Problematic Pornography Use (PPU) and its Psychopathological Correlates

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Abstract

Background

The overarching aim of this doctoral work is to advance the empirical and methodological understanding of Problematic Pornography Use (PPU) by (a) systematically mapping existing scholarship and (b) generating robust cross-cultural evidence on its psychopathological correlates. To this end, two complementary studies (Study 1 and Study 2) were designed and performed. Study 1 adopted a scientometric perspective to investigate the existing literature: (1) analysing the global structure of knowledge on PPU (countries, journals, authors, keywords), (2) identifying the most influential documents, and (3) defining the field's main thematic domains through a large-scale, data-driven mapping. Insights from that review revealed substantial gaps in gender-sensitive, affect-focused research and directly informed an empirical investigation on depression and anxiety symptoms' associations with PPU across genders. Study 2 used the database of the International Sex Surevy (ISS), an international, multi-lab, multi-language study that uses cross-sectional and self-report survey methods in 42 countries, this doctoral work (1) compared mean levels of PPU, depression and anxiety across men, women and gender-diverse adults, (2) clarified overall depression- and anxiety-PPU associations, and (3) investigated whether those links are moderated by gender.

Materials and Methods

Study 1 extracted 516 Scopus-indexed articles published between 1973 and April 2024 and their 29,133 cited references. Using CiteSpace, a document co-citation network was generated and clustered; keyword-co-occurrence, country, journal and author analyses were also performed. Study 2 based on the International Sex Survey, analysing responses from 82,243 adults (39.6% men, 57.0% women, 3.4% gender-diverse) in 42 countries. PPU was assessed with the Problematic Pornography Consumption Scale (PPCS); depression and anxiety with the Brief Symptom Inventory (BSI-18). One-way ANOVAs compared group means; Pearson correlations gauged overall associations; and hierarchical linear regressions with interaction terms tested gender moderation.

Results

Study 1 produced a 407-node co-citation network (modularity = 0.865; mean silhouette = 0.964) that resolved into six main thematic clusters. Publication output grew around 6 % per year; the United States, United Kingdom and China were the most prolific countries; the Journal of Behavioral Addictions and Journal of Sexual

Medicine were core outlets; and keyword evolution showed a shift from "pornography"/ "internet addiction" toward ICD-11-aligned terms such as "compulsive sexual behaviour disorder". Study 2 found significant gender differences: men reported the highest PPU scores (M = 38.55), gender-diverse participants the highest depression (M = 10.64) and anxiety (M = 9.75), and women the lowest PPU (M = 24.24). Across the whole sample, PPU correlated weakly but positively with anxiety (r = 0.207) and depression (r = 0.249). Moderation analysis revealed that men exhibited the strongest association between psychological distress and PPU, suggesting that they may rely more heavily on pornography as a maladaptive coping mechanism

Conclusions

By coupling a macro-level scientometric map with a micro-level, gender-moderated test of affective correlates, this thesis provides (i) the first data-driven cartography of PPU scholarship and (ii) the largest cross-cultural evidence to date on how depression and anxiety relate to PPU across gender identities. The findings consolidate the field around six thematic domains, spotlight the theoretical salience of moral incongruence and gender norms, and underscore the need for gender-sensitive assessment tools and interventions that address both emotional dysregulation and sociocultural value conflict. Together, Study 1 and Study 2 lay an empirical foundation for longitudinal, intersectional and multi-method research aimed at refining diagnostic guidelines and informing evidence-based clinical practice.

List of Abbreviations

2D	Two-Dimensional
ACT	Acceptance and Commitment Therapy
ACSID-11	Assessment of Criteria for Specific Internet-use Disorders – 11-item version
ADHD	Attention-Deficit Hyperactivity Disorder
AI	Artificial Intelligence
ANOVA	Analysis of Variance
ASEX	Arizona Sexual Experiences Scale
ASRS	Adult ADHD Self-Report Scale
AUDIT	Alcohol Use Disorders Identification Test
BEDS-7	Binge Eating Disorder Screener-7
BPD	Borderline Personality Disorder
BSI-18	Brief Symptom Inventory-18
CBT	Cognitive Behavioral Therapy
CI	Confidence Interval
CIUS	Compulsive Internet Use Scale
COVID-19	Coronavirus Disease 2019
CPC	Compulsive Pornography Consumption Scale
CCS	Cyberporn Compulsivity Scale
CSB	Compulsive Sexual Behaviour
CSBD	Compulsive Sexual Behaviour Disorder
CSBD-19	19-item Compulsive Sexual Behaviour Disorder Scale
DCA	Document Co-Citation Analysis
DSM	Diagnostic and Statistical Manual of Mental Disorders
EU	European Union
FPU	Frequent Pornography Use
GAD	Generalized Anxiety Disorder

GCS	Global Citing Score
GD	Gender-Diverse
GMSEX	Global Measure of Sexual Satisfaction
HBI	Hypersexual Behaviour Inventory
HD	Hypersexual Disorder
ICD	International Classification of Diseases
ICD-11	International Classification of Diseases, 11th Revision
ISS	International Sex Survey
LGBTQ+	Lesbian, Gay, Bisexual, Transgender, Queer/Questioning +
LL	Lower Limit (of CI)
LLR	Log-Likelihood Ratio
M	Mean value
MCPs	Multiple-Country Publications
NPHFU	Non-Problematic High-Frequency Use
NPLFU	Non-Problematic Low-Frequency Use
OCD	Obsessive-Compulsive Disorder
OSF	Open Science Framework
PCI	Pornography Consumption Inventory
PCE-S	Pornography Craving Experience – Strength form
PCES	Pornography Consumption Effects Scale
PCES-R	Pornography Consumption Effects Scale–Revised
PCES-SF	Pornography Consumption Effects Scale–Short Form
PDs	Personality Disorders
PHFU	Problematic High-Frequency Use
PPU	Problematic Pornography Use
PPCS	Problematic Pornography Consumption Scale
PPCS-6	6-item Problematic Pornography Consumption Scale
PPUS	Problematic Pornography Use Scale
PTSD	Post-Traumatic Stress Disorder

RMSEA	Root Mean-Square Error of Approximation
SCPs	Single-Country Publications
SDS	Social Desirability Scale (Marlowe–Crowne)
SD	Standard Deviation
SE	Standard Error
SEM	Structural Equation Modelling
SUD	Substance Use Disorder
UK	United Kingdom
UL	Upper Limit (of CI)
US	United States
VR	Virtual Reality
WHO	World Health Organization
ηp^2	Partial Eta Squared

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CHAPTER 1 - Background and Rationale

Sexual Behaviours and Compulsive Sexual Behaviour Disorder (CSBD)

1.1.1 Sexual Behaviours and Sexual Health

Sexuality is a fundamental part of every individual's life and encompasses a wide range of basic yet complex behaviours. For a long time, literature and scientific research mainly focused on organic alterations in sexual life (erectile dysfunction, dyspareunia, difficulty in conceiving, etc.), giving little attention to sexual behaviour disturbances. The World Health Organization now frames sexual health as "a state of physical, emotional, mental and social well-being in relation to sexuality, not merely the absence of disease or dysfunction", a definition that underlines pleasure, autonomy and diversity as core health goals (WHO, 2024). The term "sexual behaviour" conventionally comprehends a wide range of activities such as masturbation, pornography use, cybersex, sex fantasies and sex with consenting adults, including paid sexual services (Reid et al., 2012; Castro-Calvo J et al., 2020; Kowalewska et al., 2019; Wéry et al., 2016). Studies published over the last decade consistently show that the range of activities people enjoy vary by age, gender, culture and relational context; yet remain non-pathological so long as they do not lead to distress or functional impairment (Kafka, 2010; Kraus et al., 2018). Koós (2023) emphasises that diversity must be interpreted against socio-cultural norms: behaviours experienced as "excessive" in one environment may be fully normative in another, and feelings of moral incongruence (i.e., conflict between personal conduct and moral standards) can masquerade as loss of control even when objective impairment is absent (Koós et al., 2023).

