

Problematic Pornography Use as a Predictor of Depressive and Apathetic Symptoms in Slovak Young Adults

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INTRODUCTION: Problematic pornography use (PPU) has been increasingly recognized as a relevant factor in mental health research, mainly in relation to depression and apathy. Its association with apathy, reflecting diminished motivation and emotional engagement, remains largely unexplored. This study examined the predictive role of PPU on depressive and apathetic symptoms among young adults and explored gender differences in depression.

METHODS: The sample included 408 Slovak young adults who completed self-report measures assessing PPU, depression, and apathy. Hierarchical linear regression was used to test whether PPU predicts depressive and apathetic symptoms, with gender included as an additional predictor in the depression model. **RESULTS:** PPU significantly predicted both depression and apathy. Women reported higher depressive symptoms but lower levels of PPU, whereas men showed the opposite pattern. In both genders, higher PPU was associated with higher depression, while overall, higher PPU was related to lower apathy. Although the explained variance was small ($R^2 = 4.14\%$ for depression; $R^2 = 2.95\%$ for

apathy), this likely reflects the low prevalence of PPU in the sample, with only three participants meeting the criteria for problematic use. **CONCLUSIONS:** These findings indicate that PPU is a meaningful predictor of both depression and apathy, despite explaining a small portion of variance. Gender-specific patterns were observed, with women showing higher depression and lower PPU, and men showing the reverse. The results underscore the relevance of PPU in affective and motivational functioning and highlight the need for further research in larger and more diverse samples.

Keywords | Problematic pornography use – Depression – Apathy– Gender differences – Behavioral Addiction

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1 INTRODUCTION

The digital era has profoundly transformed the ways in which sexuality is expressed, consumed and understood. With the widespread availability of the internet, smartphones and platforms such as OnlyFans, access to sexually explicit material has become virtually unlimited and immediate. This phenomenon is well described in Cooper's (1998) Triple-A Engine model, which highlights Accessibility, Affordability, and Anonymity as key features of the online environment that significantly facilitate and encourage pornography use. Recent data further illustrate these trends. According to Pornhub (2024), smartphones accounted for 90.5% of all traffic in 2024. These societal and technological shifts have not only normalized public discussions about pornography but have also transformed its role, from a private or taboo activity into a mainstream form of sexual expression and entertainment. Against this backdrop, concerns have grown regarding the potential psychological and social consequences of pornography use, particularly when it escalates into patterns marked by loss of control or negative outcomes in daily functioning.

Pornography use has significantly increased over recent decades (Lewczuk et al., 2022), with a notable surge following the COVID-19 pandemic (Gjoneska et al., 2022), when global reliance on the internet intensified (Lau et al., 2021; Sallie et al., 2021). According to Li and Zheng (2017), pornography use was a widespread phenomenon even before the pandemic, with a prevalence rate of 96.6% of men and 77.7% of women. However, during periods of social distancing, online pornography likely served as a source of sexual stimulation for many users (Gjoneska et al., 2022; Sallie et al., 2021). In line with this assumption, a large-scale survey (Böthe et al., 2023) estimated that approximately 3.2% to 16.6% of young adults ($Mage = 32.4$) may be at risk of problematic pornography use (PPU). PPU refers to difficulties in controlling the frequency, duration, or intensity of pornography use that interfere with daily functioning, relationships, and well-being (Altin et al., 2025). Although not formally recognized as a distinct disorder in the ICD-11 or DSM-5, the ICD-11 includes it as a feature of Compulsive Sexual Behavior Disorder (CSBD). A core feature of PPU is the compulsive engagement in the pornography–masturbation–orgasm cycle, a highly reinforcing but maladaptive pattern associated with strong cravings and urges (Ince et al., 2023). Some researchers conceptualize PPU as a behavioral addiction, drawing parallels to substance use and gambling disorders (Stark et al., 2018), supported by neurobiological evidence of structural and functional brain alterations in individuals with compulsive sexual behavior (Love et al., 2015; Pandria et al., 2018; Sutherland et al., 2012). Given these findings, pornography use, particularly when marked by compulsive and harmful patterns, could be conceptualized as a form of behavioral addiction. Nonetheless, it is important to acknowledge that the classification of PPU remains debated within the academic community.

