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FULL-LENGTH REPORT

Identification and comprehensive characterization of moral disapproval and behavioral dysregulation-based pornography-use profiles across 42 countries

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ABSTRACT

Background and aims: The Moral Incongruence Model of Pornography Use proposes that pornography-use-related problems may be present due to problematic pornography use (PPU) and/or moral disapproval (MD) of pornography use. Despite some supporting empirical evidence, no study has tested the presence of different pornography-use profiles based on individuals' behavioral dysregulation (i.e., PPU) and moral values concerning pornography use. The generalizability of previous findings to diverse populations has also been limited given the scarcity of studies conducted outside of Western countries. *Methods:* Using data from the International Sex Survey (42 countries, $N = 66{,}994$; $M_{age} = 32.16$ years, $SD = 12.27$), we conducted latent profile analysis to identify pornography-use profiles based on individuals' frequency of use, MD, and PPU. The profiles were compared along a wide range of pornography-use-related, sexuality-related, and psychological correlates. *Results:* Six pornography-use profiles were identified, including two increased risk groups (i.e., *Increased risk of PPU without MD* and *Increased risk of PPU with some MD*). Several factors differentiated between the increased risk vs. no/low risk profiles (e.g., relatedness satisfaction) as well as between the two increased risk profiles (e.g., religiosity). Apart from behavioral dysregulation, moral values concerning pornography use played an important role in distinguishing pornography-use profiles and demonstrated the importance of inquiring about MD when working with individuals with pornography-use-related problems. *Conclusion:* Findings also support recent calls for better-integrated sex therapy and sexual medicine perspectives into pornography-use-related problems research and care.

KEYWORDS

addictive behavior, compulsive behavior, dysregulation, morality, pornography

Large-scale and nationally representative survey studies from North America, Europe, and Australia suggest that more than two-thirds (i.e., 70–95%) of adults report lifetime pornography use, with women using pornography around once a month and men using it once a week or more frequently (Bőthe, Tóth-Király, Griffiths, et al., 2021; Grubbs, Kraus, & Perry, 2019; Herbenick et al., 2020; Lewczuk, Glica, Nowakowska, Gola, & Grubbs, 2020; Rissel et al., 2017). Among these individuals, 1–11% report pornography-use-related problems, which could result in enduring impairments across multiple areas of functioning, including potential mental and physical health as well as interpersonal and social issues (e.g., job loss, divorce; Grubbs, Kraus, et al., 2019; Lewczuk et al., 2020; Rissel et al., 2017; Sniewski & Farvid, 2020; Wéry et al., 2016). Even though out-of-control pornography use is one of the most common manifestations of Compulsive Sexual Behavior Disorder (CSBD; i.e., persistent patterns of poorly controlled sexual behaviors along with significant distress and functional impairment), recently included in the 11th edition of the International Classification of Diseases (ICD-11), not all individuals with pornography-use-related problems meet the diagnostic criteria for CSBD (Kraus et al., 2018; Reed et al., 2022; Reid et al., 2012; World Health Organization, 2022).

The Moral Incongruence Model of Pornography Use, an empirically supported integrative framework, offers a potential explanation for this phenomenon (Grubbs & Perry, 2019; Grubbs, Perry, Wilt, & Reid, 2019). This model posits that while a range of individuals may report problems with pornography use, only some experience dysregulated use. Indeed, some individuals may experience problems due to dysregulated, compulsive, or excessive use (i.e., problematic pornography use [PPU]), in line with the CSBD diagnostic guidelines. Others may experience distress due to their pornography use conflicting with their moral or sexual values, such as the moral disapproval (MD) of pornography use (i.e., pornography problems due to moral incongruence [PPMI]). Notably, PPMI is described in the CSBD diagnostic guidelines as an additional clinical feature: If an individual's distress is completely due to moral judgments and disapproval of sexual behaviors or impulses, the diagnosis of CSBD should not be made. Finally, some individuals may experience problems with their pornography use due to both dysregulation and MD (i.e., PPU with PPMI). They should be diagnosed with CSBD and their PPMI should be addressed in treatment (Kraus & Sweeney, 2019).

The ICD-11 diagnostic guidelines for CSBD also highlight the importance of careful consideration of boundaries with normality, given the wide variation in the nature and frequency of individuals' sexual thoughts, impulses, and behaviors (World Health Organization, 2022). The frequency of pornography use is a potential indicator of poorly controlled or dysregulated behavior, as a meta-analysis suggested that the quantity of pornography use had a positive, moderate association with PPU (L. Chen et al., 2022; World Health Organization, 2022). However, individuals with frequent pornography use who exhibit neither impaired control over their use nor significant distress or functional impairment should not be diagnosed with CSBD (World Health Organization, 2022). The significance of this differentiation is further supported by the notion that a significant portion of people recreationally engage in high-frequency pornography use – for example, due to higher levels of sexual desire – without any problem (Bőthe, Tóth-Király, Potenza, Orosz, & Demetrovics, 2020; Carvalho, Štulhofer, Vieira, & Jurin, 2015; Štulhofer, Bergeron, & Jurin, 2016; Štulhofer, Jurin, & Briken, 2016).

Although the ICD-11 stresses the importance of accurate differential diagnosis of individuals with PPU vs. PPMI vs. non-problematic, high-frequency pornography use (World Health Organization, 2022), no study has provided empirical evidence for the presence of different pornography-use groups simultaneously considering the frequency of use, MD, and PPU. Preliminary findings across three studies using person-centered statistical approaches suggest five distinct pornography-use profiles of community and treatment-seeking adults from Canada, China, and Hungary,

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based on pornography-use frequency and PPU, or PPU and MD (Bőthe, Tóth-Király, et al., 2020; L. Chen, Jiang, Luo, Kraus, & Bőthe, 2021; Vaillancourt-Morel et al., 2017). The first profile included those who used pornography with a low frequency and did not report pornography-use-related problems (ranging between 68 and 76% of individuals across studies). The second profile included those who used pornography with a low frequency but felt highly distressed about it (i.e., potential PPMI, 13% of individuals). The third profile included those who used pornography frequently without pornography-use-related problems (ranging between 19 and 29% of individuals across studies). The fourth profile included those who used pornography frequently and reported PPU as well (ranging between 3 and 13% of individuals across studies). Finally, the fifth profile included those with high-frequency pornography use and PPU with MD (29% of individuals). However, this last estimate is based on a treatment-seeking male sample, resulting in the potential overestimation of the profile's size. These distinct groups did not only differ in their pornography-use characteristics, but also in their sociodemographic, sexual, and psychological characteristics (e.g., impulsivity and depression were higher in the PPU group than in the high-frequency, non-problematic-use group) (Bőthe, Tóth-Király, et al., 2020; L. Chen et al., 2021; Vaillancourt-Morel et al., 2017). These preliminary findings underscore the need for accurate diagnosis of individuals with pornography-use-related problems and careful differentiation on the basis of considerations regarding PPU, MD, and pornography-use frequency. In addition, characterizing these distinct groups along a wide range of sociodemographic, sexuality-related, and psychological characteristics may provide possible targets for prevention and intervention strategies uniquely tailored to the specific needs of individuals with different pornography-use habits.

Although the aforementioned findings support the presence of different pornography use profiles among individuals, they include several limitations (for overviews, see Grubbs, Hoagland, et al., 2020; Grubbs & Kraus, 2021). First, no study has simultaneously considered individuals' pornography-use frequency, MD, and PPU to create and compare pornography-use groups, despite each characteristic being important in differentiating between problematic and non-problematic patterns of use. Another main limitation pertains to the homogeneity of samples. Although culture, gender, and sexual orientation are discussed in the ICD-11 as important features in diagnosing CSBD, previous studies were mostly conducted among heterosexual or gay men and in Western countries, significantly limiting the generalizability of findings and knowledge of PPU and/or PPMI (L. Chen et al., 2022; Grubbs, Hoagland, et al., 2020; Jennings, Gleason, & Kraus, 2022; Kowalewska, Gola, Kraus, & Lew-Starowicz, 2020). This is problematic as both sexual behaviors and moral values are outcomes of a complex set of social, cultural, and historical processes (Ahorsu et al., 2023; L. Chen et al., 2022; Parker, 2009; Vaillancourt-Morel & Bergeron, 2019; World Health Organization, 2022). These culture-related variations concerning pornography-use-related problems have been emphasized in a recent meta-analysis. Findings suggested that the associations between the quantity of pornography use and PPU were stronger in more conservative countries (e.g., China), illustrating the importance of examining pornography-use-related problems in a multicultural context (L. Chen et al., 2022).

The first aim of the present study was to identify pornography-use profiles based on individuals' pornography-use frequency, MD,[1] and PPU in a culturally-, gender-, and sexually- diverse sample of individuals from 42 countries. Based on the notions of the Moral Incongruence Model of Pornography Use, clinical reports, and previous empirical work (Bőthe, Tóth-Király, et al., 2020; L. Chen et al., 2021; Grubbs, Perry, et al., 2019; Grubbs & Perry, 2019; Kraus & Sweeney, 2019; Vaillancourt-Morel et al., 2017), five distinct profiles of pornography use were hypothesized: (P1) low-frequency, non-problematic use, (P2) high-frequency, non-problematic use, (P3) low-frequency PPMI, (P4) high-frequency PPU, (P5) high-frequency PPU with PPMI, see Table 1 for the hypothesized profile configurations.