1.1.2 Compulsive Sexual Behaviour Disorder (CSBD)

Over the last few decades, it strongly emerged how experiencing problems with one's sexuality may result in significant distress (Bőthe et al., 2021; Kraus et al., 2018). This led the World Health Organization (WHO) to include Compulsive Sexual Behaviour Disorder (CSBD) in the 11th edition of the International Classification of Diseases (ICD- 11; WHO, 2018). CSBD is described as an impulse control disorder, characterised by:

"a persistent pattern of failure to control intense, repetitive sexual impulses or urges resulting in repetitive sexual behaviour. Symptoms may include repetitive sexual activities becoming a central focus of the person's life to the point of neglecting health and personal care or other interests, activities and responsibilities; numerous unsuccessful efforts to significantly reduce repetitive sexual behaviour; and continued repetitive sexual behaviour despite adverse consequences or deriving little or no satisfaction from it. The pattern of failure to control intense, sexual impulses or urges and resulting repetitive sexual behaviour is manifested over an extended period of time (e.g., 6 months or more), and causes marked distress or significant impairment in personal, family, social, educational, occupational, or other important areas of functioning. Distress that is entirely related to moral judgments and disapproval about sexual impulses, urges, or behaviours is not sufficient to meet this requirement. (WHO, 2018; Table 1)"

Table 1 - Diagnostic Criteria for Compulsive Sexual Behavior Disorder

Diagnostic Criteria	Criteria for Compulsive Sexual Behavior Disorder (ICD-11, 2018)
Control	Persistent pattern of failure to control intense, repetitive sexual impulses or urges resulting in repetitive sexual behavior
Salience	Repetitive sexual activities becoming a central focus of the person's life
Relapse	Numerous unsuccessful efforts to significantly reduce repetitive sexual behavior
Dissatisfaction (Tolerance)	Continued repetitive sexual behavior despite deriving little or no satisfaction from sexual behavior
Negative consequences	Continued repetitive sexual behavior despite adverse consequences: neglecting health and personal care or other interests, activities, and responsibilities

Duration	The pattern of failure to control intense, repetitive sexual impulses or urges and resulting repetitive sexual behaviour is manifested over an extended period of time (e.g., 6 months or more)
Not due to other problems	The sexual behaviour is not better accounted for by another mental disorder (e.g., Manic Episode) or other medical condition and is not due to the effects of a substance or medication
Marked distress or impairment	Marked distress or significant impairment in personal, family, social, educational, occupational, or other important areas of functioning. Distress that is entirely related to moral judgments and disapproval about sexual impulses, urges, or behaviours is not sufficient to meet this requirement [a]

[a] moral incongruence

This disorder appears to be closely linked to the Problematic Pornography Use (PPU), that occurs in about 80% of patients with CSBD (Reid et al., 2012; Wordecha et al., 2018), making it the most clinically relevant manifestation (Bőthe et al., 2020). The advent of digital technology has profoundly transformed the landscape of sexual behavior. The widespread availability, affordability, and anonymity of online pornography have significantly increased exposure and accessibility, particularly among younger populations. This digital environment facilitates patterns of excessive consumption, reinforcing maladaptive coping mechanisms and contributing to the escalation of PPU into a clinically relevant condition (Wéry & Billieux, 2017; Gola et al., 2017).

1.2 What is pornography?

1.2.1 Defining Pornography and its Current Patterns of Use

Pornography is commonly defined as "professionally produced or user-generated pictures or videos intended to sexually arouse the viewer" (Peter & Valkenburg, 2011, pp. 1015-1016). Kohut et al. (2020) further conceptualize pornography use as a prevalent yet stigmatized behavior involving deliberate exposure to representations of nudity or sexual activity, which can evoke immediate sexual and affective responses and potentially lead to enduring cognitive, emotional, and behavioral changes. In the contemporary digital era, this content are consumed primarily online (Bőthe et al., 2019). Large-scale monitoring projects show that exposure begins early: the EU Kids Online 2020 survey reported that 36 % of 15- to 16-year-olds across 19 European countries had encountered online pornography in the previous 12 months (Andrie et al., 2021), while US paediatric data put initial exposure for 15 % of children under 11 and 20-38 % of 11- to 17-year-olds (American Academy of Pediatrics, 2023). At the adult end of the spectrum, Pornhub's 2024 Year in Review logged roughly 5.4 billion visits per month, making it the 16th most-visited website worldwide, with 90.5 % of all traffic now coming from smartphones and the 18-24 age bracket supplying the largest share of viewers (Pornhub, 2025). Parallel growth is visible in creator-driven platforms: OnlyFans surpassed 305 million registered users and 4.1 million content creators by late 2024, after adding nearly one million new creators in 2023 alone (Social Rise, 2024). Together, these figures illustrate a dramatic normalization, and commercialization, of online sexual media across the lifespan.

1.2.2 Emerging Digital Modalities of Pornography Consumption

The digital landscape has also diversified modes of sexual engagement. Cybersex, defined as remote sexual interaction via digital media, allows individuals to exchange sexual content or experiences in real-time. While it can enhance intimacy in long-distance relationships or serve as a platform for sexual exploration, it may also become compulsive when used as a means of emotional regulation or escape (Döring, 2009). Camming, involving live-streamed erotic or sexual performances by individuals for an online audience, offers real-time interaction and personalization. The COVID-19 pandemic notably accelerated the visibility and normalization of camming as both a profession and a sexual outlet (Jones, 2020; Senft, 2008). Platforms like OnlyFans exemplify the commercialization and personalization of digital sex work. Through

subscription-based models, content creators produce and monetize erotic or pornographic material for paying audiences. This shift toward creator-driven adult content has been described as both empowering and precarious: empowering in that performers retain control over production and revenue, and precarious due to issues of exploitation, harassment, and blurred boundaries between public and private identity (Blunt & Wolf, 2020). Sexting, the exchange of sexually explicit messages, images, or videos via digital platforms, has become widespread, particularly among adolescents and young adults. A meta-analysis found that approximately 15% of youth had sent sexts, while over 27% had received them (Madigan et al., 2018). While often consensual and part of normative sexual development, sexting raises concerns regarding privacy, consent, and the non-consensual distribution of explicit material. Technological innovations have further diversified digital sexual experiences. Virtual reality (VR) pornography immerses users in three-dimensional, interactive sexual environments, intensifying sensations of presence and intimacy compared to traditional 2D content (Döring & Mohseni, 2020). Studies report heightened arousal and novelty, but also highlight potential risks, including distorted sexual expectations and diminished satisfaction in real-world relationships (Rothman et al., 2020). Teledildonics, or internet-connected sex toys, enable synchronous stimulation between partners across distances and are increasingly integrated with digital content (Power et al., 2024). While offering novel forms of connection, teledildonics present ethical and security concerns, particularly related to data protection and unauthorized access (Kleintjes et al., 2022; Chabot et al., 2024). Advancements in artificial intelligence (AI) have introduced new ethical dilemmas, notably the proliferation of deepfake pornography, where AI superimposes an individual's face onto sexually explicit content without consent. Deepfake porn is widely recognized as a form of image-based sexual abuse, posing significant risks in terms of privacy violations, reputational harm, and psychological trauma (Chesney & Citron, 2019). Despite growing calls for regulation, the rapid development of generative technologies has outpaced legal and ethical safeguards in many jurisdictions.

Collectively, these developments reflect a broader transformation in how sexuality is expressed, consumed, and regulated in the digital age. While offering novel opportunities for intimacy and sexual autonomy, they also necessitate rigorous academic scrutiny.

