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ORIGINAL ARTICLE

Early Maladaptive Schemas and Online Pornography Use: A Cross-Sectional Study

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Abstract
Several studies have explored the relationship between early maladaptive schemas and mental health difficulties, including behavioural addictions. However, no empirical studies have examined the relationship between early maladaptive schemas (EMSs) and problematic pornography use (PPU). Therefore, the present study examined the association between EMSs and online pornography use, as well as investigated the difference between problematic and non-problematic pornography users. A sample of 969 adults completed the Young Schema Questionnaire–Short Version and the Problematic Pornography Consumption Scale (PPCS). The findings indicated that the strongest correlated EMSs with PPU were (i) Emotional Deprivation, (ii) Abandonment, (iii) Mistrust and Abuse, (iv) Social Isolation, (v) Defectiveness and Shame, (vi) Self-Sacrifice, (vii) Unrelenting Standards, (viii) Entitlement, and (ix) Insufficient Self-Control. All schema domains were positively correlated with PPCS scores, with the schema domains Disconnection and Rejection, Impaired Limits, and Overvigilance and Inhibition showing the strongest correlations. Results indicated that EMSs explained approximately 26% of the variance in PPU among all participants. Disconnection and Rejection, Overvigilance and Inhibition, and Other Directedness were the strongest schema domain predictors, accounting for 15% of the variance in PPU. The present study provides novel insight and clinical implications for future clinical practice, with the aim of minimising or buffering the impact of EMSs and reducing subsequent PPU.

Keywords Pornography · Addiction · Early maladaptive schemas · Schema therapy · Compulsion · Problematic pornography use

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Introduction

Online Pornography Use

The consumption of online pornography is a common phenomenon in many developed countries where internet access is readily available. As public awareness of its prevalence has increased, so too have concerns regarding the potential negative impacts associated with pornography use (Vieira & Griffiths, 2024). Consistent with prior studies (e.g. Grubbs et al., 2019), recent research has suggested that individuals were more likely to resort to online pornography as a way of coping with the stress and anxiety brought about by the pandemic, as well as to fulfil their sexual needs (Gillespie et al., 2021; Mestre-Bach et al., 2020; Pennanen-Iire et al., 2021; Sharma & Subramanyam, 2020).

Online pornography offers a convenient and cost-effective outlet for sexual gratification. Often linked with masturbation (Carvalheira et al., 2015; McNabney et al., 2020), online pornography use serves various purposes, including seeking pleasure, enhancing sexual satisfaction, fostering intimacy with a partner, and/or coping with negative emotions (Bőthe et al., 2021a, 2021b; Esplin et al., 2021; Grubbs et al., 2019; Kohut et al., 2017). It is estimated that 5%–14% of individuals experience problematic pornography use (Efrati & Gola, 2018a, 2018b; Štulhofer, et al., 2020). Problematic pornography use (PPU) can be defined as persistent and repetitive engagement with pornography despite the negative impact on an individual's life (Leonhardt et al., 2018; Vaillancourt-Morel, et al., 2017). PPU is understood to be a subtype of compulsive sexual behaviour disorder/sexual addiction (Bőthe et al., 2020; Efrati & Gola, 2018a, 2018b; Kraus & Sweeney, 2019; Kraus et al., 2018).

Despite its estimated prevalence, online pornography addiction/online PPU remains under-researched and is often conceptualised within the broader framework of hypersexual behaviour or compulsive sexual behaviour (CSB). While some clinicians have made attempts to classify online PPU as an 'impulse-control disorder', the eleventh revision of the *International Classification of Diseases* (ICD-11) placed it under compulsive sexual behaviour disorder (CSBD) (Kraus et al., 2018).

Early Experiences and Pornography Addiction

Attachment theory argues that individuals' early attachments to primary caregivers influence their ability to regulate emotional states later in life. Infants who experience positive interactions with main caregivers develop healthy coping strategies and healthy intimate relationships in adult life. However, infants who lacked positive and secure experiences with primary caregivers and were subject to adverse early life experiences are at risk of developing insecure attachment styles, including avoidant, anxious, or disorganised attachment styles (Lahousen et al., 2019).

There is a growing body of empirical research linking adult attachment styles to addictive behaviours (Mikulincer & Shaver, 2007). Attachment theory initially placed greater emphasis on the emotional impact resulting from early experiences with caregivers. However, as the model evolved, it began to integrate cognitive elements such as internal working models and scripts. Such cognitive frameworks and stable patterns of relating throughout life are often called schemas. A study conducted by Karantzas et al. (2023) found a positive association between insecure attachment styles (anxious, avoidant, fearful) and early maladaptive schemas, while secure attachment was negatively associated with all schema domains.

Early Maladaptive Schemas

Young et al. (2003) define early maladaptive schemas (EMSs) as "*extremely stable and enduring themes, comprised of memories, emotions, cognitions, and bodily sensations regarding oneself and one's relationship with others, that develop during childhood and are elaborated on throughout the individual's lifetime, and that are dysfunctional to a significant degree*" (Young et al., 2003, p. 7). Often developed during childhood, they include memories, beliefs, bodily sensations, and expectations about self, others, and the world (Young & Brown, 2003). The development of schemas can be attributed to a variety of factors, including temperament, unmet core emotional needs, and adverse childhood experiences such as trauma, victimisation, overindulgence, and overprotection (McLaughlin & Sheridan, 2016).

A combination of 18 early maladaptive schemas are distributed across five domains: (i) Disconnection and Rejection—a domain associated with insecure attachment and lack of stability in interpersonal relationships; (ii) Impaired Autonomy and Performance—a domain associated with lack of sense of self and autonomy; (iii) Impaired Limits—a domain associated with difficulties in setting both personal and interpersonal limits; (iv) Other Directedness—a domain associated with excessive preoccupation about the reactions, opinions, and approval of others; and (v) Over-Vigilance and Inhibition—a domain associated with internalised rigid rules and moral values as well as suppression of emotional experiences (Young & Brown, 2003). Table 1 outlines each of the schema domains and individual EMSs.

More recently, and through factor analysis, four domains of the higher-order schema have emerged as more suitable in terms of interpretability and empirical evidence: (i) Disconnection and Rejection; (ii) Impaired Autonomy and Performance; (iii) Excessive Responsibility and Standards, and (iv) Impaired Limits (Bach et al., 2018). Despite these recent advances, most studies included in this review are informed by the five-domain model of schemas detailed in Table 1.

A systematic review by Vieira et al. (2023) highlighted a positive relationship between EMSs and a wide range of behavioural addictions, including food addiction, gambling addiction, internet addiction, social networking addiction, and sex addiction/compulsive sexual behaviours. The domain Disconnection and Rejection was the most strongly related domain across all behavioural addictions, followed by Impaired Limits (entitlement and insufficient self-control), Impaired Autonomy and Performance (dependence, vulnerability to harm, enmeshment, and failure), Other-Directedness (subjugation, self-sacrifice, and approval-seeking), and Overvigilance and Inhibition (negativity/pessimism, emotional inhibition, unrelenting standards, and punitiveness). In relation to sex addiction and compulsive sexual behaviour, the review indicated that individuals exhibiting higher levels of compulsive sexual behaviour tend to have impaired internal and interpersonal limits. These impairments might contribute to both their lack of behavioural control and their persistent, compulsive engagement with sexual fantasies.