The second aim of the study was to provide a comprehensive portrait of the identified use profiles by comparing them across sociodemographic, pornography-use-related, sexuality-related, and psychological characteristics that have previously differentiated individuals with different pornography use profiles or that are clinically relevant for PPU and PPMI. Sociodemographic characteristics included participants' gender, sexual orientation, age, relationship status, religious affiliation, and country of residence (Bőthe, Tóth-Király, et al., 2020; L. Chen et al., 2021, 2022; Vaillancourt-Morel et al., 2017). Concerning pornography-use-related characteristics, age at first pornography use, duration of pornography use per session, pornography-use motivations, and past and present treatment-seeking for pornography use were compared across the profiles (Bőthe, Tóth-Király, Bella, et al., 2021; Bőthe, Tóth-Király, et al., 2020; L. Chen et al., 2021; Grubbs, Wright, Braden, Wilt, & Kraus, 2019). Sexuality-related characteristics included the frequency of masturbation and partnered sexual activities as well as sexual well-being indicators (i.e., sexual desire, sexual satisfaction, sexual function, and sexual distress) (Bőthe, Tóth-Király, Demetrovics, & Orosz, 2021; Bőthe, Tóth-Király, et al., 2020; Bőthe, Vaillancourt-Morel, Dion, Štulhofer, & Bergeron,

[1]Recent findings suggest that PPMI may be most accurately operationalized as the interaction between one's MD of pornography use and pornography-use frequency (Grubbs et al., 2022; Grubbs, Kraus, et al., 2020). Our interest in these two variables in addition to PPU would mean creating interaction terms between three variables. Unfortunately, when involving three or more variables, interaction effects are typically difficult to interpret. Person-centered approaches, in contrast, naturally facilitate this process by being able to accommodate, at the same time, multiple variables as profile indicators. Their other advantage is that they could reveal profiles with different combinations of MD and pornography-use frequency (e.g., low-frequency, problematic use with high levels of MD, or high-frequency problematic use with high levels of MD).

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Table 1. Configurations of hypothesized pornography-use profiles

High-frequency pornography use	Moral disapproval of pornography	Problematic pornography use	Use profile
X	X	X	Low-frequency, non-problematic use (P1)
✓	X	X	High-frequency, non-problematic use (P2)
X	✓	✓	Low-frequency, PPMI (P3)
✓	X	✓	High-frequency, PPU (P4)
✓	✓	✓	High-frequency, PPU with PPMI (P5)

Note. PPMI = pornography problems due to moral incongruence; PPU = problematic pornography use.

2021; Vaillancourt-Morel et al., 2017; Štulhofer, Bergeron, & Jurin, 2016; Štulhofer, Jurin, & Briken, 2016). As for psychological characteristics, religiosity, impulsivity, compulsivity, basic psychological needs, depressive and anxiety symptoms, adult attention deficit hyperactivity disorder (ADHD), alcohol use disorder, and substance use were also considered (Bőthe, Koós, Tóth-Király, Orosz, & Demetrovics, 2019; Bőthe, Tóth-Király, et al., 2019, 2020; Grant Weinandy, Lee, Hoagland, Grubbs, & Bőthe, 2023; Grubbs, Perry, et al., 2019; Kraus, Potenza, Martino, & Grant, 2015). Hypothesized differences between the profiles are presented in Table S1. All research questions and hypotheses were preregistered.

METHOD

Procedure

This study used data from the International Sex Survey (ISS) (Bőthe, Koós, Nagy, Kraus, et al., 2021). The ISS is an international, multi-language, cross-sectional, self-report survey among a community sample of adults using a preregistered study protocol (link to the general study protocol preregistration). Recruitment was conducted in 42 countries[2] between October 2021 and May 2022 using different advertisement strategies (e.g., social media posts, contacting sexuality-related organizations). Individuals were eligible to participate in the study if they reached the minimal age for participation in their country (e.g., participants needed to be aged 20 years or above in Taiwan, or 18 years or above in Canada). Eligible participants completed an anonymous survey on the Qualtrics Research Suite (Qualtrics, 2022), which took approximately 25–45 min. Participants did not receive compensation for their participation, but they could select one of the non-profit, sexuality-related international organizations to receive a 0.50 USD donation (the donation was limited to a maximum of 1000 USD). The list of collaborating countries, a detailed description of the translation and data collection procedures, and more details about the eligibility criteria are described in the study protocol (Bőthe, Koós, Nagy, Kraus, et al., 2021). For complete transparency of data use, all published papers and conference presentations are listed on the project's related Open Science Framework (OSF) pages (link to publications; link to conference presentations), and these links are included in all published papers. The study was approved by all collaborating countries' national/institutional ethics review boards (link to ethics approvals).

[2]Egypt, Iran, Pakistan, and Romania were included in the study protocol paper as collaborating countries (Bőthe, Koós, et al., 2021); however, it was not possible to get ethical approval for the study in a timely manner in these countries. Chile was not included in the study protocol paper as a collaborating country (Bőthe, Koós, et al., 2021) as it joined the study after publishing the study protocol. Therefore, instead of the planned 45 countries (Bőthe, Koós, et al., 2021), only 42 individual countries are considered in the present study, see details at https://osf.io/n3k2c/.

Participants

After thorough data cleaning (see data cleaning procedure at https://doi.org/10.17605/OSF.IO/DK78R), 82,243 participants (M_{age} = 32.39 years, SD = 12.52) were included in the final ISS dataset (link to participants' detailed sociodemographic characteristics by country). In the present study, we included data from all participants who used pornography in the past year as we wanted to examine those individuals who use pornography (N = 66,994; M_{age} = 32.16 years, SD = 12.27). Participants' sociodemographic information is detailed in Table 2.

Measures

The list of all variables along with a detailed description of all items and scales can be found in the ISS study protocol (Bőthe, Koós, Nagy, Kraus, et al., 2021). Each scale's psychometric properties (e.g., factor structure; measurement invariance across subgroups) have been examined in the first phase of the ISS publications, and validation studies have been published or are in the process of being published (link to published papers). Each used scale was fully or partially invariant across languages, countries, and genders in the aforementioned validation papers; see details in the cited papers below or contact the first author for further information. The following variables were used as profile indicators: past-year pornography-use frequency, Problematic Pornography Consumption Scale (Bőthe et al., 2018; Bőthe, Nagy, et al., 2024), and MD of pornography use (see details on the computation of these variables in the Supplemental Materials).

Profile correlates included sociodemographic characteristics (i.e., gender identity, sexual orientation, age, relationship status, religious affiliation, and country of residence) and pornography-use-related descriptive characteristics

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Table 2. Participants' sociodemographic characteristics

Variables	*N* = 66,994	%
Country of residence		
Algeria	22	<0.01
Australia	544	0.8
Austria	631	0.9
Bangladesh	184	0.3
Belgium	528	0.8
Bolivia	336	0.5
Brazil	3,114	4.7
Canada	2,262	3.4
Chile	1,002	1.5
China	1,602	2.4
Colombia	1,329	2.0
Croatia	2,032	3.0
Czech Republic	1,183	1.8
Ecuador	233	0.4
France	1,403	2.1
Germany	2,493	3.7
Gibraltar	50	0.1
Hungary	10,038	15.0
India	166	0.3
Iraq	68	0.1
Ireland	1,354	2.0
Israel	942	1.4
Italy	1,766	2.6
Japan	516	0.8
Lithuania	1,558	2.3
Malaysia	987	1.5
Mexico	1,683	2.5
New Zealand	2,446	3.7
North Macedonia	935	1.4
Panama	288	0.4
Peru	2,229	3.3
Poland	7,919	11.8
Portugal	1,701	2.5
Slovakia	975	1.5
South Africa	1,436	2.14
South Korea	1,181	1.8
Spain	1,766	2.6
Switzerland	928	1.4
Taiwan	2,223	3.3
Turkey	741	1.1
United Kingdom	1,131	1.7
United States of America	2,064	3.1
Other	1,005	1.5
Sex assigned at birth		
Male	31,231	46.6
Female	35,753	53.4
Gender (original answer options in the survey)		
Masculine/Man	30,514	45.6
Feminine/Woman	34,008	50.8
Indigenous or other cultural gender minority identity (e.g., two-spirit)	136	0.2
Non-binary, gender fluid, or something else (e.g., genderqueer)	2,051	3.1
Other	254	0.4
Gender (categories used in the analyses)		
Man	30,514	45.6
Woman	34,008	50.8
Gender-diverse individuals	2,441	3.6
Trans status		
No, I am not a trans person	64,440	96.2
Yes, I am a trans man	328	0.5
Yes, I am a trans woman	244	0.4
Yes, I am a non-binary trans person	763	1.1
I am questioning my gender identity	1,020	1.5
I don't know what it means	183	0.3
Sexual orientation (original answer options in the survey)		
Heterosexual/Straight	44,107	65.8
Gay or lesbian	4,273	6.4
Heteroflexible	5,482	8.2
Homoflexible	493	0.7
Bisexual	6,869	10.3
Queer	862	1.3
Pansexual	1,769	2.6
Asexual	731	1.1
I do not know yet or I am currently questioning my sexual orientation	1,624	2.4
None of the above	603	0.9
I don't want to answer	161	0.2
Sexual orientation (categories used in the analyses)		
Heterosexual	44,107	65.8
Gay or lesbian	4,273	6.4
Bisexual	6,869	10.3
Queer and pansexual	2,631	3.9
Homo- and heteroflexible identities	5,975	8.9
Asexual	731	1.1
Questioning	1,624	2.4
Other	603	0.9
Highest level of education		
Primary (e.g., elementary school)	786	1.2
Secondary (e.g., high school)	16,818	25.1
Tertiary (e.g., college or university)	49,376	73.7
Current status in education		
Not in education	40,573	60.6
In primary education (e.g., elementary school)	50	0.1
In secondary education (e.g., high school)	1,331	2.0
In tertiary education (e.g., college or university)	25,011	37.3
Work status		
Not working	16,569	24.7
Working full-time	35,650	53.2
Working part-time	8,949	13.4
Doing odd jobs	5,809	8.7
Socioeconomic status		
Considers life circumstances among the worst	156	0.2
Considers life circumstances much worse than average	582	0.9
Considers life circumstances worse than average	3,547	5.3
Considers life circumstances average	21,437	32.0
Considers life circumstances better than average	26,037	38.9
Considers life circumstances much better than average	12,173	18.2
Considers life circumstances among the best	3,056	4.6

