# Profiles of problematic pornography use and religiosity-based moral incongruence using latent profile analysis: a two-sample study

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20/02/24

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*Funding sources*: CI is supported by an Australian Government Research Training Program (RTP) Scholarship but no other support related to research, authorship, or publication or this article. LF is supported by the Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq; grant #CNE- 302526/2018-8, Rio de Janeiro, RJ, Brazil), Fundação de Amparo à Pesquisa do Estado do Rio de Janeiro (FAPERJ; grant # CNE E-26/200.950/2021, Rio de Janerio, RJ, Brazil), and intramural grants from D’Or Institute for Research and Education (IDOR, Rio de Janeiro, RJ, Brazil). MY’s role on this paper was funded through a National Health and Medical Research Council Fellowship (NHMRC; #APP1117188). MY also receives funding from: government funding bodies such as the NHMRC, Australian Research Council (ARC), Australian Defence Science and Technology (DST), the Department of Industry, Innovation and Science (DIIS), the National Institutes of Health (NIH, USA); philanthropic donations from the David Winston Turner Endowment Fund, Wilson Foundation; sponsored Investigator- Initiated trials including Incannex Healthcare Ltd. These funding sources had no role in the data analysis, presentation, or interpretation and write-up of the data. MY also sits on the Advisory Boards of: Centre of The Urban Mental Health, University of Amsterdam; and Enosis Therapeutics. SRC, LF, and LA receive honoraria for editorial work at Elsevier journals but have no other interests to disclose. SRC’s research was previously funded by Wellcome. No other authors have competing interests to disclose. No funding organisations were involved in any stage of the study design, data collection, interpretation and analysis, writing of the report, or the decision to submit the article for Publication.

*Author contributions*: CI contributed to the study concept, design, methodology, data analysis and interpretation, and writing of the manuscript. JT and LA contributed to study design, data interpretation, reviewing of manuscript, and study supervision. LF contributed to data interpretation, reviewing of manuscript, and study supervision. SC contributed to reviewing of manuscript. MY contributed to reviewing of manuscript, study supervision, and funding. KR contributed to study design, data interpretation, reviewing of manuscript, study supervision, and funding.

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

*Acknowledgement*: We are extremely grateful to the Wilson Foundation and David Winston Turner Endowment Fund whose generous philanthropic investment in the BrainPark research team and facility made this research possible.

Data *availability*: Data will be made available on reasonable request.

**Note to Editor**: IRB approval was provided by Monash University Human Research Ethics Committee (#37969)

# ABSTRACT

**Background and Aims**: Recent taxonomies propose that pornography-related problems may arise from problematic pornography use (PPU) and/or moral incongruence (MI). Although religiosity is often viewed as a key factor in MI, religious-based MI has not yet been explicitly examined within these taxonomies, which we address herein.

**Methods**: Using latent profile analysis of self-report data obtained, we examined distinct and overlapping profiles of PPU and religiosity-based MI in two online samples of male pornography users from the United States (*N* = 1,356, *M*age = 36.86, *SD* = 11.26) and United Kingdom (*N* = 944, *M*age = 38.69, *SD* = 12.26).

**Results**: Three classes (15–25% of each sample) showed elevated PPU and/or religiosity-based MI: ‘At risk for religiosity-based MI’ (4–8%), ‘At risk for PPU’ (6–10%), and ‘At risk for co-occurring PPU and religiosity-based MI’ (6–8%). Unlike the two groups with elevated PPU, the group with religious-based MI group did not report heightened psychological distress or treatment-seeking tendencies. Respondents were otherwise classified as “not at risk” (40–47%) “low risk” (27–28%), or moderate-severity PPU (14%, Sample 2 only).

**Discussion and Conclusions**: Although the observed heterogeneity validates a taxonomy of PPU and religiosity-based MI, our findings challenge the assumption of elevated psychological distress and treatment-seeking tendencies among individuals with religiosity-based MI. Future research should further examine the clinical relevance of religiosity-based MI and extend these findings to broader (e.g., clinical, culturally diverse) samples.

**Keywords**: Problematic pornography use, moral incongruence, latent profile analysis, pornography addiction, heterogeneity, self-perceived pornography addiction

# Profiles of problematic pornography use and religiosity-based moral incongruence using latent profile analysis: a two-sample study

Technological advancements since the mid-2000s have significantly increased global rates of pornography use (Nowakowska et al., 2020). While most users experience no significant negative effects, a minority develop dysregulated or addictive patterns known as problematic pornography use (PPU; de Alarcón et al., 2019). Despite varying conceptualisations, PPU is most commonly characterised by impaired control despite adverse consequences, alongside features such as salience (preoccupation with pornography), relapse (returning to use despite efforts to quit), and sexual dissatisfaction (e.g., reduced pleasure from use; Bőthe et al., 2020; Kraus et al., 2018). Although frequent use often co-occurs with PPU, high-frequency non-problematic use has also been noted as common (Bőthe et al., 2020). Similar to other behavioural addictions, such as Internet gaming and gambling, PPU is associated with elevated psychological distress, heightened impulsivity, compulsivity, and personality traits like higher neuroticism and lower conscientiousness (Albertella et al., 2020; Antons & Brand, 2021; Bőthe, Tóth-Király, et al., 2020; Leeman & Potenza, 2012; Liu et al., 2022). Sociodemographic factors, particularly younger age and male gender, also increase susceptibility to PPU (de Alarcon et al., 2019; Castro-Calvo et al., 2020). Therefore, examining these variables may further clarify the ways in which different subtypes related to PPU may emerge.

## Prevalence and Classification of PPU

PPU research has gained momentum in recent years, but prevalence estimates remain inconsistent. Studies suggest that 3–15% of male pornography users may be at risk for PPU (Bőthe, Tóth-Király, et al., 2020; Dickenson et al., 2018; Maitland & Neilson, 2023; Zarate et al., 2023), while an additional 10–30% may experience subclinical PPU, characterised by milder negative consequences (Hernández-Mora Ruiz Del Castillo et al., 2023; Zarate et al., 2023).

Ongoing debates focus on how best to classify and diagnose such issues (Grubbs et al., 2020; Kowalewska & Lew-Starowicz, 2021). As of 2018, PPU can be clinically recognised through the new diagnostic category of Compulsive Sexual Behaviour Disorder (CSBD) in the International Classification of Diseases, Eleventh edition (ICD-11) (Kraus et al., 2018). Although generally welcomed from scientific and public health perspectives (Antons & Brand, 2021; Gola & Kraus, 2021), this new diagnostic category raised concerns about over-pathologising common sexual behaviours (Kardefelt-Winther et al., 2017). A myriad of social, cultural, and moral factors influence how individuals perceive their own pornography use (Hoagland et al., 2023), complicating self-reported accounts of pornography addiction (Briken, 2020).

## Moral Incongruence and Self-Perceived PPU

A growing body of research highlights the role of moral attitudes in shaping self-reported pornography addiction. According to moral incongruence (MI) theory, individuals who morally disapprove of pornography but engage in its use experience a discrepancy between their ideal and perceived selves, which can result in psychological distress (Grubbs et al., 2015, 2018; Walton, 2019). This distress may lead individuals to label themselves as being addicted to pornography even in the absence of dysregulated consumption (Grubbs et al., 2015). Consequently, MI may conflate psychological factors (e.g., moral disapproval of pornography) with objective indicators of problematic use (i.e., PPU; Grubbs et al., 2015, 2018). To address this distinction, some researchers have referred to “self-perceived PPU” for cases primarily driven by MI rather than objectively dysregulated and problematic engagement with pornography (Chen et al., 2021, Chen, 2022).

### The Role of Religiosity in MI

Religiosity has been identified as a key driver of MI. Studies primarily conducted in the United States—a context shaped in part by religiously conservative ideologies—indicate that internalised beliefs (e.g., sexual conservatism) may amplify guilt and shame related to pornography use (Grubbs et al., 2018). Although MI can arise from other sources (e.g., ethical concerns about the pornography industry; Hoagland et al., 2023), religiosity is likely to be especially salient in shaping deeply held values proscribing pornography use (Mestre-Bach et al., 2021). However, MI is often studied as an umbrella construct, meaning the specific psychological sources of MI are typically not distinguished (Hoagland et al., 2023). Operationalising MI as “religiosity-based MI” (indexed by moral disapproval, pornography consumption, and self-reported religiosity) may therefore enhance specificity and clarity in this area.

## Proposed Typologies of PPU and MI

Recent theoretical frameworks have proposed clinically relevant subtypes of self-reported PPU to account for the heterogeneity across PPU and MI (broadly defined). Proposed subtypes include i) a "PPU-only" presentation marked by objectively dysregulated pornography consumption; ii) an "MI-only" presentation (aligned with the notion of “self-perceived PPU”) characterised by moral incongruence without dysregulated or problematic use; and iii) a co-occurring PPU and MI presentation (Kraus & Sweeney, 2019; Vaillancourt-Morel & Bergeron, 2019). As clinically relevant typologies, these presentations are expected to correlate with heightened psychological distress and an increased likelihood of seeking treatment for pornography-related concerns (Grubbs et al., 2015; Kraus & Sweeney, 2019). Tailored interventions have also been suggested, with PPU-related issues potentially benefiting from cognitive-behavioural therapy (CBT) and MI-related concerns from acceptance and commitment therapy (ACT). For co-occurring cases, combining CBT and ACT may be most effective (Antons et al., 2022; Ripplinger et al., 2024).

Despite these advances, empirical evidence supporting these typologies is limited. Most prior work regarding PPU and MI has used variable-centred approaches (e.g., regression or structural equation models), which make two key assumptions: i) that individuals are derived from a homogenous group, and ii) that the relationships between variables are uniform across the sample. Such approaches therefore may fail to account for different subtypes that may exist within a sample (Feczko et al., 2019). Conversely, person-centred approaches such as latent profile analysis (LPA) can identify distinct ‘clusters’ or sub-groups of individuals based on their response patterns (Spurk et al., 2020) and are therefore especially suitable for examining the proposed heterogeneity associated with PPU and MI.

Several studies have applied LPA or other person-centred approaches in an attempt to identify relevant subtypes (Chen et al., 2022; Jiang et al., 2022). However, only two LPA studies specifically examined heterogeneity related to PPU and MI, and both were conducted among subclinical samples of Chinese males from online self-help forums (Chen et al., 2022; Jiang et al., 2022). While these studies found partial support for the proposed typologies, they did not identify a group with co-occurring PPU and MI, which may reflect both cultural and methodological factors. Culturally, Chinese social and moral norms surrounding pornography use likely differ from Western contexts, where religiosity ostensibly plays a more prominent role (Su, Zheng, & Zheng, 2014). Methodologically, these studies relied on a broad definition of moral disapproval without specifically interrogating religiosity-based MI. Accordingly, examining religiosity-based MI within Western samples may uncover distinct patterns of heterogeneity.

## Current Study

The present study extends prior work in several ways. First, we focused on Western samples, where religiosity-based MI may be relatively prevalent. Second, we explicitly examined religiosity-based MI (i.e., concurrent religiosity, moral disapproval of pornography, and at least semi-frequent use) to more precisely measure MI according to its typical conceptualisation in the Western context. Third, by recruiting from the general community rather than PPU-specific self-help forums, we sought to map the prevalence of proposed clinical subtypes (PPU-only, religiosity-based MI, and co-occurring PPU and religiosity-based MI), but also sub-clinical (i.e., moderate or low risk) profiles.

Building on theoretical frameworks for PPU and MI (Kraus & Sweeney, 2019; Vaillancourt-Morel & Bergeron, 2019) and recent qualitative findings (Blinka et al., 2022; Ince et al., 2023), we employed latent profile analysis (LPA) to identify meaningful subgroups of pornography users related to PPU and religiosity-based MI. We hypothesised:

*h1*): Most pornography users would report low scores on both PPU and religiosity-based MI, indicating no or relatively low clinically relevant concerns.

*h2*): A subset of users would display clinically meaningful patterns of PPU and/or religiosity-based MI, alongside elevated psychological distress and tendencies of seeking (or considering) treatment for pornography-related concerns. We further predicted that these would be distributed across three at-risk typologies:

*h2a*) a group at risk for PPU only (characterised by elevated PPU but minimal religiosity-based MI).

*h2b*) a group at risk for religiosity-based MI-only, marked by moral disapproval of pornography despite relatively frequent pornography use, religiosity, and low PPU severity.

*h2c*) Co-occurring PPU and religiosity-based MI, marked by elevated scores on dimensions related to both PPU and religiosity-based MI (moral disapproval, relatively frequent pornography use, and religiosity).

# METHODS

## Participants and recruitment

The current data were collected as part of a larger project on PPU among male pornography users from the general population. Although other analyses from this dataset have been used for additional research questions [(Ince et al., 2024)](https://www.zotero.org/google-docs/?FkQW13), such work does not overlap with the current study. The study was advertised as a survey on male sexual behaviours, which was described to participants as “...a study on male sexual behaviours (including pornography use) and how these relate to sexual and psychological well-being”. No references or implications toward PPU were given in the study description. The study was advertised on two large-scale crowdsourcing platforms (Prolific.uk and CloudResearch’s *Connect* platform), both of which yield reliable self-report data (evidenced by performance on attention checks, survey completion times, and interpretability of responses to open-ended questions) [(Douglas et al., 2023)](https://www.zotero.org/google-docs/?HeH7Kq). Sample 1 (United States) consisted of 1,356 respondents (*M*age = 36.86, *SD* = 11.26) and Sample 2 (United Kingdom) consisted of 944 respondents (*M*age = 38.69, *SD* = 12.26). Participants were compensated upon survey completion in line with rates for each platform (2.00USD and 2.50GBP for CloudResearch and Prolific, respectively) [(Douglas et al., 2023)](https://www.zotero.org/google-docs/?4ppsgV).