The Interaction of Person-Affect-Cognition-Execution (I-PACE) Model and Early Maladaptive Schemas

The I-PACE model integrates multiple psychological and neurobiological considerations to explain how individuals develop addictive behaviours related to internet use, such as

Table 1 Schema domains and early maladaptive schemas (Young et al., 2003)

Schema domain	Early maladaptive schemas	Features
Disconnection and Rejection	Abandonment/Instability Mistrust/Abuse Emotional Deprivation Social Isolation/Alienation Defectiveness/Shame	Insecure attachment and lack of stability in interpersonal relationships
Impaired Autonomy and Performance	Dependence/Incompetence Vulnerability to Harm or Illness Enmeshment/Underdeveloped Self Failure	Lack of sense of self and autonomy
Impaired Limits	Entitlement/Grandiosity Insufficient Self-Control/Self-Discipline	Difficulties with setting both personal and interpersonal limits
Other Directedness	Subjugation Self-Sacrifice	Excessive preoccupation with the reactions, opinions, and approval of others
Over-Vigilance and Inhibition	Emotional Inhibition Unrelenting Standards/Hypercriticalness	Internalised rigid rules and moral values as well as suppression of emotional experiences

PPU. Developed by Brand et al. (2016, 2019), the I-PACE framework is a process model which emphasises the interaction of various factors that may lead to the development of behavioural addiction, such as person-related factors, affect, cognitions, and executive functioning.

The I-PACE model can be effectively integrated with the concept of EMSs to provide a more comprehensive understanding of the development and maintenance of behavioural addictions, such as PPU. In relation to person-related variables, early maladaptive schemas can be seen as part of the predisposing factors that make an individual more susceptible to developing behavioural addiction (Aloi et al., 2020; Vieira et al., 2023). For example, EMSs under the Disconnection and Rejection domain (e.g. abandonment, emotional deprivation, defectiveness and shame, and mistrust and abuse) might lead an individual to seek out pornography as a means of coping with feelings of loneliness or worthlessness. On the other hand, under the affective domain, EMSs can strengthen emotional responses to specific triggering and overwhelming situations (Ahmadpanah et al., 2017). For instance, an individual with an abandonment schema might experience intense anxiety or sadness when feeling lonely, making them more vulnerable to resort to pornography use as a way of coping with these negative internal experiences.

EMSs often involve dysfunctional and distorted beliefs about self and others, such as feeling inherently unworthy, with individuals believing that they can only be loved if they meet specific conditions, and perceiving others as unreliable or untrustworthy (Dadomo et al., 2018; Young et al., 2003). These cognitive patterns, as outlined by Brand et al. (2016, 2019), can become a risk factor for engaging in addictive behaviours, seeking, for instance, compulsive pornography use as a coping strategy to reduce negative thinking. Lastly, the emotional distress and distorted thinking associated with the activation of EMSs can impair an individual's ability to exert inhibitory control, leading to compulsive engagement in problematic behaviours. Aligning with the executive functioning domain outlined in the I-PACE model, EMSs can, therefore, affect decision-making by prioritising short-term relief from emotional distress over long-term well-being (Efrati et al., 2021; Estevez et al., 2021).

The Present Study

The present study examined the association between EMSs and online pornography use, as well as investigated the difference between problematic and non-problematic pornography users. The Young Schema Questionnaire–Short Version (YSQ-SF: Young & Brown, 1998) and the Problematic Pornography Consumption Scale (PPCS-18, Bőthe et al., 2018) were administered to an adult sample. Correlation analysis was employed to explore the relationship between EMSs and the overall score on the PPCS, and regression analyses were used to identify which EMS and schema domains best predicted problematic pornography use.

It was hypothesised that the mean schema score would be predicted by group, whereby individuals who met the cut-off for problematic pornography use would score more highly than those below the threshold, particularly in the Disconnection and Rejection domain (H_1). It was also hypothesised that EMSs would significantly correlate with the overall score on the Problematic Pornography Consumption Scale and that this correlation would be stronger among participants who met the criteria for problematic pornography use (H_2). Moreover, it was hypothesised that the strongest correlated schemas would be those within the Disconnection and Rejection domain, such as the Abandonment, Emotional Deprivation, Social Isolation, Defectiveness and Shame, and Mistrust and Abuse schemas (H_3).

Lastly, it was hypothesised that a significant amount of the variance in the problematic pornography use (assessed using the PPCS) would be predicted by the EMSs (H_4).

Taking into account previous research and the extant literature on the relationship between EMSs and behavioural addictions (including compulsive sexual behaviours) (Vieira et al., 2023), it was hypothesised that different schema domains would predict problematic pornography use. More specifically, it was hypothesised that the Disconnection/Rejection domain would be most strongly predictive of problematic pornography use, followed by Impaired Limits (H_5). In relation to specific EMSs, it was hypothesised that Emotional Deprivation, Abandonment, Insufficient Self-Control, and Defectiveness and Shame would more strongly predict problematic pornography use when compared to the other EMSs (H_6).

Methods

Participants and Procedure

The participants in the present study comprised 1000 adults (58.9% males, 38.7% females; mean age = 29.2 years, *SD* = 6.9) from the general population and different nationalities. The following inclusion criteria were applied: (i) being aged 18 years or older, (2) being online pornography users, (3) being English speakers, and (4) providing their consent to participate. The data were collected using an online survey, which was completed voluntarily.

Participants were recruited online through social media platforms, including *Facebook* and *Reddit*. In addition, members of Sex Addicts Anonymous were given the opportunity to complete the survey. To maximise response and to include both problematic and non-problematic pornography users, a purposive sampling strategy was employed, and the study was advertised in general Subreddits, including '*r/SampleSize*', '*r/Relationships*', and '*r/Research Studies*', as well as in specific Subreddits such as '*r/PornAddiction*', '*r/Therapy*', '*r/Anxiety*', and '*r/Addiction*'. In their study, Luong and Lomanowska (2022) suggested that '*r/SampleSize*' is a diverse and viable participant pool that can be used to recruit relatively large and diverse samples for research studies with minimal setup, labour, and cost.

The research was advertised online with a flyer outlining the study's aims. Upon clicking the online link, participants were immediately directed to an Information Sheet and Consent Form. After agreeing to participate via the Consent Form, participants were taken to the first part of the survey, where they completed their sociodemographic information. They were then instructed to complete a short questionnaire on the frequency and intensity of their online pornography use, which was followed by the Young Schema Questionnaire-Short Form and the Problematic Pornography Consumption Scale. Participants who answered 'No' to the question 'Have you watched pornography?' and who entered a number below 18 years in the question relating to their age had the survey terminated and were unable to answer any more questions.

