

Bidirectional positive associations between problematic pornography use and body dissatisfaction in women and men: Findings among Hungarian young adults in a one-year longitudinal study

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ABSTRACT

Previous studies have established a positive link between pornography use and body dissatisfaction (BD). Nevertheless, previous empirical studies have yielded inconsistent associations between pornography use and BD when taking into account different forms of pornography use (e.g., pornography use frequency or problematic pornography use) or potential gender differences. Given that problematic pornography use (PPU, out-of-control use with negative consequences) differs from general pornography use, the associations between PPU and BD warrant further examination using a longitudinal design and large sample, which the current literature lacks. Given these limitations, this study examined the associations between PPU and BD cross-sectionally and longitudinally in a sample of Hungarian young adults. Among a sample of 2801 adults ($M_{\text{age}} = 28$ years, $SD = 4.75$, 47.69 % men and 52.30 % women), we performed an autoregressive cross-lagged analysis with a multi-group approach. According to the findings, greater levels of PPU were cross-sectionally associated with higher BD among men and women. Longitudinally, we observed bidirectional positive associations between PPU and BD over time among men and women as well. Based on the present findings, clinicians should implement systematic screening procedures for BD symptoms among individuals exhibiting signs of PPU. Similarly, individuals presenting with BD should be assessed for PPU. This dual-screening approach will enable timely intervention and the development of comprehensive treatment plans.

1. Introduction

Recent studies have demonstrated a positive association between the time spent online and body dissatisfaction (BD) among both men and

women. For example, previous studies reported that individuals spending 20 h or more on online social media weekly reported greater BD (Carter et al., 2017). Furthermore, pornography use is one of the online activities that promote unrealistic beauty standards, as it

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promotes lean and muscular bodies that are far from those of the general population making them difficult for the average individual to achieve (Dawson et al., 2020). Moreover, its intense use may be associated with problematic pornography use (PPU). PPU is defined based on Compulsive Sexual Behavior Disorder (CSBD) symptoms, which comprise (i) intense and poorly controlled pornography use, (ii) numerous failure attempts to reduce or modulate pornography use, and (iii) engaging in pornography use despite its negative effects (World Health Organization, 2018). PPU differs from non-problematic pornography use as it may result in significant impairments (Böthe et al., 2020). Previous studies have established a positive association between pornography use frequency (i.e., non-problematic pornography use) and BD; however, PPU may be associated with greater BD than pornography use frequency (i.e., non-problematic pornography use) due to excessive exposure to idealized body representations and distress resulting from PPU (McKee et al., 2008). Although the positive link between pornography use and BD is well-established, far less attention has been given to the association between PPU and BD despite preliminary evidence suggesting that PPU (and not pornography use frequency) may relate to BD among men (Gewirtz-Meydan et al., 2024). Therefore, the present study aimed to examine how PPU might relate to BD, cross-sectionally and longitudinally, using cross-lagged analysis among men and women in a sample of Hungarian young adults.

Although a universally accepted definition of pornography remains elusive, it can be characterized as sexually explicit material in which individuals deliberately exhibit nudity, with or without sexual acts, intended to elicit sexual arousal (Kohut et al., 2020). This sexually explicit material may involve, including but not limited to, oral sex, anal, or vaginal penetration (Reid et al., 2011). Besides its sexual arousal features, pornography may be considered as a form of sexual education (Wright et al., 2022) or material to help individuals discover their sexual orientation (Litsou et al., 2021). However, excessive online pornography use has been often linked to (Camilleri et al., 2021) self-perceived pornography addiction or PPU (De Alarcón et al., 2019; Grubbs & Perry, 2019), either due to excessive consumption (Cooper, 1998) or individual characteristics such as moral beliefs (Grubbs & Perry, 2019) or values (Prause, 2019).

PPU is often considered a subtype of CSBD which is more of a state like condition than a trait like indicating its occurrence due to situational factors (Horváth et al., 2025). Although Kafka (2010) proposed the concept of Hypersexual Disorder for inclusion in the Diagnostic and Statistical Manual of Mental Disorders 5th edition (DSM-5), it was ultimately rejected due to a lack of empirical evidence (Reid & Kafka, 2014; World Health Organization, 2018). However, CSBD was included under the impulse control disorder category in the latest edition of the International Classification of Diseases (ICD-11). According to a large-scale study conducted across 42 countries, prevalence estimates for PPU may vary between 3.2 % and 16.6 % across different sub-populations (Böthe et al., 2024). In this study, significant gender differences were observed as men (6.26 %) reported higher levels of PPU than women (0.72 %).

Previous studies have examined the potential impact of PPU on individuals, focusing on internalizing (e.g., depression, anxiety and self-esteem) and externalizing (e.g., hyperactivity and functionality) comorbid problems associated with PPU. For example, in previous studies, participants with PPU reported higher levels of depression (Böthe et al., 2020), anxiety (Camilleri et al., 2021), and stress (Altin et al., 2024), as well as poor social functioning (Duffy et al., 2016) and relationship anxiety (Leonhardt et al., 2018). Furthermore, although findings are mixed, PPU has been associated with body image concerns in a previous study through body comparison (Gewirtz-Meydan et al., 2024) among men. However, this association was not significant among women in another study (Borgogna, Lathan, et al., 2018), highlighting potential gender differences in the associations between PPU and BD.