## Measures

Respondents completed measures on socio-demographic information, including age, religious denomination, education, and relationship status. Participants’ natural history of sexual behaviours in the past six months was measured via frequency of various sexual activities (pornography use, masturbation with and without pornography; each measured as 1 = *Never*, 9 = *Multiple times per day*). Religiosity was measured on a five-point scale (0= *Not at all religious*, 4= *Very religious*).

We indexed PPU through the Compulsive Sexual Behaviour Disorder-19 scale [(Bőthe, Potenza, et al., 2020)](https://www.zotero.org/google-docs/?5NPi0D) tailored specifically for pornography use (CSBD-19porn). This scale includes 19 items across five subscales, with items rated on a 1-4 Likert scale (1 = *Totally disagree*, 4 = *Totally agree*). Of these five subscales, four include three items each for impaired control (e.g., “My desires for pornography controlled me”), salience (e.g., “When I could use pornography, everything else became irrelevant”), relapse (e.g., “Trying to reduce the amount of pornography I used had almost never worked”), and dissatisfaction (e.g., “I used pornography even when I did not enjoy it anymore”); alongside seven items for negative consequences (e.g., “My pornography use interfered with my work and/or education”). A score of 50+ on the original CSBD-19 has been proposed to indicate high risk for CSBD and was therefore used to indicate being at risk for PPU in the current study [(Bőthe, Potenza, et al., 2020)](https://www.zotero.org/google-docs/?dH0Gc0).

We also included the *Tolerance* subscale from the Problematic Pornography Consumption Scale [(Bőthe et al., 2018)](https://www.zotero.org/google-docs/?0Og33E) to index PPU-related tolerance/escalation. This decision was threefold. First, burgeoning evidence suggests that pornography-related tolerance is an important aspect of PPU [(Chen et al., 2021; Ince et al., 2021, 2023, 2024; Lewczuk et al., 2022)](https://www.zotero.org/google-docs/?UfCceH). Second, the CSBD-19 scale does not include a tolerance-related dimension. Third, the PPCS has been recommended as the most appropriate scale (based on construct validity and reliability) for measuring PPU-related tolerance/escalation in the current literature [(Fernandez & Griffiths, 2021)](https://www.zotero.org/google-docs/?zy2a5Q). To further gauge whether respondents considered their pornography use as dysregulated and problematic, we asked whether they had considered or sought professional treatment (e.g., from a family doctor, psychiatric, sex therapist, psychologist, or naturopath) due to difficulties controlling their pornography use (0= *No, I have not considered or sought treatment*, 1= *Yes, I have considered it but not sought treatment*, 2 = *Yes, I have sought treatment* , 3= *Prefer not to say*). Given that many individuals do not actually seek treatment for pornography-related concerns (e.g., due to shame, stigma, or accessibility; Thege et al., 2015), individuals who responded with ‘1’ or ‘2’ were recoded as 1, thereby creating a binary variable based on having considered/sought treatment (0= *Had not considered or sought treatment*, 1= *Had considered or sought treatment*; Bothe et al., 2020).

Moral disapproval of pornography was measured with a single item believed to most appropriately index such perceptions (“As a behaviour, viewing pornography is morally wrong”) [(Grubbs et al., 2015; Lewczuk et al., 2020, 2021)](https://www.zotero.org/google-docs/?bkxOt4), measured on a seven-point scale (1= *Not at all*, 7= *Extremely*). We also measured various psychological and psychopathological dimensions known to correlate with PPU and MI, analysing them as auxiliary variables to enhance the interpretation of the extracted profiles. Psychological distress was measured with the DASS-10 [(Halford & Frost, 2021; Lovibond & Lovibond, 1995)](https://www.zotero.org/google-docs/?vBKXiH), trait impulsivity was measured with the short version of the UPPS-P impulsivity scale (SUPPS-P; [Cyders et al., 2014)](https://www.zotero.org/google-docs/?jYgcJZ), trait compulsivity was measured with Cambridge–Chicago Compulsivity Trait Scale [(Chamberlain & Grant, 2018; Liu et al., 2023)](https://www.zotero.org/google-docs/?RfSK3m), and personality dimensions with the short version of the Big Five Inventory (Rammstedt et al., 2013).

## Statistical analysis

Statistical analyses were undertaken using R-Studio version 4.2.2 [(RStudio Team, 2023)](https://www.zotero.org/google-docs/?q8oJES). Group comparisons across the two samples were conducted with parametric (independent samples *t*-tests; Welch-corrected for instances of unequal variances) and non-parametric (Chi square test, Mann-Whitney *U*) inferential statistics based on normality assumptions. Statistical significance was set at *α*=.05 for all analyses (with Tukey’s HSD used to correct for multiple comparisons). Categorical variables (education, relationship status, history of seeking or considering treatment for pornography-related concerns) were dummy coded for analysis (e.g., group comparisons).

Latent profile analysis was performed to identify sub-groups of individuals with distinct and meaningful patterns of PPU and religiosity-based MI [(Rosenberg et al., 2018)](https://www.zotero.org/google-docs/?HFsmFB). Our analytic pipeline followed expert guidelines and established conventions for LPA using the *tidyLPA* package (version 1.0.8; [Bauer, 2022; Rosenberg et al., 2018)](https://www.zotero.org/google-docs/?rllihI). The *tidyLPA* package simplifies and extends the widely used *mclust* package [(Scrucca et al., 2016)](https://www.zotero.org/google-docs/?aV6RUA) by streamlining the parameterisation processes (i.e., selecting the optimal variance-covariance structures across profiles). In short, the tidyLPA package uses maximum likelihood estimation to identify the optimal joint distribution of indicator means, variances and covariances, and automates the decision making process for parameterisation and selects the most optimal joint distribution for included indicators by balancing parsimony with model complexity [(Masyn, 2013)](https://www.zotero.org/google-docs/?ps83PL).

The LPA included nine dimensions. As described above, six were relevant to PPU (each of the five subscales from the CSBDporn plus the PPCS *Tolerance* subscale) while the remaining three dimensions indexed relevant dimensions for religiosity-based MI (i.e., moral disapproval of pornography, frequency of pornography use, and religiosity).

Potential solutions containing one to ten profiles were estimated for each sample. Determining the optimal number of profiles followed an iterative process. In line with recommended pipelines for the TidyLPA package [(Bauer, 2022; Rosenberg et al., 2018)](https://www.zotero.org/google-docs/?c3M33h), we firstly evaluated the following model fit statistics: the Bayesian Information Criteria (BIC) [(Schwarz, 1978)](https://www.zotero.org/google-docs/?7jTM1b), Akaike Information Criterion (AIC) [(Akaike, 1987)](https://www.zotero.org/google-docs/?v9L6G8), and the corrected Akaike Information Criterion (CAIC) [(Anderson et al., 1998)](https://www.zotero.org/google-docs/?AvPiWo). The Bootstrapped Likelihood Ratio Test (BLRT) offered additional information whereby a significant *p*-value (*p*>.05) for *K* classes is deemed inferior to a more parsimonious model (*K*-1 classes). As fit statistics may continually decrease (i.e., improve) without substantively improving the model, especially for large samples [(Morin & Marsh, 2015; Petras & Masyn, 2010)](https://www.zotero.org/google-docs/?UDld0U), we examined ‘elbow-plots’ that visualise the relative improvement in fit statistics from additional classes [(Morin et al., 2016; Morin & Marsh, 2015; Petras & Masyn, 2010)](https://www.zotero.org/google-docs/?egClbF). The point after which the plot flattens is taken to indicate the most appropriate number of classes [(Morin et al., 2016; Petras & Masyn, 2010)](https://www.zotero.org/google-docs/?C8zlnF).

We also evaluated entropy values in which values closer to 1.0 indicate superior class separation (with >0.80 indicating acceptable class enumeration)[(Celeux & Soromenho, 1996)](https://www.zotero.org/google-docs/?WTIikV). Given our focus on numerous clinically-relevant profiles (which are all likely to fall within a minority of our community samples), we allowed for class memberships as low as 3% (i.e., slightly below the generally recommended minimum of 5% when working with smaller sample sizes than ours) [(Versella et al., 2016)](https://www.zotero.org/google-docs/?HR8dMm). Profiles were evaluated against extant theory to aid interpretation, especially for solutions with low class membership. Indicator values were standardised prior to plotting the LPAs to further assist interpretation when comparing across profiles. We also applied similar group labels to that observed in prior LPA and PPU literature (e.g., to differentiate individuals “not at risk” from “low risk” for PPU) [(Bőthe et al., 2018; Chen et al., 2021; Hernández-Mora Ruiz Del Castillo et al., 2023; Jiang et al., 2022; Zarate et al., 2023)](https://www.zotero.org/google-docs/?SY5KlX).

Following class enumeration, differences in auxiliary variables across profiles were examined via ANOVAs (2,500 bootstrapped samples). This permitted comparisons on sociodemographic (age, relationship status), sexual (e.g., frequency of partnered sex), psychological (e,g, distress), and psychopathological dimensions (trait impulsivity and compulsivity). Post-hoc comparisons were performed with Tukey’s HSD to adjust for familywise error rate.

## Ethics

Ethics approval was obtained from the [*masked for peer review*], and the study was conducted in accordance with the Declaration of Helsinki. All participants provided informed consent prior to completing the survey.

# RESULTS

Table 1 presents the relevant background variables (sociodemographics and natural history of sexual behaviours) for each sample. Table 2 shows the descriptive statistics and psychometric information for variables included in the LPA. Group differences across samples, where observed, all had small effect sizes (although religious denomination was approached a medium effect size).

[Table 2 approximately here]

## Latent profile analysis

Fit indices for LPA solutions with 1–10 profiles for each sample are presented in Table 3 (also see Appendix 1 for elbow plots for each sample).

[Table 3 approximately here]

### Sample 1 (USA)

Fit indices continually decreased as more profiles were added, indicating an ambiguous solution (likely due to the relatively large sample size; see File S1 for elbow plots). Examination of elbow plots suggested either a five- or seven-class solution as the optimal model. The five-class (rather than seven-class) solution was selected as the final model given superior entropy value (0.93 Vs 0.88) and greater model parsimony. Estimated profiles are presented in Figure 1 and Table 4 (statistical significance for pairwise comparisons across profiles are indicated in Table 4, while effect sizes are indicated in the Supplementary Materials).

[Figure 1 approximately here]

#### Not at risk/low risk profiles

The first group (Profile 1) had the largest membership (*n*= 640, 47.20%) and endorsed low levels of PPU (CSBD-19porn *M*= 21.99, *SD*= 3.35) and low levels of moral disapproval of pornography (*M*= 1.22 , *SD*= 0.60). This profile was therefore termed “not at risk”. The second group (Profile 2; *n*= 360, 26.54%) also endorsed relatively low levels of PPU severity (CSBD-19porn *M*= 36.66, *SD*= 4.64) and low levels of moral disapproval (*M*= 1.39, *SD*= 0.66), but were appreciably higher than the first group on both dimensions. Accordingly, the second profile was termed “low risk”.

#### Hypothesised at-risk profiles

The third group (Profile 3; *n*= 114, 8.40%) also endorsed comparably low levels of PPU to the low-risk group (*M*= 35.49, *SD*= 7.21). However, this group reported elevated levels of moral disapproval of pornography (*M*= 5.09, *SD*= 1.15), somewhat frequent pornography use (*M*= 4.67, *SD*= 2.07; i.e., typically between weekly and monthly) and were typically religious (*M*=2.66, *SD*= 1.43). This group was therefore deemed to be at risk for religiosity-based MI. However, contrary to predictions, this group did not report elevated levels of psychological distress or a propensity for treatment-seeking (discussed further in the subsequent section on auxiliary dimensions). As such, this profile did not align with the criteria for clinical relevance as originally hypothesised.

The fourth group (Profile 4; *n*= 107, 7.89%) exceeded the proposed cut-off score for being at risk for PPU (≧50 on the CSBD-19porn; *M*= 55.62, *SD*= 6.47) and also endorsed elevated levels of moral disapproval toward pornography (*M*= 5.29, *SD=* 1.27) and religiosity (*M*= 2.76, *SD*= 1.24). This group was therefore deemed “At risk for co-occurring PPU and religiosity-based MI”). The fifth group (Profile 5; *n*= 135, 9.96%) also exceeded the proposed cut-off score for PPU (CSBD-19porn *M*= 50.88, *SD*= 5.85), but endorsed low levels of moral disapproval (*M*= 1.81, *SD*= 0.90) and were therefore referred to as “At risk for PPU”. Both of these groups were considered clinically relevant based on elevated psychological distress and history of considering/seeking treatment for pornography-related concerns (elaborated in the following sub-section).

#### Comparisons across profiles on auxiliary dimensions

As shown in Table 4 (and supplementary materials), the groups displayed statistically significant differences of primarily small to medium effect across several auxiliary variables, particularly for the two profiles with elevated PPU severity compared to the remaining profiles: Profile 4 (At risk for co-occurring PPU and religiosity-based MI) and Profile 5 (At risk for PPU). These groups were notably younger than the others and exhibited the highest levels of psychological distress, trait impulsivity (positive and negative urgency), and trait compulsivity (reward drive and cognitive rigidity, but not perfectionism). In contrast, Profile 3 (At risk for religiosity-based MI) showed distinct personality traits, characterised by higher conscientiousness and lower neuroticism compared to the profiles with elevated PPU severity. No meaningful statistically significant group differences were found regarding relationship status or frequency of other sexual activities (pornography-free masturbation or partnered sex).

As noted above, Profile 3 (At risk for religiosity-based MI) did not exhibit key markers typically associated with clinically significant presentations. This group experienced low psychological distress and rarely sought or considered treatment for pornography-related concerns. In contrast, the other at-risk profiles—Profile 4 (At risk for co-occurring PPU and religiosity-based MI) and Profile 5 (At risk for PPU)—were characterised by higher levels of psychological distress and a greater likelihood of treatment-seeking behaviours, distinguishing them from the religiosity-based MI group.