1.3 How Much is Too Much? Frequent Pornography Use vs Problematic Pornography Use

While most people in developed countries have seen pornographic materials, only a smaller percentage show a Problematic Use of Pornography. According to recent nationally representative studies, 70% to 85% of participants have used pornography at some in their lives (Grubbs et al., 2019). In terms of gender differences, 84% to 85% of males and 54% to 57% of females reported lifetime pornography use (Grubbs et al., 2019). However, only 3% to 4.4% of males and 1% to 1.2% of females considered themselves addicted to pornography (Bőthe et al., 2021). A 2020 study, conducted by Bőthe and colleagues identified three different profiles: non-problematic low-frequency use (NPLFU, 68-73%), non-problematic high-frequency use (NPHFU, 19-29%), problematic high-frequency use (PHFU, 3-8%). Frequency was empirically defined by the pattern of the data, but in absolute terms it meant using pornography on most days of the week. Frequency alone was insufficient for classifying use as problematic, the presence of impaired control and distress was the decisive factor (Bőthe et al., 2020). Individuals with NPHFU were more commonly male with higher levels of hypersexuality, autonomy frustration, and overall basic psychological needs frustration compared with those with low-frequency use (NPLFU). Individuals with PHFU were more likely to report higher levels of not only hypersexuality and basic psychological needs frustration but also depression, boredom susceptibility, relatedness frustration, competence frustration, and discomfort when answering pornography-related questions; associated with lower levels of self-esteem and relatedness satisfaction (Bőthe et al., 2020). Moreover, a problematic pornography use appears more strongly associated with sexual function disturbances in both community and clinical samples (Bőthe et al., 2021). Large cross-cultural data from the 2024 International Sex Survey illustrate that although more than three-quarters of adults report having watched online pornography, only about 3 % endorse the cluster of impaired control, preoccupation and continued use despite harm that marks Problematic Pornography Use. Adding further support, Brahim et al. (2024) used machine-learning on a multinational sample of 1,584 adult cyber-porn users and showed that only about 22% scored in the upper quartile for compulsive cyber-porn use. The two strongest predictors of compulsive use were (a) craving intensity and (b) using pornography to suppress negative emotions; weekly frequency of viewing ranked a distant third. In other words, high exposure increased risk but was neither a necessary nor sufficient condition for problematic use, reinforcing the view that qualitative features of the behaviour—craving, impaired control, continued use despite harm—carry more diagnostic weight than frequency alone (Brahim et al., 2024).

The term PPU refers to a persistent pattern of pornography consumption that is difficult to control, continues despite negative consequences, and causes significant distress or impairment in personal, social, or occupational domains. Contemporary definitions highlight three core elements (Ince et al., 2024): (1) impaired control: failed attempts to limit or stop the behaviour, escalating time spent using pornography or a drift toward more extreme material; (2) salience and persistence: sexual content becomes a default coping strategy, displacing sleep, work or relationships; (3) continued use despite harm: relationship conflict, reduced productivity, emotional distress, or withdrawal-like symptoms upon abstinence (Ince et al., 2024).

Frequent Pornography Use (FPU) has been linked to PPU, though the magnitudes in community samples are typically small to moderate, whereas stronger, moderate associations have been reported in treatment seeking and clinical samples (Bőthe et al, 2019; 2020). The results suggest that FPU should not be considered as a sufficient or reliable indicator of PPU. Many community-dwelling individuals may use pornography without perceiving significant adverse consequences and may control or stop use when necessary (Kor et al., 2014). At the same time, some people may experience PPU accompanied by relatively low-frequency pornography use, perhaps due to moral incongruence or other factors (Brand et al., 2019; Kraus & Sweeney, 2019).

1.4 Gender and Sexual Orientation

Recent literature reveals significant gender differences in pornography consumption and problematic pornography use. Compared to women, men typically consume more pornography, both in terms of time spent and frequency (Martyniuk et al., 2016; Morgan, 2011) and tend to show higher levels of PPU (Bőthe et al., 2018; Grubbs et al., 2019a). Findings from the International Sex Survey further confirm these patterns, showing that men consistently report higher rates of PPU across different countries, gender identities, and sexual orientations, regardless of the assessment tool used (Bőthe et al., 2024). A structural-equation study of 306 cybersex users further shows that although coping motives drive compulsive cybersex in both genders, sexual desire uniquely predicts compulsive use among men, whereas social-connection motives are the stronger predictor among women, clarifying why male and female trajectories toward PPU may diverge (Brahim et al., 2019). Beyond binary gender differences, the experiences of gender-diverse individuals warrant particular attention. Gender-diverse individuals, those whose experience of gender does not conform to the traditional male-female binary, including identities such as non-binary, genderfluid, bigender, and agender (Matsuno & Budge, 2017), tend to report lower levels of PPU than cisgender

men but higher than cisgender women (Bőthe et al., 2024). Pornography use among gender-diverse individuals often fulfils unique psychosocial roles, including exploring, affirming, and constructing aspects of gender and sexual identity (Döring and Mosheni, 2020; Bőthe et al., 2019). However, engagement with pornography may also expose them to additional minority stressors when online content fails to adequately or affirmatively represent their experiences (Turban et al., 2020).

In terms of sexual orientation, sexual minority individuals, such as those identifying as gay, lesbian, bisexual, pansexual, or queer, have been traditionally reported to consume more pornography and experience higher levels of sexual compulsivity compared to heterosexual individuals (Træen & Daneback, 2013; Weinstein, Katz et al., 2015). This pattern has been explained through minority stress theory, suggesting that increased exposure to stigma, discrimination, and internalized negative attitudes can contribute to maladaptive coping strategies, including compulsive sexual behaviors (Parsons et al., 2008; Meyer, 2003). Nevertheless, more recent data from the International Sex Survey offer a nuanced perspective: no significant differences were observed across sexual orientation groups, with individuals identifying as gay, lesbian, bisexual, pansexual, and queer reporting similar levels of PPU (Bőthe et al., 2024). This finding challenges earlier assumptions that bisexual or queer individuals might be at particularly high risk for problematic pornography use. It suggests that sexual orientation alone may not sufficiently explain variations in PPU levels, and that other intersecting factors, such as minority stress, access to affirming communities, and individual psychological vulnerabilities, may play more critical roles. Importantly, pornography may also serve as an educational and identity development tool for sexual and gender minorities. LGBTQ+ adolescents may turn to online sexual content to learn about sexual practices, relationships, and body diversity, given the persistent lack of inclusive sexual education resources in many societies (Bőthe et al., 2019; Döring, 2020). While pornography can provide visibility and affirmation, it may simultaneously reinforce unrealistic expectations or expose users to stigmatizing portrayals, underscoring the need for critical media literacy interventions.

Overall, gender identity and sexual orientation are central variables in understanding pornography use patterns and their potential psychological correlates. Future research should further explore how intersecting identities, societal acceptance, and access to affirming resources influence the development and perception of problematic pornography use across diverse populations.

1.5 Social and Cultural Context

The sociocultural context plays an important role in influencing people's attitudes toward sexual behaviours (Griffiths, 2012), particularly in relation to females' sexual expression (Guo, 2019). Conservative sexual cultures may promote negative attitudes toward pornography consumption. Individuals raised in such environments may experience heightened internal conflict and negative emotions regarding their pornography use, particularly when it clashes with their moral or religious values (Griffiths, 2012; Guo, 2019). This can lead to an increased tendency to label one's pornography use as "compulsive" or "addictive," even when objective behavioral criteria for CSBD or PPU are not met (Vaillancourt-Morel & Bergeron, 2019; Grubbs et al., 2018). In such cases, it is crucial to differentiate between genuine impaired control over sexual impulses and behaviors and distress arising from internalized moral judgments (WHO, 2018). This distinction is particularly pertinent in societies where strong cultural or religious prohibitions against non-traditional sexual practices prevail. Moreover, globalization and digitalization have contributed to the rapid diffusion of Western sexual norms through Internet-based media, creating further cultural dissonance in more conservative societies (Sun et al., 2016). The clash between traditional sexual norms and easily accessible sexual content online may intensify feelings of moral incongruence and psychological distress among users. Khazaal et al. (2019) extend this perspective by showing that such sociocultural pressures rarely act in isolation: uncontrolled cybersex emerges most often when value-based conflict converges with individual-level risk factors, high sexual desire, coping-driven motives, depressed mood, impulsivity, and avoidant attachment. Their narrative review therefore locates "addictive" cybersex at the intersection of cultural disapproval and personal vulnerability and calls for integrated interventions that address both emotion-regulation deficits and the moral/relational meaning users attach to their online sexual behaviour (Khazaal et al., 2019).

1.6 Psychiatric Comorbidities and Developmental Correlates of Compulsive Sexual Behavior Disorder and Problematic Pornography Use

Across epidemiological and clinical samples, 70–95% of individuals who meet criteria for CSBD fulfil at least one additional psychiatric diagnosis (Kowalewska et al., 2024). Shared vulnerability mechanisms, heightened reward sensitivity, poor inhibitory control and maladaptive emotion regulation, help explain this broad comorbidity

profile, while developmental risk factors such as childhood adversity and familial addiction history further raise lifetime risk. Two prospective Swiss studies have refined this vulnerability framework, showing that elevated sexual desire, stronger anxiety/depression moods, insecure attachment, higher impulsivity and lower self-esteem each predict subsequent increases in addictive cybersex severity, even after controlling for baseline pornography use (Varfi et al., 2019; Brahim et al., 2019). The subsections below summarise the evidence base for the principal diagnostic clusters most often encountered in CSBD/PPU populations.