Body image, as conceptualized by Grogan (2021), encompasses an individual's subjective perceptions, thoughts, and emotions in relation

to their own physical appearance and may be characterized by both positive and negative aspects. Positive body image is conceptualized as a multidimensional construct that encompasses acceptance, love, respect, and appreciation of one's body, as well as feeling comfortable with one's physical features (Grogan, 2021; Tylka, 2011). In contrast, those who possess negative body image experience dissatisfaction with their physical appearance and often perceive discrepancies between their actual and idealized physical appearance (Bucchianeri & Neumark-Sztainer, 2014), resulting in body dissatisfaction (BD).

Pornography typically portrays idealized bodies, featuring performers whose bodily characteristics deviate from reality in terms of body fat, genitals, size, height, and muscularity (Dawson et al., 2020) with greater variability observed in women's representations than men's (McKee et al., 2008). Previous research has shown a positive correlation between pornography use and BD, although the findings have been mixed (Paslakis et al., 2022). Social comparison theory (Festinger, 1954) may provide possible explanation for BD associated with pornography use. In accordance with this theory, sense of self is developed through the comparison of the self with other individuals when physical evaluation is not available. Individuals typically assess their own worth through self-evaluation and gain insight into their own social and personal value as a result of their comparison direction, known as upward and downward comparison. Upward comparison is a process by which an individual compares themselves to someone who is superior or better, while downward comparison involves comparing oneself to someone who is lesser or worse. Downward comparison is often used as a strategy to boost self-esteem, as it can make individuals feel better about themselves in comparison to someone else (Tiggemann & Miller, 2010). In the context of PPU, one may spend excessive time on pornography use with uncontrolled consumption resulting in excessive exposure to pornography. Consequently, given that bodies presented are far from reality featuring muscular physiques and larger genitalia, individual may engage in upward comparisons (e.g., observing performers in pornography as more appealing than them), which may result in BD (Gewirtz-Meydan et al., 2024; McKee et al., 2008).

Despite conflicting findings in the literature, a systematic review conducted by Paslakis et al. (2022) revealed consistent evidence of negative associations between pornography use and body image with important gender differences. Although previous studies have predominantly been conducted among men due to their higher pornography use (Camilleri et al., 2021), some studies have included women as well. These studies have mainly examined pornography use frequency and PPU separately and have shown that the association between pornography use and BD significantly differed by gender. For men, pornography use has been positively associated with BD. Gay men, for example, reported greater BD symptoms, linked to body comparisons with pornography actors (Griffiths et al., 2018; Gewirtz-Meydan & Spivak-Lavi, 2023) and a drive to achieve a muscular physique (Morrison et al., 2007). Pornography use was further associated with men's preferences for romantic partners, favoring individuals resembling pornography actors (Leickly et al., 2017). Notably, when examining both pornography use frequency and PPU among men, significant positive associations with BD were observed only for PPU, not for pornography use frequency (Gewirtz-Meydan et al., 2024; Gewirtz-Meydan & Spivak-Lavi, 2023).

Among women, in contrast to men, PPU was not significantly associated with BD (Borgogna, Lathan, et al., 2018). Regarding pornography use rather than PPU, similar negative patterns have been observed among women as among men. For example, women often perceived the bodies in pornography as unattainable for the average person (Dawson et al., 2020) and believed that pornography distorted perceptions of ideal attractiveness (Mattebo, 2014), contributing to BD. Furthermore, women engaging in pornography use reported higher levels of BD (Dogana & Yassa, 2019a) although the association between pornography use and BD decreased with maturity and sexual experience (Davis et al., 2019). In addition to overall BD, some studies have examined sexual BD.

For example, men reported greater penis size dissatisfaction, while women did not report breast size dissatisfaction, indicating a gendered pattern in sexual BD (Cranney, 2015). Conversely, a study has identified a positive association between pornography use and BD, as both men and women reported that frequent engagement in pornography use resulted in perceiving pornography as more realistic, which, in turn, was associated with more positive body image perceptions (Vogels, 2018). Finally, several studies reported no significant associations between pornography use and BD, including the only longitudinal study in adults on this topic (Peter & Valkenburg, 2014; Laemmle-Ruff et al., 2019; Borgogna, Duncan, et al., 2018); indicating mixed findings.

Prior studies exploring the associations between pornography use and body image has typically focused on non-problematic use, which may not entail the whole spectrum of pornography use as the mere frequency of use is insufficient to identify problematic use (Bóthe et al., 2020; Chen et al., 2022). To the best of our knowledge only two studies examined the association between PPU and BD, (Gewirtz-Meydan et al., 2024; Gewirtz-Meydan & Spivak-Lavi, 2023). As mentioned above, only PPU was positively associated with BD not pornography use frequency in these studies. They interpreted these as a consequence of shame, guilt, and self-criticism, as well as neurotic tendencies associated with PPU. Although this study provides support for the association between PPU and BD, it is not without notable limitations. For instance, the sample used is a convenience sample comprised only of men, and the data is cross-sectional, limiting the generalizability of the findings and understanding of the directionality of the associations between PPU and BD (e.g., whether prior PPU may result in BD, or whether prior BD may relate to later higher levels of PPU).