Ethics

The confidential nature of the data collected in the study was highlighted to all participants in the information sheet, as well as providing details of procedures in place to protect

this. The study was conducted in accordance with the Declaration of Helsinki and gained approval from the research team's university ethics committee.

Measures

Sociodemographic Information and Pornography Use Sociodemographic data were collected, including the country of birth, age, gender, sexual orientation, education, occupation status, religion, and relationship status. Participants were also asked to indicate whether they had watched pornography, how often they watched pornography, the average duration of each viewing, and the devices used to access pornographic content (e.g. laptop, smartphone, tablet).

Young Schema Questionnaire Short Form (YSQ-SF: Young & Brown, 1998) The YSQ-SF was used to assess EMSs. The scale consists of 75 self-report items assessing 15 of the 18 identified EMSs (Young et al., 2003). The YSQ–SF uses a Likert scale to indicate how much each item applies to an individual, from 1 (*completely untrue of me*) to 6 (*describes me perfectly*). An average score of 4 or more on each EMS is considered clinically relevant. The YSQ-SF comprises five schema domains with the respective EMSs: Disconnection/Rejection (abandonment/instability, mistrust/abuse, emotional deprivation, defectiveness/shame, social isolation/alienation); Impaired autonomy/Performance (dependence/incompetence, vulnerability to harm or illness, enmeshment/undeveloped self, failure); Impaired Limits (entitlement/grandiosity, insufficient self-control); Other Directedness (subjugation, self-sacrifice); and Over vigilance/Inhibition (emotional inhibition, unrelenting standards). The full scale showed excellent internal consistency (Cronbach's alpha = 0.985).

Problematic Pornography Consumption Scale (PPCS: Bőthe et al., 2018) The PPCS was used to assess problematic pornography use over the past 6 months. The scale consists of 18 items and assesses the six core components based on the components model of addiction (Griffiths, 2005) and each component is assessed with three items: mood modification (e.g. "*Watching porn got rid of my negative feelings*"), salience (e.g. "*I continually planned when to watch porn*"), conflict (e.g. "*Watching porn prevented me from bringing out the best in me*"), relapse (e.g. "*When I vowed not to watch porn anymore, I could only do it for a short period of time*"), tolerance (e.g. "*I felt that I needed more and more porn in order to satisfy my needs*"), and withdrawal (e.g. "*I became agitated when I was unable to watch porn*"). The items are rated on a 7-point scale from 1 (*never*) to 7 (*all the time*). Total scores range between 18 and 126, and higher scores indicate higher levels of problematic pornography use (PPU). More specifically, a score greater than 76 is indicative of problematic pornography use. The full scale showed excellent internal consistency (Cronbach's alpha = 0.961).

Statistical Analysis

All data analysis was conducted using the Statistical Package for Social Sciences (SPSS for Mac, v.29). Descriptive data were examined for degree of normal distribution, using data distribution histograms, mean, mode and median, skewness, and kurtosis values. To explore the relationship between EMSs and online pornography use, both among problematic and non-problematic pornography users, Spearman's correlation was used. Multiple

regression analysis was employed to assess the contribution of EMSs and the impact of gender, age, and sexual orientation in the model. In the first regression analysis, the starting point was a model in which EMSs were the only predictor of the dependent variable. This model was used in the total sample. In a second step, the age variable was added to the model and explored whether being under the age of 25 would impact EMSs' predictability of PPU. In the third step, the gender variable was added to the model and explored whether gender would have an impact on EMSs' predictability of PPU. In the final step, the sexual orientation variable was added to the model to assess whether it would have an impact on EMSs' predictability of PPU. A standard stepwise regression analysis was then employed to identify the most influential predictors (EMSs and schema domains) of PPU. Multicollinearity diagnostics using tolerance and variance inflation factor (VIF) showed weak multicollinearity among the predictors in the model. Diagnostic checks were carried out following all regression analyses to ensure that the assumptions of the regressions were tenable. All assumptions regarding linearity, normality, and constant variance were met.

Results

Descriptive Statistics and Preliminary Analyses

Table 2 provides an overview of the descriptive statistics for the sociodemographic variables. The sample comprised 1000 adults (58.9% males, 38.7% females; mean age = 29.2 years, $SD = 6.9$), with the largest proportions being white ($n = 792$), in a relationship/married ($n = 590$), religious ($n = 762$), heterosexual ($n = 820$), from the USA ($n = 747$), with Bachelor's degrees ($n = 552$), and currently full-time employed/self-employed ($n = 541$). The results also indicated that of the 1000 participants, 96.9% had watched pornography and, therefore, met the criteria to progress with the survey. Of those 969 participants, 286 met the criteria for problematic pornography use (using the cut-off of ≥ 76 on the PPCS).

In terms of the differences between non-problematic pornography users (NPPUs) and problematic pornography users (PPUs) (Table S1 in the Supplementary Materials), the descriptive statistics indicated that across the two groups, the profile of a pornography user in the total sample was a single white Christian heterosexual male, aged over 25 years, from the USA, with a bachelor's degree, and in full-employment.

Descriptive Analysis of Pornography Use

The results indicated that 96.9% of participants had watched pornography. With regard to pornography frequency, intensity, and activities (Table 3), there were some differences between non-problematic pornography users (NPPUs) and problematic pornography users (PPUs).

In relation to the frequency of pornography use, 34.7% ($n = 237$) of NPPUs watched pornography two or more times a week, and 26.5% ($n = 181$) watched pornography once a week. Among PPUs, 36% ($n = 103$) watched pornography two or more times a week, and 21% ($n = 60$) watched pornography two or more times a day. Chi-square tests indicated a significant relationship between problematic pornography use and frequency of pornography use ($\chi^{2[}6, N = 969] = 95.8$, $p < 0.001$), with PPUs consuming pornography significantly more frequently than NPPUs.

Table 2 Descriptive statistics for the sociodemographic variables ($N = 1000$)

		N	%
Gender			
	Male	589	58.9
	Female	397	39.7
	Non-binary	13	1.3
	Transgender	1	0.1
Total		1000	100
Age			
	< = 25 years	337	33.7
	> 25 years	663	66.3
Total		1000	100
Sexual orientation			
	Heterosexual	820	82.2
	Homosexual	64	6.4
	Bisexual	103	10.3
	Other	12	1.2
Total		1000	100
Education			
	Less than secondary school	7	0.7
	Secondary school or equivalent	318	31.8
	Bachelor's degree	552	55.2
	Master's degree	103	10.3
	Doctoral degree	20	2.2
Total		1000	100
Ethnicity			
	White	792	79.2
	Black, Caribbean, or African	145	14.5
	Asian	26	2.6
	Mixed or multiple ethnic groups	23	2.3
	Other	14	1.4
Total		1000	100
Country of birth			
	UK	140	14.0
	USA	747	74.7
	Europe	65	6.5
	Asia	14	1.4
	Canada	13	1.3
	Africa	10	1.0
	Australia	6	0.6
	South America	5	0.5
Total		1000	100
Occupational status			
	Full-time employed	380	38.0
	Full-time student	135	13.5
	Part-time student	38	3.8
	Part-time student and employed	254	25.4
	Self-employed	161	16.1