[Table 4 approximately here]

### Sample 2 (UK)

Fit indices for Sample 2 also continually decreased as more profiles were added to the model (File S1). As the eight- to ten-class solutions each contained at least one group with very low membership (*n*minranging between 1.59% to 1.69%), these solutions were rejected. Comparison of the six- and seven-class solutions indicated comparable entropy values (0.88 and 0.87, respectively). The six-class solution included a class which was difficult to interpret, while the seven-class solution showed superior theoretical alignment (described in Supplementary Materials, Appendix 2). As such, the seven-class model was retained as the final model. Estimated profiles are presented in Figure 2 and Table 5 (statistical significance for pairwise comparisons across profiles are indicated in Table 5, while effect sizes are indicated in the Supplementary Materials).

#### Not at risk/low risk profiles

Estimated profiles for Sample 2 are presented in Fig. 2 and Table 6. As shown, two groups endorsed low levels of PPU (CSBD-19porn *M*= 21.96, *SD*= 2.97; *M*= 21.94, *SD*= 3.04, respectively) and moral disapproval of pornography (*M*= 1.24, *SD*= 0.54; *M*= 1.57, *SD*= 0.90, respectively) and could therefore be considered as “not at risk”. However, these groups were differentiated on their frequency of pornography use (*M*= 4.17, *SD*= 1.42; *M*= 8.84, *SD*= 0.46, respectively) and were therefore termed “Not at risk (sporadic user)” (Profile 1; *n*= 331, 35.06%) and “Not at risk (frequent user)” (Profile 2; *n*= 51, 5.40%).

A third group (Profile 3; *n*= 266, 28.18%) also reported relatively low levels of PPU severity (although notably higher than the first two groups; *M*= 32.80, *SD*= 3.91) and moral disapproval of pornography (*M*= 1.28, *SD*= 0.56). This group was therefore termed “Low risk”. The fourth group (Profile 4; *n*= 136, 14.41%) reported relatively higher levels of PPU (*M*= 42.65, *SD*= 4.13), but fell below the suggested threshold for being at risk for PPU. This group also reported relative low levels of moral disapproval of pornography (*M*= 1.28, *SD*= 0.56). This group was therefore deemed to be at “moderate risk” for PPU.

#### Hypothesised at-risk profiles

A fifth group (Profile 5; *n*= 41, 4.34%) also endorsed relatively low levels of PPU severity (CSBD-19porn *M*= 30.95, *SD*= 6.16), but reported elevated levels of moral disapproval of pornography (*M*= 5.07, *SD*= 1.01), somewhat frequent pornography use (*M*= 4.05, *SD*=2.16; i.e., typically between weekly and monthly) and were often religious (*M*=1.98, *SD*= 1.51). This profile was therefore termed “At risk for religiosity-based MI” (i.e., ‘self-perceived PPU’). As observed in Sample 1, this group did not endorse elevated psychological distress and reported relatively rare rates of seeking or considering treatment for pornography-related concerns (see section below on *Auxiliary variables*).

A sixth group (Profile 6; *n*= 60, 6.36%) reported elevated PPU levels that typically exceeded the proposed cut-off (*M=* 51.22, *SD*=7.47). Moreover, this group reported elevated moral disapproval of pornography use (*M*= 5.73, *SD*= 1.09), religiosity (*M*= 2.13, *SD*= 1.42) and frequency of pornography use (*M*= 5.03, *SD*= 1.95). This group was therefore termed “At risk for PPU & religiosity-based MI”. Finally, a seventh group (Profile 7; *n*= 59, 6.25%) reported elevated levels of PPU (*M*= 55.59, *SD*= 5.50), but relatively low levels of moral disapproval (*M*= 1.64, *SD*= 0.91) and religiosity (*M*= 0.54, *SD*= 1.01). This group was therefore termed “At risk for PPU”.

As noted above, Profile 5 ("At risk for religiosity-based MI") endorsed minimal markers of clinically relevant characteristics, including relatively low psychological distress (*M*= 5.54, *SD* = 6.07) and low rates of considering or seeking treatment for pornography-related concerns (9.8%). In contrast, the other at-risk profiles exhibited higher psychological distress (Profile 4: "At risk for co-occurring PPU and religiosity-based MI," *M*= 10.38, *SD*= 6.59; Profile 5: "At risk for PPU," *M*= 11.93, *SD*= 7.22) and greater intentions or behaviours related to treatment-seeking (Profile 4: 36.7%; Profile 5: 45.8%), distinguishing them from the religiosity-based MI group.

[Figure 2 approximately here]

#### Comparisons across profiles on auxiliary dimensions

As shown in Table 5, groups meaningfully differed across auxiliary variables in similar ways to Sample 1. The two groups endorsing the highest levels of PPU (Profiles 6 and 7) were again the youngest, but these differences were only statistically different compared to Profile 1 (Not-at risk, sporadic users). Also in line with Sample 1, the highest levels of psychological distress were found in the groups classified as being at risk for PPU (Profile 6: At risk for comorbid PPU and MI; Profile 7: At risk for PPU). This was followed by Profile 4 (At moderate risk for PPU). All other groups were statistically significantly lower on psychological distress. Trait impulsivity was relatively comparable across profiles, but Profiles 6 and 7 demonstrated the highest levels of negative urgency, a facet of impulsivity, compared to other groups. Positive urgency was moderately elevated across all groups with elevated PPU and/or religiosity-based MI (Profiles 4–7), but such differences were less pronounced than negative urgency. Trait compulsivity (specifically reward drive and cognitive rigidity) was also elevated in the two profiles with high PPU severity (Profiles 6 and 7). No statistically significant group differences were observed in offline sexual behaviours, such as partnered sex or pornography-free masturbation. For personality traits, Profile 5 (At risk for religiosity-based MI) endorsed higher conscientiousness and lower neuroticism relative to Profile 7 (At risk for PPU), but was comparable to Profile 6 (At risk for co-occurring PPU and religiosity-based MI) on these dimensions.

As with Sample 1, Profile 5 (At risk for religiosity-based MI) did not exhibit key markers associated with clinically meaningful profiles. This group reported low psychological distress and minimal treatment-seeking tendencies for pornography-related concerns, distinguishing them from the other at-risk profiles. In contrast, Profiles 6 (At risk for co-occurring PPU and religiosity-based MI) and 7 (At risk for PPU) were characterised by elevated psychological distress and greater likelihood of treatment-seeking behaviours, further highlighting the distinct nature of the religiosity-based MI-only group.

[Table 5 approximately here]

### Relative proportions of hypothesised at-risk subtypes across samples

The relative rates of membership of the hypothesised subtypes regarding PPU and religiosity-based MI (*H2*) are presented in Table 4. Although the sizes of profile membership was comparable across the two samples, the 'PPU-only' profile was slightly smaller in Sample 1, whereas the 'At risk for religiosity-based MI' profile was slightly smaller in Sample 2.

As noted in earlier passages, the religiosity-based MI group did not endorse elevated psychological distress nor tendencies to consider or seek treatment for pornography-related concerns, but are included in these comparisons given the hypothesised profiles related to PPU and religiosity-based MI.

[Table 6 approximately here]

# DISCUSSION

This work sought to examine heterogeneity regarding self-reported problematic pornography use (PPU) and religiosity-based moral incongruence (MI) among males who consume Internet pornography. Experts have recently proposed three distinct subtypes in this area, namely: i) a profile characterised by objectively dysregulated and problematic pornography consumption (i.e., PPU), ii) individuals with elevated moral incongruence regarding their pornography use, and iii) individuals with co-occurring PPU and MI [(Kraus & Sweeney, 2019; Vaillancourt-Morel & Bergeron, 2019)](https://www.zotero.org/google-docs/?wAdqRN). Although prior research has provided some evidence for this typology (using samples of sub-clinical Chinese males recruited from PPU self-help forums; Chen et al., 2022; Jiang et al., 2022), such work has lacked specificity in how MI is operationalised. Although religiosity is widely considered a core feature of MI (especially in the Western cultural context; Floyd et al., 2022; Mestre-Bach et al., 2021), no studies to date have specifically measured religiosity-based MI (i.e., concurrent religiosity, moral disapproval of pornography, and at least somewhat frequent usage). To address these shortfalls, we evaluated heterogeneity across PPU and religiosity-based MI heterogeneity using latent profile analysis (LPA) among two independent samples of male pornography users from the United Kingdom and United States.

## Summary of results across samples

Results were broadly consistent across samples. Supporting our first hypothesis (*h1*), the majority of respondents reported low levels of PPU and religiosity-based MI, leading to their classification as “not at risk” (40–47%) or “low risk” (27–28%) across these dimensions. These findings align with previous work suggesting that pornography use is often recreational and adaptive, serving to satisfy sexual needs and curiosity (Bőthe, Tóth-Király et al., 2020; Hald & Malamuth, 2008).

Consistent with previous research in the Western cultural context, we also identified a subset of individuals (limited to the UK sample; 14%) with elevated PPU scores, but which nevertheless fell below proposed cut-off values. This largely aligned with similar estimates in which approximately 20-30% of individuals were classified as moderate or moderate-high risk (although these samples included both men and women; Hernandez-Mora et al., 2023; Zarate et al., 2023). These observations suggest a non-trivial subset of individuals are potentially prone to developing patterns of PPU.

Results also partially supported our second set of hypotheses (h2), with a significant minority of respondents (15–25%) aligning with a hypothesised subtype of PPU and religiosity-based MI. These individuals could be further classified into a ‘PPU only’ subtype (6–10%; *h2a*), a religiosity-based MI group (4–8%; *h2b*), and a group at risk for co-occurring PPU and religiosity-based MI (6–8%; *h2c*). Notably, these estimated rates slightly exceed prior prevalence estimates of PPU (3–15%; Bőthe, Tóth-Király, et al., 2020; Dickenson et al., 2018; Maitland & Neilson, 2023; Zarate et al., 2023), potentially reflecting differences in sample characteristics or measurement approaches. Both groups characterised by elevated PPU symptoms (with or without concurrent religiosity-based MI) reported higher levels of clinically relevant covariates such as psychological distress, tendencies to consider or seek treatment for pornography-related concerns, as well as psychopathological (e.g., impulsivity aspects such as negative urgency; compulsive reward seeking) and psychological markers (e.g., lower conscientiousness). This suggests that PPU may be linked with psychological traits in ways similar to other addictive behaviours (e.g., gambling and substance use; Albertella et al., 2020; Leeman & Potenza, 2012; Liu et al., 2022).

These findings also reinforce the notion that PPU and MI may be driven and maintained by different psychological mechanisms (Brand et al., 2019; Brand, 2019). Finally, lower age among the groups with elevated PPU aligns with prior findings (Castro-Calvo et al., 2023; Reid et al., 2012), though it is worth noting that PPU may, in some cases, represent a transient issue (Castro-Calvo et al., 2023). Notably, however, the religiosity-based MI group (*h2b*) did not exhibit elevated psychological distress or increased tendencies to seek or consider treatment for pornography-related concerns. These results suggest that - in most cases - individuals with religiosity-based moral incongruence do not experience substantial distress or functional impairment. While some cases of religiosity-based MI may involve treatment-seeking despite the absence of PPU symptoms (Kraus & Sweeney, 2019), such instances appear to be relatively uncommon among general population samples. This challenges the assumption that religiosity-based MI necessarily involves significant inner conflict and instead may reflect a form of moral disapproval without pronounced psychological turmoil. This distinction highlights the importance of refining MI-related measures to better differentiate between moral disapproval and genuine moral incongruence.

## Strength, limitations, and future directions

Our work contained various notable strengths and limitations. Applying LPA allowed us to uncover important nuances in how PPU and religiosity-based MI can manifest across individuals in ways that may be otherwise obscured in traditional variable-centred approaches. Such information may help researchers and clinicians to move beyond the traditional and dualistic assumption that PPU and MI are competing explanatory frameworks for self-reported PPU. Instead, our findings support the notion that PPU and (religiosity-based) MI are related yet distinct issues, and the identified profiles suggest potentially important phenotypes that may benefit from tailored interventions. Intuitively, cognitive behaviour therapy may be especially suitable for PPU, acceptance and commitment therapy for (religiosity-based) MI, whereas a combination of both approaches may be suitable for individuals with co-occurring concerns [(Antons et al., 2022; Brand, 2019)](https://www.zotero.org/google-docs/?LhSMQG). Additionally, the general consistency of results across our two independent samples enhances the reliability of our results.

Our study also extends prior research on proposed subtypes, which have been examined among Chinese men (Chen et al., 2021; Jiang et al., 2022). While broadly aligning with earlier findings, our results diverge slightly in identifying a group characterised by co-occurring PPU and religiosity-based MI (observed in both samples). This discrepancy may reflect methodological factors, such as our specific focus on religiously-based MI rather than more generalised MI, as well as cultural differences. Notably, MI in Western contexts may be shaped by unique religious and cultural influences inherent to our North American and UK samples (Su et al., 2023).

Several limitations should also be noted. Our sampling was limited to all-male community samples, which limits generalisability regarding sex/gender diversity and the extrapolation to clinical samples. Furthermore, we combined two different scales to measure PPU: the CSBD-19 scale tailored for pornography use and the *Tolerance* subscale from the PPCS (see Methods). Although these are psychometrically validated scales that cover well-established facets of PPU, future work should compare our results against different indices for PPU [(Fernandez & Griffiths, 2021)](https://www.zotero.org/google-docs/?DePPTB).

It is also important to acknowledge recent advancements in the study of MI, which suggest that individuals may morally object to their pornography use for reasons beyond the traditional frameworks of social or religious conservatism (Hoagland et al., 2023). To this end, our operationalisation of religiously-based MI represents an important step towards improving the specificity of how moral incongruence is conceptualised. However, other sources of moral disapproval warrant further exploration. For example, individuals may disapprove of their pornography use from feminist, sexual health, or secular ethical perspectives, rather than from a religious framework. Moreover, individuals with PPU who escalate to consuming extreme content (e.g., sexually violent material) may experience moral conflict rooted in ethical or personal values that are independent of religious beliefs (Hoagland et al., 2023; Ince et al., 2023; Wright, 2019). This escalation can clash with individuals’ intrinsic moral frameworks beyond their religious dispositions. As such, it is possible that religious individuals might disapprove of their pornography use independently to religious dispositions. Consequently, it is possible that some individuals classified within the comorbid PPU and religiosity-based MI group might have been misclassified as their primary source of moral disapproval was assumed to be religious. These reasons highlight the need for more nuanced measures of MI that specifically capture the reasons for such disapproval, in turn expanding the scope of MI research to focus less centrally on religiosity (Vaillancourt-Morel & Bergeron, 2019; Willoughby, 2019). Finally, MI appears to be relevant to other addictive problems beyond pornography use (e.g., gambling), albeit at weaker effects (Lewczuk et al., 2021). Future work specifically examining religiosity-based MI across other potentially behaviours is recommended.