Previous studies have also primarily used cross-sectional designs, with the exception of one study (Peter & Valkenburg, 2014) and, this only longitudinal study relied on a single item to measure both overall BD and pornography use. However, single-item measurements may not capture the complex nature of variables of interest and multi-item measurement scales are recommended to better capture the nuances of the variables of interest (Fisher et al., 2016; Kohut et al., 2020). In addition, existing studies had small sample sizes and thus were not necessarily representative of the general population (Borgogna, Lathan, et al., 2018). Finally, in the existing studies, the majority of studies have focused on men, examining both problematic and non-problematic pornography use (Gewirtz-Meydan et al., 2024; Paslakis et al., 2022), which makes it impossible to generalize the findings to other populations (e.g., women).

1.1. The present study

Considering these various limitations, the present study aimed to examine the cross-sectional and longitudinal associations between PPU and BD among a sample of Hungarian young adults. We hypothesized that PPU would be positively associated with BD both cross-sectionally and longitudinally at one-year follow-up. Gender differences were examined in an exploratory manner due to the conflicting findings.

2. Method

2.1. Participants

A total of 2801 individuals participated in the study ($M_{\text{age}} = 28$ years, $SD = 4.75$). The sample comprised a near-equal proportion of men and women, with a slightly larger number of women participants, totaling 1336 men (47.69 %) individuals, compared to 1465 (52.30 %) women. Sociodemographic information is presented in Table 1.

2.2. Procedure

In the present study, we used data from the Budapest Longitudinal Study (BLS). The BLS is a longitudinal study that focuses on addictions

Table 1
Sociodemographic characteristics of participants.

Characteristics	<i>N</i>	%	<i>M</i>	<i>SD</i>
Total sample	2801	100		
Gender				
Men	1336	47.70		
Women	1465	52.30		
Marital status				
Single	1450	51.7		
Married	1282	45.7		
Widow	5	0.17		
Divorced	38	1.51		
Not identified	26	0.92		
Age				
18–21	1700	60.69	28	4.75
22–27	973	34.7		
28–34	128	4.56		
Education level				
Elementary	669	23.38		
High school	1659	59		
University degree / MA / MSC /	449	16		
Post-graduate degree	16	0.57		
Not identified	20	0.71		
Socio economic status				
Among the best	18	0.64		
Much better than average	53	1.89		
Slightly better than average	329	11.74		
Average	1817	64.86		
Slightly worse than average	447	15.95		
Much worse than average	116	0.57		
Does not know	7	0.24		
Not identified	14	0.49		

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

and problematic behaviors, such as gaming disorder, gambling disorder, compulsive sexual behaviors, and other substance addictions (e.g., alcohol and exercise) among adults (18–34 years old) in the capital city of Hungary (Budapest). The target group of the initial sample was the young adult population aged 18–34 years old with a valid Budapest address (321,974 persons) according to the registration of the Ministry of the Interior as of 1 January 2019. The sample was selected using a single-stage random sampling procedure stratified by age groups (18–24 and 25–34, i.e. born between 1994 and 2000 and 1984–1993) and districts. The first wave of the BLS took place in 2019 and for the present study we used only second and third waves which was collected between June and September 2020 and June and November 2021 as our variables of interest were included since second data collection (see Supplementary Fig.1.). The data collection process for both waves involved conducting face-to-face interviews with self-report questionnaires or online interviews with self-report questionnaires based on the availability of the participants. Considering the sensitive nature of the survey items, to mitigate social desirability bias, we used a mixed interviewing technique, combining face-to-face interviewing with self-completion elements. This was done in such a way that the sensitive questions (e.g., questions on behavioral addictions) were self-administered during the interview. The self-completed questions were filled in by the respondent and handed to the interviewer in a sealed envelope. At the same time, the presence of the interviewer ensured the standardization of the interview conditions (e.g., the respondent did not complete the questionnaire with family members).

In the first wave of the data collection, 2744 participants attended in person, while 57 participants participated through online interviews. In the second wave, 2867 participants attended in person, with 7 participants participating via online interviews. Furthermore, only participants who completed the questionnaires in both waves were included in our analysis. Consequently, 2801 participants were included in the present study. Prior to conducting the main analysis, we assessed the normal distribution of all study variables by evaluating skewness and kurtosis. We considered skewness values between -2 and $+2$ and kurtosis values ranging from -7 to $+7$ as indicative of an acceptable level of normality.

According to Hair and Bryne, the normality assumption is fulfilled when the skewness coefficient is within the range of ± 2 , and the kurtosis coefficient is within the range of ± 7 (Byrne, 2013) (see Table 2). Participants were provided with a 1000 HUF (3\$) shopping voucher and a mug with the study logo as incentives. Prior to the initiation of data collection, all participants provided their consent to participate in the research. The study protocol for the BLS was approved by the Research and Ethical Committee of the Medical Research (no. 60471–2/2018/EKU). The analysis codes were uploaded in Open Science Framework (OSF; LINK). However, due to the confidential nature of the information and the fact that participants were not informed about the potential for their data to be shared publicly, we chose not to upload the dataset to OSF.