1.6.1 Mood Disorders (Major Depression and Bipolar Spectrum)

Major depressive disorder and bipolar disorder are classified within the same diagnostic family of mood (affective) disorders, and they represent one of the most frequently documented axis-I comorbidities in clinical samples of Compulsive Sexual Behaviour Disorder and Problematic Pornography Use (American Psychiatric Association, 2013; Raymond et al., 2003). Meta-analytic and large clinical-registry data indicate that 40-60% of individuals seeking treatment for CSBD meet criteria for a current or lifetime unipolar depressive episode (Kraus et al., 2016). Depression, characterized by persistent sadness, anhedonia, and functional impairment (American Psychiatric Association, 2013), is both highly prevalent among individuals with PPU and potentially exacerbated by it. Recent systematic reviews consistently demonstrate a positive correlation between PPU and depressive symptoms (Lewczuk et al., 2022a; Duffy et al., 2022; Fernandez et al., 2021). However, the directionality remains unclear: while some research suggests that depression drives individuals toward pornography use as a coping mechanism (Cooper et al., 2001), other studies propose that habitual pornography use fosters social isolation and exacerbates depressive symptoms (Owens et al., 2012; Yoder et al., 2005; Van den Eijnden et al., 2008). Additionally, moral incongruence, when pornography use conflicts with one's moral or religious values, has been found to amplify feelings of guilt, shame, and depressive symptoms (Grubbs et al., 2019; Malicka et al., 2022), indicating a complex bidirectional relationship. Trauma-related psychopathology can further complicate this picture: mediation and moderation analyses show that traumatic experiences and their psychological sequelae strengthen the path from mood symptoms to hypersexual and other problematic sexual behaviours, highlighting a multifaceted interplay between mood pathology, trauma, and compulsive sexual behaviour (Fontanesi et al., 2021). Approximately 12–20% of CSBD/PPU patients receive a bipolar-spectrum diagnosis, and follow-up assessments show that one-third of these patients continue to satisfy CSBD/PPU criteria outside

acute manic or hypomanic phases, suggesting a trait-like compulsive phenotype rather than a transient state effect (Black et al., 1997). Longitudinal research further demonstrates a bidirectional relationship as well: baseline dysphoria or hypomanic mood predicts subsequent escalation of pornography use as a maladaptive coping strategy, whereas sustained high-frequency PPU prospectively aggravates depressive severity and mood-cycle lability over six- to twelve-month intervals (Gola et al., 2017). Neuroimaging and neuropsychological studies converge on shared vulnerability mechanisms, fronto-striatal reward hyper-responsivity, impaired prefrontal inhibitory control and heightened stress reactivity, that are observed across major depression, bipolar disorder and CSBD/PPU, supporting a common liability framework for mood pathology and compulsive sexual behaviour (Gola & Potenza, 2018; Fiandor-Montesino et al., 2023).

1.6.2 Anxiety Disorders

Anxiety, similarly, plays both a contributory and consequential role in CSBD/PPU. As defined by the DSM-5, anxiety involves prolonged and excessive worry or fear, impairing daily functioning (American Psychiatric Association, 2013). A recent systematic review of 40 quantitative studies concluded that anxiety is one of the most robust correlates of CSBD, with prevalence estimates ranging from 46 % to 96 % in clinical cohorts (Grant Weinandy et al., 2023), with individuals with generalized anxiety disorder (GAD), social anxiety disorder, and obsessive-compulsive disorder (OCD) significantly more likely to exhibit compulsive sexual behaviors (Kraus et al., 2018). Importantly, perceived loss of control over pornography use predicts anxiety more strongly than objective frequency, underscoring the mediating role of cognitive appraisal and moral incongruence (Vaillancourt-Morel & Bergeron, 2019; Chen et al., 2022). Social anxiety appears disproportionately higher among individuals engaging in compulsive pornography use, especially when online sexual behaviors replace offline social and romantic interactions (Bőthe et al., 2019). This substitution can perpetuate a cycle of isolation, further exacerbating anxiety and PPU symptoms (Sniewski & Farvid, 2020; Grubbs et al., 2020). Notably, young adults (18–35 years) demonstrate the highest prevalence of CSBD and anxiety, possibly due to increased digital sexual content exposure and evolving societal norms around sexuality (Reid et al., 2012). These findings align with the self-medication hypothesis (Khantzian, 1985, 1997), which posits that repetitive engagement in sexual behaviors, such as frequent pornography use, may serve as a maladaptive attempt to suppress or manage negative emotional states like anxiety and depression. While such coping strategies may

temporarily alleviate distress, over time they tend to reinforce compulsive patterns and perpetuate psychological suffering (Dickenson et al., 2018).

1.6.3 Obsessive–Compulsive Disorder (OCD)

OCD is defined in the DSM-5 as the presence of recurrent, intrusive thoughts, images, or urges (obsessions) and/or repetitive behaviours or mental acts (compulsions) that an individual feels driven to perform, together consuming at least one hour per day or causing clinically significant distress or functional impairment (American Psychiatric Association, 2013). The phenomenological overlap between OCD and Compulsive Sexual Behaviour Disorder (CSBD) is increasingly recognised, as both conditions involve intrusive, ego-dystonic thoughts and repetitive acts that are difficult to suppress (Fuss et al., 2019). In the largest outpatient OCD cohort to date (N = 539), lifetime CSBD prevalence reached 5.6 %, a rate nearly four-fold higher in men than in women (Fuss et al., 2019). Patients meeting criteria for both disorders showed significantly greater mood- and impulse-control comorbidity than OCD-only peers, supporting the hypothesis that CSBD aggregates within a broader compulsive–impulsive diathesis (Lochner et al., 2020).

1.6.4 Substance-Use Disorders and Behavioural Addictions

Converging evidence indicates that Compulsive Sexual Behaviour Disorder often emerges against a background of wide-ranging addictive phenotypes. Early outpatient studies of DSM-IV "Hypersexual Disorder" already documented lifetime substance-use disorder (SUD) rates between 34 % and 71 %, with alcohol and stimulant-type disorders most prevalent (Black et al., 1997; Raymond et al., 2003). Subsequent work in residential treatment programmes has replicated these figures, showing that nearly two-thirds of individuals hospitalised for CSBD meet criteria for at least one current SUD, and that concurrent alcohol misuse predicts poorer CSBD treatment response and higher six-month relapse risk (Vearrier et al., 2024). Parallel patterns are evident for behavioural addictions. Pathological gambling, compulsive buying, and problematic gaming appear in 10 %–25 % of CSBD patients, well above population baselines (Grant & Steinberg, 2005; Kausch, 2003). Factor-analytic research suggests that these comorbidities load on a common latent "addictive-like behaviours" dimension, distinct from internalising psychopathology, and are jointly predicted by high impulsivity and delay-discounting (Fineberg et al., 2020). Longitudinal data

further show temporal clustering: onset of a behavioural addiction (e.g., online gambling) increases the odds of developing CSBD within two years by a factor of 3.4, and vice-versa, underscoring bidirectional risk (Koós et al., 2024a). Clinically, co-occurring behavioural addictions are associated with earlier CSBD onset, greater cue-induced craving, and reduced efficacy of monotherapeutic cognitive-behavioural interventions; combined relapse-prevention protocols or adjunctive naltrexone appear to yield superior outcomes in these high-risk subgroups (Stein et al., 2021).