Table 2 (continued)

		N	%
	Unemployed	25	2.5
	Other	7	0.7
Total		1000	100
Religion			
	No religion	238	23.8
	Catholic	154	15.4
	Christian	302	30.2
	Buddhist	59	5.9
	Jewish	80	8.0
	Muslim	78	7.8
	Hindu	82	8.2
	Other	7	0.7
Total		1000	100
Relationship status			
	In a relationship	299	29.9
	Single	401	40.1
	Married	291	29.1
	Other	9	0.9
Total		1000	100

In terms of the intensity of pornography use, 35.1% ($n=240$) of NPPUs watched, on average, 30–59 min of pornography in one session, and 33.1% ($n=226$) watched, on average, 10–29 min in one session. These figures differ among PPUs. In this group, 38.8% ($n=111$) watched, on average, 30–59 min of pornography in one session, and 30.8% ($n=88$) watched 1–2 h of pornography in one session. Moreover, 15% of the PPUs ($n=15$) watched more than 2 h of pornography in one session. Chi-square tests indicated a significant relationship between problematic pornography use and intensity of pornography use ($\chi^{2[}4, N=969]=86.02, p<0.001$), with PPUs consuming pornography for longer sessions than NPPUs.

In relation to access to pornography, 69.3% ($n=473$) of NPPUs watched free online pornography content, and 37.9% ($n=259$) watched paid online content. Among PPUs, 85.3% ($n=244$) watched free online pornography content, and 43.7% ($n=125$) watched paid online content. Only 8.1% ($n=55$) of NPPUs accessed offline pornography material (e.g. magazines, DVDs), compared to 22.4% ($n=64$) of PPUs.

Accessing pornographic content through a smartphone was the most preferred way among both NPPUs (57.7%, $n=394$) and PPUs (84.3%, $n=241$), followed by computer/laptop (NPPUs 42.5%, $n=290$; PPUs 62.6%, $n=179$), and tablet (NPPUs 31.3%, $n=214$; PPUs 40.6%, $n=116$). The least preferred way of accessing pornography was through printed material, with 3.5% ($n=24$) among NPPUs and 17.5% ($n=50$) among PPUs. Chi-square tests (with Yates' continuity correction) indicated a significant association between problematic pornography use and (i) and free online pornography use ($\chi^2[1, N=969]=26.2, p<0.001$), offline pornography use ($\chi^2[1, N=969]=37.1, p<0.001$), (ii) computer/laptop pornography use ($\chi 2[1, N=969]=31.9, p<0.001$), (iii) smartphone pornography use (χ^2 [1, $N=969]=61.9, p<0.001$), and (iv) printed pornography use (χ^2 [1, $N=969]=53.8, p<0.001$). No other significant differences were found.

Table 3 Descriptive statistics of frequency, intensity, and access to pornography ($N=969$)

		Non-problematic pornography users		Problematic pornography users	
		N	%	*N*	%
Frequency of pornography use					
	Two or more times a day	36	5.3	60	21.0
	Once a day	42	6.1	42	14.7
	Two or more times a week	237	34.7	103	36.0
	Once a week	181	26.5	38	13.3
	Two or more times a month	145	21.2	33	11.5
	Once a month	18	2.6	4	1.4
	Less than once a month	24	3.5	6	2.1
Total		683	100	286	100
Intensity of pornography use					
	More than 2 h	18	2.6	43	15.0
	1 to 2 h	173	25.3	88	30.8
	30 to 59 min	240	35.1	111	38.8
	10 to 29 min	226	33.1	34	11.9
	Less than 10 min	26	3.8	10	3.5
Total		683	100	286	100
Access to free online pornography					
	Yes	473	69.3	244	85.3
	No	210	30.7	42	14.7
Total		683	100	286	100
Access to paid online pornography					
	Yes	259	37.9	125	43.7
	No	424	62.1	161	56.3
Total		683	100	286	100
Access to offline pornography					
	Yes	55	8.1	64	22.4
	No	628	91.9	222	77.6
Total		683	100	286	100
Computer/laptop use					
	Yes	290	42.5	179	62.6
	No	393	57.5	107	37.4
Total		683	100	286	100
Smartphone use					
	Yes	394	57.7	241	84.3
	No	289	42.3	45	15.7
Total		683	100	286	100
Tablet/iPad use					
	Yes	214	31.3	116	40.6
	No	469	68.7	170	59.4
Total		683	100	286	100
Printed pornography					
	Yes	24	3.5	50	17.5

Table 3 (continued)

	Non-problematic pornography users		Problematic pornography users	
	N	%	*N*	%
No	659	96.5	236	82.5
Total	683	100	286	100
Virtual reality use				
Yes	1	0.1	0	0
No	682	99.9	286	100
Total	683	100	286	100
TV/DVD use				
Yes	0	0	2	0.7
No	683	100	284	99.3
Total	683	100	286	100

Independent *t*-tests were conducted to compare the EMS scores for PPUs and NPPUs. There were significant statistical differences between PPUs and NPPUs on the following schemas: Abandonment [$t(645.6) = 2.54$, $p = 0.001$], Social Isolation [$t(533.3) = -2.93$, $p = 0.004$], Failure [$t(690.5) = -3.09$, $p = 0.002$], Dependence-Incompetence [$t(688.6) = -4.11$, $p < 0.001$], Enmeshment [$t(755.4) = -3.13$, $p = 0.002$], Subjugation [$t(726.5) = -2.88$, $p = 0.004$], and Self-Sacrifice [$t(650.9) = -2.88$, $p = 0.004$]. There were no significant differences between PPUs and NPPUs in the other EMSs.

In relation to schema domains, Overvigilance and Inhibition was the domain with the highest score in both groups (PPU = 4.22, NPPU = 4.26), followed by Impaired Limits (mean = 4.08) for PPUs and Other Directedness for NPPUs (mean = 4.22). Independent *t*-tests were conducted to compare the schema domain scores for PPUs and NPPUs. There was a significant difference in scores for PPUs ($M = 3.62$, $SD = 0.93$) and NPPUs ($M = 3.92$, $SD = 1.34$; $t(766.8) = -4.01$, $p < 0.001$, two-tailed) in the Impaired Autonomy and Performance domain, with NPPUs scoring significantly higher than PPUs. The magnitude of the differences in the means (mean difference = 0.3, 95% CI [−0.45, −0.16]) was small (Cohen's $d = -0.24$). There was also a significant difference in scores for PPUs ($M = 3.99$, $SD = 0.72$) and NPPUs ($M = 4.20$, $SD = 1.13$; $t(817.4) = -3.42$, $p < 0.001$, two-tailed) in the Other Directedness domain, with NPPUs also scoring significantly higher than PPUs. The magnitude of the differences in the means (mean difference = 0.21 95% CI [−0.33, −0.09]) was small (Cohen's $d = -0.20$). There were no significant statistical differences between PPUs and NPPUs in the other schema domains.