2.3. Measures

Sociodemographic information was measured using single, researcher created items as follows. Participants responded to a single item that assessed their on sex/gender⁷: “Sex of the respondent,” age: “In what year were you born?”, and marital status: “What is your current official marital status?”, education level: “What is your highest level of education?”, socioeconomic status: “All in all, in your opinion, how good conditions do you / your family have compared to others?”.

PPU was measured using the Problematic Pornography Consumption Scale-Short Version (PPCS-6) (Bóthe et al., 2018; Bóthe et al., 2021). The PPCS-6 measures PPU with six items. Participants rated the items on (e.g., “I felt that porn is an important part of my life) a seven-point Likert scale ranging from 1 (never) to 7 (all the time). The total score ranges from 6 to 42 points. A score of ≥ 20 points on the PPCS-6 indicates a risk of PPU. However, in our analysis, we computed mean scores instead of sum scores in SPSS, resulting in a score range from 1 to 7. Higher scores are an indicator of higher levels of PPU. Previous studies using PPCS-6 reported strong validity in differentiating participants with PPU and non-PPU among Hungarian and international samples (Bóthe et al., 2021, 2023, 2024). In the present study, we used Hungarian version of PPCS-6. Those participants naturally missing data on the PPCS-6 who did not use pornography in the past year (T1: $n = ,78.4\%$; T2: $n = ,82.6.4\%$) were recoded as “never” on all PPCS-6 items for subsequent analyses, as was done in previous studies (e.g., Bóthe et al., 2022). According to a reliability generalization meta-analysis study of the PPCS, the average Cronbach’s alpha score of the PPCS was .91, indicating excellent internal consistency (Demirgüil et al., 2024). In our sample, at T1 and T2, the PPCS-6 showed excellent reliability (T1: $\alpha = .93$, $\omega = .93$; T2: $\alpha = .94$, $\omega = .94$).

Body dissatisfaction was measured using the BD subscale of the Body Attitude Test (BAT; Probst et al., 1995). The BAT is a self-report instrument that assesses an individual’s perception about their body. In the present study, we used the Hungarian version of the BAT. According to previous findings, the Hungarian version of the BAT demonstrated strong reliability and validity in distinguishing between individuals with BD and without BD among diverse Hungarian samples (Czeglédi et al., 2010; Edit et al., 2010). This subscale consists of four items (e.g., “When I look at myself in the mirror, I am dissatisfied with my own body.”). In the present study, at T1 and T2, the subscale of BAT measuring BD had excellent reliability (T1: $\alpha = .92$, $\omega = .92$; T2: $\alpha = .95$, $\omega = .95$).

2.4. Statistical analysis

We computed descriptive statistics, correlations among variables, reliability indices (i.e., McDonald’s omega and Cronbach’s alpha) and normality indices using SPSS 26, (see Table 2). We performed our main

analysis using Mplus 8.7. The outcome variable (PPU) did not meet the assumption of normality, as indicated by skewness and kurtosis values exceeding the threshold for skewness (± 2) and kurtosis (± 7). Therefore, we used the robust Maximum Likelihood (MLR) estimation, which provides standard errors and chi-square statistics robust to non-normality. When examining gender-based differences in PPU and BD, we conducted independent samples t-tests for data that followed a normal distribution (i.e., BD) and performed the Mann-Whitney *U* test for non-normally distributed data (i.e., PPU). We performed autoregressive cross-lagged models to examine the association between PPU and BD. In interpreting our findings, we relied on Cohen’s (1988) effect size criteria for group differences and Orth et al.’s (2024) criteria for cross-lagged associations. We tested the adequacy of the model fit with the 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).

Moreover, a previous study has shown that traditional techniques, such as listwise or pairwise deletion, are inadequate and inappropriate for handling missing data when 10 % or more of the respondent sample consists of partial responders (Newman, 2014). Therefore, as traditional techniques may introduce biases, the Full Information Maximum Likelihood (FIML) is recommended to be used as it outperforms other approaches when missingness exceeds 10 %. Given that our missing data was more than 10 % (ranging between 30 % and 33 % in T1 and 28–31 % in T2), we used the FIML method to handle missing data. To apply the FIML method for handling missing data, first, we determined the type of missing data among men and women separately. Both for men ($\chi^2(25) = 31.343$, $p = .178$) and women ($\chi^2(27) = 17.252$, $p = .925$), Little’s MCAR test indicated that missing data was completely at random allowing us to apply the FIML method to handle our missing data (Enders & Bandalos, 2001; Newman, 2014). Initially, we examined the associations between PPU and BD in the total sample (Model A). Next, we examined the gender differences by adding participant’s gender as a grouping variable (i.e., men vs. women) into the model and performed a multi-group analysis to examine gender differences in the association between PPU and BD (Model B). Subsequently, we constrained the paths to be equal across all groups (Model C). Finally, we compared Models B and C, which represented the unconstrained and constrained models, respectively, to determine whether gender differences were present in the paths by analyzing the changes in chi-square, CFI, TLI, and RMSEA values. A significant corrected chi-square difference test, significant decreases in CFI and TLI ($\Delta CFI \leq 0.010$; $\Delta TLI \leq 0.010$), and significant increases in RMSEA ($\Delta RMSEA \leq 0.015$) (Bóthe, Tóth-Király, Griffiths, et al., 2021; Chen, 2007; Cheung & Rensvold, 2002) indicated whether the constrained and unconstrained models differed significantly (i.e., whether the associations differed significantly between men and women).