1.6.5 Attention-Deficit/Hyperactivity Disorder (ADHD)

The DSM-5 defines ADHD as a "persistent pattern of inattention and/or hyperactivity-impulsivity that interferes with functioning or development," with several symptoms present before age 12 and in at least two settings (APA, 2013). Impulsivity, central to the hyperactive/combined presentation, appears to drive the disproportionate representation of ADHD traits among individuals with hypersexuality and Problematic Pornography Use (Turner et al., 2025). In a recent case–control investigation (N = 235), adults meeting full ADHD criteria reported significantly more paraphilic fantasies and behaviours than neurotypical controls, and the number of such fantasies correlated positively with scores on the Hypersexual Behaviour Inventory within the ADHD group (Turner et al., 2025). Earlier cross-sectional work likewise demonstrates that executive-function deficits and heightened delay discounting, both hallmarks of ADHD, predict higher CSBD-19 severity and greater cue-reactivity to sexual stimuli (Reid et al., 2014). Converging evidence from a community-based survey of 309 adults further clarifies this association: ADHD symptom severity predicted hypersexuality, and impulsivity was a significant—but only partial—mediator, while depressive and psychotic-prodromal symptoms exerted even stronger mediating effects (Doroldi et al., 2024). Together, these findings support a shared vulnerability model in which defective inhibitory control and reward-seeking tendencies heighten the risk for compulsive sexual behaviour among people with ADHD.

1.6.6 Eating Disorders

Eating disorders are characterised in the DSM-5 by "persistent disturbance of eating or eating-related behaviour that results in altered consumption or absorption of food" and significant impairment (American Psychiatric Association, 2013). Anorexia

nervosa, bulimia nervosa, and binge-eating disorder all feature perfectionism, body-image disturbance, and emotion-dysregulation profiles that overlap with those observed in CSBD (Ciocca et al., 2023). A 2023 narrative review of personality pathology and sexuality reported that binge-eating and bulimic phenotypes frequently co-occur with compulsive or high-risk sexual acts, particularly in individuals with trauma histories and high negative affect (Ciocca et al., 2023).

1.6.7 Personality Disorders

DSM-5 describes personality disorders (PDs) as "enduring patterns of inner experience and behaviour that deviate markedly from the expectations of the individual's culture," are pervasive and inflexible, and lead to distress or impairment (APA, 2013). Borderline Personality Disorder (BPD)—marked by instability in relationships, self-image, affect, and pronounced impulsivity—shows the strongest empirical association with CSBD. In an experimental delay-discounting study, women with BPD scored higher on the CSBD-19 and were more willing to trade condom use for immediate gratification than healthy controls, reflecting impaired impulse regulation in sexual contexts (Finkenstaedt et al., 2024). A 2023 systematic review extended these observations to other clusters, identifying elevated sexual compulsivity in narcissistic and antisocial presentations, where sensation-seeking, low empathy, and externalising proneness converge to heighten CSBD risk (Ciocca et al., 2023).

Finally, consistent with minority stress models, sexual and gender minorities, especially transgender and gender-diverse individuals, report disproportionately higher rates of mental health concerns, including depression and anxiety, relative to cisgender populations (Ferlatte et al., 2019; Borgogna et al., 2019). This elevated vulnerability may compound the risk of engaging in maladaptive coping strategies, such as compulsive pornography use, and underscores the importance of adopting culturally sensitive and inclusive assessment and intervention strategies. The psychiatric comorbidities associated with CSBD reflect a complex interplay of emotional dysregulation, maladaptive coping, developmental trauma, and sociocultural stressors.

1.7 The Problem of Assessment for Problematic Pornography Use: Overcoming Limitations

Over time, psychometric tools have been created to evaluate various facets of problematic pornography consumption. A systematic review carried out by Fernandez and Griffiths (2019) evaluated 22 instruments for assessing PPU. The Compulsive Pornography Consumption Scale (CPC; (Noor, Rosser, & Erickson, 2014) and the Cyberporn Compulsivity Scale (CCS; Abell, Steenbergh, & Boivin, 2006) conceptualized problematic pornography use within models of compulsive behaviour. The Pornography Consumption Inventory (PCI; Reid, Garos, & Carpenter, 2011) was designed to evaluate the motivations for pornography use among hypersexual men. Consequently, problematic pornographic use is viewed as a hypersexual conduct (Kafka, 2010). The Habit Strength Scale, Deficient Self-Regulation Scale, and Negative Consequences Scale (Sirianni & Vishwanath, 2016) were conceptualized based on a social cognitive theory of dysregulated media use and clearly distinguish their model from addiction models. These three instruments are part of a hypothesized model investigating various aspects of unregulated media usage. The PCES (Hald & Malamuth, 2008), PCES-R (Hald, Smolenski, & Rosser, 2013), and the PCES-SF (Miller, Kidd, & Hald, 2019) focus at both positive and negative effects of pornography consumption, with negative effects being particularly relevant to problematic pornography use.

13 of the 22 items conceptualized problematic pornographic usage using an addiction paradigm. Four of these were based on two already-existing measures of Internet addiction that were modified to account for online sexual behaviour, including the use of pornography. The Compulsive Internet Use Scale adapted to Sexually Explicit Media (CIUS-Adapted) and the Compulsive Use of Sexually Explicit Internet Material were based on the (CIUS) (Meerkerk et al., 2009). It seems clear that addiction was the most frequently employed theoretical framework. The most commonly assessed addiction components across the different instruments were (1) impaired control, (2) salience, (3) mood modification, (4) interpersonal conflict, and (5) general life conflict. Based on the findings of the aforementioned review, the most comprehensive tools for the assessment of problematic pornography use (based on their coverage of specific addiction components) are the Problematic Pornography Use Scale (PPUS; Kor et al., 2014) and Problematic Pornography Consumption Scale (PPCS; Bőthe et al., 2018). The PPUS evaluates the key elements of addiction, moreover is the instrument that comes closest to assessing the same components assessed by and CSBD criteria (7 of 9);

the PPUS does not explicitly assess craving and intrapsychic conflict, which are the missing components of these criteria. The PPCS is the only tool to evaluate each of the six Griffiths (2005) components, including specifically evaluating withdrawal and tolerance. In order to distinguish between problematic and non-problematic pornography users, the PPCS also offers a verified cut-off score, which increases its research and clinical utility. Beyond the widely used PPCS-6, recent work has introduced the PCE-S, a craving-focused instrument grounded in Elaborated Intrusion theory, and has empirically contrasted addiction- versus ICD-11-based screening tools, showing superior diagnostic granularity for the ACSID-11(Franc et al., 2018; Brahim et al., 2024; Vera Cruz et al., 2024).

All these data were collected through studies conducted on small samples, with simplistic and poorly unified methodology. Recent work highlighted the necessity to better understand which processes may underlie the development of CSBD and PPU and which populations may be at greater risk of developing these pathological behaviours (Bőthe et al., 2019; Bőthe et al., 2020; Grubbs et al., 2020; Grubbs & Kraus, 2021; Kowalewska et al., 2020; Kraus et al., 2016). Currently, there is not sufficient scientific evidence to define whether CSBD and PPU should be considered as impulse control, compulsivity-related, or addictive disorders (Kor et al., 2013; Kraus et al., 2016; 2016a; 2016b; Potenza et al., 2017; Prause et al., 2017; Sassover & Weinstein, 2020). Therefore, the field is still largely unexplored and often lacks quality and integrated measurements, supported by theoretical models and unified through studies on different populations (Bőthe et al., 2021; Grubbs & Kraus, 2021).

CHAPTER 2 – Thesis Structure, Aim and Objectives

2.1 The International Sex Survey (ISS)

The ISS is a cross-sectional, multi-lab, multi-language online survey project preregistered on the Open Science Framework (OSF, https://osf.io/uyfra/?view_only=6e4f96b748be42d99363d58e32d511b8). Collaborators in > 40 countries sign a common agreement, translate materials via a forward–backward procedure (Beaton et al., 2000), obtain local ethics approval and recruit community samples through nationwide media campaigns. The survey was disseminated in Africa (Algeria, Egypt, South Africa), America (Bolivia, Brazil, Canada, Colombia, Ecuador, Mexico, Panama, Peru, United States, Asia (Bangladesh, China, India, Iran, Iraq, Israel, Japan, Malaysia, Pakistan, South Korea, Taiwan), Europe (Austria, Belgium, Croatia, Czech Republic, France, Germany, Gibraltar, Hungary, Ireland, Italy, Lithuania, North Macedonia, Poland, Portugal, Romania, Slovakia, Spain, Switzerland, Turkey United, Kingdom) and Oceania (Australia, New Zealand).

The survey was disseminated through a secure online platform (Qualtrics Research Suite) and was translated in country-specific language. The time required to complete it ranged from 25 to 35 minutes. Inclusion criteria were: a) being at least 18 years old (or the legal age to provide informed consent) and (b) understand any of the languages in which the survey is available. Exclusion criteria were: (a) fail two out of three attention questions (Thomas & Clifford, 2017), and/or (b) produce contradictory response patterns. At the end of the survey participants received a list of mental health services whether they felt the need to consult a professional (Bőthe et al., 2021).