Research indicates that adolescents and young adults are particularly vulnerable to such risks (Camilleri et al., 2021; Lim et al., 2017; Sinković et al., 2012). According to APA (2023a), adolescence spans from approximately 10–12 to 18–20 years, while young adulthood (APA, 2023b) extends from 20 to 35 years.

During these stages, ongoing sexual development, curiosity, and limited critical evaluation of sexually explicit material may increase susceptibility to excessive use (Altin et al., 2025). In addition to age, gender also represents an important factor in relation to PPU. Altin et al. (2025) reported that men scored higher on PPU, whereas women with PPU showed stronger associations with suicidal ideation. More broadly, women with elevated PPU scores also reported higher stress, greater anxiety, lower life satisfaction, and increased suicidal thoughts, while these effects were not observed in men (Altin et al., 2025). The findings of Altin et al. (2025) specifically concern university students and are consistent with other studies linking compulsive pornography use to higher levels of depression and anxiety also among university students (Camilleri et al., 2021). The observed gender differences may be shaped not only by psychological vulnerabilities but also by cultural and social norms surrounding pornography use. For example, the pornography industry is structured primarily to cater to male pleasure (Altin et al., 2025; Dines, 2011), which may foster women's more negative attitudes toward sexually explicit material and amplify the psychological consequences of PPU. Historically, pornography use has been more socially acceptable for men (Davis et al., 2020; Löfgren-Mårtenson & Månsson, 2010), while many women, particularly in committed relationships, have viewed it as an act of disloyalty (Carroll et al., 2016). From an evolutionary perspective, pornography consumption may reflect short-term mating orientations, particularly among men, as it provides similar stimulation to casual sex but in a more accessible and less costly form (Burtaverde et al., 2021). Although such consumption cannot contribute to reproductive success, it may be understood as a by-product of adaptations linked to short-term mating strategies (Burtaverde et al., 2021). Additionally, Malamuth (1996) views pornography use as a consequence of stronger male sex drive, which in ancestral contexts would have promoted greater reproductive fitness (Greiling & Buss, 2000). While short-term sexual strategies may also benefit women, these frameworks primarily describe average differences between the sexes (Burtaverde et al., 2021). Thus, evolutionary perspectives help explain why men may engage more frequently and with fewer negative attitudes toward pornography, while the modern digital environment, with its Accessibility, Affordability, and Anonymity (Cooper, 1998), can amplify these tendencies into maladaptive patterns with serious psychological consequences. Empirical studies further show that women often display stronger negative emotional reactions to identical sexual material than men (Allen et al., 2007). These responses may partly explain why only women in Altin et al.'s (2025) study reported severe emotional distress and suicidality. However, Gough et al. (2021) caution that men may underreport psychological difficulties due to stigma or reluctance to seek help, complicating interpretation of gender differences. Moreover, prior research has documented associations between other addictive behaviors and suicidal ideation in young adulthood (Peng et al., 2021; Valenciano-Mendoza et al., 2022; Xie et al., 2023), highlighting the broader relevance of these findings beyond pornography use. Nevertheless, this gender divide may be narrowing as social norms evolve and women increasingly engage with sexually explicit content through platforms such as OnlyFans (Donevan et al., 2024), shaping how they perceive and internalize their pornography use.

Several studies have identified individual-level predictors of PPU, including lower self-control (Holt et al., 2012) and lower life satisfaction (Sulyok et al., 2024). In addition, individuals with PPU often show heightened sensitivity to negative stimuli (Qu et al., 2024), a pattern that mirrors findings in substance use disorders, where exaggerated reactivity to unpleasant stimuli is common (Aguilar de Arcos et al., 2008). Such sensitivity may drive pornography use as a means of alleviating distress (Cheetham et al., 2010), suggesting that PPU can function both as a coping strategy for negative affect and as a behavior reinforced over time, thereby increasing the risk of addiction (Qu et al., 2024). Within this framework, the negative reinforcement model emphasizes a cyclical process. Individuals may initially use pornography to elevate mood or distract from discomfort, but as dependence develops, continued use is increasingly motivated by avoidance of withdrawal-related distress (Kassel et al., 2007). These mechanisms are also reflected in the frequent comorbidity of PPU or CSBD with mood and anxiety disorders (Berberovic, 2013; Engel et al., 2019; Grant Weinandy et al., 2023). Consistently, Qu et al. (2024) report that individuals with PPU demonstrate higher levels of anxiety and depression compared to healthy controls, underscoring the central role of dispositional vulnerabilities and affect regulation difficulties in PPU. In this context, it is important to note that while negative emotions are often identified as predictors of PPU, they are also commonly considered adverse outcomes (Altin et al., 2025; Camilleri et al., 2021; Valenciano-Mendoza et al., 2021; Xie et al., 2023). This dual role further reinforces the assumption of a cyclical or reciprocal relationship between PPU and negative emotional states (Kassel et al., 2007). Among these outcomes, depression has been the most extensively studied and in the present research is conceptualized as a “negative affective state, ranging from unhappiness and discontent to an extreme feeling of sadness, pessimism and despondency, that interferes with daily life” (APA, 2018c).