3. Results

3.1. Descriptive results of PPU and BD for men and women

To assess gender differences, an independent samples *t*-test was applied to normally distributed variable (i.e., BD), while the non-normally distributed variable (i.e., PPU) was analyzed using the Mann-Whitney *U* test. According to our findings, PPU differed significantly among men and women. Men reported higher levels of PPU both at T1 ($M = 1.14$, $SD = 0.54$, Cohen’s $d = 0.20$) and T2 ($M = 1.09$, $SD = 0.45$, Cohen’s $d = 0.08$) than women at T1 ($M = 1.04$, $SD = 0.32$) and T2 ($M = 1.05$, $SD = 0.42$). Similarly, we observed significant gender differences in BD. At T1, women reported greater BD ($M = 3.94$, $SD = 4.53$, Cohen’s $d = 0.20$) than men ($M = 3.07$, $SD = 4.15$), and at T2, men reported greater BD ($M = 5.26$, $SD = 4.66$, Cohen’s $d = 0.11$) than women ($M = 4.66$, $SD = 5.34$).

⁷ The survey was conducted in Hungarian, a language which does not include a clear differentiation between sex and gender (i.e., the word used in the Hungarian survey was “nem”).

Table 2
Reliability indices, comparisons of men’s and women’s problematic pornography use, and body dissatisfaction.

	ω	α	Mean (SD) Overall	N	Mann-Whitney U Z test Statistic	(1) Men M (SD)	(2) Women M (SD)	t	Cohen’s d	p
1. Problematic pornography use T1 ^a	.93	.93	1.09 (2.42)	2801 (Men: 1336, Women: 1465)	-7.93	1.14 (0.54)	1.04 (0.32)	5.21	0.20	< 0.01
2. Problematic pornography use T2 ^a	.94	.94	1.07 (1.14)	2801 (Men: 1,336- Women: 1465)	-8.20	1.09 (0.45)	1.05 (0.42)	2.42	0.08	< 0.01
3. Body dissatisfaction T1 ^b	.92	.92	3.53 (4.37)	2729 (Men: 1298, Women: 1431)		3.07 (4.15)	3.94 (4.53)	-5.19	0.20	< 0.01
4. Body dissatisfaction T2 ^b	.95	.95	3.98 (5.27)	2484 (Men: 1174 Women: 1130)		5.26 (4.66)	4.66 (5.34)	2.73	0.11	< 0.01

Note. a = 1 = Never, 2 = Rarely, 3 = Occasionally, 4 = Sometimes, 5 Often, 6 = Very often, 7 = All the time; b = 0 = never, 1 = rarely, 2 = sometimes, 3 = often, 4 = usually, 5 = always; M = mean; SD = standard deviation; ω = omega; α = Cronbach’s alpha

To examine the bivariate associations between the variables, we conducted Spearman’s correlation. The findings revealed that all correlations between PPU and BD were statistically significant, showing positive associations with a weak effect size (r ranging between .15 to .19 p s < .001) (Table 3).

3.2. Cross-sectional and longitudinal associations between PPU and BD

The latent variable models provided excellent fit to the data, as presented in Table 4. To examine whether the association between PPU and BD differed between men and women, we compared the constrained model (Model C) to the unconstrained model (Model B) (Δ CFI = 0.005; Δ TLI = 0.002; Δ RMSEA = 0.001). The Chi-square difference test revealed a statistically significant result ($\Delta\chi^2 = 56,968$; $p < 0.001$). The findings demonstrated that the associations between PPU and BD exhibit significant differences between men and women. Hence, we reported Model B and presented in Fig. 1. and 2, separately for men and women.

Among men, higher levels of T1 PPU were associated with higher levels of T1 BD with a large effect size ($r = .21$, 95 % CI [.15,.27], $p < 0.001$). T2 PPU was not significantly associated with T2 BD ($r = .03$, 95 % CI [$<.001,.078$], $p = .110$). Longitudinally, higher levels of T1 PPU were associated with higher levels of T2 PPU with a large effect ($\beta = .43$, 95 % CI [.28,.57], $p < 0.001$). Higher levels of T1 BD were associated with higher levels of T2 PPU with a medium to large effect ($\beta = .10$, 95 % CI [.03,.15], $p = .002$). Higher levels of T1 BD were associated with higher levels of T2 BD with a large effect ($\beta = .35$, 95 % CI [.29,.41], $p < 0.001$). Higher levels of T1 PPU were associated with higher level of T2 BD with a medium to large effect ($\beta = .11$, 95 % CI [.06,.16], $p < 0.001$).

Among women, higher levels of T1 PPU were associated with higher levels of T1 BD with a large effect ($r = .19$, 95 % CI [.13,.25],

Table 3
Descriptive statistics, correlation between problematic pornography use and body dissatisfaction.