Group Differences

Chi-square tests were conducted to examine the relationship between problematic pornography use and gender, sexual orientation, relationship status, and age. There was a significant relationship between problematic pornography use and gender (χ^2 [1, $N = 957$] = 4.85, $p < 0.03$), indicating that males were more likely to meet the criteria for PPU than females. The relationship between problematic pornography use and age was significant (χ^2 [1, $N = 969$] = 6.03, $p = 0.014$). Participants over 25 years old were more likely to engage in

PPU than those who were 25 years or under. There was no significant relationship between PPU and sexual orientation (χ^2 [1, $N=969$] = 0.45, $p=0.5$). Moreover, there was a significant relationship between PPU and relationship status (χ^2 [1, $N=967$] = 11.63, $p<0.001$). Those in a relationship were less likely to experience PPU.

Correlation Analyses

Spearman's non-parametric correlation analyses were undertaken for the five schema domains and the total score on the PPCS. For PPUs (Table S2 in the Supplementary Materials), all schema domains were positively correlated with the PPCS, with the schema domains Disconnection and Rejection ($r[284]=0.48$, $p<0.01$), Impaired Limits ($r[284]=0.45$, $p<0.01$), and Overvigilance and Inhibition ($r[284]=0.52$, $p<0.01$) being the strongest related with the PPCS. In relation to the NPPUs (Table S3 in the Supplementary Materials), all schema domains were also positively correlated with the PPCS, with Impaired Performance ($r[681]=0.42$, $p<0.01$) having the strongest correlation.

Spearman's correlation analyses were also undertaken for all EMSs and the total score on the Problematic Pornography Consumption Scale. The results for non-problematic pornography users (NPPUs) and problematic pornography users (PPUs) are shown in Tables 4 and 5, respectively. For NPPUs, all EMSs were positively correlated with the PPCS, although eight out of 15 showed weak levels of correlation. The strongest correlated EMSs were Defectiveness and Shame ($r[681]=0.35$, $p<0.01$), Failure ($r[681]=0.37$, $p<0.01$), Dependence-Incompetence ($r[681)=0.38$, $p<0.01$], Vulnerability to Harm ($r[681]=0.31$, $p<0.01$), Subjugation ($r[681]=0.37$, $p<0.01$], and Entitlement ($r[681]=0.37$, $p<0.01$). The Enmeshment schema was the most correlated EMS ($r[681]=0.42$, $p<0.01$).

In relation to PPUs, all EMSs were positively correlated with the PPCS except Dependence and Incompetence. The strongest correlated EMSs were Emotional Deprivation ($r[284]=0.39$, $p<0.01$), Abandonment ($r[284]=0.47$, $p<0.01$), Mistrust and Abuse ($r[284]=0.45$, $p<0.01$), Social Isolation ($r[284)=0.37$, $p<0.01$), Defectiveness and Shame ($r[284]=0.37$, $p<0.01$), Self-Sacrifice ($r[284]=0.37$, $p<0.01$), Unrelenting Standards ($r[284]=0.44$, $p<0.01$), Entitlement ($r[284)=0.36$, $p<0.01$), and Insufficient Self-Control ($r[284]=0.42$, $p<0.01$). The schemas Failure, Enmeshment, and Subjugation had weak correlations and Emotional Inhibition was the most correlated schema ($r[284]=0.5$, $p<0.01$).

Regression Analysis for Predicting Problematic Pornography Use

Early Maladaptive Schemas and Problematic Pornography Use

Multiple regression analysis was conducted to evaluate the extent to which EMSs could predict PPU among all participants (see Table 6). The findings were significant ($F[15,953]=22.38$, $p<0.001$)]. The R^2 was 0.26, indicating that EMSs explained approximately 26% of the variance in PPU among all participants. Table S4 in the Supplementary Materials provides information about regression coefficients for the predictor variables entered into the model. Emotional Deprivation, Abandonment, Mistrust and Abuse, Social Isolation, Defectiveness and Shame, Vulnerability to Harm, and Emotional Inhibition were significant predictors of PPU. The remaining EMSs were non-significant.

Table 4 Correlation analysis on the relationship between early maladaptive schemas and the Problematic Pornography Consumption Scale (PPCS) among non-problematic pornography users ($N = 683$)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Total PPCS																
2	Emotional Deprivation	.23**															
3	Abandonment	.27**	.57**														
4	Mistrust and Abuse	.28**	.66**	.64**													
5	Social Isolation	.23**	.67**	.55**	.67**												
6	Defectiveness and Shame	.35**	.72**	.65**	.74**	.69**											
7	Failure	.37**	.66**	.64**	.75**	.63**	.77**										
8	Dependence-Incompetence	.38**	.66**	.65**	.74**	.63**	.77**	.79**									
9	Vulnerability to Harm	.31**	.64**	.65**	.76**	.63**	.76**	.75**	.76**								
10	Enmeshment	.42**	.64**	.66**	.72**	.59**	.74**	.76**	.77**	.75**							
11	Subjugation	.37**	.68**	.67**	.74**	.63**	.77**	.76**	.79**	.76**	.78**						
12	Self-Sacrifice	.22**	.58**	.59**	.65**	.53**	.65**	.65**	.65**	.67**	.68**	.69**					
13	Emotional Inhibition	.29**	.64**	.54**	.68**	.61**	.68**	.68**	.67**	.67**	.69**	.71**	.57**				
14	Unrelenting Standards	.23**	.59**	.55**	.62**	.53**	.61**	.60**	.60**	.62**	.62**	.64**	.59**	.60**			
15	Entitlement	.37**	.65**	.64**	.72**	.63**	.71**	.71**	.73**	.75**	.77**	.75**	.69**	.69**	.63**		
16	Insufficient Self-Control	.18**	.60**	.57**	.61**	.59**	.65**	.64**	.61**	.60**	.60**	.64**	.57**	.58**	.54**	.61**	