While depression, anxiety and suicidality have received considerable attention in PPU research (Altin et al., 2025; Camilleri et al., 2021; Valenciano-Mendoza et al., 2021; Xie et al., 2023), apathy has received far less focus, despite its potential significance as a psychological correlate. Depression is typically understood as a mental state of altered mood characterized by sadness, desperation, anhedonia, decreased interest in daily life activities, subjective discomfort, feelings of worthlessness, and low self-esteem (Iacobacci, 2017). Apathy is defined as “diminished motivation for physical, cognitive, emotional or social activity” (Costello et al., 2025, p. 314). In this sense, apathy could be superficially considered an aspect of depression, as it also involves reduced motivation and diminished engagement in daily activities. However, evidence suggests (Batail et al., 2018; Hollocks et al., 2015; Kirsch-Darrow, et al., 2011; Levy et al., 1998; Levy & Dubois, 2006) that apathy represents a discriminable clinical construct. In depression, the loss of interest is closely tied to feelings of sadness and affective distress, whereas apathy manifests as a reduction in motivation and initiative without accompanying sadness or depressed mood (Iacobacci, 2017). Neuroimaging evidence (Hollocks et al., 2015) further underscores this distinction. Structural equation modeling and voxel-based analyses in patients with small vessel disease revealed that apathy, but not depression, was linked to widespread reduc-

tions in white matter integrity, particularly in tracts associated with emotion regulation, reward, and goal-directed behavior (Hollocks et al., 2015). Additional empirical findings have shown a negative correlation between apathy and depression (Batail et al., 2018; Levy et al., 1998). These findings align with the work of Kirsch-Darrow et al. (2011), who used confirmatory factor analysis to demonstrate that depression and apathy are distinct constructs, and with Levy and Dubois (2006), who likewise argued for their conceptual independence. Whereas depression is characterized by sadness, negative self-evaluation, guilt, irritability, and perceptions of failure, apathy is marked by an absence of affective distress or negative self-image, reflecting instead a lack of responsiveness to both positive and negative events (Kirsch-Darrow et al., 2011). This distinction is crucial. Depression reflects emotional suffering, while apathy reflects diminished initiation, motivation, and effort (Kirsch-Darrow et al., 2011). Together, these findings reinforce the conceptualization of apathy and depression as independent constructs that may demonstrate distinct associations with other psychological variables, including PPU.

Sierra et al. (2015) conceptualize apathy and impulse control disorders as opposite motivational manifestations of dopaminergic dysfunction, reflecting shared abnormalities in dopamine receptor activity. Psychologically, apathy is understood as a transdiagnostic symptom characterized by reduced motivation, initiative, and goal-directed behavior (Levy, 2012; Marin, 1991; Robert et al., 2009), overlapping with constructs such as anhedonia and diminished life engagement (Costello et al., 2023; Levy & Czernecki, 2006; Pardini et al., 2016). Chronic exposure to highly stimulating digital content can induce desensitization (Daneback et al., 2018) and reduce responsiveness to natural rewards (De Sousa & Lodha, 2017), which may contribute to apathetic states. From a neurobiological perspective, PPU shares features with other addictions, particularly dysregulation of the reward system (Kühn & Gallinat, 2014; Love et al., 2015; Stark & Klucken, 2017). Neuroimaging studies show that sexually explicit stimuli increase activation in the anterior cingulate cortex (ACC), ventral striatum, and amygdala among individuals with pornography addiction (Voon et al., 2014; Seok & Sohn, 2015). These are regions also implicated in apathy (Lázaro-Perlado, 2019). The relationship between PPU and apathy may therefore be dynamic rather than unidirectional. On the one hand, repeated overstimulation of reward-related pathways may lead to desensitization, contributing to reduced capacity for pleasure and diminished motivational drive (De Sousa & Lodha, 2017; Levy, 2012; Robert et al., 2009). On the other hand, activation of these same circuits during pornography use may transiently reduce apathetic symptoms, offering short-term relief from motivational deficits (Kirschner et al., 2020). This dual effect highlights the complexity of PPU’s psychological consequences. While pornography consumption may temporarily counteract apathy by engaging the reward system, over time it may reinforce compulsive behavior and deepen emotional and motivational impairments.