## Conclusion

Overall, our findings suggest that a minority, but still substantial number, of male pornography users self-report problems with the behaviour itself (PPU) and/or with their psychological (moral) relationship to the activity (manifesting in moral incongruence). Important heterogeneity exists across these dimensions, which reinforces the idea that PPU and religiosity-based MI can differentially manifest across individuals. This suggests that individuals with different types of self-reported PPU may require tailored interventions based on the nature of such issues. Future work extending these findings to more diverse populations (e.g., women, treatment-seekers) will help to further clarify our findings and enhance understanding of PPU and related complaints.

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# REFERENCES

[Ahorsu, D. K., Adjorlolo, S., Nurmala, I., Ruckwongpatr, K., Strong, C., & Lin, C.-Y. (2023). Problematic Porn Use and Cross-Cultural Differences: A Brief Review. *Current Addiction Reports*, *10*(3), 572–580. https://doi.org/10.1007/s40429-023-00505-3](https://www.zotero.org/google-docs/?rxcGSz)

[Akaike, H. (1987). Factor analysis and AIC. *Psychometrika*, *52*, 317–332. https://doi.org/10.1007/BF02294359](https://www.zotero.org/google-docs/?rxcGSz)

[Albertella, L., Chamberlain, S. R., Le Pelley, M. E., Greenwood, L.-M., Lee, R. S., Den Ouden, L., Segrave, R. A., Grant, J. E., & Yücel, M. (2020). Compulsivity is measurable across distinct psychiatric symptom domains and is associated with familial risk and reward-related attentional capture. *CNS Spectrums*, *25*(4), 519–526. https://doi.org/10.1017/S1092852919001330](https://www.zotero.org/google-docs/?rxcGSz)

[Anderson, D. R., Burnham, K. P., & White, G. C. (1998). Comparison of Akaike information criterion and consistent Akaike information criterion for model selection and statistical inference from capture-recapture studies. *Journal of Applied Statistics*, *25*(2), 263–282. https://doi.org/10.1080/02664769823250](https://www.zotero.org/google-docs/?rxcGSz)

[Antons, S., & Brand, M. (2021). Diagnostic and Classification Considerations Related to Compulsive Sexual Behavior Disorder and Problematic Pornography Use. *Current Addiction Reports*, *8*(3), 452–457. https://doi.org/10.1007/s40429-021-00383-7](https://www.zotero.org/google-docs/?rxcGSz)

[Antons, S., Engel, J., Briken, P., Krüger, T. H. C., Brand, M., & Stark, R. (2022). Treatments and interventions for compulsive sexual behavior disorder with a focus on problematic pornography use: A preregistered systematic review. *Journal of Behavioral Addictions*, *11*(3), 643–666. https://doi.org/10.1556/2006.2022.00061](https://www.zotero.org/google-docs/?rxcGSz)

[Bauer, J. (2022). A Primer to Latent Profile and Latent Class Analysis. In M. Goller, E. Kyndt, S. Paloniemi, & C. Damşa (Eds.), *Methods for Researching Professional Learning and Development* (Vol. 33, pp. 243–268). Springer International Publishing. https://doi.org/10.1007/978-3-031-08518-5\_11](https://www.zotero.org/google-docs/?rxcGSz)

[Blinka, L., Ševčíková, A., Dreier, M., Škařupová, K., & Wölfling, K. (2022). Online Sex Addiction: A Qualitative Analysis of Symptoms in Treatment-Seeking Men. *Frontiers in Psychiatry*, *13*.](https://www.zotero.org/google-docs/?rxcGSz)

[Bőthe, B., Potenza, M. N., Griffiths, M. D., Kraus, S. W., Klein, V., Fuss, J., & Demetrovics, Z. (2020). The development of the Compulsive Sexual Behavior Disorder Scale (CSBD-19): An ICD-11 based screening measure across three languages. *Journal of Behavioral Addictions*, *9*(2), 247–258. https://doi.org/10.1556/2006.2020.00034](https://www.zotero.org/google-docs/?rxcGSz)

[Bőthe, B., Tóth-Király, I., Potenza, M. N., Orosz, G., & Demetrovics, Z. (2020). High-Frequency Pornography Use May Not Always Be Problematic. *The Journal of Sexual Medicine*, *17*(4), 793–811. https://doi.org/10.1016/j.jsxm.2020.01.007](https://www.zotero.org/google-docs/?rxcGSz)

[Bőthe, B., Tóth-Király, I., Zsila, Á., Griffiths, M. D., Demetrovics, Z., & Orosz, G. (2018). The Development of the Problematic Pornography Consumption Scale (PPCS). *The Journal of Sex Research*, *55*(3), 395–406. https://doi.org/10.1080/00224499.2017.1291798](https://www.zotero.org/google-docs/?rxcGSz)

[Brand, Blycker, & Potenza. (2019). When Pornography Becomes a Problem: Clinical Insights. *Psychiatric Times*, *36*(12). https://www.psychiatrictimes.com/view/when-pornography-becomes-problem-clinical-insights](https://www.zotero.org/google-docs/?rxcGSz)

[Brand, M. (2019). Theoretical Assumptions on Pornography Problems Due to Moral Incongruence and Mechanisms of Addictive or Compulsive Use of Pornography: Are the Two “Conditions” as Theoretically Distinct as Suggested? *Archives of Sexual Behavior*, 7.](https://www.zotero.org/google-docs/?rxcGSz)

[Briken, P. (2020). An integrated model to assess and treat compulsive sexual behaviour disorder. *Nature Reviews Urology*, *17*(7), 391–406. https://doi.org/10.1038/s41585-020-0343-7](https://www.zotero.org/google-docs/?rxcGSz)

[Castro-Calvo, J., Ballester-Arnal, R., Giménez-García, C., García-Barba, M., & Gil-Llario, M. D. (2023). Natural Course of Compulsive Sexual Behavior (CSB): A 1-Year Follow-up Study. *International Journal of Mental Health and Addiction*. https://doi.org/10.1007/s11469-023-01061-7](https://www.zotero.org/google-docs/?rxcGSz)

[Celeux, G., & Soromenho, G. (1996). An entropy criterion for assessing the number of clusters in a mixture model. *Journal of Classification*, *13*(2), 195–212. https://doi.org/10.1007/BF01246098](https://www.zotero.org/google-docs/?rxcGSz)

[Chamberlain, S. R., & Grant, J. E. (2018). Initial validation of a transdiagnostic compulsivity questionnaire: The Cambridge–Chicago Compulsivity Trait Scale. *CNS Spectrums*, *23*(5), 340–346. https://doi.org/10.1017/S1092852918000810](https://www.zotero.org/google-docs/?rxcGSz)

[Chen, L., Jiang, X., Luo, X., Kraus, S. W., & Bőthe, B. (2021). The role of impaired control in screening problematic pornography use: Evidence from cross-sectional and longitudinal studies in a large help-seeking male sample. *Psychology of Addictive Behaviors*. https://doi.org/10.1037/adb0000714](https://www.zotero.org/google-docs/?rxcGSz)

[Cyders, M. A., Littlefield, A. K., Coffey, S., & Karyadi, K. A. (2014). Examination of a short English version of the UPPS-P Impulsive Behavior Scale. *Addictive Behaviors*, *39*(9), 1372–1376. https://doi.org/10.1016/j.addbeh.2014.02.013](https://www.zotero.org/google-docs/?rxcGSz)

[de Alarcón, R., de la Iglesia, J., Casado, N., & Montejo, A. (2019). Online Porn Addiction: What We Know and What We Don’t—A Systematic Review. *Journal of Clinical Medicine*, *8*(1), 91. https://doi.org/10.3390/jcm8010091](https://www.zotero.org/google-docs/?rxcGSz)

[Dickenson, J. A., Gleason, N., Coleman, E., & Miner, M. H. (2018). Prevalence of Distress Associated With Difficulty Controlling Sexual Urges, Feelings, and Behaviors in the United States. *JAMA Network Open*, *1*(7), e184468. https://doi.org/10.1001/jamanetworkopen.2018.4468](https://www.zotero.org/google-docs/?rxcGSz)

[Douglas, B. D., Ewell, P. J., & Brauer, M. (2023). Data quality in online human-subjects research: Comparisons between MTurk, Prolific, CloudResearch, Qualtrics, and SONA. *PLOS ONE*, *18*(3), e0279720. https://doi.org/10.1371/journal.pone.0279720](https://www.zotero.org/google-docs/?rxcGSz)

Feczko, E., Miranda-Dominguez, O., Marr, M., Graham, A. M., Nigg, J. T., & Fair, D. A. (2019). The heterogeneity problem: approaches to identify psychiatric subtypes. *Trends in cognitive sciences*, *23*(7), 584-601. doi:10.1016/j.tics.2019.03.009

[Fernandez, D. P., & Griffiths, M. D. (2021). Psychometric Instruments for Problematic Pornography Use: A Systematic Review. *Evaluation & the Health Professions*, *44*(2), 111–141. https://doi.org/10.1177/0163278719861688](https://www.zotero.org/google-docs/?rxcGSz)

[Gola, M., & Kraus, S. W. (2021). Sexual Addiction vs. CSBD. *Compulsive Sexual Behavior Disorder: Understanding, Assessment, and Treatment*, *7*.](https://www.zotero.org/google-docs/?rxcGSz)

[Grubbs, J. B., Exline, J. J., Pargament, K. I., Hook, J. N., & Carlisle, R. D. (2015). Transgression as Addiction: Religiosity and Moral Disapproval as Predictors of Perceived Addiction to Pornography. *Archives of Sexual Behavior*, *44*(1), 125–136. https://doi.org/10.1007/s10508-013-0257-z](https://www.zotero.org/google-docs/?rxcGSz)

[Grubbs, J. B., Hoagland, K. C., Lee, B. N., Grant, J. T., Davison, P., Reid, R. C., & Kraus, S. W. (2020). Sexual addiction 25 years on: A systematic and methodological review of empirical literature and an agenda for future research. *Clinical Psychology Review*, *82*, 101925. https://doi.org/10.1016/j.cpr.2020.101925](https://www.zotero.org/google-docs/?rxcGSz)

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

[Grubbs, J. B., & Perry, S. L. (2019). Moral Incongruence and Pornography Use: A Critical Review and Integration. *The Journal of Sex Research*, *56*(1), 29–37. https://doi.org/10.1080/00224499.2018.1427204](https://www.zotero.org/google-docs/?rxcGSz)

[Grubbs, J. B., Wilt, J. A., Exline, J. J., Pargament, K. I., & Kraus, S. W. (2018). Moral disapproval and perceived addiction to internet pornography: A longitudinal examination. *Addiction*, *113*(3), 496–506. https://doi.org/10.1111/add.14007](https://www.zotero.org/google-docs/?rxcGSz)

[Hald, G. M., & Malamuth, N. M. (2008). Self-Perceived Effects of Pornography Consumption. *Archives of Sexual Behavior*, *37*(4), 614–625. https://doi.org/10.1007/s10508-007-9212-1](https://www.zotero.org/google-docs/?rxcGSz)

[Halford, K. W., & Frost, A. D. J. (2021). Depression Anxiety Stress Scale-10: A Brief Measure for Routine Psychotherapy Outcome and Progress Assessment. *Behaviour Change*, *38*(4), 221–234. https://doi.org/10.1017/bec.2021.12](https://www.zotero.org/google-docs/?rxcGSz)

[Hernández-Mora Ruiz Del Castillo, M., Bonnet, P., & Varescon, I. (2023). Profiles of Pornography Use Based on Addictive Mechanisms and Psychopathological Features. *International Journal of Mental Health and Addiction*. https://doi.org/10.1007/s11469-023-01087-x](https://www.zotero.org/google-docs/?rxcGSz)

[Hoagland, K. C., Rotruck, H. L., Moore, J. N., & Grubbs, J. B. (2023). Reasons for Moral-Based Opposition to Pornography in a US Nationally Representative Sample. *Journal of Sex & Marital Therapy*, 1–22.](https://www.zotero.org/google-docs/?rxcGSz)

[Ince, C., Albertella, L., Liu, C., Tiego, J., Fontenelle, L. F., Chamberlain, S. R., Yücel, M., & Rotaru, K. (2024). Problematic pornography use and novel patterns of escalating use: A cross-sectional network analysis with two independent samples. *Addictive Behaviors*, *156*, 108048. https://doi.org/10.1016/j.addbeh.2024.108048](https://www.zotero.org/google-docs/?rxcGSz)

[Ince, C., Fontenelle, L. F., Carter, A., Albertella, L., Tiego, J., Chamberlain, S. R., & Rotaru, K. (2023). Clarifying and extending our understanding of problematic pornography use through descriptions of the lived experience. *Scientific Reports*, *13*(1), 18193.](https://www.zotero.org/google-docs/?rxcGSz)

[Ince, C., Yücel, M., Albertella, L., & Fontenelle, L. F. (2021). Exploring the clinical profile of problematic pornography use. *CNS Spectrums*, *26*(6), 648–657. https://doi.org/10.1017/S1092852920001686](https://www.zotero.org/google-docs/?rxcGSz)

[Jiang, X., Wu, Y., Zhang, K., Bőthe, B., Hong, Y., & Chen, L. (2022). Symptoms of problematic pornography use among help-seeking male adolescents: Latent profile and network analysis. *Journal of Behavioral Addictions*, *11*(3), 912–927.](https://www.zotero.org/google-docs/?rxcGSz)