(continued)

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Table 2. Continued

Variables	*N* = 66,994	%
Residence		
Metropolis (population is over 1 million people)	22,164	33.1
City (population is between 100,000–999,999 people)	24,105	36.0
Town (population is between 1,000–99,999 people)	17,071	25.5
Village (population is below 1,000 people)	3,645	5.4
Relationship status		
Single	23,119	34.5
In a relationship	22,487	33.6
Married or common-law partners	19,195	28.7
Widow or widower	273	0.4
Divorced	1,899	2.8
Relationship status (categories used in the analyses)		
Single	25,291	37.8
In a relationship	41,682	62.2
Religious affiliation		
Buddhist	1,145	1.7
Christian	18,399	27.5
Confucianist	14	<0.1
Hindu	209	0.3
Jain	8	<0.1
Jewish	925	1.4
Muslim	899	1.3
Sikh	28	<0.1
Spiritist	366	0.6
Taoist	514	0.8
Spiritual but not committed to one religion	9,493	14.2
I am not religious	33,229	49.6
Other	1,717	2.6

Note. Percentages might not add up to 100% due to missing data.

(i.e., age at first pornography use, duration of pornography use per session in minutes, and past and current treatment-seeking for pornography use) and pornography-use motivations (Pornography Use Motivations Scale) (Bőthe, Tóth-Király, Bella, et al., 2021; Koós et al., 2024). Sexuality-related characteristics included past-year masturbation frequency, past-year sexual frequency (total and romantic partner), sexual satisfaction (Global Measure of Sexual Satisfaction) (Lawrance & Byers, 1998), sexual desire (Sexual Desire Inventory-2) (Spector, Carey, & Steinberg, 1996), sexual function (Arizona Sexual Experience Scale) (McGahuey et al., 2000), and sexual distress (Sexual Distress Scale) (Derogatis et al., 2011; Lin et al., 2024; Pâquet et al., 2018). Psychological characteristics included religiosity (Grubbs, Kraus, et al., 2019), impulsivity (Short UPPS-P Impulsive Behavior Scale) (Billieux et al., 2012; Fournier et al., 2024), compulsivity (Compulsive Personality Assessment Scale) (Fineberg, Sharma, Sivakumaran, Sahakian, & Chamberlain, 2007), basic psychological needs (Basic Psychological Needs Satisfaction and Frustration Scale) (B. Chen et al., 2015), depressive and anxiety symptoms (Brief Symptom Inventory) (Asner-Self, Schreiber, & Marotta, 2006; Quintana et al., 2024), ADHD (Adult ADHD Self-Report Scale) (Kessler et al., 2005; Lewczuk et al., 2024), alcohol use disorder (Alcohol Use Disorders Identification Test) (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001; Horváth et al., 2023) and substance use frequency (Alcohol, Smoking, and Substance Involvement Screening Test) (Humeniuk et al., 2010; Lee et al., 2023) (see details on the computation of these variables in the Supplemental Materials).[3]

Statistical analyses

Following the preregistered analytic plans, descriptive statistics and correlations between the study variables were computed in SPSS 29 (IBM Corp, 2021), while the remaining analyses were conducted using Mplus 8.8 (Muthén & Muthén, 2022). Preliminary measurement models were estimated to verify the psychometric properties of our multi-item measures and obtain standardized factor scores (with $M = 0$ and $SD = 1$) for the main analyses (see details in the Supplemental Materials). When compared to manifest scale scores (i.e., the sum or average of the items forming a scale), factor scores provide a way to preserve the nature of the underlying measurement model and partially control for unreliability (Morin, 2023; Skrondal & Laake, 2001). These analyses are presented in the online Supplemental Materials and support the adequacy and reliability of all factors.

We used latent profile analysis (LPA) to identify pornography-use profiles based on participants' pornography-use frequency, MD, and PPU (i.e., profile indicators). Alternative LPA solutions, including one to eight pornography-use profiles, were estimated using Mplus' robust maximum likelihood estimator. In the selection of the optimal number of profiles, we considered the meaningfulness, theoretical adequacy, and statistical adequacy of the profile solutions (Morin, 2016; Morin, McLarnon, & Litalien, 2020). A variety of statistical indicators were used to test the adequacy of the profile solutions, including the Akaike Information Criterion (AIC), the Bayesian Information Criterion (BIC), the Consistent AIC (CAIC), the Sample-Size-Adjusted BIC (SSABIC), the adjusted Lo-Mendell Rubin (aLMR) likelihood ratio test, and the Bootstrap Likelihood Ratio Test (BLRT). A lower value on the AIC, BIC, CAIC, and SSABIC suggests a better-fitting solution. A non-significant *p*-value for aLMR and BLRT suggests the superiority of a model with one less profile based on the principle of parsimony. Results from statistical simulation studies have demonstrated the utility of the CAIC, BIC, SSABIC, and BLRT, while showing that the AIC and aLMR are not reliable indicators of the number of profiles (e.g., Diallo, Morin, & Lu, 2016, 2017; Peugh & Fan, 2013). For this reason, we only reported these indicators (i.e., AIC and aLMR) to ensure complete disclosure of information but did not use them to guide

[3]As not all of the scales were fully invariant across languages, countries, or other characteristics of participants (e.g., Short UPPS-P Impulsive Behavior Scale; Fournier et al., 2024) when validating them using the ISS dataset, we opted to use factor scores instead of "raw" total scores to account for potential measurement biases (Morin, 2023; Skrondal & Laake, 2001). See details in the Supplemental Materials.

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model selection. Furthermore, as the BIC, CAIC, and SSABIC often keep improving with the addition of more profiles, the graphical examination of "elbow plots" could facilitate the decision-making where the point after which the slope flattens suggests that the optimal number of profiles has been reached. We also reported the entropy (i.e., classification accuracy). After the identification of the final profile solution by considering their meaningfulness, theoretical adequacy, and statistical adequacy, we compared them along the sociodemographic, pornography-use-related, sexuality-related, and psychological characteristics listed in Table S1 (i.e., profile correlates). We used Mplus' BCH and DCAT auxiliary functions to compare the profiles across the aforementioned continuous and non-continuous variables, respectively (Morin et al., 2020).

Ethics

The authors assert that all procedures contributing to this work comply with the relevant national and institutional committees' ethical standards on human experimentation and the Helsinki Declaration. The study was approved by all collaborating countries' national/institutional ethics review boards or the local ethics committees considered the study exempt and did not further assess the study as it had already been approved by the ethics committees of the principal investigators' institutions: https://osf.io/n3k2c/?view_only=838146f6027c4e6bb68371d9d14220b5.

RESULTS

Identification of pornography-use profiles

The results from the solutions, including different numbers of profiles, are reported in Table S8 and graphically displayed in Figure S1 of the Supplemental Materials. Generally, entropy values remained moderate across solutions (varying between 0.70 and 0.79). Inspection of the information criteria showed that all four reached their lowest values at the seven-profile solution, while the aLMR and the BLRT appear to support the eight-profile solution. A complementary examination of the elbow plots supported this conclusion as all information criteria kept decreasing with the inclusion of a new profile, although this decrease became negligible after the six-profile solution. On this basis, solutions including five to seven profiles were more carefully contrasted. This inspection revealed that all solutions were statistically proper and that increasing the number of profiles from five to six resulted in the addition of a theoretically meaningful, well-defined, and distinct profile. In contrast, adding a seventh (or eighth) profile did not bring additional information, but simply resulted in the division of one existing profile into two smaller ones characterized by similar shapes. For these reasons, the six-profile solution was retained for interpretation and further analyses. See Fig. 1 for a graphic depiction of this final solution and Table 3 for the exact within-profile means and variances.