Participants were asked several questions to investigate socio-demographic characteristics, various aspects of sexual functioning and behaviours, pornography use and different psychopathological dimensions. All instruments undergo dual forward translation, reconciliation, backward translation and cognitive pre-testing, ensuring semantic, idiomatic and conceptual equivalence across languages (Bőthe et al., 2021).

2.2 My role in the International Sex Survey

When I joined the project as a Visiting Research Fellow in October 2021, and subsequently as a doctoral candidate in November 2022, the study's core design had already been formally approved. From the outset, I was involved in data collection, first

in the United Kingdom with the team led by Professor Corazza (University of Hertfordshire), and later in the analysis of the Italian sample gathered by Professor Ciocca's group (Sapienza University of Rome).

In the UK phase, I assisted in coordinating the research team, streamlining communication among investigators, and ensuring compliance with the pre-registered protocols. As part of my responsibilities, I also successfully obtained ethical approval for the UK team from the University of Hertfordshire Ethics Committee (approval number: 1362 2025 Jul HSET). I also co-designed and managed a multi-channel recruitment campaign that combined institutional mailing lists, targeted social-media advertisements, and partnerships with national and regional online newspapers, substantially broadening our reach. These efforts yielded 1,120 participants in the United Kingdom, and I continuously monitored response rates throughout the fieldwork.

I then contributed to the analysis of the Italian dataset (n = 2,437), as well as to the interpretation and dissemination of the findings through peer-reviewed journal articles, conference posters, and oral presentations.

In addition, I had the opportunity to develop my own ideas stemming from the ISS study, deciding to focus on Problematic Pornography Use and its psychopathological correlates, that became the central focus of my PhD thesis.

2.3 Aim of the Thesis

The overarching aim of this doctoral research is to advance the empirical and methodological understanding of Problematic Pornography Use by (a) systematically mapping existing knowledge and (b) generating robust, cross-cultural evidence on its psychopathological correlates. Together, the two studies seek to inform theory-driven measurement development, identify research gaps, and guide tailored intervention strategies.

2.4 Phases of the Thesis

The research unfolded in three sequential phases; each aligned with the thesis aims:

2.4.1 Phase 1 - Data Collection

In the first phase of the study, each national co-investigator of the International Sex Survey carried out some core tasks within their respective countries: securing approval from the local research ethics committee, translating and culturally adapting all study materials, and managing country-specific online recruitment. As part of the UK team, I completed these steps for the United Kingdom, mainly directing a multi-channel digital recruitment campaign. Collectively, the contributions of all country teams broadened the ISS dataset with culturally diverse samples, thereby enhancing the study's cross-national validity and its relevance for clinical and public-health applications.

2.4.2 Phase 2 - Data Analysis

This phase comprised two complementary lines of inquiry. First, a scientometric analysis mapped the intellectual landscape of PPU research, identifying influential publications, leading scholars, and thematic clusters over time. Second, using the ISS dataset, the project examined the psychological correlates of PPU, specifically depression and anxiety, and tested whether these associations vary across gender identities in a 42-country sample.

2.4.3 Phase 3 - Dissemination

Findings were disseminated through presentations at national and international conferences and the preparation of peer-reviewed manuscripts. These efforts targeted both academic and applied audiences, including clinicians, mental-health professionals, and policymakers, to refine diagnostic frameworks and inform intervention strategies for PPU in the digital era.

2.5 Thesis Objectives

2.5.1 Objectives of the Study 1 - Scientometric Analysis of Scientific Literature regarding Problematic Pornography Use

Before proceeding with the analysis of the ISS collected data, I conducted a comprehensive review of the existing literature on the topic. The aim was to provide an overview of the literature on Problematic Pornography Use:

1- analyzing the structure of knowledge (most active countries, journals, authors, and most frequently used keywords);
2- identifying the most impactful documents;

3- identifying the main thematic domains of research in the literature.

The decision to adopt a scientometric approach was driven by the intention to conduct a large-scale, data-driven, and systematic mapping of the literature. This method allowed for the identification of prevailing theoretical orientations and research gaps within the different thematic clusters.

2.5.2 Objectives of the Study 2 - Depression and Anxiety Symptoms' Associations with Problematic Pornography Use Across Genders in the ISS cross-cultural sample

The insights derived from the scientometric review played a crucial role in guiding the subsequent empirical investigation, particularly by revealing gaps and underrepresented areas within the existing body of literature. Guided by these insights, an empirical investigation was carried out using data from the International Sex Survey, which included responses from a large, diverse international sample (N = 82,243). I decided to focus on the associations between PPU and symptoms of depression and anxiety, with a specific focus on the moderating role of gender.

Guided by the review's insights, the present study set out to:

1- Compare mean levels across genders: determine whether men, women, and gender-diverse participants differ in problematic pornography use, depressive symptoms, and anxiety symptoms.

2- Clarify overall associations: testing whether higher levels of depression and anxiety are linked to greater PPU in the sample as a whole.

3- Test gender moderation: assess whether the strength of the PPU-distress link changes by gender, identifying which groups show the strongest or weakest associations.

Together, these objectives aim to refine our understanding of the interplay between PPU and emotional distress and illuminate the gender-specific patterns that should inform future prevention and intervention efforts.

CHAPTER 3 – Study 1: Scientometric Analysis of Scientific Literature regarding Problematic Pornography Use

3.1 Abstract

This current study aims to systematically analyze the evolution of the scientific literature on Problematic Pornography Use, identifying: (1) the main domains of research; (2) the most impactful documents in the field; and (3) the structure of knowledge (most active countries, main sources, most productive authors, and most frequently used keywords). For this reason, we conducted a comprehensive scientometric analysis of the literature on Problematic Pornography Use, sourcing our data from Scopus. Our research involved a document co-citation analysis of 29,133 references, leading to the identification of six key thematic areas within the PPU literature. Findings indicate that the published evidence covers clusters focused on the conceptualization of "hypersexuality" and the social and psychopathological factors that might characterize or predict it. The recent literature also analyzed the role of "moral incongruence" and provided validated psychometric tools to assess PPU. This scientometric perspective provides greater insight into the knowledge gaps within this new and rapidly growing field of study and highlights the need to raise awareness to produce targeted responses in public mental health.

3.2 Materials and Methods

3.2.1 Data Collection

Documents were downloaded from Scopus in accordance with established scientometric procedures (Chen, 2014). We used the following search string TITLE-ABS (porn* AND (depress* OR anxious OR anxiety OR "mental health")) and found a total of 516 documents published from 1973 to 29 April 2024 (see Fig.1).