**Correlation is significant at the $p < 0.01$ level (2-tailed)

Table 5 Correlation analysis on the relationship between early maladaptive schemas and the Problematic Pornography Consumption Scale (PPCS) among problematic pornography users ($N = 286$)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Total PPCS																
2	Emotional Deprivation	.39**															
3	Abandonment	.47**	.50**														
4	Mistrust and Abuse	.45**	.52**	.60**													
5	Social Isolation	.37**	.44**	.40**	.49**												
6	Defectiveness and Shame	.37**	.43**	.40**	.48**	.76**											
7	Failure	.19**	.19**	.18**	.23**	.33**	.33**										
8	Dependence-Incompetence	0.06	.17**	.13*	.20**	.37**	.42**	.63**									
9	Vulnerability to Harm	.21**	.14*	.25**	.31**	.39**	.46**	.57**	.58**								
10	Enmeshment	.14*	.22**	.28**	.28**	.28**	.36**	.54**	.66**	.53**							
11	Subjugation	.24**	.17**	.31**	.31**	.49**	.51**	.58**	.62**	.64**	.61**						
12	Self-Sacrifice	.37**	.36**	.42**	.47**	.32**	.32**	.13*	.17**	.29**	.29**	.24**					
13	Emotional Inhibition	.50**	.42**	.38**	.43**	.37**	.39**	.30**	.21**	.33**	.27**	.32**	.38**				
14	Unrelenting Standards	.44**	.32**	.33**	.36**	.22**	.26**	0	0.04	.15*	.12*	0.1	.47**	.53**			
15	Entitlement	.36**	.29**	.42**	.48**	.38**	.44**	.35**	.37**	.38**	.47**	.43**	.48**	.50**	.44**		
16	Insufficient Self-Control	.42**	.34**	.31**	.40**	.47**	.51**	.25**	.30**	.39**	.27**	.43**	.34**	.54**	.35**	.44**	

**Correlation is significant at the $p < 0.01$ level (2-tailed)

*Correlation is significant at the $p < 0.05$ level (2-tailed)

Table 6 Multiple regression analysis of early maladaptive schemas on problematic pornography use ($N = 969$)

Model summary[b]										
Model	R	R^2	Adjusted R^2	Std. error of the estimate	Change statistics					Durbin-Watson
					R^2 change	F change	df1	df2	Sig. F change	
1	.510[a]	.260	.249	18.412	.260	22.374	15	953	< .001	1.455

[a]Predictors: (Constant), Insufficient Self-Control, Self-Sacrifice, Social Isolation, Abandonment, Unrelenting Standards, Emotional Inhibition, Dependence-Incompetence, Emotional Deprivation, Mistrust and Abuse, Entitlement, Vulnerability to Harm, Failure, Subjugation, Defectiveness and Shame, Enmeshment

[b]Dependent Variable: Total PPCS score

The Role of Age, Gender, and Sexual Orientation

A set of analyses attempted to provide further insights into the relationship between the variables examined, particularly the role of age, gender, and sexual orientation in the relationship between EMSs and PPU. Age was dichotomously coded as 0 = under 25 years old, 1 = 25 years old or older, whereas gender was coded as 0 = male, 1 = female. The first distinct subgroup was related to emerging adults (i.e. those aged 18–24 years) because individuals in this group are still maturing. The second distinct group was related to adults (i.e. those aged over 24 years old). There was further consideration given to splitting the remaining participants into further age bands. However, only 41 participants were over 40 years old, meaning there would not be sufficient data to create a large enough subgroup of mature/older adults.

In relation to sexual orientation, the variable was coded as 0 = non-heterosexual and 1 = heterosexual. The relationship status variable was coded as 0 = not in a relationship and 1 = in a relationship (which included participants who responded, 'in a relationship' and 'married'). The results indicated that age, gender, and relationship status did not have a direct impact on the relationship between EMSs and PPU, only explaining 0.7% ($p = 0.006$), 0.6% ($p = 0.01$), and 0.7% ($p = 0.007$) of the variance, respectively (Table S5–S8 in the Supplementary Materials). However, sexual orientation was statistically significant ($p < 0.001$), explaining 5% of the variance in the relationship between EMSs and PPU.

Stepwise Regression Analysis—Early Maladaptive Schemas/Schema Domains and Problematic Pornography Use

A stepwise regression analysis was performed to identify the most influential predictors (EMSs and schema domains) of PPU. The model (Table 7) identified Abandonment, Emotional Inhibition, Vulnerability to Harm, Defectiveness and Shame, Social Isolation, Mistrust and Abuse, Self-Sacrifice, and Emotional Deprivation as the most powerful EMSs, accounting for a substantial proportion of the variance (25%) in PPU ($R^2 = 0.25$, adjusted $R^2 = 0.24$) The Abandonment schema alone accounted for 16% of the variance in problematic pornography use. In relation to the schema domains, the model (Table S8 in the Supplementary Materials) identified Disconnection and Rejection, Overvigilance and Inhibition, and Other Directedness as the most powerful schema domains, accounting for 15% of the variance in PPU ($R^2 = 0.15$, adjusted $R^2 = 0.147$). The Disconnection and Rejection schema domain alone accounted for 13% of the variance of problematic pornography use.

Discussion

The present study explored the relationship between EMSs and PPU, examining differences between problematic (PPUs) and non-problematic pornography users (NPPUs), with a sample of 1000 adults. Although other studies have explored core beliefs associated with compulsive sexual behaviours, no previous research has ever examined the relationship between EMSs and PPU. The findings indicated that the strongest correlated EMSs with PPU were (i) Emotional Deprivation, (ii) Abandonment, (iii) Mistrust and Abuse, (iv) Social Isolation, (v) Defectiveness and Shame, (vi) Self-Sacrifice, (vii) Unrelenting Standards, (viii) Entitlement, and (ix) Insufficient Self-Control. All schema domains

Table 7 Stepwise regression analysis of early maladaptive schemas on problematic pornography use ($N=969$)

Model summary[i]										
Model	R	R^2	Adjusted R^2	Std. error of the estimate	Change statistics					Durbin-Watson
					R^2 change	F change	df1	df2	Sig. F change	
1	.395[a]	.156	.155	19.526	.156	178.715	1	967	< .001	
2	.442[b]	.195	.193	19.078	.039	46.998	1	966	< .001	
3	.456[c]	.208	.206	18.932	.013	15.910	1	965	< .001	
4	.467[d]	.218	.215	18.825	.010	12.061	1	964	< .001	
5	.484[e]	.234	.230	18.636	.016	20.655	1	963	< .001	
6	.488[f]	.239	.234	18.594	.004	5.331	1	962	.021	
7	.495[g]	.245	.240	18.524	.007	8.293	1	961	.004	
8	.500[h]	.250	.243	18.478	.004	5.731	1	960	.017	1.405

[a]Predictors: (Constant), Abandonment

[b]Predictors: (Constant), Abandonment, Emotional Inhibition

[c]Predictors: (Constant), Abandonment, Emotional Inhibition, Vulnerability to Harm

[d]Predictors: (Constant), Abandonment, Emotional Inhibition, Vulnerability to Harm, Defectiveness and Shame

[e]Predictors: (Constant), Abandonment, Emotional Inhibition, Vulnerability to Harm, Defectiveness and Shame, Social Isolation

[f]Predictors: (Constant), Abandonment, Emotional Inhibition, Vulnerability to Harm, Defectiveness and Shame, Social Isolation, Mistrust and Abuse

[g]Predictors: (Constant), Abandonment, Emotional Inhibition, Vulnerability to Harm, Defectiveness and Shame, Social Isolation, Mistrust and Abuse, Self-Sacrifice

[h]Predictors: (Constant), Abandonment, Emotional Inhibition, Vulnerability to Harm, Defectiveness and Shame, Social Isolation, Mistrust and Abuse, Self-Sacrifice, Emotional Deprivation

[i]Dependent Variable: Total PPCS

were positively correlated with PPCS scores, with the schema domains Disconnection and Rejection, Impaired Limits, and Overvigilance and Inhibition showing the strongest correlations. Results indicated that EMSs explained approximately 26% of the variance in PPU among all participants. Disconnection and Rejection, Overvigilance and Inhibition, and Other Directedness were the strongest schema domain predictors, accounting for 15% of the variance in PPU.