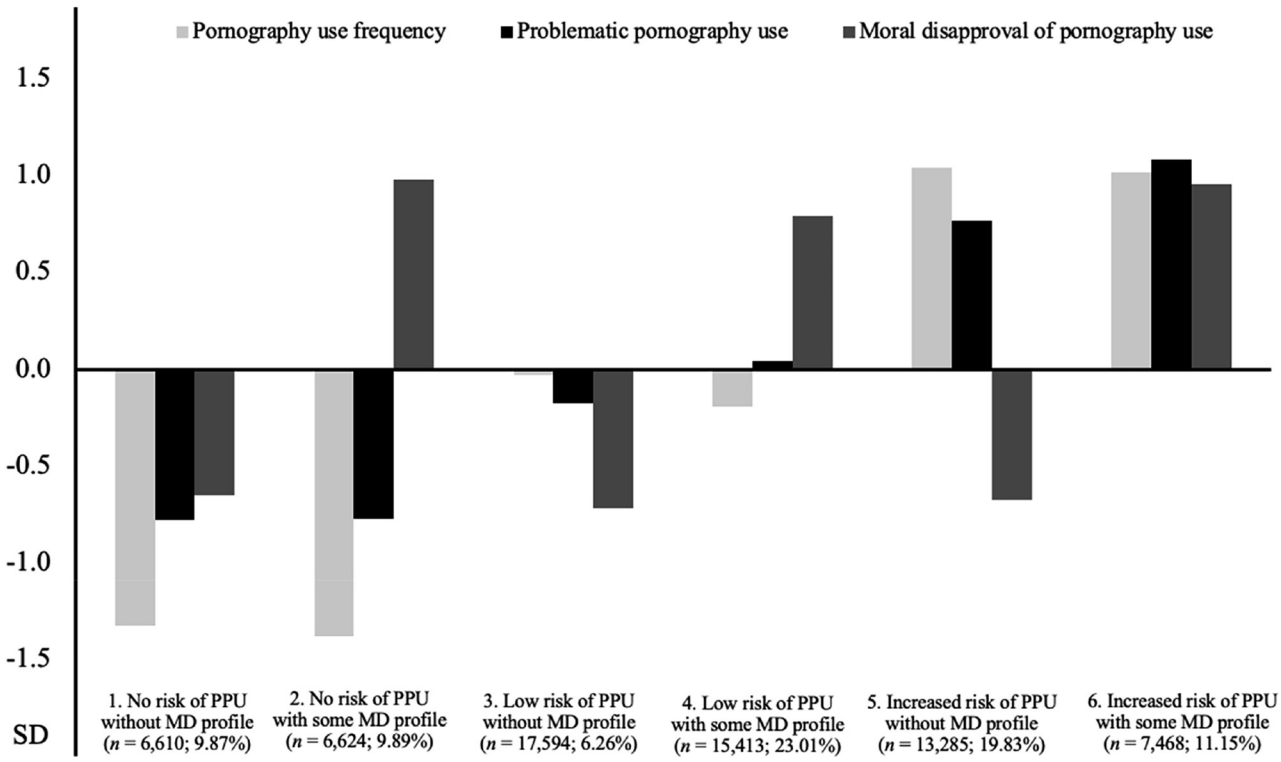

Fig. 1. Graphic depiction of the identified pornography use profiles

Note. Scores were estimated from factor scores with a mean of 0 and a standard deviation of 1 or were standardized prior to the analyses. Thus, the reported values for all variables are standardized scores. PPU: problematic pornography use. MD: moral disapproval of pornography use. SD: standard deviation.

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Table 3. Exact within-profile means, variances, and 95% confidence intervals [95% CI] from the final six-profile solution

	1. No risk of PPU without MD profile (n = 6,610; 9.87%) Mean [95% CI]	2. No risk of PPU with some MD profile (n = 6,624; 9.89%) Mean [95% CI]	3. Low risk of PPU without MD profile (n = 17,594; 6.26%) Mean [95% CI]	4. Low risk of PPU with some MD profile (n = 15,413; 23.01%) Mean [95% CI]	5. Increased risk of PPU without MD profile (n = 13,285; 19.83%) Mean [95% CI]	6. Increased risk of PPU with some MD profile (n = 7,468; 11.15%) Mean [95% CI]
Pornography use frequency	−1.329 [−1.342, −1.317]	−1.381 [−1.391, −1.370]	−0.030 [−0.062, 0.002]	−0.193 [−0.227, −0.160]	1.042 [1.009, 1.074]	1.018 [0.978, 1.057]
PPU	−0.782 [−0.812, −0.751]	−0.773 [−0.808, −0.738]	−0.175 [−0.204, −0.147]	0.044 [0.018, 0.071]	0.766 [0.737, 0.795]	1.087 [1.046, 1.128]
MD	−0.653 [−0.665, −0.641]	0.980 [0.950, 1.010]	−0.717 [−0.734, −0.700]	0.793 [0.735, 0.771]	−0.674 [−0.686, −0.661]	0.960 [0.926, 0.994]
	Variance [95% CI]	Variance [95% CI]	Variance [95% CI]	Variance [95% CI]	Variance [95% CI]	Variance [95% CI]
Pornography use frequency	0.059 [0.055, 0.062]	0.053 [0.051, 0.056]	0.363 [0.345, 0.382]	0.405 [0.388, 0.421]	0.313 [0.300, 0.325]	0.322 [0.309, 0.336]
PPU	0.275 [0.252, 0.297]	0.312 [0.285, 0.340]	0.338 [0.325, 0.351]	0.460 [0.447, 0.473]	0.408 [0.386, 0.431]	0.473 [0.446, 0.500]
MD	0.088 [0.086, 0.090]	0.788 [0.766, 0.811]	0.073 [0.068, 0.077]	0.753 [0.735, 0.771]	0.084 [0.081, 0.087]	0.853 [0.828, 0.878]

Note. CI: Confidence interval; PPU: problematic pornography use; MD: moral disapproval of pornography use. Profile indicators were estimated from factor scores with a mean of 0 and a standard deviation of 1. Thus, the reported values for all variables are standardized scores.

Profile 1 (*No risk of PPU without MD* profile) included 9.87% of the participants who displayed lower-than-average scores on all three profile indicators. In this profile, individuals used pornography approximately once a year, reported no dysregulation concerning their use, and did not disapprove of pornography use from a moral perspective. Profile 2 (*No risk of PPU with some MD* profile) comprised 9.89% of participants displaying lower-than-average pornography use frequency (i.e., once a year) and PPU (i.e., no dysregulation), and higher-than-average yet still low levels of MD. Profile 3 (*Low risk of PPU without MD* profile) was the largest, including 26.26% of individuals displaying average pornography use frequency (i.e., approximately once a month) and PPU (i.e., low levels of dysregulation), and lower-than-average MD (i.e., did not disapprove of pornography use). Profile 4 (*Low risk of PPU with some MD* profile) included 23.01% of individuals reporting similar pornography use habits as members of the *Low risk of PPU without MD* profile. They used pornography around once a month and had low levels of dysregulation. They had higher than average yet still low levels of MD (i.e., somewhat disagreed with pornography use being morally wrong). Profile 5 (*Increased risk of PPU without MD* profile) comprised 19.83% of participants with higher-than-average pornography use frequency (i.e., approximately two to three times a week) and PPU (i.e., somewhat elevated levels of dysregulation), and lower than average MD. Finally, Profile 6 (*Increased risk of PPU with some MD* profile) included 11.15% of participants with higher-than-average scores on all three profile indicators. Individuals in this profile reported similar pornography use habits as their peers in the *Increased risk of PPU without MD* profile (i.e., watching pornography approximately two to three times a week and having somewhat elevated levels of dysregulation), and they also reported higher-than-average yet still low levels of MD. Importantly, even though individuals in the two *Increased risk* profiles reported elevated dysregulation compared to other individuals in the sample, these profiles' mean score did not meet the pre-established cut-off score on the PPU measure (i.e., having ≥76 points).

Profile membership breakdown across sociodemographic characteristics

We characterized the six profiles across a wide range of sociodemographic variables, with the results reported in Table 4. In brief, most men (94%) belonged to the *Low risk* and *Increased risk* profiles, while the majority of women (88%) belonged to the *No risk* and *Low risk* profiles. The ratio of gender-diverse individuals[4] in the profiles was more balanced as 15% belonged to the *No risk*, 51% to the *Low Risk*, and 34% to the *Increased risk profiles*, similar to the composition of profiles by relationship status, religious affiliation, and country of residence. A higher proportion

[4]Gender-diverse individuals are individuals who do not identify with the binary categories of "men" and "women" regardless of their trans status (e.g., nonbinary individuals).

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Table 4. Profile membership breakdown across sociodemographic characteristics

Sociodemographic characteristics	1. No risk of PPU without MD profile (n = 6,610; 9.87%)	2. No risk of PPU with some MD profile (n = 6,624; 9.89%)	3. Low risk of PPU without MD profile (n = 17,594; 6.26%)	4. Low risk of PPU with some MD profile (n = 15,413; 23.01%)	5. Increased risk of PPU without MD profile (n = 13,285; 19.83%)	6. Increased risk of PPU with some MD profile (n = 7,468; 11.15%)
Gender						
Men	3.0%	3.3%	22.3%	20.1%	32.5%	18.9%
Women	16.2%	16.0%	29.7%	25.6%	8.2%	4.2%
Diverse	7.8%	7.2%	28.2%	22.8%	23.1%	10.9%
Sexual orientation						
Heterosexual	10.5%	10.6%	25.6%	23.6%	18.2%	11.5%
Gay or lesbian	4.4%	5.0%	24.5%	15.8%	37.1%	13.3%
Bisexual	8.8%	9.3%	28.2%	23.7%	20.2%	9.9%
Queer/pansexual	10.1%	8.5%	32.3%	21.7%	19.8%	7.5%
Homo- and heteroflexible	10.1%	8.5%	28.7%	21.5%	20.6%	10.6%
Asexual	15.6%	15.5%	25.1%	24.3%	13.0%	6.5%
Questioning	9.3%	11.0%	23.5%	27.7%	16.5%	12.1%
Other	10.1%	10.1%	25.6%	25.2%	19.2%	9.8%
Relationship status						
Single	7.9%	8.9%	24.0%	23.3%	22.1%	13.7%
In a relationship	11.1%	10.5%	27.6%	22.8%	18.4%	9.6%
Past treatment-seeking for pornography use						
Yes	0.7%	3.6%	7.0%	19.6%	26.9%	42.2%
No, because I haven't had any problems with my porn viewing.	12.1%	11.4%	30.6%	22.3%	17.8%	5.9%
No, because I haven't felt that it was a serious problem.	1.7%	4.2%	11.8%	26.5%	30.6%	25.1%
No, because I haven't known where I should seek help.	1.1%	3.1%	4.1%	22.6%	21.5%	47.6%
No, because I would have felt uncomfortable or embarrassed.	0.5%	2.4%	4.1%	25.5%	17.9%	49.5%
No, because I couldn't afford it.	1.6%	3.5%	6.1%	21.1%	24.3%	43.4%
No, because of other reason.	7.3%	12.1%	17.5%	24.6%	18.2%	20.3%
Current treatment-seeking for pornography use						
Yes	1.3%	2.9%	6.3%	18.9%	25.9%	44.7%
No, because I don't have any problems with my porn viewing.	11.8%	11.3%	30.1%	22.6%	18.0%	6.1%
No, because I don't feel that it is a serious problem.	1.5%	3.8%	10.9%	25.6%	31.1%	27.0%
No, because I don't know where I should seek help.	0.7%	1.1%	3.3%	22.0%	24.3%	48.7%
No, because I would feel uncomfortable or embarrassed.	0.4%	2.1%	3.3%	23.3%	18.2%	52.6%
No, because I couldn't afford it.	2.0%	2.3%	4.9%	21.2%	23.2%	46.5%
No, because of other reason.	6.0%	8.3%	14.9%	21.6%	20.0%	29.1%
Religious affiliation						
Christian	9.7%	13.2%	22.3%	27.0%	14.8%	13.1%
Buddhist	5.7%	6.8%	20.4%	24.9%	24.4%	17.7%
Hindu	6.4%	6.9%	16.6%	23.0%	21.8%	25.3%
Muslim	4.9%	10.1%	12.9%	28.7%	14.6%	28.9%
Spiritual but not committed to one religion	11.0%	10.7%	26.6%	24.0%	17.8%	9.9%
I am not religious	10.2%	8.0%	29.3%	20.1%	22.9%	9.5%
Other	8.0%	9.3%	24.5%	22.6%	23.9%	11.5%
Jewish	7.8%	13.9%	22.3%	28.3%	16.0%	11.8%