3.2.2 Data import on CiteSpace

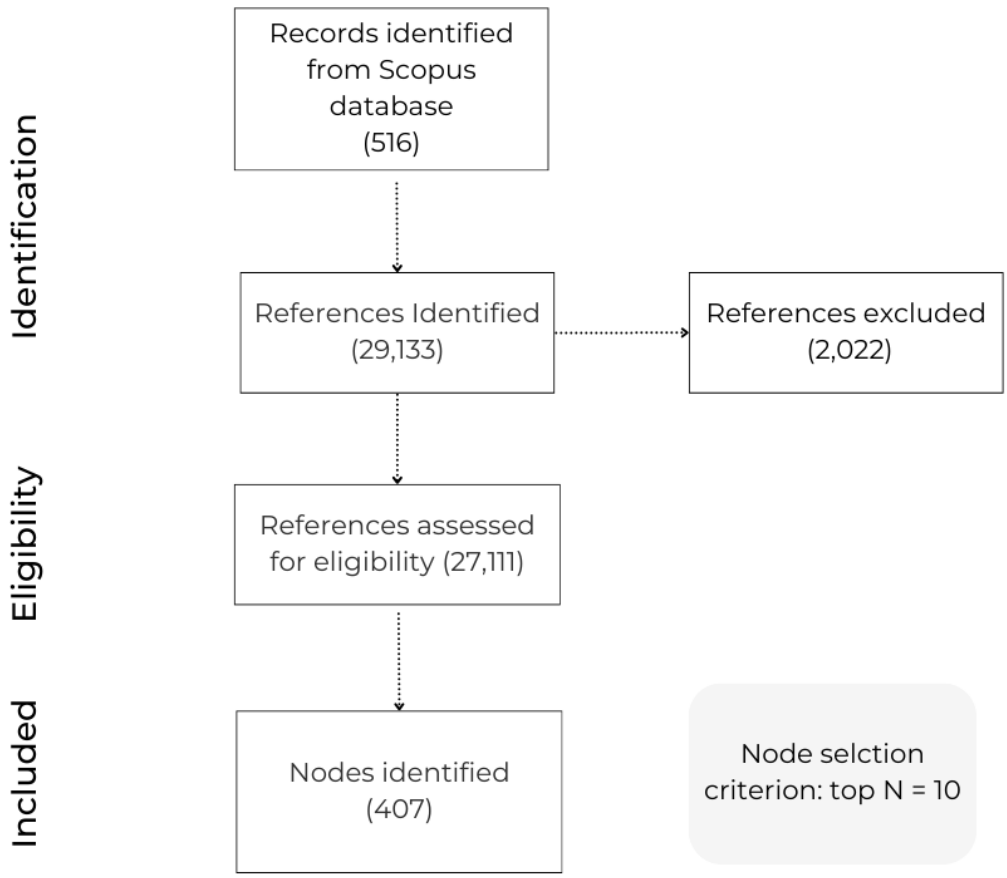
The articles downloaded from Scopus were imported into the CiteSpace software (Version 6.1.R2). When importing the data, 27,111 of a total of 29,133 cited references (93.06%) were valid. A "valid" reference contains seven key pieces of information: author, year of publication, title, source, volume, pages and DOI (Chen, 2014). Several references were considered invalid, due to irregularities in the citation format. Losses in references commonly occur during the data import to the CiteSpace software (Chen, 2016). The CiteSpace function (Remove Alias) was turned ON to eliminate repeated or identical entries (see Fig.1).

3.2.3 Document co-citation Analysis (DCA) and Optimization of Parameters

Document co-citation analysis (DCA) was performed to identify the major domains of research in the literature on PPU. DCA is based on the frequency of co-citation between documents, which occurs when two or more documents are cited together by other publications (Small, 1980; Trujillo et al., 2018). The assumption is that papers with a shared thematic interest will be frequently cited together by other papers, suggesting common research trends and intellectual domains in the literature (Chen et al., 2010). The result obtained by modeling the single documents as
nodes, the co-citations as links, and the frequency of co-citations as link weights, is a network of connected documents frequently cited together; that includes both citing (i.e., documents retrieved directly from Scopus) and cited documents (i.e., documents cited by the publications collected from Scopus) (Carollo et al., 2021, Cataldo et al., 2022). Node selection criteria were used to optimize the DCA network, the most common are the g-index, TOP N, and TOP N%. The g-index, derived from the h-index, is a measure of the citation scores of an author's top publications (Egghe, 2006) and it is the "largest number that equals the average number of citations of the most highly cited g publications" (Alonso et al., 2009). TOP N and TOP N % are used to select respectively N and N % most cited references within a time slice (i.e., 1 year) (Chen, 2014). In order to generate the final optimal network, node selection criteria were combined with their scale factor values, which allows the user to control the number of documents included in the final network (Cataldo et al., 2022). Specifically, DCAs with the following node selection criteria were compared: g-index with scale factor k set at 25, 50, 100, TOP N with scale factor N set at 20, 25, 50 and TOP N % with scale factor N set at 5, 10, 30. All networks were compared in terms of their

structural properties, and only the one with the most optimal structure was selected for the analysis. The DCA generated with TOP N% with scaling factor N set to 10 was chosen (See Fig.1).

Figure 1 - PRISMA flowchart for search criteria and reference eligibility



3.2.4 Metrics

The findings will be presented using both structural and temporal metrics.
On CiteSpace, available structural metrics include modularity, silhouette, and betweenness centrality. Modularity is a network-level metric with values ranging from 0 to 1, measuring the extent to which the network can be divided into separate clusters (Newman, 2006). Higher modularity values indicate greater divisibility into distinct clusters (Chen, 2010). In contrast, the silhouette score is a cluster-level metric ranging from −1 to 1. Clusters with high internal consistency and separation from other clusters

have higher silhouette values (Rousseeuw, 1987). Betweenness centrality, a node-level metric, measures a single node's influence on the overall network, with values ranging from 0 to 1. Higher values indicate nodes that frequently connect other random pairs of nodes (Freeman, 1977). Temporal metrics include citation burstness and sigma. Citation burstness is a node-level metric indicating a sudden increase in citations for an article, computed using Kleinberg's algorithm (Kleinberg, 2002). This metric helps identify impactful documents that have received significant attention from experts. Sigma incorporates both betweenness centrality and citation burstness, calculated using the equation $(\text{centrality} + 1)^{\text{burstness}}$ (Chen, 2017). By combining structural and temporal metrics, sigma indicates a document's novelty and influence on the overall network (Chen et al., 2009).

3.3 Results

3.3.1 Bibliometric analysis of the citing documents

The sample of documents grew from 1973 to 2024 with an annual growth rate of 6.05%. Each document obtained an average of 23.43 citations with an average of 2.764 citations by year. The documents cited more often were authored by McKenna (total citations = 998; total citations per year = 39.92) (McKenna and Bargh, 2000), by Seto (total citations = 490; total citations per year = 32.67) (Seto and Lalumiere, 2010), and by Kiraly (total citations = 479; total citations per year = 95.80) (Király et al., 2020). An amount of 1142 keywords were selected by the authors who indexed the documents. The most popular keywords plus were pornography (n = 85 documents), internet (n = 27 documents), depression (n = 23 documents), mental health (n = 22 documents), Covid-19 (n = 21 documents), addiction (n = 19 documents), adolescents (n = 18 documents), internet addiction (n = 18 documents), anxiety (n = 14 documents), and problematic pornography use (n = 14 documents) (See Fig.2).

The documents were authored by a total of 1382 unique authors. On average, the dataset included 0.366 documents per author and an average of 3.24 co-authors per document. The two most productive authors in the sample were Kraus S.W. (n = 12 documents) and Potenza M.N. (n = 9 documents, see Fig 3).

Authors' affiliations were mostly from the United States (n = 121 documents; frequency = 0.3270; Single Country Publications [SCPs] = 108; Multiple Country Publications [MCPs] = 13), the United Kingdom (n = 27 documents; frequency = 0.0730; SCP =

19; MCP = 8), or from China (n = 23 documents; frequency = 0.0622; SCP = 18; MCP = 5, see Fig. 4).

The main sources in the literature on Pornography Addiction were the Journal of Behavioral Addictions (n = 12 documents), Sexual Addiction and Compulsivity (n = 11 documents), and the Journal of Sexual Medicine (n = 10 documents).

