.1300/J082v47n03_03

Enders, C. K., & Bandalos, D. L. (2001). The relative performance of full information maximum likelihood estimation for missing data in structural equation models. *Structural Equation Modeling, 8*(3), 430–457. https://doi.org/10.1207/S15328007SEM0803_5

Esnaola, I., Rodríguez, A., & Goñi, A. (2010). Body dissatisfaction and perceived sociocultural pressures: Gender and age differences. *Salud Mental,33*(1), 21–29.

Esplin, C. R., Hatch, S. G., Hatch, H. D., Deichman, C. L., & Braithwaite, S. R. (2021). What motives drive pornography use? *The Family Journal, 29*(2), 161–174. https://doi.org/10.1177/1066480720956 6

Fallon, E. A., Harris, B. S., & Johnson, P. (2014). Prevalence of body dissatisfaction among a United States adult sample. *Eating Behaviors, 15*(1), 151–158. https://doi.org/10.1016/j.eatbeh.2013.11.007

Festinger, L. (1954). A theory of social comparison processes. *Human Relations, 7*(2), 117–140. https://doi.org/10.1177/001872675400700202

Fitzsimmons-Craft, E. E., Harney, M. B., Koehler, L. G., Danzi, L. E., Riddell, M. K., & Bardone-Cone, A. M. (2012). Explaining the relation between thin ideal internalization and body dissatisfaction among college women: The roles of social comparison and body surveillance. *Body Image, 9*(1), 43–49. https://doi.org/10.1016/j.bodyim.2011.09.002

Frederick, D. A., & Essayli, J. H. (2016). Male body image: The roles of sexual orientation and body mass index across five national US studies. *Psychology of Men & Masculinity,17*(4), 336. https://doi.org/10.1037/men0000031

Fredrickson, B. L., & Roberts, T.-A. (1997). Objectification theory: Toward understanding women's lived experiences and mental health risks. *Psychology of Women Quarterly,21*(2), 173–206. https://doi.org/10.1111/j.1471-6402.1997.tb00108.x

Gerressu, M., Mercer, C. H., Graham, C. A., Wellings, K., & Johnson, A. M. (2008). Prevalence of masturbation and associated factors in a British national probability survey. *Archives of Sexual Behavior, 37*, 266–278. https://doi.org/10.1007/s10508-006-9123-6

Gewirtz-Meydan, A., & Spivak-Lavi, Z. (2023). The association between problematic pornography use and eating disorder symptoms among heterosexual and sexual minority men. *Body Image, 45*, 284–295. https://doi.org/10.1016/j.bodyim.2023.03.008

Gewirtz-Meydan, A., Bőthe, B., & Spivak-Lavi, Z. (2024). The associations of pornography use and body image among heterosexual and sexual minority men. *Archives of Sexual Behavior*. https://doi.org/10.1007/s10508-024-02887-5

Gewirtz-Meydan, A., Feder, H., Nagy, L., Koós, M., Kraus, S. W., Demetrovics, Z., Potenza, M. N., Ballester-Arnal, R., Batthyány, D., & Bergeron, S. (2025). Motives for pornography use and women's sexual wellbeing: Insights from a 42-country study. *Journal of Behavioral Addictions*. https://doi.org/10.1111/add.16431.

Girouard, A., Dion, J., Bőthe, B., O'Sullivan, L., & Bergeron, S. (2021). Bullying victimization and sexual wellbeing in sexually active heterosexual, cisgender and sexual/gender minority adolescents: The mediating role of emotion regulation. *Journal of Youth and Adolescence, 50*(11), 2136–2150. https://doi.org/10.1007/s10964-021-01471-7

Gleason, N., & Sprankle, E. (2019). The effects of pornography on sexual minority men's body image: An experimental study. *Psychology & Sexuality,10*(4), 301–315. https://doi.org/10.1080/19419899.2019.1637924

Goldsmith, J., & Burton, E. (2017). Why teaching ethics to AI practitioners is important. *Thirty-First AAAI Conference on Artificial Intelligence*. https://doi.org/10.3138/cjhs.262-a2

Goldsmith, K., Dunkley, C. R., Dang, S. S., & Gorzalka, B. B. (2017). Pornography consumption and its association with sexual concerns and expectations among young men and women. *The Canadian Journal of Human Sexuality, 26*(2), 151–162. https://doi.org/10.3138/cjhs.262-a2

Griffiths, S., Mitchison, D., Murray, S. B., & Mond, J. M. (2018). Pornography use in sexual minority males: Associations with body dissatisfaction, eating disorder symptoms, thoughts about using anabolic steroids and quality of life. *Australian & New Zealand Journal of Psychiatry, 52*(4), 339–348. https://doi.org/10.1177/0004867417728807