In summary, the present study aims to extend existing knowledge on the psychological correlates of PPU by examining its associations with depression and apathy among young adults. Given the consistent evidence of gender differences in de-

pression but not in apathy, gender will be included as an additional predictor only in the analysis of depressive symptoms. Moreover, existing neurobiological research does not provide sufficient grounds to expect gender-based variability in apathy within this framework.

This topic is particularly relevant given that pornography use may act as a risk factor for psychological difficulties, including depression and addictive behaviors. Young adults, who are frequently exposed to high levels of stress and rely heavily on smartphones and the internet as integral parts of daily life, represent a population especially vulnerable to such risks. In this context, pornography may serve as a readily accessible means of temporary relief from distress, potentially reinforcing maladaptive coping patterns over time. This study included three hypotheses:

- **H1:** Problematic pornography use will significantly predict depressive symptoms in a positive direction.
- **H2:** Gender will significantly contribute to the prediction of depressive symptoms, with women reporting higher depressive symptoms than men.
- **H3:** Problematic pornography use will significantly predict apathy.

2 METHODS

2.1 Participants and procedures

The final sample consisted of 408 participants, including 299 women and 109 men, aged between 18 and 29 years. The average age was 21.5 years for women and 22.5 years for men. Participants were primarily university students and young adults, recruited through convenience and snowball sampling methods. Data collection took place in three waves: June 21–July 26, 2024; September 23–October 23, 2024; and February 18–April 20, 2025. The survey was administered online via PsyToolkit (Stoet, 2010; 2017). The sample included 405 Slovak participants, 2 Czech, and 1 participant of Rusyn nationality. Participants were recruited from the general population of young adults in Slovakia and the Czech Republic due to cultural and linguistic similarities. Only participants who identified as male or female, were between 18 and 30 years old, and had no self-reported diagnosis of substance or behavioral addiction were eligible for inclusion. Participants who did not complete the questionnaire in full or who selected a non-binary or joke gender response (e.g., “attack helicopter”) were excluded. Additionally, Ukrainian participants ($n = 4$) were excluded due to potential language barriers. After all exclusion criteria were applied and data cleaning was completed, the final dataset consisted of 408 valid responses.

Out of the 408 participants, only 3 individuals scored within the range indicative of PPU, comprising 2 men and 1 woman. This suggests a very low prevalence of PPU within the sample.

Comprehensive data cleaning procedures were applied prior to analysis. After excluding incomplete and low-quality responses, the final analytic sample consisted of 408 participants.

A detailed description of the data screening process, including outlier detection and inclusion criteria, is available here <https://osf.io/pfh5k/files/b75sg>.

2.2 Measures

Three research methods were used for data collection.

The Problematic Pornography Use Scale (PPUS; Kor et al., 2014) is a 12-item measure assessing problematic patterns of pornography use across four dimensions: excessive use, self-control difficulties, emotionally driven use, and distress/functional impairment. Items are rated on a 6-point Likert scale (0 = *never true* to 5 = *almost always true*), with higher scores reflecting greater severity. The scale demonstrated excellent internal consistency in the present sample (McDonald's $\omega = .90$; original $\omega = .93$; Kor et al., 2014). Subscale reliability was high for excessive use ($\omega = .86$), emotionally driven use ($\omega = .88$), and self-control difficulties ($\omega = .91$), but low for distress and functional impairment ($\omega = .52$), which should therefore be interpreted with caution.