(continued)

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Table 4. Continued

Sociodemographic characteristics	1. No risk of PPU without MD profile (n = 6,610; 9.87%)	2. No risk of PPU with some MD profile (n = 6,624; 9.89%)	3. Low risk of PPU without MD profile (n = 17,594; 6.26%)	4. Low risk of PPU with some MD profile (n = 15,413; 23.01%)	5. Increased risk of PPU without MD profile (n = 13,285; 19.83%)	6. Increased risk of PPU with some MD profile (n = 7,468; 11.15%)
Taoist	4.7%	4.3%	19.2%	26.0%	26.2%	19.6%
Confucianist	13.0%	2.6%	14.1%	43.6%	15.3%	11.5%
Sikh	7.3%	7.4%	27.8%	22.1%	26.2%	9.2%
Spiritist	9.3%	8.2%	25.7%	20.8%	24.3%	11.7%
Jain	0.0%	15.5%	15.1%	10.2%	52.3%	7.0%
Country of residence						
Algeria	10.9%	6.4%	4.3%	22.9%	19.2%	36.3%
Australia	7.6%	7.3%	28.8%	19.9%	25.7%	10.7%
Austria	11.8%	9.1%	30.6%	21.2%	19.6%	7.7%
Bangladesh	2.7%	8.6%	8.8%	44.8%	11.4%	23.7%
Belgium	12.3%	5.4%	28.6%	14.9%	28.3%	10.5%
Bolivia	5.2%	11.4%	17.8%	28.4%	18.6%	18.5%
Brazil	6.8%	8.3%	23.0%	19.1%	26.7%	16.1%
Canada	9.2%	7.0%	31.2%	16.5%	27.2%	8.8%
Chile	8.8%	9.4%	24.9%	21.8%	21.7%	13.4%
China	7.1%	7.5%	15.9%	32.2%	21.3%	16.0%
Colombia	15.2%	16.1%	21.9%	27.3%	9.4%	10.1%
Croatia	12.9%	8.0%	35.9%	20.9%	15.8%	6.5%
Czech Republic	15.4%	10.2%	32.3%	19.7%	15.4%	7.0%
Ecuador	9.7%	10.6%	21.2%	25.4%	15.9%	17.3%
France	11.5%	9.2%	27.3%	18.9%	22.6%	10.4%
Germany	13.4%	10.4%	30.2%	19.7%	19.5%	6.9%
Gibraltar	16.2%	9.3%	32.3%	16.9%	15.6%	9.7%
Hungary	6.7%	8.3%	24.3%	24.6%	22.8%	13.4%
India	4.1%	9.2%	17.5%	17.9%	29.2%	22.0%
Iraq	7.5%	7.5%	10.0%	23.7%	17.0%	34.4%
Ireland	8.6%	12.2%	24.6%	25.7%	18.4%	10.4%
Israel	7.3%	15.0%	19.2%	32.6%	14.6%	11.2%
Italy	12.6%	6.9%	37.4%	16.2%	21.2%	5.6%
Japan	4.4%	3.3%	25.2%	16.7%	35.5%	15.0%
Lithuania	9.7%	14.1%	22.6%	28.2%	15.7%	9.7%
Malaysia	3.9%	8.8%	15.5%	26.3%	22.1%	23.4%
Mexico	11.7%	18.3%	18.7%	29.1%	11.5%	10.8%
New Zealand	9.5%	9.5%	28.1%	20.2%	23.3%	9.5%
North Macedonia	9.5%	6.8%	31.5%	21.6%	21.9%	8.7%
Panama	8.9%	9.7%	24.0%	21.4%	21.2%	14.8%
Peru	9.7%	12.4%	24.2%	24.3%	18.6%	10.8%
Poland	15.8%	12.3%	33.6%	22.3%	11.1%	4.8%
Portugal	19.3%	12.3%	30.5%	20.4%	12.4%	5.0%
Slovakia	5.8%	11.6%	20.3%	29.0%	19.1%	14.2%
South Africa	7.2%	13.2%	19.3%	26.9%	18.2%	15.2%
South Korea	3.4%	8.5%	17.1%	31.2%	20.1%	19.6%
Spain	7.8%	14.8%	20.2%	31.5%	14.3%	11.4%
Switzerland	11.6%	9.9%	29.5%	20.8%	20.3%	7.8%
Taiwan	5.1%	3.0%	19.6%	20.5%	30.3%	21.5%
Turkey	9.1%	4.8%	31.6%	14.6%	29.3%	10.7%
United Kingdom	10.4%	9.5%	29.0%	21.2%	21.1%	8.8%
United States of America	7.6%	6.5%	28.9%	17.4%	28.3%	11.3%
Other	6.6%	10.1%	21.2%	26.5%	17.4%	18.2%
	Mean [95% CI]	Mean [95% CI]	Mean [95% CI]	Mean [95% CI]	Mean [95% CI]	Mean [95% CI]
Age	0.082 [0.053, 0.111]	−0.105 [−0.132, −0.078]	0.043 [0.023, 0.063]	−0.152 [−0.172, −0.132]	0.180 [0.156, 0.204]	−0.086 [−0.115, −0.057]

Note. CI: Confidence interval. Age was standardized prior to the analyses with a mean of 0 and a standard deviation of 1.

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of gay and lesbian individuals (50%) belonged to the two *Increased risk* profiles compared to individuals with all other sexual orientations (20–31%). Participants in the no MD profiles were slightly older than their peers in the with some MD profiles.

Correlates of profile membership

The results from the analyses of associations between profile membership and correlates and their effect sizes are reported in Table 5. Several correlate comparisons were statistically significant and weak to moderate in effect size, thus supporting the construct validity of the profiles. With respect to the pornography use-related characteristics, results revealed that the levels of correlates were the highest (i.e., longest duration of pornography use per session, higher scores across all pornography use motivation factors) in the *Increased risk of PPU with some MD* profile, followed by the *Increased risk of PPU without MD*, *Low risk of PPU with some MD*, *Low risk of PPU without MD*, *No risk of PPU without MD*, and *No risk of PPU with some MD* profiles. In addition, most participants who sought treatment for their pornography use in the past or were currently in treatment for their pornography use belonged to the two *Increased risk* profiles (69–71%).

Individuals in the two *Increased risk* profiles reported the highest frequency of masturbation and the lowest frequency of past year sexual activities, followed by the *Low risk* and *No risk* profiles. Individuals in the *Increased risk of PPU with some MD* profile had the lowest levels of sexual satisfaction and highest levels of sexual distress, followed by the *Increased risk of PPU without MD*, *Low risk, and No risk* profiles. In contrast, members of the *Increased risk of PPU without MD* profile reported the highest levels of sexual desire, followed by members of the *Increased risk of PPU with some MD, Low risk, and No risk* profiles.

Concerning psychological characteristics, similar general trends can be observed with the two *Increased risk* profiles showing the least desirable correlates. Participants in the *Increased risk* profiles had the highest levels of specific aspects of impulsivity (e.g., sensation seeking, lack of perseverance), basic psychological needs frustration, and alcohol use problems, and the lowest levels of basic psychological needs satisfaction. At the same time, the two *Increased risk* profiles also showed some significant differences, with participants in the *Increased risk of PPU with some MD* profile having the highest levels of religiosity, followed by the other *No/Low risk of PPU with some MD* and *without MD* profiles. Similarly, participants in the *Increased risk of PPU with some MD* profile had the highest levels of compulsivity, followed by the *Low risk of PPU with some MD*, *No risk of PPU with some MD*, *Increased risk of PPU without MD*, and *No risk* and *Low risk of PPU without MD* profiles. Alcohol use and substance use were the highest in the *Increased risk of PPU without MD* profile.

DISCUSSION

Despite recent advancements in the field of pornography-use-related problems, previous findings' generalizability to diverse populations was strongly limited due to theoretical and methodological shortcomings (e.g., relative lack of studies outside of Western countries and among individuals with diverse gender identities and sexual orientations) (Grubbs, Hoagland, et al., 2020; Grubbs & Kraus, 2021). Therefore, the aims of the present study were to identify MD and dysregulation-based pornography use profiles among a diverse sample of adults and characterize them along pornography-use-related, sexuality-related, and psychological correlates to provide a comprehensive portrait of pornography users worldwide. We identified six profiles of use, based on individuals' pornography use frequency, PPU, and MD. Given the importance of the *Increased risk of PPU* profiles from prevention, intervention, and public health perspectives (Briken et al., 2024; Grubbs, Floyd, & Kraus, 2023; Kraus & Sweeney, 2019; Nelson & Rothman, 2020), we focused on the discussion of factors that differentiated between the increased risk vs. no/low risk profiles as well as between the two increased risk profiles (i.e., *Increased risk of PPU without MD* vs. *Increased risk of PPU with some MD*).