[Kardefelt-Winther, D., Heeren, A., Schimmenti, A., van Rooij, A., Maurage, P., Carras, M., Edman, J., Blaszczynski, A., Khazaal, Y., & Billieux, J. (2017). How can we conceptualize behavioural addiction without pathologizing common behaviours?: How to conceptualize behavioral addiction. *Addiction*, *112*(10), 1709–1715. https://doi.org/10.1111/add.13763](https://www.zotero.org/google-docs/?rxcGSz)

[Kowalewska, E., & Lew-Starowicz, M. (2021). Compulsive Sexual Behavior Disorder – the evolution of a new diagnosis introduced to the ICD-11, current evidence and ongoing research challenges. *Wiedza Medyczna*, *3*(1), 17–23. https://doi.org/10.36553/wm.72](https://www.zotero.org/google-docs/?rxcGSz)

[Kraus, S. W., Krueger, R. B., Briken, P., First, M. B., Stein, D. J., Kaplan, M. S., Voon, V., Abdo, C. H., Grant, J. E., & Atalla, E. (2018). Compulsive sexual behaviour disorder in the ICD‐11. *World Psychiatry*, *17*(1), 109.](https://www.zotero.org/google-docs/?rxcGSz)

[Kraus, S. W., & Sweeney, P. J. (2019). Hitting the Target: Considerations for Differential Diagnosis When Treating Individuals for Problematic Use of Pornography. *Archives of Sexual Behavior*, *48*(2), 431–435. https://doi.org/10.1007/s10508-018-1301-9](https://www.zotero.org/google-docs/?rxcGSz)

[Leeman, R. F., & Potenza, M. N. (2012). Similarities and differences between pathological gambling and substance use disorders: A focus on impulsivity and compulsivity. *Psychopharmacology*, *219*(2), 469–490. https://doi.org/10.1007/s00213-011-2550-7](https://www.zotero.org/google-docs/?rxcGSz)

[Lewczuk, K., Glica, A., Nowakowska, I., Gola, M., & Grubbs, J. B. (2020). Evaluating Pornography Problems Due to Moral Incongruence Model. *The Journal of Sexual Medicine*, *17*(2), 300–311. https://doi.org/10.1016/j.jsxm.2019.11.259](https://www.zotero.org/google-docs/?rxcGSz)

[Lewczuk, K., Nowakowska, I., Lewandowska, K., Potenza, M. N., & Gola, M. (2021). Frequency of use, moral incongruence and religiosity and their relationships with self‐perceived addiction to pornography, internet use, social networking and online gaming. *Addiction*, *116*(4), 889–899. https://doi.org/10.1111/add.15272](https://www.zotero.org/google-docs/?rxcGSz)

[Lewczuk, K., Wizła, M., Glica, A., Potenza, M. N., Lew-Starowicz, M., & Kraus, S. W. (2022). Withdrawal and tolerance as related to compulsive sexual behavior disorder and problematic pornography use–Preregistered study based on a nationally representative sample in Poland. *Journal of Behavioral Addictions*, *11*(4), 979–993.](https://www.zotero.org/google-docs/?rxcGSz)

[Liu, C., Albertella, L., Lochner, C., Tiego, J., Grant, J. E., Ioannidis, K., Yücel, M., Hellyer, P. J., Hampshire, A., & Chamberlain, S. R. (2023). Conceptualising compulsivity through network analysis: A two-sample study. *Comprehensive Psychiatry*, *127*, 152429. https://doi.org/10.1016/j.comppsych.2023.152429](https://www.zotero.org/google-docs/?rxcGSz)

[Liu, C., Rotaru, K., Chamberlain, S. R., Yücel, M., Grant, J. E., Lee, R. S. C., Wulandari, T., Suo, C., & Albertella, L. (2022). Distress-driven impulsivity interacts with trait compulsivity in association with problematic drinking: A two-sample study. *Frontiers in Psychiatry*, *13*, 938275. https://doi.org/10.3389/fpsyt.2022.938275](https://www.zotero.org/google-docs/?rxcGSz)

[Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour Research and Therapy*, *33*(3), 335–343. https://doi.org/10.1016/0005-7967(94)00075-U](https://www.zotero.org/google-docs/?rxcGSz)

[Maitland, D. W. M., & Neilson, E. C. (2023). Associations Between Pornography Consumption Patterns, Pornography Consumption Motives, and Social Wellbeing among U.S. College Students: A Latent Profile Analysis with a Primarily Female Sample. *Journal of Sex & Marital Therapy*, *49*(7), 739–754. https://doi.org/10.1080/0092623X.2023.2193182](https://www.zotero.org/google-docs/?rxcGSz)

[Masyn, K. E. (2013). *Latent Class Analysis and Finite Mixture Modeling*. Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199934898.013.0025](https://www.zotero.org/google-docs/?rxcGSz)

[Morin, A. J. S., & Marsh, H. W. (2015). Disentangling Shape from Level Effects in Person-Centered Analyses: An Illustration Based on University Teachers’ Multidimensional Profiles of Effectiveness. *Structural Equation Modeling: A Multidisciplinary Journal*, *22*(1), 39–59. https://doi.org/10.1080/10705511.2014.919825](https://www.zotero.org/google-docs/?rxcGSz)

[Morin, A. J. S., Meyer, J. P., Creusier, J., & Biétry, F. (2016). Multiple-Group Analysis of Similarity in Latent Profile Solutions. *Organizational Research Methods*, *19*(2), 231–254. https://doi.org/10.1177/1094428115621148](https://www.zotero.org/google-docs/?rxcGSz)

[Nowakowska, I., Lewczuk, K., & Gola, M. (2020). Changes in the Addiction Prevalence in Polish Population between 1990-2019: Review of Available Data. *Journal of Addiction Science*, *06*(01). https://doi.org/10.17756/jas.2020-045](https://www.zotero.org/google-docs/?rxcGSz)

[Petras, H., & Masyn, K. (2010). General Growth Mixture Analysis with Antecedents and Consequences of Change. In A. R. Piquero & D. Weisburd (Eds.), *Handbook of Quantitative Criminology* (pp. 69–100). Springer New York. https://doi.org/10.1007/978-0-387-77650-7\_5](https://www.zotero.org/google-docs/?rxcGSz)

[Reid, R. C., Carpenter, B. N., Hook, J. N., Garos, S., Manning, J. C., Gilliland, R., Cooper, E. B., McKittrick, H., Davtian, M., & Fong, T. (2012). Report of Findings in a DSM‐5 Field Trial for Hypersexual Disorder. *The Journal of Sexual Medicine*, *9*(11), 2868–2877. https://doi.org/10.1111/j.1743-6109.2012.02936.x](https://www.zotero.org/google-docs/?rxcGSz)

[Ripplinger, J. C., Beecher, M. E., Scalese, A. M., Spjut, K., Griner, D., Worthen, V. E., Jackson, A. P., Hansen, K. S. W., Myers, E., Roberts, A. F., & Swanson, S. E. (2024). Acceptance and Commitment Therapy Group for Problematic Sexual Behavior: Treatment Principles and Participant Experiences. *Sexual Health & Compulsivity*, 1–24. https://doi.org/10.1080/26929953.2024.2303652](https://www.zotero.org/google-docs/?rxcGSz)

[Rosenberg, J., Beymer, P., Anderson, D., Van Lissa, C. j., & Schmidt, J. (2018). tidyLPA: An R Package to Easily Carry Out Latent Profile Analysis (LPA) Using Open-Source or Commercial Software. *Journal of Open Source Software*, *3*(30), 978. https://doi.org/10.21105/joss.00978](https://www.zotero.org/google-docs/?rxcGSz)

[RStudio Team. (2023). *RStudio: Integrated Development for R. RStudio,* (Version 4.2.2) [Computer software]. http://www.rstudio.com](https://www.zotero.org/google-docs/?rxcGSz)

[Schwarz, G. (1978). Estimating the dimension of a model. *The Annals of Statistics*, *6*(2), 461–464.](https://www.zotero.org/google-docs/?rxcGSz)

[Scrucca, L., Fop, M., Murphy, T. B., & Raftery, A. E. (2016). mclust 5: Clustering, Classification and Density Estimation Using Gaussian Finite Mixture Models. *The R Journal*, *8*(1), 289–317.](https://www.zotero.org/google-docs/?rxcGSz)

[Su, Y., Zheng, L., & Zheng, Y. (2023). Pornography Use and Mental Health Problems in the Chinese Population: Examining the Pornography Problems Due to Moral Incongruence Model. *The Journal of Sex Research*, 1–12. https://doi.org/10.1080/00224499.2023.2201255](https://www.zotero.org/google-docs/?rxcGSz)

[Vaillancourt-Morel, M.-P., & Bergeron, S. (2019). Self-perceived problematic pornography use: Beyond individual differences and religiosity. *Archives of Sexual Behavior*, *48*(2), 437–441.](https://www.zotero.org/google-docs/?rxcGSz)

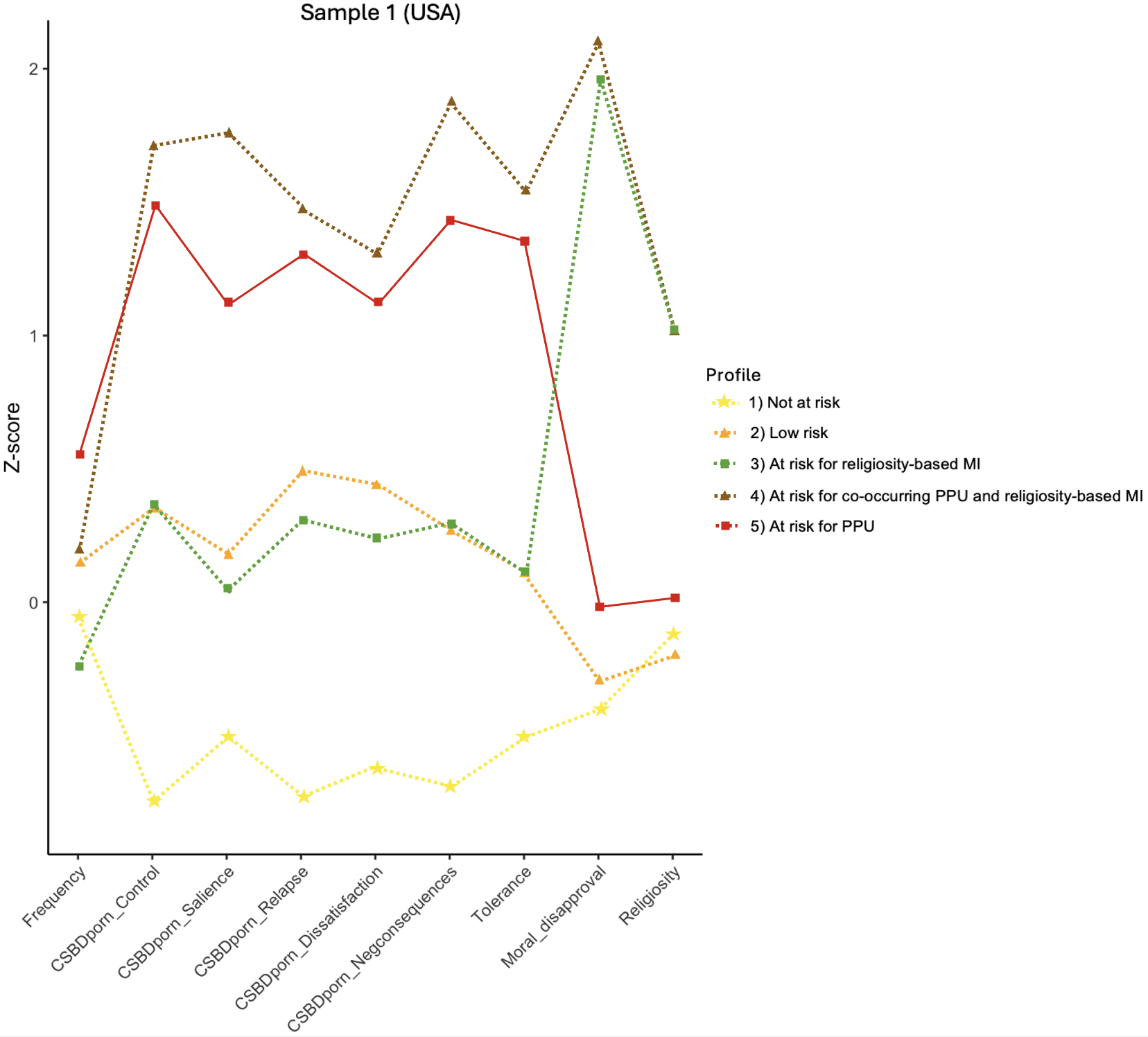
[Versella, M. V., Piccirillo, M. L., Potter, C. M., Olino, T. M., & Heimberg, R. G. (2016). Anger profiles in social anxiety disorder. *Journal of Anxiety Disorders*, *37*, 21–29. https://doi.org/10.1016/j.janxdis.2015.10.008](https://www.zotero.org/google-docs/?rxcGSz)

[Wright, P. J. (2019). Dysregulated pornography use and the possibility of a unipathway approach. *Archives of Sexual Behavior*, *48*, 455–460.](https://www.zotero.org/google-docs/?rxcGSz)

[Zarate, D., Allen, A., Kannis-Dymand, L., Karimi, L., & Stavropoulos, V. (2023). Problematic Pornography Use: Can It Be Accurately Measured via the Problematic Pornography Use Scale? *International Journal of Mental Health and Addiction*. https://doi.org/10.1007/s11469-023-01164-1](https://www.zotero.org/google-docs/?rxcGSz)

**Figure 1**.

Latent profile analysis (five-class solution) for Sample 1.