Grogan, S. (2006). Body image and health: Contemporary perspectives. *Journal of Health Psychology, 11*(4), 523–530. https://doi.org/10.1177/1359105306065013

Grogan, S. (2021). Body image: Understanding body dissatisfaction in men, women and children. *Routledge*. https://doi.org/10.4324/9781003100041

Grubbs, J. B., Kraus, S. W., & Perry, S. L. (2019). Self-reported addiction to pornography in a nationally representative sample: The roles of use habits, religiousness, and moral incongruence. *Journal of Behavioral Addictions, 8*(1), 88–93. https://doi.org/10.1556/2006.7.2018.134

Harper, C., & Hodgins, D. C. (2016). Examining correlates of problematic internet pornography use among university students. *Journal of Behavioral Addictions, 5*(2), 179–191. https://doi.org/10.1556/2006.5.2016.022

Hart, E. A., Leary, M. R., & Rejeski, W. J. (1989). Tie measurement of social physique anxiety. *Journal of Sport and Exercise Psychology,11*(1), 94–104. https://doi.org/10.1123/jsep.11.1.94

Hayes, A. F., & Coutts, J. J. (2020). Use omega rather than Cronbach's alpha for estimating reliability. But…. *Communication Methods and Measures,14*(1), 1–24. https://doi.org/10.1080/19312458.2020.1718629

Higgins, E. T. (1987). Self-discrepancy: A theory relating self and affect. *Psychological Review, 94*(3), 319. https://doi.org/10.1037/0033-295X.94.3.319

Higgins, E. T., Bond, R. N., Klein, R., & Strauman, T. (1986). Self-discrepancies and emotional vulnerability: How magnitude, accessibility, and type of discrepancy influence affect. *Journal of Personality and Social Psychology, 51*(1), 5. https://doi.org/10.1037/0022-3514.51.1.5

Horvath, Z., Smith, B. H., Sal, D., Hevesi, K., & Rowland, D. L. (2020). Body image, orgasmic response, and sexual relationship satisfaction: Understanding relationships and establishing typologies based on body image satisfaction. *Sexual Medicine, 8*(4), 740–751. https://doi.org/10.1016/j.esxm.2020.06.008

Huang, Q., Peng, W., & Ahn, S. (2021). When media become the mirror: A meta-analysis on media and body image. *Media Psychology, 24*(4), 437–489. https://doi.org/10.1080/15213269.2020.1737545

Kalaaji, A., Dreyer, S., Maric, I., Schnegg, J., & Jönsson, V. (2019). Female cosmetic genital surgery: Patient characteristics, motivation, and satisfaction. *Aesthetic Surgery Journal, 39*(12), 1455–1466. https://doi.org/10.1093/asj/sjy309

Klaassen, M. J., & Peter, J. (2015). Gender (in) equality in internet pornography: A content analysis of popular pornographic internet videos. *The Journal of Sex Research, 52*(7), 721–735. https://doi.org/10.1080/00224499.2014.976781

Kogure, G. S., Ribeiro, V. B., Lopes, I. P., Furtado, C. L. M., Kodato, S., de Sá, M. F. S., Ferriani, R. A., da Silva Lara, L. A., & Dos Reis, R. M. (2019). Body image and its relationships with sexual functioning, anxiety, and depression in women with polycystic ovary syndrome. *Journal of Affective Disorders,253*, 385–393. https://doi.org/10.1016/j.jad.2019.05.006

Kohut, T., Balzarini, R. N., Fisher, W. A., Grubbs, J. B., Campbell, L., & Prause, N. (2020). Surveying pornography use: A shaky science resting on poor measurement foundations. *The Journal of Sex Research, 57*(6), 722–742. https://doi.org/10.1080/00224499.2019.1695244

Kraus, S. W., Potenza, M. N., Martino, S., & Grant, J. E. (2015). Examining the psychometric properties of the Yale-Brown Obsessive–Compulsive Scale in a sample of compulsive pornography users. *Comprehensive Psychiatry,59*, 117–122. https://doi.org/10.1016/j.comppsych.2015.02.007

Kraus, S. W., Martino, S., & Potenza, M. N. (2016). Clinical characteristics of men interested in seeking treatment for use of pornography. *Journal of Behavioral Addictions, 5*(2), 169–178. https://doi.org/10.1556/2006.5.2016.036