Profiles of pornography use

As hypothesized, two low-frequency, non-problematic use profiles emerged in the present sample. The *No risk of PPU without MD* profile corresponded to hypothesized P1 and the *No risk of PPU with some MD* profile somewhat corresponded to hypothesized P3 (see Table 1). Individuals in these profiles had infrequent and non-problematic pornography use habits. However, members of the *No risk of PPU with some MD* profile reported somewhat higher levels of MD, in line with prior findings whereby a group of low-frequency pornography users were distressed about their pornography use (Vaillancourt-Morel et al., 2017). Even though a high-frequency, non-problematic use profile was hypothesized (P2) based on the findings of a large-scale study from Hungary with three independent samples (Bőthe, Tóth-Király, et al., 2020), this profile did not emerge in the present, more culturally diverse sample. Instead, two average-frequency, non-problematic use profiles were identified, with one of them including individuals who did not disapprove of pornography use (*Low risk of PPU without MD* profile) and the other one including those who had some levels of MD (*Low risk of PPU with some MD* profile). These two average-use profiles represented half of the total sample. Thus, the high-frequency, non-problematic use profile might be more culture-specific than previously proposed (Bőthe, Tóth-Király, et al., 2020), warranting further investigation. Moreover, the frequency of pornography use may not play as an essential role in differentiating between pornography-use profiles as other characteristics of consumption (e.g., MD, binge use, content escalation), corroborating that mere frequency of pornography use and sexual behaviors may not be central symptoms of PPU and CSBD (Bőthe, Lonza, Štulhofer, & Demetrovics,

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Table 5. Correlates' means and pairwise comparisons between the six profiles

	1. No risk of PPU without MD profile (n = 6,610; 9.87%) Mean [95% CI]	2. No risk of PPU with some MD profile (n = 6,624; 9.89%) Mean [95% CI]	3. Low risk of PPU without MD profile (n = 17,594; 6.26%) Mean [95% CI]	4. Low risk of PPU with some MD profile (n = 15,413; 23.01%) Mean [95% CI]	5. Increased risk of PPU without MD profile (n = 13,285; 19.83%) Mean [95% CI]	6. Increased risk of PPU with some MD profile (n = 7,468; 11.15%) Mean [95% CI]	Differences between profiles	Cramer's V
Pornography use-related characteristics								
Age of first pornography use	0.402 [0.367, 0.437]	0.380 [0.345, 0.415]	0.058 [0.038, 0.078]	0.045 [0.025, 0.065]	−0.327 [−0.345, −0.309]	−0.334 [−0.358, −0.310]	6 = 5 < 4 = 3 < 2 = 1	0.05
Duration of pornography use per session (in minutes)	−0.254 [−0.274, −0.234]	−0.320 [−0.340, −0.300]	−0.134 [−0.150, −0.118]	−0.079 [−0.099, −0.059]	0.309 [0.282, 0.336]	0.427 [0.386, 0.468]	2 < 1 < 3 < 4 < 5 < 6	0.09
Sexual pleasure PUM	−0.853 [−0.875, −0.831]	−0.985 [−1.007, −0.963]	−0.120 [−0.134, −0.106]	−0.113 [−0.129, −0.097]	0.790 [0.774, 0.806]	0.825 [0.803, 0.847]	2 < 1 < 3 = 4 < 5 < 6	0.32
Sexual curiosity PUM	−0.343 [−0.368, −0.318]	−0.476 [−0.500, −0.452]	−0.095 [−0.111, −0.079]	−0.049 [−0.067, −0.031]	0.493 [0.473, 0.513]	0.457 [0.432, 0.482]	2 < 1 < 3 < 4 < 5 < 6	0.15
Fantasy PUM	−0.684 [−0.706, −0.662]	−0.789 [−0.809, −0.769]	−0.224 [−0.238, −0.210]	−0.082 [−0.098, −0.066]	0.839 [0.823, 0.855]	0.946 [0.922, 0.970]	2 < 1 < 3 < 4 < 5 < 6	0.30
Boredom avoidance PUM	−0.607 [−0.627, −0.587]	−0.646 [−0.664, −0.628]	−0.264 [−0.278, −0.250]	−0.070 [−0.086, −0.054]	0.800 [0.782, 0.818]	0.983 [0.959, 1.007]	2 < 1 < 3 < 4 < 5 < 6	0.29
Lack of sexual satisfaction PUM	−0.624 [−0.646, −0.602]	−0.654 [−0.676, −0.632]	−0.194 [−0.208, −0.180]	−0.012 [−0.028, 0.004]	0.722 [0.704, 0.740]	0.900 [0.876, 0.924]	2 = 1 < 3 < 4 < 5 < 6	0.26
Emotional suppression/ distraction PUM	−0.712 [−0.730, −0.694]	−0.751 [−0.769, −0.733]	−0.319 [−0.333, −0.305]	−0.041 [−0.057, −0.025]	0.887 [0.871, 0.903]	1.126 [1.102, 1.150]	2 < 1 < 3 < 4 < 5 < 6	0.35
Stress reduction PUM	−0.797 [−0.815, −0.779]	−0.877 [−0.895, −0.859]	−0.289 [−0.303, −0.275]	−0.091 [−0.107, −0.075]	0.963 [0.947, 0.979]	1.097 [1.073, 1.121]	2 < 1 < 3 < 4 < 5 < 6	0.38
Self-exploration PUM	−0.470 [−0.494, −0.446]	−0.638 [−0.662, −0.614]	−0.099 [−0.115, −0.083]	−0.086 [−0.104, −0.068]	0.586 [0.566, 0.606]	0.513 [0.488, 0.538]	2 < 1 < 3 = 4 < 5 < 6	0.18
Sexuality-related characteristics								
Past-year masturbation frequency	−0.867 [−0.894, −0.840]	−0.958 [−0.985, −0.931]	−0.147 [−0.163, −0.131]	−0.259 [−0.277, −0.241]	0.905 [0.887, 0.923]	0.885 [0.861, 0.909]	2 < 1 < 3 < 4 < 6 = 5	0.29
Past-year sexual frequency (total)	0.156 [0.129, 0.183]	0.061 [0.032, 0.090]	0.193 [0.173, 0.213]	−0.033 [−0.055, −0.011]	−0.133 [−0.155, −0.111]	−0.343 [−0.374, 0.312]	6 < 5 < 4 < 2 < 1 < 3	0.06
Past-year sexual frequency (romantic partner)	0.033 [0.000, 0.066]	0.058 [0.025, 0.091]	0.137 [0.115, 0.159]	0.006 [−0.019, 0.031]	−0.158 [−0.189, −0.127]	−0.237 [−0.284, −0.190]	6 < 5 < 4 = 1 < 3; 6 < 5 < 2 = 1 < 3; 4 < 2	0.03
Sexual satisfaction	0.016 [−0.008, 0.040]	0.006 [−0.018, 0.030]	0.033 [0.017, 0.049]	−0.090 [−0.106, 0.074]	−0.261 [−0.279, −0.243]	−0.367 [−0.389, −0.345]	6 < 5 < 4 < 2 = 1 = 3	0.06
Partner-related desire	−0.292 [−0.319, −0.265]	−0.348 [−0.375, −0.321]	−0.055 [−0.073, −0.037]	−0.158 [−0.176, −0.140]	0.338 [0.318, 0.358]	0.242 [0.217, 0.267]	2 < 1 < 4 < 3 < 6 < 5	0.10