In a literature review, McKeague (2014) suggested that individuals who engage in compulsive sexual behaviours are more likely to perceive themselves as bad and defective. In addition, such individuals are prone to believe that others will not meet their core needs of safety and nurturance. These beliefs are consistent with the Disconnection and Rejection schema domain, which includes EMSs such as Abandonment, Emotional Deprivation, Defectiveness and Shame, Social Isolation, and Mistrust and Abuse. McKeague (2014) and Bőthe et al. (2024) also suggested that individuals who engage in compulsive sexual behaviours use sex as a way of fulfilling personal needs. This, in turn, is likely to reinforce dependence on others. Such a coping strategy is consistent with the Impaired Autonomy and Performance schema domain, which includes the EMSs of dependence, vulnerability to harm, enmeshment, and failure.

Hypotheses were formulated to address the aims of the present study. It was hypothesised that the mean schema score would be predicted by group, whereby individuals who met the cut-off for problematic pornography use would score more highly than those below the threshold, particularly in the Disconnection and Rejection domain (H_1). The findings indicated that (overall) NPPUs scored higher on EMSs than PPUs. In addition, the results suggested that PPUs scored lower on the Disconnection and Rejection schema domain than NPPUs. However, this difference was not statistically significant. The higher schema domain among PPUs was Impaired Limits, followed by Disconnection and Rejection, whereas, among NPPUs, the schema domain with the highest score was Overvigilance and Inhibition, followed by Other Directedness. These results contrast with a study by Elmquist et al. (2016), where participants who engaged in compulsive sexual behaviours (CSB) scored significantly higher than the non-CSB group on the Disconnection Rejection schema domain.

However, when examining specific individual EMSs from the Disconnection and Rejection schema domain, the results of the present study indicated that PPUs scored significantly higher on the Abandonment schema when compared to NPPUs. The difference was even higher between males from those groups. In addition, when examining the Defectiveness and Shame schema, another EMS from the Disconnection and Rejection domain, male PPUs scored higher (but not significantly) than male NPPUs. A similar tendency was observed in other EMSs from other domains, including Emotional Inhibition and Insufficient Self-Control schemas, where male PPUs scored higher (but not significantly) than male NPPUs.

The present study also hypothesised that EMSs, as assessed using the Young Schema Questionnaire–Short Version (YSQ: Young & Brown, 1998), would significantly correlate with the overall score on the Problematic Pornography Consumption Scale (PPCS: Bőthe et al., 2018) and that this correlation would be stronger among participants who met the criteria for problematic pornography use (H_2). Moreover, it was hypothesised that the strongest correlated schemas would be those within the Disconnection and Rejection domain, such as the Abandonment, Emotional Deprivation, Social Isolation, Defectiveness and Shame, and Mistrust and Abuse schemas (H_3). The findings supported these hypotheses. In relation to PPUs, all EMSs were positively correlated with PPCS scores except Dependence and Incompetence.

These findings are consistent with previous research. A study conducted by Efrati et al. (2021) examining the relationship between EMSs and CSB suggested that individuals with CSB expect that their needs for love, safety, nurturance, and social belonging will not be met consistently, with the Disconnection and Rejection schema domain strongly correlating with such problematic behaviours. In addition, the present study also highlighted that individuals with PPU were prone to present with a deficiency in internal limits which relates to having difficulties in respecting the rights of others, cooperating with them, making commitments, and controlling their emotions and impulses. This is in line with the Impaired Limits schema domain, which is characterised as an inability to maintain or understand appropriate internal and interpersonal limits and a lack of respect and responsibility to others (Young et al., 2003). These results suggest that individuals who present with impaired internal and interpersonal limits might lack behavioural control and have a persistent and compulsive engagement with PPU.

In addition, and consistent with the results on the Overvigilance and Inhibition schema domain, Efrati et al. (2021) highlighted that those who engaged in CSBs were vulnerable to experiencing difficulties in emotional expression in the context of close relationships. This is supported by previous research (Barbanel, 2006; Efrati et al., 2019; Reid et al., 2012), which suggested that individuals with high CSBs are more likely to neglect their feelings and needs, present with higher perfectionism, and strive to meet extreme and rigid standards and rules. This personality and interpersonal functioning is consistent with the Unrelenting Standards and Emotional Inhibition EMSs, which are part of the Overvigilance and Inhibition schema domain.

Lastly, it was hypothesised that a significant amount of the variance in problematic pornography use (assessed using the PPCS) would be predicted by the EMSs (H_4). Taking into account previous research and the extant literature on the relationship between EMSs and behavioural addictions (including compulsive sexual behaviours) (Vieira et al., 2023), it was hypothesised that different schema domains would predict problematic pornography use. More specifically, it was hypothesised that the Disconnection/Rejection domain would be most strongly predictive of problematic pornography use (H_5). In relation to specific EMSs, it was hypothesised that Emotional Deprivation, Abandonment, Insufficient Self-Control, and Defectiveness and Shame would more strongly predict problematic pornography use when compared to the other EMSs (H_6).

Multiple regression analysis confirmed the three hypotheses, indicating that EMSs explained approximately 26% of the variance in PPU among all participants. More specifically, the findings highlighted that Emotional Deprivation, Abandonment, Mistrust and Abuse, Social Isolation, Defectiveness and Shame, Vulnerability to Harm, and Emotional Inhibition were significant predictors of PPU. Standard stepwise regression analysis showed that Abandonment, Emotional Inhibition, Vulnerability to Harm, Defectiveness and Shame, Social Isolation, Mistrust and Abuse, Self-Sacrifice, and Emotional Deprivation were the strongest EMSs, accounting for a substantial proportion of the variance (25%) in PPU, with the Abandonment schema alone accounting for 16% of the variance in PPU. Regarding the schema domains, the model identified Disconnection and Rejection, Overvigilance and Inhibition, and Other Directedness as the strongest schema domains, accounting for 15% of the variance in PPU. The Disconnection and Rejection schema domain alone accounted for 13% of the variance in PPU.

These findings are consistent with previous research (Elmquist et al., 2016; Roemmele & Messman-Moore, 2011), which found that the Disconnection and Rejection schema domain was the strongest predictor of risky sexual behaviours. The Disconnection and Rejection schema domain is closely related to the concept of insecure attachment, and it

is characterised by the fear that an individual's basic needs will not be met and that significant others will abuse and/or abandon them (Young et al., 2003). Previous research has also demonstrated that individuals who engage in CSBs often hold a belief system whereby those close to them will eventually abandon them (McKeague, 2014) and might resort to PPU to manage feelings of shame and guilt (Bőthe et al., 2024). This core belief system is consistent with the Disconnection and Rejection schema domain.