# *Note*. CSBD\_19porn = Compulsive Sexual Behavior Disorder Scale-19 modified for pornography use, Moral\_disapproval= Single item for moral disapproval of pornography, *PPU\_Control*= ‘Control’ dimension from the CSBD\_19porn scale, *PPU\_Dissatisfaction*= ‘Dissatisfaction’ dimension from the CSBD\_19porn scale, *PPU\_Neg\_conseq*= ‘Negative consequences’ dimension from the CSBD\_19porn scale, *PPU\_Relapse*= ‘Relapse’ dimension from the CSBD\_19porn scale, *PPU\_Salience*= ‘Salience’ dimension from the CSBD\_19porn scale, *PPU\_Tolerance*= ‘Tolerance’ dimension from the Problematic Porngraphy Consumption Scale, *Usage\_frequency*= Frequency of pornography use, Religiosity= Single item measuring self-reported religiosity.

**Figure 2**.

Latent profile analysis (seven-class solution) for Sample 2.

A graph of different colored lines

AI-generated content may be incorrect.

# *Note*. CSBD\_19porn = Compulsive Sexual Behavior Disorder Scale-19 modified for pornography use, Moral\_disapproval= Single item for moral disapproval of pornography, *PPU\_Control*= ‘Control’ dimension from the CSBD\_19porn scale, *PPU\_Dissatisfaction*= ‘Dissatisfaction’ dimension from the CSBD\_19porn scale, *PPU\_Neg\_conseq*= ‘Negative consequences’ dimension from the CSBD\_19porn scale, *PPU\_Relapse*= ‘Relapse’ dimension from the CSBD\_19porn scale, *PPU\_Salience*= ‘Salience’ dimension from the CSBD\_19porn scale, *PPU\_Tolerance*= ‘Tolerance’ dimension from the Problematic Porngraphy Consumption Scale, *Usage\_frequency*= Frequency of pornography use, Religiosity= Single item measuring self-reported religiosity.

**Table 1**.

Sociodemographics and natural history of sexual behaviours.

|  |  |  |  |
| --- | --- | --- | --- |
| **Characteristics** | **Sample 1**  **(USA; *N*= 1,356)**  *n* (%) / *M* (SD) | **Sample 2**  **(UK; *N*= 944)**  *n* (%) / *M* (SD) | Chi square tests of independence / Independent samples t-tests |
| ***Sociodemographics*** |  |  |  |
| Age (years) | 36.86 (11.26) | 38.69 (12.26) | *t*(1916)a= -3.63, *p*<.001,*d*= -0.16 |
| Education |  |  |  |
| None | <1% | <1% | χ2(4, *N*=2,300)= 14.92, *p*<.001, *V*= 0.08 |
| Primary/elementary school | 1% | <1% |  |
| Secondary school | 31% | 25% |  |
| Tertiary | 51% | 55% |  |
| Higher education | 17% | 20% |  |
| Relationship status |  |  |  |
| Single | 40% | 29% | χ2(4, *N*=2,300)= 67.55, *p*<.001, *V*= 0.17 |
| In a relationship | 21% | 35% |  |
| Married | 34% | 32% |  |
| Divorced/separated | 4% | 2% |  |
| Widowed | <1% | <1% |  |
| Religious denominationb |  |  |  |
| Agnostic/atheist | 47 | 61 | χ2(6, *N*=2,300)= 7.21,  *p*=0.21, *V*= 0.19 |
| Buddhist | 2 | 1 |  |
| Christian/catholic | 36 | 24 |  |
| Jewish | 2 | 0 |  |
| Muslim | 2 | 3 |  |
| Other | 8 | 5 |  |
| Prefer not to disclose | 4 | 5 |  |
| Religiosityc | 1.31 (1.47) | 0.76 (1.17) | *t*(2,258)a= 9.93, *p*<.001, *d*= 0.41 |
| ***Natural history of sexual behaviours*** |  |  |  |
| Pornography use frequency | 5.19 (1.84) | 5.13 (1.90) | *t*(2,298)= 0.76, *p*=.45 *d*= 0.04 |
| Porn-free masturbation frequency | 3.00 (2.26) | 3.23 (2.42) | *t*(2,298)= -2.29, *p*=.0.03, *d*= -0.10 |
| Partnered sex frequencyd | 3.82 (2.35) | 3.89 (2.40) | *t*(2,118)= -0.75 *p*= 45, *d*= -0.03 |

**Note**. *a*Welch-corrected due to unequal variances. *b*Total exceeds 100% due to individuals with multiple religious denominations (n=18). *c*Religiosity measured on a five-point scale (0= *Definitely not*, 4= *Definitely yes*; Lewczuk et al., 2017). dOnly includes individuals with any history of partnered sex (*N*1=1,219, *N*2 = 901). eSought or considered treatment for pornography problems (0= *No*, 1= *Yes*).

**Table 2**.

Descriptive statistics for dimensions included in the latent profile analysis and auxiliary variables.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Characteristics** | **Sample 1**  **(USA; *N*= 1,356)**  *M* (*SD*) | **Reliability**  **[95% CI]** | **Sample 2**  **(UK; *N*= 944)**  *M* (*SD*) | **Reliability**  **[95% CI]** | Mann-Whitney *U* test / Chi-square test of independence |
| ***LPA dimensions*** |  |  |  |  |  |
| CSBD-19porn Compositea | 32.55 (12.46) | ω= 0.96 [0.96-0.96] | 32.35 (11.53) | ω= 0.95 [0.95-0.96] | *U*= 631652, *p*= 0.59, *Rbc*= -0.01 |
| CSBD-19porn Control | 5.51 (2.56) | ω=0.92 [0.92-0.93] | 5.45 (2.45) | ω= 0.91 [0.90-0.92] | *U*= 640133.50, *p*= .99, *Rbc*= <.01 |
| CSBD-19porn Salience | 4.36 (1.90) | ω= 0.83 [0.81-0.85] | 4.24 (1.62) | ω= 0.78 [0.76-0.81] | *U*= 641,858.00 *p*= .90, *Rbc*<.01 |
| CSBD-19porn Relapse | 5.61 (2.36) | ω= 0.87 [0.86-0.88] | 5.80 (2.34) | ω= 0.87 [0.85-0.88] | *U*= 609,543.50, *p*=.05 , *Rbc*= -0.05 |
| CSBD-19porn Dissatisfaction | 5.71 (2.61) | ω= 0.92 [0.92-0.93] | 5.86 (2.48) | ω= 0.91 [0.90-0.92] | *U*= 610,851.00, *p*= .06, *Rbc*= -0.05 |
| CSBD-19porn Neg. conseq. | 11.37 (4.97) | ω= 0.93 [0.92-0.93] | 11.00 (4.64) | ω= 0.92 [0.91-0.93] | *U*= 653,492.00, *p*= .38, *Rbc*= 0.02 |
| Tolerance (PPCS) | 7.49 (4.32) | ω= 0.89 [0.88-0.90] | 7.32 (4.34) | ω= 0.90 [0.89-0.91] | *U*= 656914, *p*= .28, *Rbc*= 0.03 |
| Frequency of use | 5.19 (1.84) | N/A | 5.13 (1.90) | N/A | *U*= 662548 , *p*= .15, *Rbc*= 0.04 |
| Moral disapproval | 1.97 (1.63) | N//A | 1.82 (1.47) | N//A | *U*= 658096 , *p*= .18, *Rbc*= 0.03 |
| Religiosity | 1.31 (1.47) | N/A | 0.76 (1.17) | N/A | *U*= 766900 , *p*< .001, *Rbc*= 0.20 |
| ***Auxiliary variables*** |  |  |  |  |  |
| Distress (DASS-10) | 6.42 (6.35) | ω= 0.93 [0.92-0.94] | 6.35 (6.03) | ω= 0.93 [0.92-0.94] | *U*= 632796, *p*= .64, *Rbc*= -0.01 |
| Trait impulsivity (SUPPS-P) |  |  |  |  |  |
| Sensation seeking | 9.39 (2.69) | ω= 0.68 [0.65-0.71] | 9.72 (2.60) | ω= 0.65 [0.62-0.69] | *U*= 599101, *p*< .01, *Rbc*= -0.06 |
| Lack of premeditation | 7.18 (1.98) | ω= 0.79 [0.77-0.81] | 7.48 (1.94) | ω= 0.80 [0.78-0.82] | *U*= 585043, *p*< .001, *Rbc*= -0.09 |
| Lack of perseverance | 7.73 (1.99) | ω= 0.70 [0.68-0.73] | 7.99 (1.86) | ω= 0.69 [0.66-0.73] | *U*= 591634, *p*< .01, *Rbc*= -0.08 |
| Positive urgency | 7.53 (2.67) | ω= 0.82 [0.80-0.83] | 7.55 (2.51) | ω= 0.82 [0.80-0.84] | *U*= 633004, *p*= .65, *Rbc*= -0.01 |
| Negative urgency | 8.73 (2.89) | ω= 0.80 [0.78-0.82] | 8.82 (2.69) | ω= 0.80 [0.78-0.82] | *U*= 631960, *p*= .60, *Rbc*= -0.01 |
| Trait compulsivity (CHI-T) |  |  |  |  |  |
| Perfectionism | 2.15 (0.69) | ω= 0.77 [0.75-0.79] | 2.09 (0.65) | ω= 0.75 [0.72-0.77] | *U*= 680130, *p*<.01, *Rbc*= 0.06 |
| Reward drive | 3.93 (2.08) | ω= 0.70 [0.67-0.73] | 4.18 (1.88) | ω= 0.65 [0.62-0.69] | *U*= 596034, *p*<.01, *Rbc*= -0.07 |
| Cognitive rigidity | 11.41 (3.59) | ω= 0.72 [0.70-0.74] | 11.45 (3.01) | ω= 0.63 [0.59-0.66] | *U*= 643228, *p*= .84, *Rbc*<.01 |
| Personality (BFI) |  |  |  |  |  |
| Openness | 7.44 (1.94) | N/A | 7.11 (1.86) | N/A | *U*= 706383, *p*<.001, *Rbc*=0.10 |
| Extraversion | 5.09 (2.26) | N/A | 5.23 (2.13) | N/A | *U*= 614767, *p*=.10, *Rbc*=-0.04 |
| Conscientiousness | 7.37 (1.87) | N/A | 7.02 (1.84) | N/A | *U*= 708152, *p*<.001, *Rbc*=0.11 |
| Agreeableness | 6.77 (1.96) | N/A | 7.01 (1.80) | N/A | *U*= 595104, *p*<.001, *Rbc*=-0.07 |
| Neuroticism | 5.43 (2.24) | N/A | 5.56 (2.16) | N/A | *U*= 618586, *p*=.17, *Rbc*= -0.03 |
| Sought or considered treatment | 126 (9) | N/A | 85 (9) | N/A | χ2 (1) = 0.58, *p*= .45, *V*= 0.02 |

# Note. aCSBDporn composite score was not included in the LPA but presented here to allow the reader to compare each profile’s score to the suggested cut-off (≥50) for the original CSBD-19 scale. BFI = Big Five Inventory (10-item), CHI-T = Cambridge-Chicago Compulsivity Trait Scale, CSBD-19porn = Compulsive Sexual Behaviour Disorder-19 scale modified for pornography use, CSBD-19porn Neg. Conseq.= *Negative consequences* subscale from the CSBD-19porn. DASS-10 = 10-item version of the Depression, Anxiety and Stress scale, LPA = Latent Profile Analysis. Religiosity measured on five-point Likert scale (0= *Definitely not*, 4= *Definitely yes* ),Rbc = Rank biserial correlation coefficient, Tolerance (PPCS)= *Tolerance* subscale from the Problematic Pornography Consumption Scale.

**Table 3**.

Fit indices for class enumeration across samples. Bold values indicate the final class solution for each sample.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Classes | AIC | BIC | CAIC | SABIC | Entropy | n\_min | n\_max | BLRT\_p |
| **Sample 1 (USA; *N*= 1,356)** | | |  |  |  |  |  |  |
| 1 | 56229 | 56504 | 56323 | 56265 | 1.00 | 1.00 | 1 |  |
| 2 | 52331 | 52069 | 51980 | 51898 | 0.908 | 0.361 | 0.639 | < 0.001 |
| 3 | 50506 | 50544 | 50385 | 50349 | 0.92 | 0.154 | 0.498 | < 0.001 |
| 4 | 50463 | 50511 | 50311 | 50264 | 0.868 | 0.115 | 0.399 | < 0.001 |
| **5** | **49746** | **49804** | **49562** | **49505** | **0.925** | **0.079** | **0.472** | **< 0.001** |
| 6 | 49664 | 49732 | 49448 | 49380 | 0.898 | 0.075 | 0.367 | < 0.001 |
| 7 | 49527 | 49605 | 49279 | 49201 | 0.881 | 0.046 | 0.342 | < 0.001 |
| 8 | 49591 | 49679 | 49311 | 49223 | 0.804 | 0.047 | 0.263 | 0.545 |
| 9 | 49627 | 49725 | 49316 | 49217 | 0.79 | 0.061 | 0.220 | < 0.001 |
| 10 | 49646 | 49754 | 49303 | 49194 | 0.757 | 0.000 | 0.225 | < 0.001 |
| **Sample 2 (UK; *N*= 944)** | | |  |  |  |  |  |  |
| 1 | 37958 | 38221 | 38045 | 37988 | 1.00 | 1.00 | 1.00 |  |
| 2 | 35230 | 35366 | 35277 | 35176 | 0.914 | 0.297 | 0.703 | < 0.001 |
| 3 | 34428 | 34468 | 34347 | 34209 | 0.901 | 0.156 | 0.501 | < 0.001 |
| 4 | 34235 | 34468 | 34315 | 34141 | 0.875 | 0.0657 | 0.431 | < 0.001 |
| 5 | 34049 | 34330 | 34146 | 33934 | 0.826 | 0.0487 | 0.345 | < 0.001 |
| 6 | 33619 | 33949 | 33733 | 33485 | 0.884 | 0.0413 | 0.400 | < 0.001 |
| **7** | **33190** | **33790** | **33542** | **33257** | **0.869** | **0.0434** | **0.351** | **< 0.001** |
| 8 | 33124 | 33624 | 33345 | 33023 | 0.876 | 0.0159 | 0.342 | < 0.001 |
| 9 | 33133 | 33609 | 33298 | 32939 | 0.87 | 0.0169 | 0.332 | < 0.001 |
| 10 | 33075 | 33599 | 33256 | 32861 | 0.866 | 0.0169 | 0.315 | < 0.001 |

# Note: AIC = Akaike Information Criterion, BIC = Bayesian Information Criterion , CAIC = Corrected Akaike Information Criterion, SABIC = sample size adjusted Bayesian Information Criterion , n\_min= minimum number of individuals included in each profile, n\_max = maximum number of individuals included in each profile, BLRT\_p = *p* value for the Bootstrapped Likelihood Ratio Test.