The Beck Depression Inventory – Second Edition (BDI-II; Beck et al., 1996) comprises 21 items that align with the diagnostic criteria for depressive disorders as outlined in the DSM-IV. Each item targets a specific symptom of depression (such as sadness, pessimism, guilt, or fatigue) and is rated on a 4-point scale ranging from 0 to 3, with higher scores reflecting greater symptom severity. The BDI-II has shown high internal consistency, with a reported Cronbach's alpha of .92 (Osman et al., 2008), and strong test–retest reliability ranging from .73 to .96 (Wang et al., 2013). In the present study, the BDI-II exhibited also excellent internal consistency, with McDonald's omega of .93. These results support the reliability and clinical utility of the BDI-II in assessing depressive symptomatology within the target population.

The Apathy Scale (Starkstein et al., 1992) comprises of 14 items and uses a 4-point Likert response format (1 = *not at all* to 4 = *a lot*) to assess motivational and behavioral engagement (e.g., “Does someone have to tell you what to do each day?”). In the present study, internal consistency reached McDonald's $\omega = .82$ (original $\alpha = .76$; Starkstein et al., 1992). One item (“Are you concerned about your condition?”) was reverse-scored, although not designated for recoding in the original manual, due to a negative item–total correlation and theoretical inconsistency with the construct of apathy (i.e., concern implies motivation rather than indifference). Reverse-scoring improved reliability, and further details of this adjustment are available here <https://osf.io/pfh5k/files/8y2np>.

All instruments were translated from English into Slovak independently by the authors of the study. The translations were then compared and reviewed collaboratively to resolve discrepancies and to ensure clarity and accuracy of the Slovak version.

2.3 Data analysis

All statistical analyses were conducted using Jamovi 2.3.18. Prior to the main analysis, data distribution was examined by

assessing skewness values for each variable. Among the studied variables, only apathy met the criterion of normal distribution (skewness = -0.305), while both depression (skewness = 1.58) and PPU (skewness = 2.40) exceeded the acceptable range (-1 to 1). Subsequently, a correlation matrix was computed to examine the associations among the studied variables. As shown in Table 1, all correlations were statistically significant. Given that only apathy approximated normal distribution, Spearman’s correlation coefficient was employed to test the relationships between variables. Subsequently, a t-test was conducted to examine potential gender differences in the levels of PPU and depression. However, as the assumptions of normal distribution were not met for either variable, nonparametric Mann–Whitney U tests for two independent samples were employed in both cases.

Potential outliers were identified via box plots and retained, as their values were realistic and attention checks had ensured careful responding. Normality of residuals was only met for apathy, and collinearity was not a concern, with VIF values below 1.18 in both models. Two separate linear regression analyses were conducted to examine the predictive value of PPU. In the first analysis, depression was the dependent variable, with Model 1 including PPU as the sole predictor and Model 2 including both PPU and gender. In the second analysis apathy was the dependent variable and PPU figured as the only predictor. Regression results were interpreted based on the size and direction of the standardized estimates (β) and the coefficient of determination (R^2), which indicated the proportion of variance in the dependent variable explained by the predictors

2.4 Compliance with ethical standards

This study was conducted as part of the GAPU3/2025 project, which underwent a formal review process at the Faculty of Arts, University of Prešov and received approval, ensuring compliance with ethical standards. The study also adhered to the ethical principles of the Declaration of Helsinki (1964) as well as the American Psychological Association’s Ethical Principles of Psychologists and Code of Conduct (2017), with a strong em-

phasis on voluntary participation, anonymity, and data confidentiality. All participants provided informed consent prior to beginning the survey. Participation was fully voluntary, anonymous and participants were informed they could withdraw at any point without providing a reason.

3 RESULTS

The results of the correlation matrix, presented in Table 1, demonstrated the existence of significant relationships among the examined variables. A significant relationship was found between PPU and depression ($p = .011$), with a weak positive effect ($\rho = .126$). In the case of PPU and apathy, a significant ($p < .001$) but negative relationship with a weak effect was identified ($\rho = -.182$). A noteworthy finding was also the presence of a moderately strong negative correlation between apathy and depression ($p < .001$; $\rho = -.357$).