The results of this study also support the integration of schema theory (Young et al., 2003) in the I-PACE model, developed by Brand et al. (2016, 2019), a framework which emphasises the interaction of various factors that may lead to the development of behavioural addiction, including PPU. Both frameworks emphasise the complex interplay between personal traits, emotional states, cognitive processes, and behavioural execution, highlighting how early life experiences shape vulnerability to addiction. Early maladaptive schemas may significantly influence not only the person-related factors but also the affective responses, cognitive processes, and executive functioning outlined in the I-PACE model. In particular, schemas from the Disconnection and Rejection domain, such as Abandonment, Mistrust and Abuse, or Emotional Deprivation, may predispose individuals to addictive behaviours as an attempt to escape or cope with the distress associated with the schema activation. Previous research has reported the mediating role of anxiety and loneliness in the relationship between pornography use and mental health outcomes (Vieira et al., 2024). In addition, alongside these emotional responses, schema activation can also lead to distorted thinking and impaired executive function by fostering maladaptive coping strategies, making it difficult to exert self-control.

By addressing EMSs in therapeutic settings, such as through schema therapy, individuals can modify these problematic patterns, thereby reducing their emotional and cognitive vulnerabilities to addiction, including PPU. Enhancing executive functioning and developing healthier coping mechanisms can also further aid in developing appropriate and effective relapse-prevention plans for those struggling with PPU.

Strengths and Limitations

The present study is the first to examine the relationship between EMSs and PPU. In addition, the study had a good male-to-female participant ratio, with 58.9% male participants and 39.7% female participants. While this is not a perfect gender ratio, it has greater female representation than many other studies (Ballester-Arnal et al., 2022; Gola et al., 2017; Nolan & Smyth, 2024) examining pornography use. In addition, the present study also included a good sample size of individuals who met the criteria for PPU ($n = 286$), which allowed for meaningful and powerful statistical analyses between variables. In relation to the reliability of the scales used in the study, all EMSs demonstrated very good to excellent reliability (Cronbach's alphas ranging from 0.82 to 0.93), and scores on the full YSQ-SF also showed excellent internal consistency (Cronbach's alpha = 0.985). The PPCS had a Cronbach's alpha of 0.96, also demonstrating excellent internal consistency.

Despite these strengths, the present study is not without limitations. Firstly, despite the good size sample, the demographics were not very diverse. A significant proportion of the sample was aged below 35 years (78%), heterosexual (82%), and white (79%). This might be due to most of the sample being represented by US participants (74%) recruited on *Reddit*, not giving an accurate representation of the population from other countries, including those who might have different attitudes towards online pornography. It is also worth noting that the cross-sectional nature of the present study did not permit the establishment of

cause-and-effect relationships between variables. While predictive effects were tested in the regression analyses, only longitudinal and experimental designs can determine directional effects. Lastly, the YSQ-SF covers personal and sensitive information about individuals' feelings and cognitions about themselves and those close to them. While EMSs are thought to be unconscious structures, self-report measures are based on information consciously available to participants. As a result, some aspects of the EMSs may not be sufficiently assessed by self-report questions.

Lastly, the present study attempted to include a sub-group of individuals with sex addiction to explore whether their EMSs will align with those of a non-clinical population. However, less than 10 participants from Sex Addicts Anonymous completed the survey. Therefore, there was not enough data to run an analysis on this distinct clinical group. It is recommended that future research looks at the differences and similarities between clinical and non-clinical populations.

Clinical Implications and Future Research

Although the findings from the present study are preliminary, the results have potentially important treatment and research implications. EMSs, particularly those in the Disconnection and Rejection domain, were identified as a strong predictor of PPU, which may help those in clinical practice to minimise or buffer the impact of EMSs and reduce subsequent PPU among their clients. The results provide additional evidence that there is a relationship between EMSs and compulsive sexual behaviours, particularly PPU. These findings can assist clinicians to better understand the cognitive vulnerabilities towards PPU and to devise treatment and intervention protocols to target these specific maladaptive schemas.

The findings also provide directions for continued research. The findings need to be replicated and extended with other samples. The present study was limited in its use of a majority White Western sample. The role of EMSs in predicting PPU may differ cross-culturally. Furthermore, previous research has suggested that compulsive sexual behaviour negatively impacts treatment outcomes (Hartman et al., 2012). The treatment of sexual addiction, including pornography addiction, has unique challenges (such as the stigma and shame associated with it and the easy access to online pornography content) which may be overlooked by mental health professionals and other clinicians who do not have the necessary expertise and skills to work with this presentation. Assessing and monitoring the activation of EMSs in the context of online pornography use could support clinicians with appropriate treatment plans and formulations and ultimately develop effective relapse prevention plans.

Different treatment modalities have been developed to address and treat problematic and compulsive sexual behaviours, including PPU. Integrating schema therapy with interventions targeting the components of the I-PACE model can provide a more effective treatment for PPU. Schema therapy is an integrative intervention model incorporating elements of cognitive behavioural therapy, psychodynamic therapy, attachment theory, and Gestalt therapy. It focuses greatly on early life experiences, attachment styles, and relationships with self and others. Schema therapy was developed to address core unmet needs, help clients break maladaptive patterns of feeling and behaving, and develop healthier alternatives to replace them. The present study supports the use of schema-informed interventions to (i) address PPU and conceptualise it in the context of schema activation, (ii) improve treatment outcomes and therapeutic engagement, and (iii) reduce the likelihood of relapse rates among individuals with PPU.

Conclusion

The present study is the first to examine the predictive ability of EMSs in online pornography use and examine the differences between PPUs and NPPUs. The strongest correlated EMSs were Emotional Deprivation, Abandonment, Mistrust and Abuse, Social Isolation, Defectiveness and Shame, Self-Sacrifice, Unrelenting Standards, Entitlement, and Insufficient Self-Control. All schema domains were positively correlated with PPCS score, with the schema domains Disconnection and Rejection, Impaired Limits, and Overvigilance and Inhibition showing the strongest correlation. This study also indicated that EMSs explained approximately 26% of the variance in PPU among all participants, with the Abandonment schema alone accounting for 16% of the variance of problematic pornography use. With regard to the schema domains, the study suggested that Disconnection and Rejection, Overvigilance and Inhibition, and Other Directedness were the strongest schema domains, accounting for 15% of the variance in PPU.

The present study provides novel insight and implications for future clinical practice to minimise or buffer the impact of EMSs and reduce subsequent PPU. Integrating schema therapy with interventions targeting the components of the I-PACE model can provide a more effective treatment for PPU. Interventions can be tailored to address specific schemas, such as developing healthier coping strategies for managing feelings of abandonment or inadequacy, improving emotional regulation, and enhancing inhibitory control.

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Declarations

Conflict of Interest The authors declare no competing interests.

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