**Table 4.** Group comparisons (ANOVA with 2,500 bootstrap permutations) across profiles (Sample 1) presented as mean (SD) or n (%)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | Total Sample (*N*=1,356) | | Skewness (Kurtosis) | Profile 1  Not at risk  (*n*=640; 47%) | | Profile 2  Low risk  (*n*=360; 27%) | | Profile 3  At risk for religious-based MI  (*n*=114; 8%) | | Profile 4  At risk for co-occurring PPU and religious-based MI  (*n*=107; 8%) | | | Profile 5  At risk for PPU  (*n*=135; 10%) | | *F(H)*a | *η*2 |
| ***LPA variables*** | | |  | |  |  | |  | |  | |  | | |  | |  |  |
| CSBDporn Compositeb | | | 32.55 (12.46) | | 0.74 (-0.31) | 21.99 (3.35)1,2,3,4 | | 36.66 (4.64)1,4,5 | | 35.49 (7.21)1,4,5 | | 55.62 (6.47)1,2,3,5 | | | 50.88 (5.85)1,2,3,4 | | 1,1102.05\*\*\* | 0.86 |
| CSBDporn Control | | | 5.51 (2.56) | | 0.76 (-0.39) | 3.44 (0.86)2,3,4,5 | | 6.28 (1.43)1,4,5 | | 6.31 (1.61)1,4,5 | | 9.70 (1.56)1,2,3,5 | | | 9.24 (1.60)1,2,3,4 | | 1038.39\*\*\* | 0.76 |
| CSBDporn Salience | | | 4.36 (1.90) | | 1.51 (1.93) | 3.28 (0.74)2,3,4,5 | | 4.56 (1.49)1,4,5 | | 4.39 (1.51)1,4,5 | | 7.59 (2.35)1,2,3,5 | | | 6.36 (1.93)1,2,3,4 | | 632.42\*\*\* | 0.49 |
| CSBDporn Relapse | | | 5.61 (2.36) | | 0.5 (-0.71) | 3.74 (1.16)2,3,4,5 | | 6.67 (1.43)1,3,4,5 | | 6.21 (1.71)1,2,4,5 | | 8.93 (1.56)1,2,3 | | | 8.58 (1.51)1,2,3 | | 922.50\*\*\* | 0.67 |
| CSBDporn Dissatisfaction | | | 5.71 (2.61) | | 0.52 (-0.85) | 3.94 (1.60)2,3,4,5 | | 6.70 (2.09)1,3,4,5 | | 6.14 (2.25)1,2,4,5 | | 9.00 (1.67)1,2,3 | | | 8.44 (2.18)1,2,3 | | 672.13\*\*\* | 0.49 |
| CSBDporn Negative conseq. | | | 11.37 (4.97) | | 1.01 (0.13) | 7.60 (1.28)2,3,4,5 | | 12.46 (2.98)1,4,5 | | 12.45 (3.67)1,4,5 | | 20.40 (3.66)1,2,3,5 | | | 18.27 (3.35)1,2,3,4 | | 988.81\*\*\* | 0.74 |
| Tolerance | | | 7.49 (4.32) | | 0.89 (0.01) | 5.05 (2.62)2,3,4,5 | | 7.76 (3.36)1,4,5 | | 7.75 (3.38)1,4,5 | | 13.88 (3.87)1,2,3 | | | 13.10 (3.36)1,2,3 | | 596.17\*\*\* | 0.49 |
| Frequency of use | | | 5.19 (1.84) | | 0.03 (-0.38) | 4.97 (1.88)2,5 | | 5.34 (1.64)1,3,5 | | 4.67 (2.07)2,4,5 | | 5.45 (1.92)3,5 | | | 6.11 (1.57)1,2,3,4 | | 60.16\*\*\* | 0.04 |
| Moral disapproval | | | 1.97 (1.63) | | 1.71 (1.93) | 1.22 (0.60)2,3,4,5 | | 1.39 (0.66)1,3,4,5 | | 5.09 (1.15)1,2,5 | | 5.29 (1.27)1,2,5 | | | 1.81 (0.90)1,2,3,4 | | 788.01\*\*\* | 0.77 |
| Religiosity | | | 1.41 (1.47) | | 0.63 (-1.12) | 1.04 (1.37)3,4 | | 0.96 (1.26)3,4 | | 2.66 (1.43)1,2,5 | | 2.76 (1.24)1,2 | | | 1.24 (1.33)4,3 | | 219.02\*\*\* | 0.18 |
| ***Auxiliary variables*** | | |  | |  |  | |  | |  | |  | | |  | |  |  |
| Age (years) | | | 36.86 (11.26) | | 0.84 (0.49) | 38.27 (38.27)4,5 | | 37.49 (37.49)4,5 | | 37.35 (37.35)4,5 | | 31.37 (31.37)1,2,3 | | | 32.43 (32.43)1,2,3 | | 60.44\*\*\* | 0.04 |
| Relationship status | | |  | |  |  | |  | |  | |  | | | *X*2 (16) = 26.49, *p*=.05 | | | |
| Single | | | 546 (40) | | - | 236 (37) | | 156 (43) | | 45 (39) | | 49 (46) | | | 60 (44) | |  |  |
| In a relationship | | | 284 (21) | | - | 140 (22) | | 82 (23) | | 15 (14) | | 15 (14) | | | 32 (24) | |  |  |
| Married | | | 462 (34) | | - | 226 (35) | | 106 (29) | | 48 (42) | | 41 (38) | | | 41 (30) | |  |  |
| Divorced/separated | | | 58 (4) | | - | 35 (5) | | 13 (4) | | 6 (5) | | 2 (2) | | | 2 (1) | |  |  |
| Widowed | | | 6 (1) | | - | 3 (1) | | 3 (1) | | 0 (0) | | 0 (0) | | | 0 (0) | |  |  |
| Frequency of partnered sexc | | | 3.82 (2.35) | | 0.68 (-0.23) | 3.84 (2.36) | | 3.67 (2.45) | | 3.90 (2.06) | | 4.05 (2.19) | | | 3.88 (2.38) | | 5.18 | <0.01 |
| Frequency of porn-free masturbation | | | 3.00 (2.26) | | 1.29 (0.89) | 2.97 (2.19) | | 2.88 (2.20) | | 2.88 (2.40) | | 3.45 (2.57) | | | 3.27 (2.32) | | 7.00 | <0.01 |
| DASS-10 | | | 6.42 (6.35) | | 0.98 (0.19) | 4.09 (4.96)2,3,4,5 | | 6.53 (5.50)1,4,5 | | 6.33 (5.80)1,4,5 | | 13.54 (6.93)1,2,3,5 | | | 11.55 (7.11)1,2,3,4 | | 266.48\*\*\* | 0.23 |
| SUPPS-P | | |  | |  |  | |  | |  | |  | | |  | |  |  |
| Sensation seeking | | | 9.39 (2.69) | | -0.04 (-0.56) | 9.19 (2.81)4 | | 9.30 (2.54)4 | | 9.74 (2.56) | | 10.27 (2.63)1,2 | | | 9.63 (2.51) | | 19.61\*\*\* | 0.01 |
| Lack of premeditation | | | 7.18 (1.98) | | 0.28 (0.23) | 6.82 (1.92)2,3,5 | | 7.50 (1.93)1 | | 7.39 (2.02)1 | | 7.32 (1.96) | | | 7.75 (2.07)1 | | 45.64\*\*\* | 0.03 |
| Lack of perseverance | | | 7.73 (1.99) | | 0.19 (0.18) | 7.55 (1.95)2 | | 8.02 (1.94)1 | | 7.69 (2.13) | | 7.54 (1.92) | | | 7.96 (2.17) | | 16.14\*\*\* | 0.01 |
| Positive urgency | | | 7.53 (2.67) | | 0.48 (-0.32 | 6.59 (2.46)2,3,4,5 | | 7.79 (2.32)1,4,5 | | 8.06 (2.51)1,4 | | 9.98 (2.85)1,2,3,5 | | | 8.90 (2.42)1,2,4 | | 214.40\*\*\* | 0.16 |
| Negative urgency | | | 8.73 (2.89) | | 0.08 (-0.67) | 7.56 (2.70)2,3,4,5 | | 9.14 (2.50)1,4,5 | | 9.30 (2.75)1,4,5 | | 11.34 (2.20)1,2,3 | | | 10.64 (2.51)1,2,3 | | 267.17\*\*\* | 0.19 |
| CHI-T | | |  | |  |  | |  | |  | |  | | |  | |  |  |
| Perfectionism | | | 2.15 (0.69) | | -0.55 (0.38) | 2.22 (0.68)2 | | 2.06 (0.66)1 | | 2.18 (0.75) | | 2.11 (0.70) | | | 2.11 (0.70) | | 16.12\*\*\* | 0.01 |
| Reward drive | | | 3.93 (2.08) | | 0.04 (-0.50) | 3.14 (2.03)2,3,4,5 | | 4.22 (1.76)1,4,5 | | 4.02 (1.84)1,4,5 | | 5.73 (1.69)1,2,3 | | | 5.34 (1.67)1,2,3 | | 246.52\*\*\* | 0.18 |
| 11.41 (3.59) | -0.20 (0.41) | 10.47 (3.84)2,3,4,5 | | 11.74 (3.01)1,4,5 | | | 11.61 (3.31)1,4,5 | | 13.75 (3.06)1,2,3 | | 12.98 (2.83)1,2,3 | | 117.26\*\*\* | 0.09 | |
| Personality (BFI) | | |  | |  |  | |  | |  | |  | | |  | |  |  |
| Openness | | | 7.44 (1.94) | | -0.46 (-0.32) | 7.62 (2.00)3 | | 7.36 (1.91) | | 7.07 (1.95)1 | | 7.07 (1.70) | | | 7.44 (1.79) | | 3.47\*\*\* | 0.01 |
| Extraversion | | | 5.09 (2.26) | | 0.35 (-0.75) | 5.28 (2.38) | | 4.92 (2.22) | | 5.25 (2.14) | | 4.73 (1.95) | | | 4.78 (2.08) | | 3.04\* | <.01 |
| Conscientiousness | | | 7.37 (1.87) | | -0.26 (-0.81) | 7.76 (1.83)2,4,5 | | 7.06 (1.73)1,3 | | 7.68 (1.86)1,2,4,5 | | 6.63 (1.99)1,3,5 | | | 6.68 (1.84)1,3 | | 19.96\*\*\* | 0.06 |
| Agreeableness | | | 6.77 (1.96) | | -0.35 (-0.43) | 7.00 (2.03)5 | | 6.65 (1.85) | | 6.68 (1.89) | | 6.51 (1.91) | | | 6.33 (1.87)1 | | 4.74\*\*\* | 0.01 |
| Neuroticism | | | 5.43 (2.24) | | 0.24 (-0.80) | 4.98 (2.25)2,4,5 | | 5.63 (2.19)4,5 | | 5.48 (2.17)1,4,5 | | 6.32 (1.95)1,2,3 | | | 6.28 (2.12)1,2,3 | | 16.92\*\*\* | 0.05 |
| Sought/considered treatment | | |  | | - | 5 (1) | | 29 (8) | | 9 (8) | | 51 (48) | | | 41 (30) | | *X*2 (14) = 299.86, *p*<.001 | |

Note: BFI = Big Five Intentory (10-item), Conseq. = Consequences, CSBDporn = Compulsive Sexual Behaviour Disorder-19 scale modified for pornography use, CHI-T = Cambridge-Chicago Compulsivity Trait Scale, DASS-10 = 10-item version of the Depression, Anxiety and Stress scale, LPA= Latent Profile Analysis. Religiosity measured on a five-point Likert scale (0= Not at all, 4= Very religious). Frequency of sexual behaviours (pornography use, porn-free masturbation, partnered sex) measured on a nine-point scale (1= *Never*, 9= *Multiple times per day*). Sought/considered treatment = binary variable indicating previously considering/seeking treatment for pornography use (0= *No*, 1= *Yes*), aH represents the Kruskal-Wallis H test results to account for non-normality. bCSBDporn Composite score not included in the LPA but presented here to allow the reader to compare each profile’s score to the suggested cut-off (≥50) for the original CSBD-19 scale. cIncludes only those with history of partnered sex (*n*=1,219).