Kumar, P., Patel, V. K., Bhatt, R. B., Vasavada, D. A., Sangma, R. D., & Tiwari, D. S. (2021). Prevalence of problematic pornography use and attitude toward pornography among the undergraduate medical students. *Journal of Psychosexual Health,3*(1), Article Article 1. https://doi.org/10.1177/2631831821989677

Kvalem, I. L., Træen, B., & Iantaffi, A. (2016). Internet pornography use, body ideals, and sexual self-esteem in Norwegian gay and bisexual men. *Journal of Homosexuality, 63*(4), 522–540. https://doi.org/10.1080/00918369.2015.1083782

Laemmle-Ruff, I. L., Raggatt, M., Wright, C. J., Carrotte, E. R., Davis, A., Jenkinson, R., & Lim, M. S. (2019). Personal and reported partner pornography viewing by Australian women, and association with mental health and body image. *Sexual Health,16*(1), 75–79. https://doi.org/10.1071/SH18037

Lawless, N. J., Karantzas, G. C., & Knox, L. (2023). The development and validation of the Pornography Use in Romantic Relationships Scale. *Archives of Sexual Behavior, 52*(4), 1799–1818. https://doi.org/10.1007/s10508-023-02534-5

Leickly, E., Nelson, K., & Simoni, J. (2017). Sexually explicit online media, body satisfaction, and partner expectations among men who have sex with men: A qualitative study. *Sexuality Research & Social Policy,14*(3), 270–274. https://doi.org/10.1007/s13178-016-0248-7

Levine, M. P., & Harrison, K. (2009). Effects of media on eating disorders and body image. In J. Bryant, & M. B. Oliver (Eds.), *Media effects: Advances in theory and research* (3rd ed., pp. 490–515). Routledge/Taylor & Francis.

Lewczuk, K., Wójcik, A., & Gola, M. (2019). Increase in the prevalence of online pornography use: Objective data analysis from the period between 2004 and 2016 in Poland. *Archives of Sexual Behavior*, 1–15. https://doi.org/10.1007/s10508-021-02090-w

Malki, K., Rahm, C., Öberg, K. G., & Ueda, P. (2021). Frequency of pornography use and sexual health outcomes in Sweden: Analysis of a national probability survey. *The Journal of Sexual Medicine, 18*(10), 1735–1751. https://doi.org/10.1016/j.jsxm.2021.08.003

McKee, A., Albury, K., & Lumby, C. (2008). *The porn report*. Melbourne University Publishing. https://doi.org/10.1111/j.1471-6402.1996.tb00467.x

McKinley, N., & Hyde, J. (1996). The objectified body consciousness scale: Self-objectification, body shame, and disordered eating. *Psychology of Women Quarterly, 22*, 623–636. https://doi.org/10.1016/j.bodyim.2017.10.005

Morrison, T. G., Morrison, M. A., & Bradley, B. A. (2007). Correlates of gay men's self-reported exposure to pornography. *International Journal of Sexual Health,19*(2), 33–43. https://doi.org/10.1300/J514v19n02_03

Newman, D. A. (2014). Missing data: Five practical guidelines. *Organizational Research Methods, 17*(4), 372–411. https://doi.org/10.1177/1094428114548590

O'Brien, J. E., Li, W., & Burton, D. L. (2015). Eating disordered behaviors and body disapproval in adolescent males adjudicated for sexual and nonsexual crimes. *Journal of Child Sexual Abuse, 24*(8), 922–942. https://doi.org/10.1080/10538712.2015.1092004

Öberg, P., & Tornstam, L. (1999). Body images among men and women of different ages. *Ageing & Society*, *19*(5), 629–644. Cambridge University Press

Paquette, M.-M., Dion, J., Bőthe, B., Girouard, A., & Bergeron, S. (2022). Heterosexual, cisgender and gender and sexually diverse adolescents' sexting behaviors: The role of body appreciation. *Journal of Youth and Adolescence, 51*(2), 278–290. https://doi.org/10.1007/s10964-021-01568-z

Paquette, M.-M., Bőthe, B., Dion, J., Girouard, A., & Bergeron, S. (2023). Can I love my body even if it doesn't look like the porn stars'? Longitudinal associations between pornography use frequency and body appreciation in a diverse sample of adolescents. *Archives of Sexual Behavior*. https://doi.org/10.1007/s10508-023-02679-3

Park, H. J., & Park, Y. B. (2024). Negative upward comparison and relative deprivation: Sequential mediators between social networking service usage and loneliness. *Current Psychology,43*(10), 9141–9151. https://doi.org/10.1007/s12144-023-05057-3