Variables	Skew. (SE)	Kurt. (SE)	Range	1	2	3	4
1. Problematic pornography use T1 ^a	8.01 (.03)	72.93 (.19)	0-7	1			
2. Problematic pornography use T2 ^a	9.33 (.03)	100 (.07)	0-7	.36**	1		
3. Body dissatisfaction T1 ^b	1.25 (.04)	1.03 (.09)	0-6	.16**	.17**	1	
4. Body dissatisfaction T2 ^b	.84 (.04)	-.43 (.09)	0-6	.16**	.17**	.39**	1

Note. Skew. = Skewness; Kurt. = Kurtosis; a = 1 = Never, 2 = Rarely, 3 = Occasionally, 4 = Sometimes, 5 = Often, 6 = Very often, 7 = All the time; b = 0 = never, 1 = rarely, 2 = sometimes, 3 = often, 4 = usually, 5 = always; M = mean; SD = standard deviation.

** $p < .001$; * $p < .005$

Table 4
Examination of the problematic pornography use and body dissatisfaction among men and women.

Models	χ^2 (df)	CFI	TLI	RMSEA	RMSEA (90 % CI)
Model A: Latent model baseline analysis (total sample)	506.435 (164)**	.959	.952	.023	.021 -.025
Model B: Same as model A with grouping by gender	991.667 (360)**	.925	.920	.035	.033 -.038
Model C: Same as model B, parameters constrained to be equal between groups	1036.917 (369)**	.920	.918	.036	.033 -.039

Note. χ^2 =scaled chi square; df=degrees of freedom; CFI=Comparative Fit Index; TLI=Tucker-Lewis Index; RMSEA=Root Mean Square Error of Approximation; 95 % CI= 95 % confidence interval for Root Mean Square Error of Approximation; SRMR=Standardized Root Mean Square Residual.

** $p < .001$; * $p < .005$

$p < 0.001$). Higher levels of T2 PPU were associated with higher levels of T2 BD with a medium to large effect ($r = .10$, 95 % CI [.04,.16], $p < 0.001$). Longitudinally, higher levels of T1 PPU were associated with higher levels of T2 PPU ($\beta = .23$, 95 % CI [.05,.40], $p = .010$) with a large effect. Higher levels of T1 BD were associated with higher levels of T2 PPU with a large effect ($\beta = .13$, 95 % CI [.04,.20], $p = .002$). Higher levels of T1 BD were associated with higher levels of T2 BD with a large effect ($\beta = .45$, 95 % CI [.40,.50], $p < 0.001$). Higher levels of T1 PPU were associated with higher levels of T2 BD with a medium effect ($\beta = .08$, 95 % CI [.02,.14], $p = .008$).

4. Discussion

Previous studies have documented a positive association between pornography use and BD (Paslakis et al., 2022). However, these studies have either been short-term studies (e.g., covering 6 months) (Peter & Valkenburg, 2014) or have neglected the potential association between PPU and BD as they mostly focused on the association between pornography use frequency and BD (Cranney, 2015; Paslakis et al., 2022). Although the optimal time interval between waves is not known, a minimum of one year has been recommended to ensure robust prediction in longitudinal studies (White & Arzi, 2005). Thus, in the present study, we aimed to address this knowledge gap by examining the association between PPU and BD over a one-year period using a cross-lagged analysis among a sample of Hungarian young adults, considering potential gender differences. According to the present findings, greater

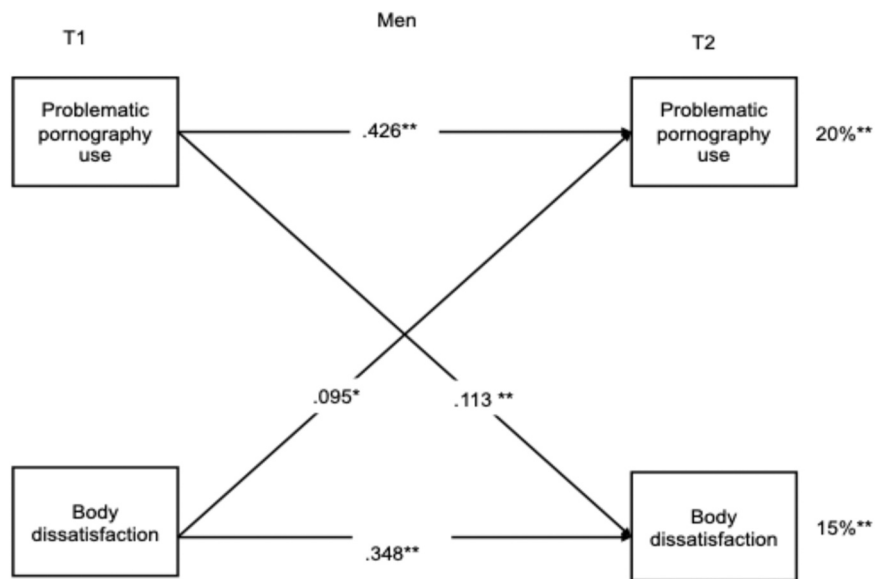


Fig. 1. Relationship between problematic pornography use and body dissatisfaction among men. *Note.* Correlations between the variables are not presented to ensure clarity. Only significant associations between T1 problematic pornography use and body dissatisfaction, and T2 problematic pornography use and body dissatisfaction, 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, * $p < 0.05$, ** $p < 0.01$.