Table 1 | Correlation Matrix (N=408)

Variable	1.	2.	3.
1. PPU	–		
2. D	.126*	–	
3. A	-.182***	-.357***	–

Note: PPU – problematic pornography use, D – depression, A – apathy, Spearman’s correlation coefficient, *- $p < .05$, ***- $p < .001$

The results of the U-test ($U = 8694$, $p < .001$, $r = .467$) indicated that men ($M = 8.63$, $SD = 9.35$) exhibited higher levels of PPU compared to women ($M = 2.55$, $SD = 4.71$), with an medium strong effect. In the case of the Mann–Whitney U test examining gender differences in depression, the results also demonstrated significant differences with a weak effect ($U = 13802$, $p = .018$, $r = .153$). Women ($M = 12.10$, $SD = 10.30$) scored slightly higher on depressive symptoms compared to men ($M = 9.98$, $SD = 9.68$). The mean BDI-II score for men can, according to some sources, be considered borderline, whereas for women it indicates mild mood disturbance. According to other sources, however, these values may be regarded as within the normal range.

Table 2 | Hierarchical Linear Regression Analysis of PPU and Gender as Predictors of Depression (N=408)

Predictors	Model 1			Model 2		
	b (SE)	p	β	b (SE)	p	β
PPU	.190 (.073)	.009	.128	.291 (.078)	<.001	.196
Gender	–	–	–	3.936 (1.211)	<.001	.388
F	F(1,406)=6.80, p=.009			F(2,405)=8.76, p<.001		
R ²	.016			.041		
ΔR^2	–			.025		

Note: N-number of respondents, b – unstandardized regression coefficient, SE – standard error, β – standardized regression coefficient, p – significance level of predictors (considered significant at $p < .05$), F – model fit, R^2 – percentage of variance in the dependent variable explained by the predictors in the model, ΔR^2 – change in the percentage of explained variance in the model, PPU – problematic pornography use

When testing Hypothesis H1 and H2, PPU was found to be a significant predictor of overall depression ($b = .078$, $t = 3.70$, $p < .001$). The size of the standardized regression coefficient indicated a weak positive effect ($\beta = .196$). Gender was also found to be a significant predictor of overall depression ($b = 1.211$, $t = 3.25$, $p = .001$, $\beta = .388$). Given the positive direction of the effect, it can be concluded that it is the female gender that positively predicts the level of depressive symptoms. In the study, gender was coded as male = 1, female = 2. Model 1 explained 1.65% of the variance ($F(1,406) = 6.68$, $p = .009$). Model 2 explained 4.14% of the variance ($F(2,405) = 8.76$, $p < .001$). All the results are presented in Table 2.

When testing Hypothesis H3, PPU was found to be a significant predictor of apathy ($b = .044$, $t = -3.51$, $p < .001$). The size of the standardized regression coefficient indicated a weak negative effect ($\beta = -.172$). The model explained 2.95% of the variance ($F(1,406) = 12.3$, $p < .001$). All the results are presented in Table 3.

Table 3 | Hierarchical Linear Regression Analysis of PPU as Predictor of Apathy (N=408)

Predictors	Model		
	b (SE)	p	β
PPU	.157 (.044)	<.001	-.172
F	F(1,406)=12.3, p<.001		
R ²	.029		

Note: N-number of respondents, b – unstandardized regression coefficient, SE – standard error, β – standardized regression coefficient, p – significance level of predictors (considered significant at $p < .05$), F – model fit, R² – percentage of variance in the dependent variable explained by the predictors in the model, ΔR^2 – change in the percentage of explained variance in the model, PPU – problematic pornography use

4 DISCUSSION

The primary aim of this study was to examine whether PPU predicts symptoms of depression and apathy among young adults. A secondary aim was to determine whether gender contributes to the prediction of depressive symptoms beyond the effect of PPU. Consistent with our hypotheses, PPU significantly predicted depressive symptomatology. For apathy, we observed a significant association as well, with higher PPU associated with lower apathy. Gender also emerged as a relevant factor, with women reporting higher depressive symptoms, whereas men reported higher PPU. Importantly, PPU remained a significant predictor of depressive symptoms in both genders, underscoring the robustness of this association within our dataset. Given the cross-sectional design, the findings reflect associations and predictions, thus cannot be interpreted causally.