\* *p*<.05

\*\*\* *p*<.001

**Table 5.**

Group comparisons (ANOVA with 2,500 bootstrap permutations) across profiles (Sample 2) presented as mean (SD) or n (%)

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Total Sample (*N*=944) | Skewness (kurtosis) | Profile 1  Not at risk (sporadic user)  *n*= 331, 35% | Profile 2  Not at risk (frequent user)  *n*= 51, 5% | Profile 3  Low risk  *n*= 266, 28% | Profile 4  Moderate risk for PPU  *n*= 136, 14% | Profile 5  At risk for religious-based MI  *n*= 41, 4% | Profile 6  At risk for co-occurring PPU ad religious-based MI  *n*= 60, 6% | Profile 7  At risk for PPU  *n*= 59, 6% | *F(H)*a | *η*2 |
| ***LPA variables*** |  |  |  |  |  |  |  |  |  |  |  |
| CSBDporn Compositeb | 32.35 (11.53) | 0.81 (0.01) | 21.96 (2.97)3,4,5,6,7 | 21.94 (3.04)3,4,5,6,7 | 32.80 (3.91)1,2,4,6,7 | 42.65 (4.13)1,2,3,5,6,7 | 30.95 (6.16)1,2,4,6,7 | 51.22 (7.47)1,2,3,4,5,7 | 55.59 (5.50)1,2,3,4,5,6 | 937.00\*\*\* | 0.87 |
| CSBDporn Control | 5.45 (2.45) | 0.80 (-0.24) | 3.42 (0.82)3,4,5,6,7 | 3.47 (0.76)3,4,5,6,7 | 5.41 (1.28)1,2,4,6,7 | 7.73 (1.30)1,2,3,5,6,7 | 4.85 (1.46)1,2,4,6,7 | 9.18 (1.64)1,2,3,4,5,7 | 10.10 (1.32)1,2,3,4,5,6 | 711.51\*\*\* | 0.78 |
| CSBDporn Salience | 4.24 (1.62) | 1.21 (0.73) | 3.21 (0.57)2,3,4,5,6,7 | 3.20 (0.72)1,3,4,6,7 | 4.30 (1.26)1,2,4,6,7 | 5.41 (1.64)1,2,3,5,7 | 3.90 (1.36)1,4,6,7 | 5.83 (1.95)1,2,3,5,7 | 6.59 (1.70)1,2,3,4, 5,6 | 419.10\*\*\* | 0.44 |
| CSBDporn Relapse | 5.80 (2.34) | 0.45 (-0.59) | 3.66 (1.01)3,4,5,6,7 | 3.88 (1.18)3,4,5,6,7 | 6.47 (1.35)1,2,4,5,6,7 | 7.72 (1.45)1,2,3,5,6,7 | 5.27 (1.52)1,2,3,4,6,7 | 8.62 (1.80)1,2,3,4,5,7 | 9.47 (1.39)1,2,3,4,5,6 | 358.38\*\*\* | 0.70 |
| CSBDporn Dissatisfaction | 5.86 (2.48) | 0.40 (-0.81) | 4.03 (1.60)3,4,5,6,7 | 3.96 (1.67)3,4,5,6,7 | 6.32 (1.87)1,2,4,6,7 | 7.47 (1.80)1,2,3,5,6,7 | 6.10 (2.43)1,2,4,6,7 | 8.83 (1.88)1,2,3,4,5 | 8.81 (2.08)1,2,3,4,5 | 141.40\*\*\* | 0.48 |
| CSBDporn Neg. conseq. | 11.00 (4.64) | 1.17 (0.64) | 7.64 (1.25)3,4,5,6,7 | 7.43 (0.90)3,4,5,6,7 | 10.30 (2.63)1,2,4,6,7 | 14.32 (3.07)1,2,3,5,6,7 | 10.83 (2.62)1,2,4,6,7 | 18.75 (3.82)1,2,3,4,5,7 | 20.61 (2.70)1,2,3,4,5,6 | 451.28\*\*\* | 0.74 |
| Tolerance | 7.32 (4.34) | 1.01 (0.24) | 4.62 (2.30)3,4,5,6,7 | 4.76 (2.00)3,4,5,6,7 | 6.72 (3.02)1,2,4,6,7 | 10.35 (3.65)1,2,3,5,6,7 | 7.41 (4.11)1,2,4,6,7 | 13.13 (4.46)1,2,3,4,5 | 14.47 (3.24)1,2,3,4,5 | 165.84\*\*\* | 0.52 |
| Frequency of use | 5.13 (1.90) | 0.28 (-0.23) | 4.17 (1.42)2,3,4,6,7 | 8.84 (0.46)1,3,4,5,6,7 | 5.35 (1.66)1,2,5 | 5.71 (1.53)1,2,5 | 4.05 (2.16)2,3,4,6,7 | 5.03 (1.95)1,2,5,7 | 5.88 (1.51)1,2,5,6 | 79.10\*\*\* | 0.34 |
| Moral disapproval | 1.82 (1.47) | 2.04 (3.43) | 1.24 (0.54)2,4,5,6,7 | 1.57 (0.90)1,5,6 | 1.28 (0.56)4,5,6,7 | 1.77 (0.94)1,3,5,6 | 5.07 (1.01)1,2,3,4,6,7 | 5.73 (1.09)1,2,3,4,5,7 | 1.64 (0.91)1,3,5,6 | 487.68\*\*\* | 0.76 |
| Religiosity | 0.76 (1.17) | 1.40 (0.77) | 0.56 (0.97)4,5,6 | 0.53 (0.90)5,6 | 0.50 (0.89)4,5,6 | 0.99 (1.31)1,3,5,6 | 1.98 (1.51)1,2,3,4,7 | 2.13 (1.42)1,2,3,4,7 | 0.54 (1.01)5,6 | 31.93\*\*\* | 0.17 |
| **Auxiliary variables** |  |  |  |  |  |  |  |  |  |  |  |
| Age (years) | 38.69 (12.26) | 0.62 (-0.20) | 40.95 (12.20)4,6,7 | 40.20 (12.85)6 | 39.23 (11.84)6 | 36.18 (12.21)1 | 35.68 (12.92) | 34.08 (11.88)1,3 | 34.76 (10.76)1 | 6.07\*\*\* | 0.04 |
| Relationship status |  |  |  |  |  |  |  |  |  | *X*2(24) = 64.30, *p*<.001 | |
| Single | 277 (29) | - | 90 (27) | 10 (20) | 87 (33) | 41 (30) | 11 (27) | 20 (33) | 18 (31) |  |  |
| In a relationship | 334 (35) | - | 109 (33) | 21 (41) | 94 (35) | 51 (38) | 14 (34) | 18 (30) | 27 (46) |  |  |
| Married | 306 (32) | - | 127 (38) | 16 (31) | 78 (29) | 39 (29) | 15 (37) | 20 (33) | 11 (19) |  |  |
| Divorced/separated | 23 (2) | - | 5 (2) | 1 (2) | 7 (3) | 5 (4) | 0 (0) | 2 (3) | 3 (5) |  |  |
| Widowed | 4 (1) | - | 0 (0) | 3 (6) | 0 (0) | 0 (0) | 1 (2) | 0 (0) | 0 (0) |  |  |
| Freq. of partnered sexc | 3.89 (2.40) | 0.80 (-0.08) | 4.08 (2.37) | 4.10 (2.41) | 3.69 (2.31) | 3.84 (2.52) | 4.28 (2.60) | 3.77 (2.58) | 3.51 (2.38) | 1.13 | <0.01 |
| Freq. of porn-free mast. | 3.23 (2.42) | 1.22 (0.55) | 3.12 (2.21) | 3.49 (2.80) | 3.33 (2.55) | 3.26 (2.46) | 2.46 (2.05) | 3.55 (2.68) | 3.32 (2.36) | 1.17 | <0.01 |
| DASS-10 (psych. distress) | 6.35 (6.03) | 1.02 (0.52) | 4.31 (4.92)3,4,6,7 | 4.75 (4.61)4,6,7 | 5.96 (5.54)1,4,6,7 | 8.76 (6.03)1,2,3,5,7 | 5.54 (6.07)4,6,7 | 10.38 (6.59)1,2,3,5 | 11.93 (7.22)1,2,3,4,5 | 27.81\*\*\* | 0.15 |
| SUPPS-P (trait impulsivity) |  |  |  |  |  |  |  |  |  |  |  |
| Sensation seeking | 9.72 (2.60) | 0.00 (-0.52) | 9.70 (2.69) | 10.20 (2.54) | 9.48 (2.53) | 9.95 (2.46) | 10.29 (2.38) | 9.92 (2.95) | 9.37 (2.54) | 1.40 | <0.01 |
| Lack of premeditation | 7.48 (1.94) | 0.32 (0.70) | 7.19 (1.83)4 | 7.22 (1.78) | 7.35 (1.93)4 | 8.13 (2.05)1,3 | 8.10 (1.95) | 7.50 (1.77) | 7.97 (2.21) | 5.59\*\*\* | 0.03 |
| Lack of perseverance | 7.99 (1.86) | 0.22 (0.75) | 7.94 (1.78) | 7.71 (1.69) | 7.97 (1.81) | 8.29 (2.09) | 7.93 (2.04) | 7.80 (1.98) | 8.22 (1.84) | 1.08 | <0.01 |
| Positive urgency | 7.55 (2.51) | 0.51 (-0.06) | 6.71 (2.32)3,4,5,6,7 | 6.90 (2.27)4,5,6,7 | 7.47 (2.25)1,4,6,7 | 8.50 (2.39)1,2,3,6,7 | 8.63 (2.90)1,2 | 8.93 (2.77)1,2,3 | 8.83 (2.55)1,2,3 | 18.84\*\*\* | 0.11 |
| Negative urgency | 8.82 (2.69) | 0.14 (-0.49) | 7.67 (2.49)2,3,4,5,6,7 | 7.43 (2.21)3,4,5,6,7 | 8.94 (2.34)1,2,4,6,7 | 9.99 (2.41)1,2,3,7 | 9.37 (2.88)1,2,7 | 10.33 (2.60)1,2,3 | 11.25 (2.49)1,2,3,4,5 | 34.19\*\*\* | 0.18 |
| CHI-T (trait compulsivity) |  |  |  |  |  |  |  |  |  |  |  |
| Perfectionism | 2.09 (0.65) | -0.29 (0.14) | 2.11 (0.62) | 2.16 (0.64) | 2.09 (0.60) | 2.00 (0.73) | 2.24 (0.49) | 2.03 (0.82) | 1.97 (0.64) | 1.44 | <0.01 |
| Reward drive | 4.18 (1.88) | 0.04 (-0.21) | 3.48 (1.78)3,4,5,6,7 | 3.41 (1.88)3,4,6,7 | 4.21 (1.59)1,2,4,6,7 | 4.92 (1.78)1.2.3.7 | 4.44 (2.05)1,7 | 5.10 (1.79)1,2,3 | 5.83 (1.72)1,2,3,4,5 | 26.48\*\*\* | 0.14 |
| Cognitive rigidity | 11.45 (3.01) | -0.02 (0.20) | 10.61 (2.98)3,4,5,6,7 | 10.08 (3.15)3,4,5,6,7 | 11.56 (2.81)1,2,7 | 12.33 (2.68)1,2 | 12.61 (3.06)1,2 | 12.60 (2.76)1,2 | 12.81 (2.98)1,2,3 | 13.56\*\*\* | 0.08 |
| Personality (BFI) |  |  |  |  |  |  |  |  |  |  |  |
| Openness | 7.11 (1.86) | -0.34 (-0.43) | 7.11 (1.87) | 6.9 (1.89) | 7.18 (1.87) | 7.08 (1.77) | 6.80 (1.74) | 7.22 (1.80) | 7.00 (2.12) | 0.36 | <0.01 |
| Extraversion | 5.23 (2.13) | 0.40 (-0.57) | 5.49 (2.20)7 | 5.45 (2.32) | 5.06 (2.07) | 5.14 (2.05) | 5.90 (2.11)7 | 4.93 (1.91) | 4.39 (1.95)1,5 | 3.69\*\*\* | 0.02 |
| Conscientiousness | 7.02 (1.80) | -0.18 (-0.54) | 7.41 (1.78)7 | 7.31 (1.71)4,7 | 7.04 (1.78)4,7 | 6.40 (1.93)1,2,3 | 7.15 (1.67)7 | 6.78 (1.78) | 6.03 (1.88)1,2,3,5,7 | 8.71\*\*\* | 0.05 |
| Agreeableness | 7.01 (1.80) | -0.48 (-0.11) | 7.18 (1.90)7 | 7.57 (1.63)7 | 6.99 (1.72) | 6.71 (1.62) | 6.93 (1.94) | 7.13 (1.77) | 6.31 (1.79)1,2 | 3.56\*\*\* | 0.02 |
| Neuroticism | 5.56 (2.16) | 0.25 (-0.70) | 5.06 (2.15)1,4 | 4.80 (1.83)1,3,4,7 | 5.79 (2.06)1,2 | 6.24 (2.10)2,3 | 5.39 (2.18) | 5.68 (2.07) | 6.36 (2.35)2,7 | 8.49\*\*\* | 0.05 |
| Sought/considered treatment | 85 (9) | - | 0 (0) | 1 (2) | 11 (4) | 20 (15) | 4 (10) | 22 (37) | 27 (46) | *X*2(6) = 203.80, *p*<.001 | |

Note: BFI = Big Five Inventory (10-item), CSBDporn = Compulsive Sexual Behaviour Disorder-19 scale modified for pornography use, CHI-T = Cambridge-Chicago Compulsivity Trait Scale, DASS-10 = 10-item version of the Depression, Anxiety and Stress scale, LPA = Latent profile analysis, SUPPS-P = short version of the UPPS-P impulsivity scale. Religiosity measured on a five-point Likert scale (0= *Definitely not*, 4= *Definitely yes*). Frequency of sexual behaviours (pornography use, porn-free masturbation, partnered sex) measured on a 9-point scale (1= *Never* , 9= *Multiple times per day*). Neg. conseq.= Negative consequences. Freq.= Frequency, Mast. = Masturbation, Psych.= Psychological. a*H* represents the Kruskal-Wallis *H* test results to account for non-normality. bCSBDporn Composite score not included in the LPA but presented here to allow the reader to compare each profile’s score to the suggested cut-off (≥50) for the original CSBD-19 scale. cIncludes only those with history of partnered sex (*n*=1,219).

\*\*\* *p*<.001.

**Table 6.** Relative proportions of clinically relevant profiles across samples.

|  |  |  |
| --- | --- | --- |
| **Class** | **Sample 1** | **Sample 2** |
| At risk for religious-based MIa | 31% | 25% |
| At risk for co-occurring religious-based MI and PPUb | 31% | 37.50% |
| At risk for PPUc | 38% | 37.50% |

# Note: aClass 3 in Sample 1, Class 5 in Sample 2; bClass 4 in Sample 1, Class 6 in Sample 2; cClass 5 in Sample 1, Class 7 in Sample 2