Paslakis, G., Chiclana Actis, C., & Mestre-Bach, G. (2022). Associations between pornography exposure, body image and sexual body image: A systematic review. *Journal of Health Psychology, 27*(3), 743–760. https://doi.org/10.1177/1359105320967085

Perry, S. L. (2018). Pornography use and depressive symptoms: Examining the role of moral incongruence. *Society and Mental Health, 8*(3), 195–213. https://doi.org/10.1177/2156869331772837

Perry, S. L. (2020). Is the link between pornography use and relational happiness really more about masturbation? Results from two national surveys. *The Journal of Sex Research, 57*(1), 64–76. https://doi.org/10.1080/00224499.2018.1556772

Perry, S. L., & Whitehead, A. L. (2019). Only bad for believers? Religion, pornography use, and sexual satisfaction among American men. *The Journal of Sex Research, 56*(1), 50–61. https://doi.org/10.1080/00224499.2017.1423017

Peter, J., & Valkenburg, P. M. (2014). Does exposure to sexually explicit Internet material increase body dissatisfaction? A longitudinal study. *Computers in Human Behavior, 36*, 297–307. https://doi.org/10.1016/j.chb.2014.03.071

Prause, N. (2019). Porn is for masturbation. *Archives of Sexual Behavior, 48*(8), 2271–2277. https://doi.org/10.1007/s10508-019-1397-6

Probst, M., Vandereycken, W., Coppenolle, H. V., & Vanderlinden, J. (1995). The body attitude test for patients with an eating disorder: Psychometric characteristics of a new questionnaire. *Eating Disorders, 3*(2), 133–144. https://doi.org/10.1080/10640269508249156

Punyanunt-Carter, N. M. (2006). Love on television: Reality perception differences between men and women. *North American Journal of Psychology, 2*(2), 269–277.

Quittkat, H. L., Hartmann, A. S., Düsing, R., Buhlmann, U., & Vocks, S. (2019). Body dissatisfaction, importance of appearance, and body appreciation in men and women over the lifespan. *Frontiers in Psychiatry, 10*, Article 864. https://doi.org/10.3389/fpsyt.2019.00864

Reid, R. C., Li, D. S., Gilliland, R., Stein, J. A., & Fong, T. (2011). Reliability, validity, and psychometric development of the pornography consumption inventory in a sample of hypersexual men. *Journal of Sex & Marital Therapy,37*(5), 359–385. https://doi.org/10.1080/0092623X.2011.607047

Rissel, C., Richters, J., De Visser, R. O., McKee, A., Yeung, A., & Caruana, T. (2017). A profile of pornography users in Australia: Findings from the second Australian study of health and relationships. *The Journal of Sex Research,54*(2), 227–240. https://doi.org/10.1080/00224499.2016.1191597

Rothman, E. F. (2021). *Pornography and public health* (pp. 121–130). Oxford University Press.

Ruscio, A. M., Brown, T. A., Chiu, W. T., Sareen, J., Stein, M. B., & Kessler, R. C. (2008). Social fears and social phobia in the USA: Results from the National Comorbidity Survey Replication. *Psychological Medicine, 38*(1), 15–28. https://doi.org/10.1017/S0033291707001699

Sadeghi, E., & Kilavuz, M. (2022). How is sex knowledge and sex attitude and pornography usage status among students? *The Journal of Sexual Medicine, 19*(11), S131. https://doi.org/10.1016/j.jsxm.2022.10.065

Schilder, P. (2013). *The image and appearance of the human body* (Vol. 163). Routledge. https://doi.org/10.4324/9781315010410

Ševčíková, A., Blinka, L., & Soukalová, V. (2018). Excessive internet use for sexual purposes among members of Sexaholics Anonymous and Sex Addicts Anonymous. *Sexual Addiction & Compulsivity, 25*(1), 65–79. https://doi.org/10.1080/10720162.2018.1431166

Sevic, S., Ciprić, A., Buško, V., & Štulhofer, A. (2020). The relationship between the use of social networking sites and sexually explicit material, the internalization of appearance ideals and body self-surveillance: Results from a longitudinal study of male adolescents. *Journal of Youth and Adolescence, 49*(2), 383–398. https://doi.org/10.1007/s10964-019-01172-2

Sharp, G., & Oates, J. (2019). Sociocultural influences on men's penis size perceptions and decisions to undergo penile augmentation: A qualitative study. *Aesthetic Surgery Journal, 39*(11), 1253–1259. https://doi.org/10.1093/asj/sjz154

Sharp, G., Tiggemann, M., & Mattiske, J. (2015). Predictors of consideration of labiaplasty: An extension of the tripartite influence model of beauty ideals. *Psychology of Women Quarterly, 39*(2), 182–193. https://doi.org/10.1177/0361684314549949