The association between PPU and depression has been documented previously, and several theoretical explanations may account for this link. In line with the findings of previous studies (Aldao et al., 2010; Hanseder & Dantas, 2023; Ricketts & Macaskill, 2004; Testa et al., 2024) and the self-medication

hypothesis (Torrens & Rossi, 2015), it can be assumed that individuals may consume sexually explicit material as a coping mechanism to alleviate negative emotions or boredom. Individuals with elevated depressive symptoms may therefore be more likely to engage in PPU as a form of emotion regulation. Conversely, repeated exposure to highly stimulating content, which may act as an object of addiction (Jha & Banerjee, 2022), can contribute to neuroadaptive changes and affective dysregulation (Torrens & Rossi, 2015). Although such mechanisms are theoretically plausible, our design does not allow us to determine whether PPU precedes depressive symptoms or vice versa. Future longitudinal and experimental studies are needed to clarify these temporal relationships.

Gender differences observed in our study are consistent with previous research showing that men report higher levels of PPU, while women report higher depressive symptoms (Allen et al., 2007; Altin et al., 2025; Camilleri et al., 2021). These patterns likely reflect an interplay of psychological, social, and evolutionary factors. Evolutionary perspectives suggest that men may be more responsive to sexually explicit material due to a stronger sex drive and tendencies toward short-term mating strategies, which in ancestral contexts supported reproductive fitness (Burtaverde et al., 2021; Greiling & Buss, 2000; Malamuth, 1996). In today's digital environment, characterized by accessibility, affordability, and anonymity (Cooper, 1998), these predispositions may manifest in ways that contribute to maladaptive patterns and negative psychological outcomes, such as depressive symptoms. Although evolutionary explanations provide one perspective, they should be considered alongside sociocultural influences. For women, social and cultural factors appear particularly relevant. The pornography industry is largely oriented toward male pleasure (Altin et al., 2025; Dines, 2011), and pornography use has historically been more socially acceptable for men (Davis et al., 2020; Löfgren-Mårtenson & Månsson, 2010), whereas women, particularly in committed relationships, may perceive it as an act of disloyalty (Carroll et al., 2016). Consequently, women often report more negative attitudes toward sexually explicit material and stronger emotional reactions to the same content compared to men (Allen et al., 2007). These social and cultural dynamics, together with pre-existing psychological vulnerabilities, may help explain why women in our sample exhibit higher depressive symptoms despite generally lower levels of PPU. While our findings do not allow conclusions about the relative contribution of these factors, they underscore the importance of considering gender-specific pathways in future research.

The negative association between PPU and apathy is noteworthy. The direction of this relationship suggests that pornography use may transiently increase activation, arousal or engagement, thereby reducing apathetic feelings in the short term. Neuroimaging studies indicate that sexually explicit material activates reward-related brain regions (Kirschner et al., 2020; Lázaro-Perlado, 2019; Seok & Sohn, 2015; Voon et al., 2014), which may contribute to temporary increases in motivation and attentional focus. At the same time, theoretical models propose that excessive stimulation could, over longer periods, diminish sensitivity to everyday rewards or contribute to emotional blunting (Daneback et al., 2018; De Sousa & Lodha, 2017; Levy,

2012; Robert et al., 2009). As our study does not distinguish between short- and long-term effects, these interpretations remain speculative. It is also possible that individuals with lower apathy simply have more energy or initiative to engage with rewarding stimuli, including pornography, which would reflect a reversed causal direction.

A closer examination of our findings suggests a gender-specific pattern in the relationship between PPU and depressive symptoms. In our sample, men reported significantly higher levels of PPU but slightly lower depressive symptoms compared to women, whereas women exhibited higher depressive symptoms despite low PPU levels. This pattern leads us to formulate a tentative hypothesis: among men, higher pornography use may contribute in part to increases in depressive symptomatology, potentially through mechanisms related to repeated engagement with highly stimulating content and its effects on reward processing and dopaminergic function. For women, on the other hand, elevated depressive symptoms appear largely independent of PPU, as their consumption levels were generally low. While these considerations are purely hypothetical and were not directly tested in our study, they offer a useful starting framework for future research. However overall, our findings indicate that PPU is linked to both depressive symptoms and apathy, but in different ways. The positive association with depression and negative association with apathy suggest that pornography use may serve distinct psychological functions, potentially providing short-term activation while being associated with greater emotional distress.