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Table 5. Continued

	1. No risk of PPU without MD profile (n = 6,610; 9.87%) Mean [95% CI]	2. No risk of PPU with some MD profile (n = 6,624; 9.89%) Mean [95% CI]	3. Low risk of PPU without MD profile (n = 17,594; 6.26%) Mean [95% CI]	4. Low risk of PPU with some MD profile (n = 15,413; 23.01%) Mean [95% CI]	5. Increased risk of PPU without MD profile (n = 13,285; 19.83%) Mean [95% CI]	6. Increased risk of PPU with some MD profile (n = 7,468; 11.15%) Mean [95% CI]	Differences between profiles	Cramer's V
Solidarity desire	−0.678 [−0.703, −0.653]	−0.797 [−0.822, −0.772]	−0.148 [−0.164, −0.132]	−0.223 [−0.241, −0.205]	0.768 [0.750, 0.786]	0.735 [0.711, 0.759]	2 < 1 < 4 < 3 < 6 < 5	0.25
Attractive person-related desire	−0.458 [−0.483, −0.433]	−0.530 [−0.555, −0.505]	−0.175 [−0.193, −0.157]	−0.136 [−0.154, −0.118]	0.608 [0.588, 0.628]	0.591 [0.566, 0.616]	2 < 1 < 3 < 4 < 6 = 5	0.18
Sexual function problems	0.409 [0.382, 0.436]	0.460 [0.433, 0.487]	0.065 [0.047, 0.083]	0.166 [0.148, 0.184]	−0.445 [−0.463, −0.427]	−0.367 [−0.392, −0.342.]	5 < 6 < 3 < 4 < 1 < 2	0.14
Sexual distress	−0.216 [−0.240, −0.192]	−0.152 [−0.176, −0.128]	−0.215 [−0.231, −0.199]	0.046 [0.028, 0.064]	0.279 [0.259, 0.299]	0.599 [0.574, 0.624]	1 = 3 < 2 < 4 < 5 < 6	0.11
Psychological characteristics								
Religiosity	−0.034 [−0.058, −0.010]	0.308 [−0.281, 0.335]	−0.134 [−0.150, −0.118]	0.252 [0.234, 0.270]	−0.112 [−0.130, −0.094]	0.402 [0.375, 0.429]	3 = 5 < 1 < 4 < 2 < 6	0.09
Impulsivity: Lack of premeditation	−0.011 [−0.036, 0.014]	−0.061 [−0.086, −0.036]	−0.033 [−0.051, −0.015]	0.046 [0.028, 0.064]	0.006 [−0.014, 0.026]	0.164 [0.137, 0.191]	2 = 3 < 5 < 4 < 6; 2 < 1 = 5 < 4 < 6; 1 = 3	0.03
Impulsivity: Position urgency	−0.105 [−0.130–0.080]	−0.063 [−0.088, −0.038]	−0.138 [−0.156, −0.120]	0.038 [0.020, 0.056]	0.065 [0.045, 0.085]	0.333 [0.306, 0.360]	3 = 1 < 2 < 4 < 5 < 6	0.06
Impulsivity: Sensation-seeking	−0.122 [−0.147, −0.097]	−0.137 [−0.162, −0.112]	−0.038 [−0.056, −0.020]	−0.033 [−0.051, −0.015]	0.147 [0.127, 0.167]	0.141 [0.116, 0.166]	2 = 1 < 3 = 4 < 6 = 5	0.04
Impulsivity: Negative urgency	−0.067 [−092, −0.042]	0.020 [−0.005, 0.045]	−0.153 [−0.171, −0.135]	0.069 [0.051, 0.087]	−0.010 [−0.030, 0.010]	0.344 [0.319, 0.369]	3 < 1 < 5 = 2 < 4 < 6	0.06
Impulsivity: Lack of perseverance	−0.093 [−0.118, −0.068]	−0.074 [−0.099, −0.049]	−0.083 [−0.101, −0.065]	0.051 [0.033, 0.069]	0.065 [0.045, 0.085]	0.234 [0.207, 0.261]	1 = 3 = 2 < 4 = 5 < 6	0.04
Compulsivity: Perfectionism	−0.127 [−0.151, −0.103]	0.077 [0.053, 0.101]	−0.193 [−0.209, −0.177]	0.083 [0.065, 0.101]	0.019 [0.001, 0.037]	0.324 [0.300, 0.348]	3 < 1 < 5 < 2 = 4 < 6	0.07
Compulsivity: Anankasticism	−0.128 [−0.152, −0.104]	0.024 [0.000, 0.048]	−0.196 [−0.212, −0.180]	0.074 [0.058, 0.090]	0.032 [0.014, 0.050]	0.365 [0.341, 0.389]	3 < 1 < 2 = 5 < 4 < 6	0.08
Basic Psychological Needs: Autonomy satisfaction	0.067 [0.042, 0.092]	0.029 [0.004, 0.054]	0.107 [0.089, 0.125]	−0.054 [−0.072, −0.036]	−0.031 [−0.051, −0.011]	−0.235 [−0.260, −0.210]	6 < 4 = 5 < 2 = 1 < 3	0.04
Basic Psychological Needs: Relatedness satisfaction	0.153 [0.128, 0.178]	0.101 [0.076, 0.126]	0.146 [0.128, 0.164]	−0.038 [−0.056, −0.020]	−0.164 [−0.184, −0.144]	−0.369 [−0.394, −0.344]	6 < 5 < 4 < 2 < 3 = 1	0.07
Basic Psychological Needs: Competence satisfaction	0.025 [0.000, 0.050]	−0.035 [−0.060, −0.010]	0.091 [0.073, 0.109]	−0.077 [−0.095, −0.059]	0.028 [0.008, 0.048]	−0.170 [−0.195, −0.145]	6 < 4 < 2 < 1 = 5 < 3	0.04
				0.065 [0.047, 0.083]	0.071 [0.053, 0.089]	0.394 [0.370, 0.418]		0.08

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Table 5. Continued

	1. No risk of PPU without MD profile (n = 6,610; 9.87%) Mean [95% CI]	2. No risk of PPU with some MD profile (n = 6,624; 9.89%) Mean [95% CI]	3. Low risk of PPU without MD profile (n = 17,594; 6.26%) Mean [95% CI]	4. Low risk of PPU with some MD profile (n = 15,413; 23.01%) Mean [95% CI]	5. Increased risk of PPU without MD profile (n = 13,285; 19.83%) Mean [95% CI]	6. Increased risk of PPU with some MD profile (n = 7,468; 11.15%) Mean [95% CI]	Differences between profiles	Cramer's V
Basic Psychological Needs: Autonomy frustration	−0.159 [−0.184, −0.134]	−0.022 [−0.047, 0.003]	−0.197 [−0.215, −0.179]				3 < 1 < 2 < 4 = 5 < 6	
Basic Psychological Needs: Relatedness frustration	−0.176 [−0.200, −0.152]	−0.034 [−0.058, −0.010]	−0.206 [−0.222, −0.190]	0.091 [0.073, 0.109]	0.100 [0.082, 0.118]	0.451 [0.426, 0.476]	2 < 1 = 3 < 4 = 5 < 6	0.09
Basic Psychological Needs: Competence frustration	−0.111 [−0.136, −0.086]	−0.004 [−0.029, 0.021]	−0.173 [−0.191, −0.155]	0.088 [0.070, 0.106]	0.022 [0.002, 0.042]	0.351 [0.326, 0.376]	3 < 1 < 2 = 5 < 4 < 6	0.07
Depressive symptoms	−0.094 [−0.119, −0.069]	0.015 [−0.010, 0.040]	−0.149 [−0.167, −0.131]	0.090 [0.072, 0.108]	0.079 [0.059, 0.099]	0.410 [0.385, 0.435]	3 < 1 < 2 < 5 = 4 < 6	0.07
Anxiety symptoms	−0.028 [−0.053, −0.003]	0.093 [0.068, 0.118]	−0.122 [−0.140, −0.104]	0.111 [0.093, 0.129]	−0.014 [−0.034, 0.006]	0.327 [0.302, 0.352]	3 < 1 = 5 < 2 = 4 < 6	0.06
Adult ADHD symptoms	−0.146 [−0.171, −0.121]	−0.030 [−0.055, −0.005]	−0.178 [−0.196, −0.160]	0.068 [0.050, 0.086]	0.088 [0.068, 0.108]	0.405 [0.380, 0.430]	3 = 1 < 2 < 4 = 5 < 6	0.07
Alcohol consumption	−0.050 [−0.072, −0.028]	−0.136 [−0.160, −0.112]	0.059 [0.043, 0.075]	−0.013 [−0.031, 0.005]	0.160 [0.140, 0.180]	0.045 [0.018, 0.072]	2 < 1 < 4 < 6 = 3 < 5	0.04
Alcohol problems	−0.065 [−0.087, −0.043]	−0.077 [−0.101, −0.053]	0.003 [−0.013, 0.019]	0.073 [0.055, 0.091]	0.154 [0.136, 0.172]	0.213 [0.188, 0.238]	2 = 1 < 3 < 4 < 5 < 6	0.04
Substance use	−0.025 [−0.047, −0.003]	−0.136 [−0.160, −0.112]	0.083 [0.067, 0.099]	−0.044 [−0.060, −0.028]	0.150 [0.130, 0.170]	−0.004 [−0.029, 0.021]	2 < 4 < 6 < 3 < 5; 2 < 4 = 1 < 3 < 5; 1 = 6	0.04

Note. CI: Confidence interval; PUM: pornography use motivation. Correlates were either estimated from factor scores with a mean of 0 and a standard deviation of 1 or were standardized prior to the analyses. Thus, the reported values for all variables are standardized scores.

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2020; Bőthe, Tóth-Király, et al., 2020; Ince et al., 2024; Jiang et al., 2022; Werner, Štulhofer, Waldorp, & Jurin, 2018; Wordecha et al., 2018).

Similarly to the no/low risk profiles, two increased risk groups were identified (*Increased risk of PPU without MD* and *Increased risk of PPU with some MD* profiles), with MD being the differentiating characteristic between them. These profiles showed similarities with the hypothesized problematic use profiles (P4 and P5) (Bőthe, Tóth-Király, et al., 2020; L. Chen et al., 2021; Vaillancourt-Morel et al., 2017). Yet, it is important to emphasize that despite having elevated dysregulation compared to other individuals in the sample, the mean PPU score of these profiles did not meet the pre-established cut-off score on the PPU measure (Bőthe et al., 2018; Bőthe, Nagy, et al., 2024). Thus, they should *not* be considered as individuals with PPU or CSBD, but as individuals who may be at elevated risk of developing such problems.

Comparison of increased risk and no/low risk pornography-use profiles

In line with our hypothesis (Bőthe, Tóth-Király, et al., 2020; Vaillancourt-Morel et al., 2017), the majority of women belonged to the *No/Low risk* profiles, while a higher percentage of men were included in the *Increased risk* profiles. The proportion of gender-diverse individuals in the *Increased risk* profiles was lower than men's but higher than women's, showing similarities with the occurrence of PPU across genders (Bőthe, Nagy, et al., 2024). Single individuals were also overrepresented in the *Increased risk* profiles, corroborating previous findings (Bőthe, Tóth-Király, et al., 2020). Moreover, a higher proportion of gay and lesbian individuals belonged to the *Increased risk* profiles compared to individuals of all other sexual orientations. These findings highlight the importance of including individuals with diverse genders and sexual orientations when studying pornography use-related problems and considering these characteristics when working with such problems, as they may experience unique stress factors (e.g., minority stress) (Borgogna, Mcdermott, Aita, & Kridel, 2019, 2022; Jennings et al., 2022, 2024). No clear patterns of differences were observed concerning other sociodemographic characteristics (e.g., age, country of residence). As these results may represent the absence of true differences or derive from the sample's characteristics (e.g., use of a self-selected, non-representative sample), further studies with more balanced samples are needed to corroborate these findings.