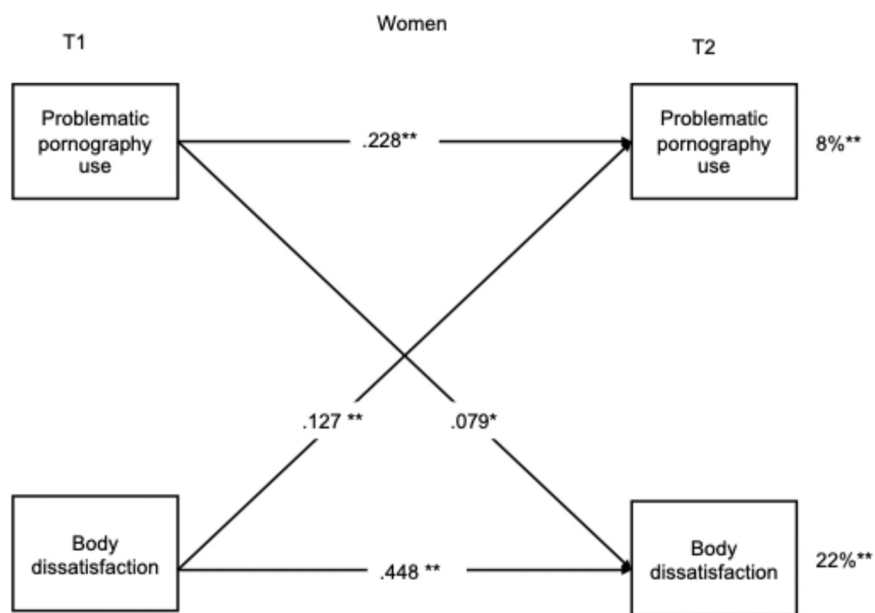


Fig. 2. Relationship between problematic pornography use and body dissatisfaction among women. *Note.* Correlations between the variables are not presented to ensure clarity. Only significant associations between T1 problematic pornography use and body dissatisfaction, and T2 problematic pornography use and body dissatisfaction, 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, * $p < 0.05$, ** $p < 0.01$.

baseline PPU was associated with greater BD one year later, and similarly, greater baseline BD was associated with greater PPU one year later among men and women as well.

Regarding the cross-sectional findings, at baseline, PPU demonstrated a positive association with BD. At the one-year follow-up, this association was only significant for women. Regarding longitudinal findings, we observed that PPU at baseline had a positive cross-lagged association with BD at the one-year follow-up among men and women as well supporting our hypothesis. Similarly, baseline BD had a positive cross-lagged association with PPU one year later. These results indicate a potentially bidirectional association between PPU and BD among both

genders, with significant gender differences, as this association was stronger among men.

Our study was conducted on the basis of social comparison theory, which was first proposed by Festinger (1954), where one tends to compare themselves to others when objective measures are not available. Given that pornography depicts muscular and lean bodies which are idealized (McKee et al., 2008), one may engage in such a comparison and these comparisons may result in reduced self-rating. Thus, our findings that PPU was associated with BD is supported by this theoretical model. Moreover, previous studies have linked PPU with self-criticism (Sassover et al., 2023). Given that self-criticism is associated with

attaining higher goals and feelings of disappointment, in the context of the PPU and BD association, this phenomenon may be attributed to individuals engaging in excessive upward social comparisons and their inability to achieve higher goals (e.g., idealized bodies) and it may result in BD (Blatt et al., 1976; Festinger, 1954). Furthermore, regarding PPU, rather than pornography use in general, individuals may prefer more extreme pornographic content as a result of desensitization (Binnie & Reavey, 2020). Therefore, those with PPU may be more exposed to exaggerated representations of unrealistic body images, potentially skewing their perception of what a “normal” body looks like. This extremity in content along with excessive use and exaggerated body representations in pornography may help explain the association between PPU and BD. Our findings and assumptions extend those of previous studies, suggesting that PPU may be associated with greater BD symptoms through social comparison among both men and women as well (Gewirtz-Meydan et al., 2024).

Concerning gender differences, women who engaged in pornography use reported greater negative sexual body image (Dogan & Yassa, 2019b) due to exposure to female genitalia (Sharp et al., 2016). In another study, women with higher pornography use reported increased breast size dissatisfaction; however, overall BD was not significantly associated with pornography use (Peter & Valkenburg, 2014). In the case of men, pornography use was associated not only with overall BD (Whitfield et al., 2018) but also with genital dissatisfaction. Moreover, some studies have observed that the frequency of pornography use was negatively related to the perception of the range of normal penis size (Sharp & Oates, 2019), resulting in dissatisfaction with one’s own penis size (Cranney, 2015). Nevertheless, in contrast to these studies demonstrating a positive association between pornography use and BD, other studies reported no significant associations between pornography use frequency and BD (Duggan & McCreary, 2004; Gewirtz-Meydan et al., 2024; Gleason & Sprankle, 2019; Sevic et al., 2020) among men as well as between PPU and BD among women (Borgogna, Lathan, et al., 2018).