Shulman, J. L., & Horne, S. G. (2003). The use of self-pleasure: Masturbation and body image among African American and European American women. *Psychology of Women Quarterly, 27*(3), 262–269. https://doi.org/10.1111/1471-6402.00106

Solano, I., Eaton, N. R., & O'Leary, K. D. (2018). Pornography consumption, modality and function in a large internet sample. *The Journal of Sex Research*. https://doi.org/10.1080/00224499.2018.1532488

Statista. (2021). Global digital population as of January 2021. https://www.statista.com/

Swallow, S. R., & Kuiper, N. A. (1988). Social comparison and negative self-evaluations: An application to depression. *Clinical Psychology Review, 8*(1), 55–76. https://doi.org/10.1016/0272-7358(88)90049-9

Štulhofer, A. (2021). Is male adolescents' sexual aggressiveness better explained by prior pornography use or callousness? A brief report. *Sexual Abuse, 33*(3), 361–373. https://doi.org/10.1177/1079063220952777

Truong, C., Amaya, S., & Yazdany, T. (2017). Women's perception of their vulvar appearance in a predominantly low-income, minority population. *Female Pelvic Medicine & Reconstructive Surgery,23*(6), 417–419. https://doi.org/10.1097/SPV.0000000000000442

Tylka, T. L. (2011). Positive psychology perspectives on body image. In T. F. Cash, & L. Smolak (Eds.), *Body image: A handbook of science, practice, and prevention* (2nd ed., pp. 56–64). Guilford Press. https://doi.org/10.1016/B978-0-12-384925-0.00104-8

Tylka, T. L. (2015). No harm in looking, right? Men's pornography consumption, body image, and well-being. *Psychology of Men & Masculinity,16*(1), 97. https://doi.org/10.1037/a0035774

Tylka, T. L., & Kroon Van Diest, A. M. (2015). You looking at her "hot" body may not be "cool" for me: Integrating male partners' pornography use into objectification theory for women. *Psychology of Women Quarterly, 39*(1), 67–84. https://doi.org/10.1177/0361684314521784

Vogels, E. A. (2018). Loving oneself: The associations among sexually explicit media, body image, and perceived realism. *The Journal of Sex Research*. https://doi.org/10.1080/00224499.2018.1475546

Ward, L. M. (2016). Media and sexualization: State of empirical research, 1995–2015. *The Journal of Sex Research, 53*(4–5), 560–577. https://doi.org/10.1080/00224499.2016.1142496

Whitfield, T. H., Rendina, H. J., Grov, C., & Parsons, J. T. (2018). Viewing sexually explicit media and its association with mental health among gay and bisexual men across the US. *Archives of Sexual Behavior,47*(4), 1163–1172. https://doi.org/10.1007/s10508-017-1045-y

Wiederman, M. W., & Pryor, T. (1997). Body dissatisfaction and sexuality among women with bulimia nervosa. *International Journal of Eating Disorders, 21*(4), 361–365. https://doi.org/10.1002/(SICI)1098-108X(1997)21:4%3c361::AID-EAT9%3e3.0.CO;2-M

Wills, T. A. (1981). Downward comparison principles in social psychology. *Psychological Bulletin, 90*(2), 245. https://doi.org/10.1037/0033-2909.90.2.245

Wordecha, M., Wilk, M., Kowalewska, E., Skorko, M., Łapiński, A., & Gola, M. (2018). "Pornographic binges" as a key characteristic of males seeking treatment for compulsive sexual behaviors: Qualitative and quantitative 10-week-long diary assessment. *Journal of Behavioral Addictions, 7*(2), 433–444. https://doi.org/10.1556/2006.7.2018.33

Wright, P. J., Tokunaga, R., & Herbenick, D. (2023a). But do porn sites get more traffic than TikTok, OpenAI, and Zoom? *The Journal of Sex Research, 60*(6), 763–767. https://doi.org/10.1080/00224499.2023.2220690

Wright, P. J., Tokunaga, R. S., & Herbenick, D. (2023b). Perceived similarity, utility, and social realism as potential mediators of the link between pornography use and condomless sex. *Health Communication, 38*(9), 1800–1812.

Yean, C., Benau, E. M., Dakanalis, A., Hormes, J. M., Perone, J., & Timko, C. A. (2013). The relationship of sex and sexual orientation to self-esteem, body shape satisfaction, and eating disorder symptomatology. *Frontiers in Psychology, 4*, Article 887. https://doi.org/10.3389/fpsyg.2013.00887