Individuals in the *Increased risk* profiles started to watch pornography at a younger age and used it for a longer period at each watching session than others in the *No/Low risk* groups (Bőthe, Tóth-Király, et al., 2020). They also reported higher levels of each pornography use motivations, but emotional distraction/suppression and stress reduction motivations differentiated the most between the *No/Low risk* and *Increased risk* profiles. These findings support previous empirical evidence suggesting that individuals with PPU and/or PPMI may turn to pornography to cope with negative emotions or stress, potentially due to the easy accessibility and instant availability of online pornography (Bőthe, Tóth-Király, Bella, et al., 2021; Bőthe, Vaillancourt-Morel, et al., 2024; Grubbs, Wright, et al., 2019; Lew-Starowicz, Lewczuk, Nowakowska, Kraus, & Gola, 2020). These results are also of diagnostic importance as emotion dysregulation has been shown to be associated with higher levels of PPU and CSBD and it is still debated whether using sexual activities as an emotion regulation strategy should be a diagnostic criterion for CSBD (Briken et al., 2024; Gola et al., 2020; Grubbs, Reid, et al., 2023; Lew-Starowicz et al., 2020; World Health Organization, 2022). In addition, members of the *Increased risk* profiles reported higher masturbation frequency and lower frequency of sexual activities with a partner compared to the *No/Low risk* groups. They also reported greater sexual desire and distress, as well as lower sexual satisfaction, supporting the notion that problems with pornography use may negatively relate to sexual health and well-being (Bőthe, Tóth-Király, et al., 2020; Bőthe, Tóth-Király, Griffiths, et al., 2021; Dwulit & Rzymski, 2019; Grubbs & Gola, 2019; Hoagland & Grubbs, 2021; Vaillancourt-Morel et al., 2017). However, it is important to note that the present study used a cross-sectional study design, and thus, it is also a plausible explanation that individuals turn to pornography when their sexual or romantic lives and relationships are not satisfying.

Finally, partly supporting our hypotheses, specific aspects of impulsivity (e.g., sensation seeking) and basic psychological needs (e.g., relatedness frustration) differentiated better between members of the *Increased risk* profiles and *No/Low risk* profiles than other psychological characteristics (e.g., ADHD symptoms). In line with the propositions of Self-Determination Theory and previous findings on pornography-use profiles, individuals who felt isolated, perceived lacking social support, or could not develop meaningful relationships with others might have found pornography an easy way to feel some connection potentially due to its increasingly immersive nature (e.g., virtual reality pornography) (Butler, Pereyra, Draper, Leonhardt, & Skinner, 2018; Bőthe, Tóth-Király, et al., 2020; Elsey, van Andel, Kater, Reints, & Spiering, 2019; Vansteenkiste & Ryan, 2013). However, given the lack of data on the type of pornography used in the present sample (e.g., "classic" online pornography or virtual reality pornography) to further investigate this hypothesis, future studies are warranted. Previous studies among treatment-seeking populations documented more substance use-related issues among individuals with PPU/CSBD (Ballester-Arnal, Castro-Calvo, Giménez-García, Gil-Juliá, & Gil-Llario, 2020; Kraus et al., 2015; Wéry et al., 2016). Our findings corroborated these results, suggesting that alcohol use problems may be more common among members of the *Increased risk* profiles.

To conclude, individuals in the *Increased risk* profiles reported worse sexual health and well-being as well as more issues with impulse control and social relations than others in the *No/Low risk* groups. These findings provide empirical support for recent calls to consider the sexual and relational

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aspects of pornography-use-related problems and CSBD as well as integrate sex therapy and sexual medicine perspectives into their treatment (Briken et al., 2024; Briken & Turner, 2022; Bőthe, Potenza, & Demetrovics, 2024; Lew-Starowicz & Coleman, 2022).

Differentiating between increased risk pornography-use profiles with and without MD

In line with the Moral Incongruence Model of Pornography Use and our hypotheses, MD emerged as an essential differentiating factor between pornography-use profiles (Grubbs & Perry, 2019; Grubbs, Perry, et al., 2019). Indeed, all profiles had a variant in which individuals had some MD. As MD bears importance from a differential diagnostic perspective (Kraus & Sweeney, 2019; World Health Organization, 2022), we deemed it crucial to highlight differences between the *Increased risk of PPU without MD* and *Increased risk of PPU with some MD* profiles.

In general, individuals in the *Increased risk of PPU with some MD* profile reported significantly more issues with almost all pornography-related, sexuality-related, and psychological characteristics than their peers in the *Increased risk of PPU without MD* group. However, when considering those characteristics that differentiated best between these two profiles, individuals in the *Increased risk of PPU with some MD* profile reported higher levels of sexual distress, religiosity, negative urgency, compulsivity, and depressive and anxiety symptoms than participants in the *Increased risk of PPU without MD* group, while members of the *Increased risk of PPU without MD* group had a higher alcohol and substance use frequency (Briken et al., 2022). MD may add an additional layer of distress when an individual experiences problems with their pornography use, in particular when it is combined with compulsive tendencies. Alternatively, the elevated levels of the aforementioned clinical characteristics in the *Increased risk of PPU with some MD* profile may suggest an underlying vulnerability in this group, warranting further examination. Finally, another potential hypothesis is that individuals in the *Increased risk of PPU without MD* profile may be less aware and critical about pornography use patterns and related negative consequences, resulting in having better self-reported psychological indicators than their peers in the *Increased risk of PPU with some MD* profile (Rogers, Pinedo, Villatoro, & Zemore, 2019). These findings further show the importance of assessing anxiety, depression, and negative urgency (e.g., impulsive actions taking place when experience intense negative affect or emotional states) when diagnosing pornography-use-related problems, as mood-related issues may not only be common among individuals experiencing pornography-use-related problems but may also help in the differential diagnostic process as well (Bőthe, Vaillancourt-Morel, et al., 2024; Grant Weinandy et al., 2023; Kraus et al., 2015).

Finally, no at-risk or high-risk of PPU profiles were identified in the present study (i.e., no profile's mean score on the PPU measure reached the cut-off score for PPU). The lack of an at-risk/high-risk PPU profile may derive from the characteristics of the sample (i.e., a large sample of individuals from the general population) as individuals who are at risk of experiencing PPU (i.e., approximately 3% of the current sample, see Bőthe, Nagy, et al., 2024) were likely to be included in the *Increased risk of PPU profiles* rather than emerging as a distinct profile. These points should be kept in mind when considering potentially negative health correlates of types and patterns of pornography use. Further studies among clinical populations are warranted to examine the roles of pornography use frequency, MD, and PPU among individuals who seek treatment for their pornography use.

Limitations and future directions

Apart from the general limitations of the ISS (link to general limitations), some specific limitations need to be considered concerning the present study. The sample was not representative of each country's population and some groups were overrepresented (e.g., individuals with higher levels of education, those who were more open to discussing sexuality, or who were more sexually active). Even though the sample was more diverse in terms of participants' cultural background, gender identity, and sexual orientation than in previous studies (Grubbs, Hoagland, et al., 2020; Klein, Savaş, & Conley, 2021), findings should be interpreted with caution and replicated in future studies among nationally representative samples. Individuals in the present study reported relatively low levels of MD in general (M = 2.49 [SD = 1.68] on a scale ranging between 1 and 7). Thus, future studies are needed to corroborate the presence of the identified profiles among individuals with high/higher levels of MD. Moreover, recent empirical evidence suggests that the interaction between an individual's MD and pornography use frequency may be the most optimal operationalization of MI (Grubbs, Floyd, Griffin, Jennings, & Kraus, 2022; Grubbs, Kraus, Perry, Lewczuk, & Gola, 2020); however, it was not feasible to conduct LPA with this interaction term. Future studies should further test the role of moral values concerning pornography-use-related problems across diverse samples, accounting for the interaction of pornography use frequency and MD. Individuals may report moral disapproval of pornography use for several reasons (e.g., religiosity, concerns about the potential effects of pornography on children and adolescents, feminist values, or concerns about abuse and exploitation), and moral beliefs about pornography use as well as use patterns (e.g., PPU) may change over time (Grubbs, Kraus, et al., 2020; Hoagland, Rotruck, Moore, & Grubbs, 2023; Štulhofer, Rousseau, & Shekarchi, 2020). Thus, future studies are warranted to examine whether considering the reasons underlying moral opposition to pornography may yield more nuanced findings in terms of different pornography-use profiles and whether memberships in such profiles are stable over time.

CONCLUSIONS

Addressing the limitations of previous studies (Grubbs, Hoagland, et al., 2020; Grubbs & Kraus, 2021), the present

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study examined MD and dysregulation-based pornography-use profiles and their correlates among a large, diverse population (e.g., cultural background). Findings suggest that six different pornography-use profiles may emerge when considering different aspects of watching habits, including two *Increased risk* profiles. Several correlates differentiated well between increased risk and no/low risk profiles, with sexuality- and social-relational factors playing important roles (e.g., sexual distress, relatedness satisfaction). These findings support recent calls to integrate sex therapy and sexual medicine perspectives into pornography-use-related care (Briken et al., 2024; Briken & Turner, 2022; Bőthe, Potenza, & Demetrovics, 2024; Lew-Starowicz & Coleman, 2022). Moral values concerning pornography use played a crucial role in the identification of pornography-use profiles and demonstrated the importance of inquiring about one's MD of pornography use when working with clients with pornography-use-related problems (Grubbs & Perry, 2019; Grubbs, Perry, et al., 2019; Kraus & Sweeney, 2019; World Health Organization, 2022).

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Appendix

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