Furthermore, the present study’s findings also suggested that higher BD levels were associated with higher PPU levels one year later. Several factors could explain these results. For example, individuals with BD reported greater dating and interpersonal anxiety, therefore, these individuals may prefer pornography over real-life sexual experiences (Swami et al., 2021) and excessive use may result in PPU in some cases (Kraus et al., 2018). Moreover, sexual self-efficacy and increased sexual anxiety may be a result of perceived BD, potentially leading individuals with BD to abstain from real-life sexual experiences (Blashill et al., 2016; van den Brink et al., 2018) and chose more solitary sexual activities such as pornography. This longitudinal positive association between BD and PPU is a novel finding, as no longitudinal study to date has examined this association among men and women as well.

Although significant gender differences were established in the literature with women exhibiting greater BD (Esnaola et al., 2010; Quittkat et al., 2019), the association between PPU and BD among men was stronger than women in the present study. However, when it comes to BD predicting PPU over time, this association was slightly stronger among women compared to men. This finding suggests that PPU may have a stronger association with BD among men, whereas for the reverse association (i.e., path from BD to PPU over time), women may be slightly more prone to engage in PPU due to their BD. However, the difference between men and women’s T1 BD and T2 PPU was very small (i.e., men’s β :.10; women’s: β .13). This stronger association of men’s T1 PPU and T2 BD may be due to pornography’s presentation of more extreme idealized bodies in men than women (Rothman, 2021), prompting men to engage more in upward comparisons thus increasing their BD more than women. This differences may also be attributed to men’s greater tendency to internalize and perceive realistic body representations in pornography (Peter & Valkenburg, 2014), whereas women may demonstrate a more critical approach in differentiating between normative and unrealistic body proportions (Doornwaard et al., 2014).

4.1. Study limitations and future research

This study is the first longitudinal one examining the associations between PPU and BD considering gender differences among a sample of Hungarian young adults. Despite filling an important gap in the literature, this study had several limitations that should be taken into consideration when interpreting the results. Firstly, the study used self-report measures, indicating possible response bias as pornography may be a stigmatized behavior (Stulhofer et al., 2022). Secondly, we did not include a definition of pornography that might have introduced some biases (Kohut et al., 2020). Thirdly, although we used a longitudinal design, we cannot establish causal relationships between the study variables. Fourthly, amateur and professional pornography differ in terms of the bodies presented, which may have an impact on individual’s degree of perceived BD, yet, the present study did not measure the types of pornography preferred by the users (Kvalem et al., 2016). Fifthly, to measure BD, we employed the BD subscale of Body Attitude Test (BAT; Probst et al., 1995). As BD is a complex multidimensional construct encompassing various features associated with the body, such as physical appearance, muscularity, and weight. While using a four-item scale is efficient, it may inadequately capture distinct features associated with more comprehensive aspects of BD’s relationship with PPU. For example, pornography use may not only be associated with overall BD but is also associated with sexual BD, such as penis size or breast size (Peter & Valkenburg, 2014; Sharp & Oates, 2019). Thus, using a four-item scale focusing only on overall BD may limit our understanding of the association between specific body parts and PPU. Sixthly, considering the sensitive and stigmatized nature of the topic, it is important to acknowledge that the use of pornography-related questionnaires may introduce some bias, even though we conducted face-to-face interviewing with self-completion elements. Finally, an additional important limitation is that BD and PPU vary significantly depending on sexual orientation; we did not measure sexual orientation of the participants (Gewirtz-Meydan et al., 2024; Gewirtz-Meydan & Spivak-Lavi, 2023), which limits the generalizability of the study’s findings. Future research should examine potential additional variables, such as internalization of bodies, that may explain the association between PPU and BD. Additionally, future studies should explore longer timeframes (e.g., three years) to gain a more comprehensive understanding of the associations between BD and PPU over time.

5. Conclusion

Although an association between pornography use and BD has often been examined in the literature (Paslakis et al., 2022), only two cross-sectional studies have assessed the association between PPU and BD and they only focused on men (Gewirtz-Meydan & Spivak-Lavi, 2023; Gewirtz-Meydan et al., 2024), limiting the generalizability of their findings. Thus, we examined the cross-sectional and longitudinal associations between PPU and BD in a sample of Hungarian young men and women over one year. The findings showed that PPU and BD were positively associated cross-sectionally and longitudinally with a medium to large effect among both men and women. Importantly, the longitudinal associations between BD and PPU were bidirectional. Nevertheless, these longitudinal findings should be interpreted with caution, as causal inferences cannot be drawn from the present study. Given that a bidirectional association was observed, clinicians treating PPU should consider BD symptoms and vice versa; therefore, addressing one may positively contribute to the other. Moreover, mental health professionals may integrate screening tools both addressing BD and PPU to develop more comprehensive treatment plans when individuals seek help for PPU and/or BD.

CRedit authorship contribution statement

Zsolt Demetrovics: Supervision, Project administration,

Methodology. **Süleyman Agah Demirgöl:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Investigation. **Borbála Paksi:** Data curation, Conceptualization. **Andrea Czakó:** Data curation. **Beáta Bóthe:** Writing – review & editing, Supervision, Methodology. **Gyöngyi Kőkonyei:** Data curation, Conceptualization.

Ethical permission statement

This work was supported by the Research and Ethical Committee of the Medical Research (no. 60471–2/2018/EKU).

Consent statement

Prior to the initiation of data collection, all participants provided their consent to participate in the research.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.bodyim.2025.101940](https://doi.org/10.1016/j.bodyim.2025.101940).

Data availability

Data will be made available on request.

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