Although the proportion of explained variance in both models was small, these findings are not uncommon in psychological research, particularly when complex, multifactorial constructs such as depression or apathy are examined. While these effect sizes should be interpreted with caution, they nonetheless indicate that PPU contribute meaningfully to the prediction of these outcomes, even after accounting for gender in the case of depression. The small percentage values of explained variance may partly reflect the fact that only 3 individuals in the entire sample met the criteria for PPU. Small percentage should therefore be interpreted not as a lack of relevance, but rather as evidence that PPU represents one of many interacting factors influencing affective and motivational functioning (Funder & Ozer, 2019). Building on this perspective, future research could address this limitation by employing alternative sampling strategies, such as focusing specifically on individuals with elevated or clinically relevant levels of PPU.

A further noteworthy result was the negative correlation between apathy and depression. Although seemingly counterintui-

tive, this aligns with prior findings reporting their conceptual independence (Batail et al., 2018; Kirsch-Darrow et al., 2011; Levy & Dubois, 2006; Levy et al., 1998). Depression is characterized by sadness, guilt and negative self-evaluation, whereas apathy reflects diminished motivation and reduced responsiveness to emotional events. This distinction reinforces the importance of treating apathy and depression as separate constructs with potentially different associations to PPU. Moreover, this pattern is consistent with our interpretative framework, in which pornography use may temporarily reduce apathy through its stimulating effects, while simultaneously contributing to longer-term mood disturbances such as depression.

Taken together these findings suggest that PPU predicts both depression and apathy, but through different mechanisms that are, in case of depression, gender-specific. Among men, pornography use appears more strongly tied to addictive processes and their neuroadaptive consequences and evolutionary susceptibility, whereas among women, it may function primarily as a coping response to pre-existing depressive states.

The study has several limitations. The distress and functional impairment subscale of the PPU measure showed poor internal consistency ($\omega = .52$), which may have influenced results. One item of the Apathy Scale was recoded due to psychometric inconsistency and theoretical misalignment; this modification may reduce comparability with other studies. Data deviated from normality and contained outliers, limiting robustness, though cases were retained to preserve sample size and data variability. As the dataset was already cleaned of careless and incomplete responses, we chose to retain these participants in the analyses. Further limitations include the cross-sectional design and reliance on self-reported data. The scope was also limited to depression and apathy, excluding other potentially relevant constructs such as perceived stress, impulsivity or family-related variables. Another limitation is that we did not conduct a sensitivity analysis, as doing so would have substantially reduced the number of participants and consequently weakened the statistical power. Future studies may therefore consider performing sensitivity analyses on larger samples to evaluate the stability of findings.

Despite these limitations, the study contributes several strengths. To our knowledge, it is the first to examine apathy in relation to PPU, highlighting its relevance as a neglected correlate of behavioral addictions. Furthermore, the study is among the first to propose potential explanatory mechanisms that may underlie these associations. While these mechanisms were discussed in a hypothetical framework, they nonetheless provide a valuable conceptual basis for future empirical investigations. At last, al-

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though the explanatory pathways discussed remain hypothetical, the identification of apathy and depression as distinct yet relevant correlates of PPU may carry important implications for clinical practice and prevention. Specifically, the findings highlight the need for clinicians and researchers to consider not only mood-related distress but also motivational deficits when assessing the psychological impact of problematic pornography use.

5 CONCLUSIONS

The present findings provide evidence that PPU is associated with both depressive and apathetic symptomatology, although through distinct psychological pathways. Among men, pornography use may serve as a source of stimulation consistent with evolutionary predispositions toward stronger sexual drive and short-term mating strategies, which, when reinforced by the accessibility, immediacy, and anonymity of online sexual content, can develop into maladaptive patterns associated with affective dysregulation such as depressive symptoms. Among women, PPU appears to emerge primarily in the context of pre-existing negative affect, functioning as a form of self-medication that temporarily alleviates emotional distress.

The negative association between PPU and apathy suggests that pornography consumption may transiently increase motivation and engagement, yet its long-term consequences may include emotional blunting and desensitization. These results underscore the need to distinguish between depression and apathy as separate yet interrelated affective constructs that interact differently with PPU.

Overall, this study contributes to the growing literature on behavioral addictions by highlighting gender-specific patterns and the dual role of PPU as both a coping strategy and a potential source of emotional dysregulation. Future research using longitudinal and neurobiological methods is needed to clarify causal mechanisms.

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