Figure 2 - Keywords Co-Occurrence

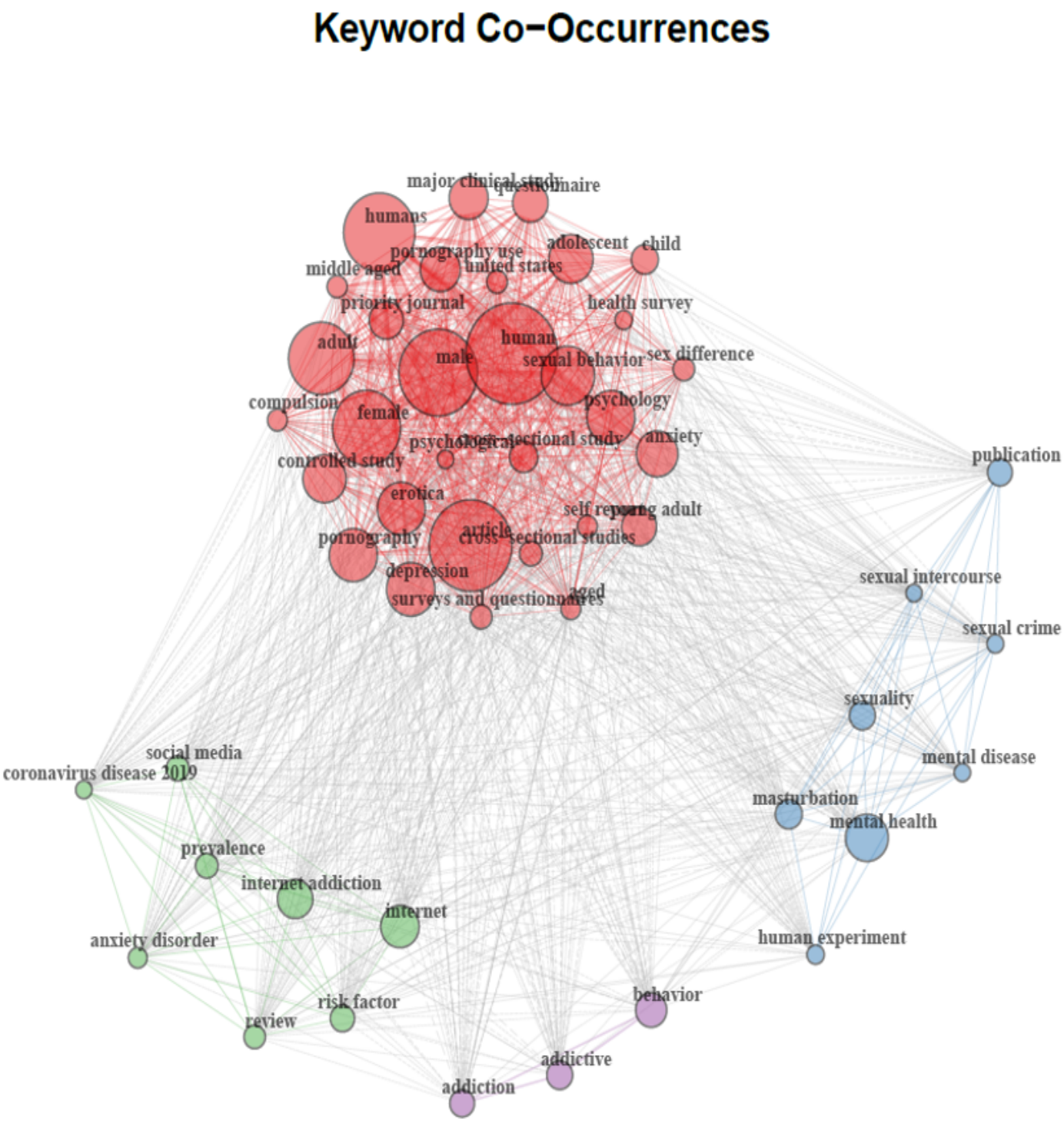


Figure 3 - Results of the bibliometric analyses. Ten most productive authors.

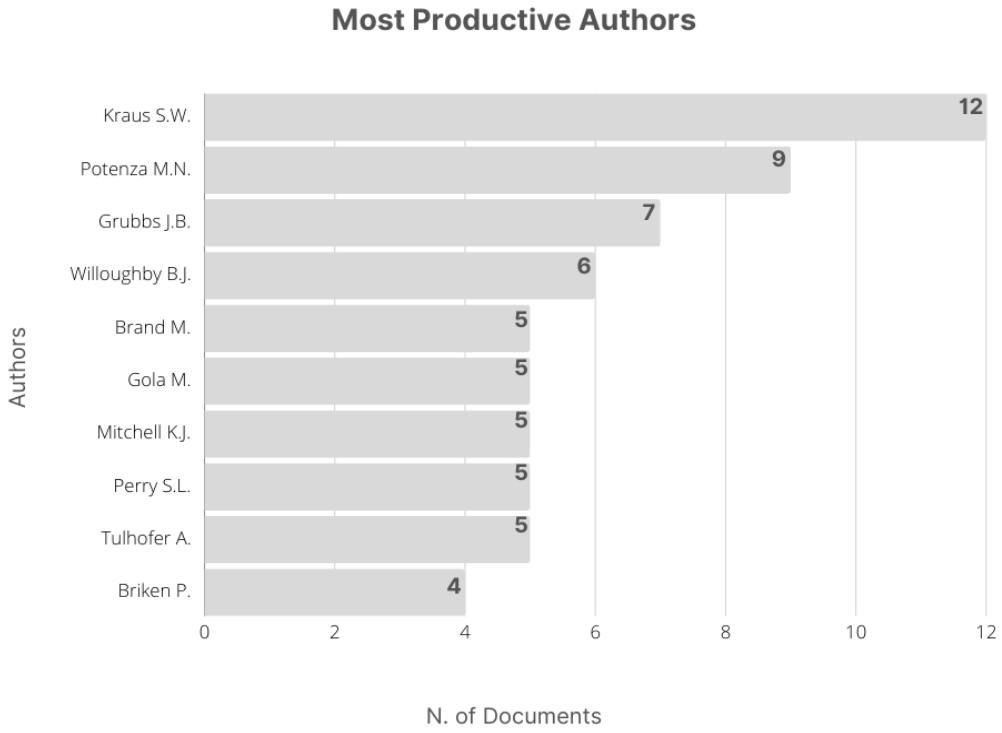
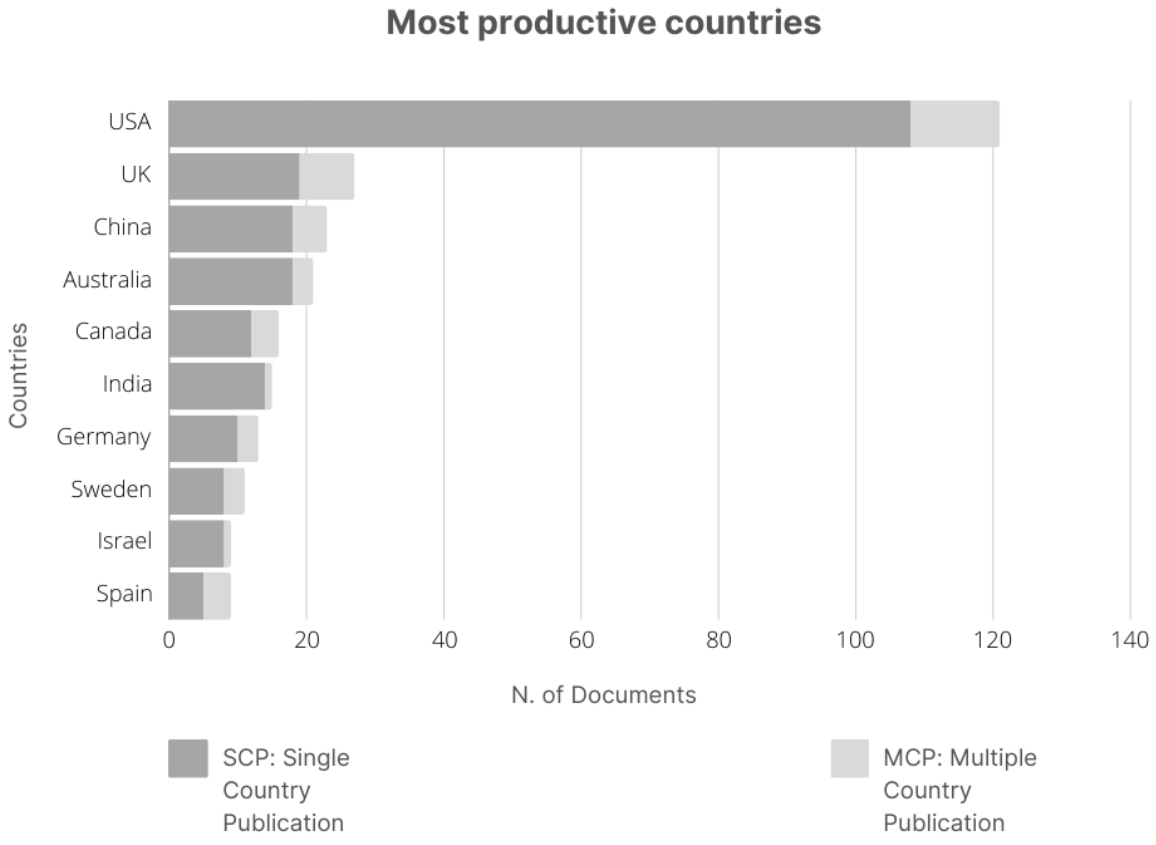


Figure 4 - Results of the bibliometric analyses. Ten most occurring countries in authors' affiliations.



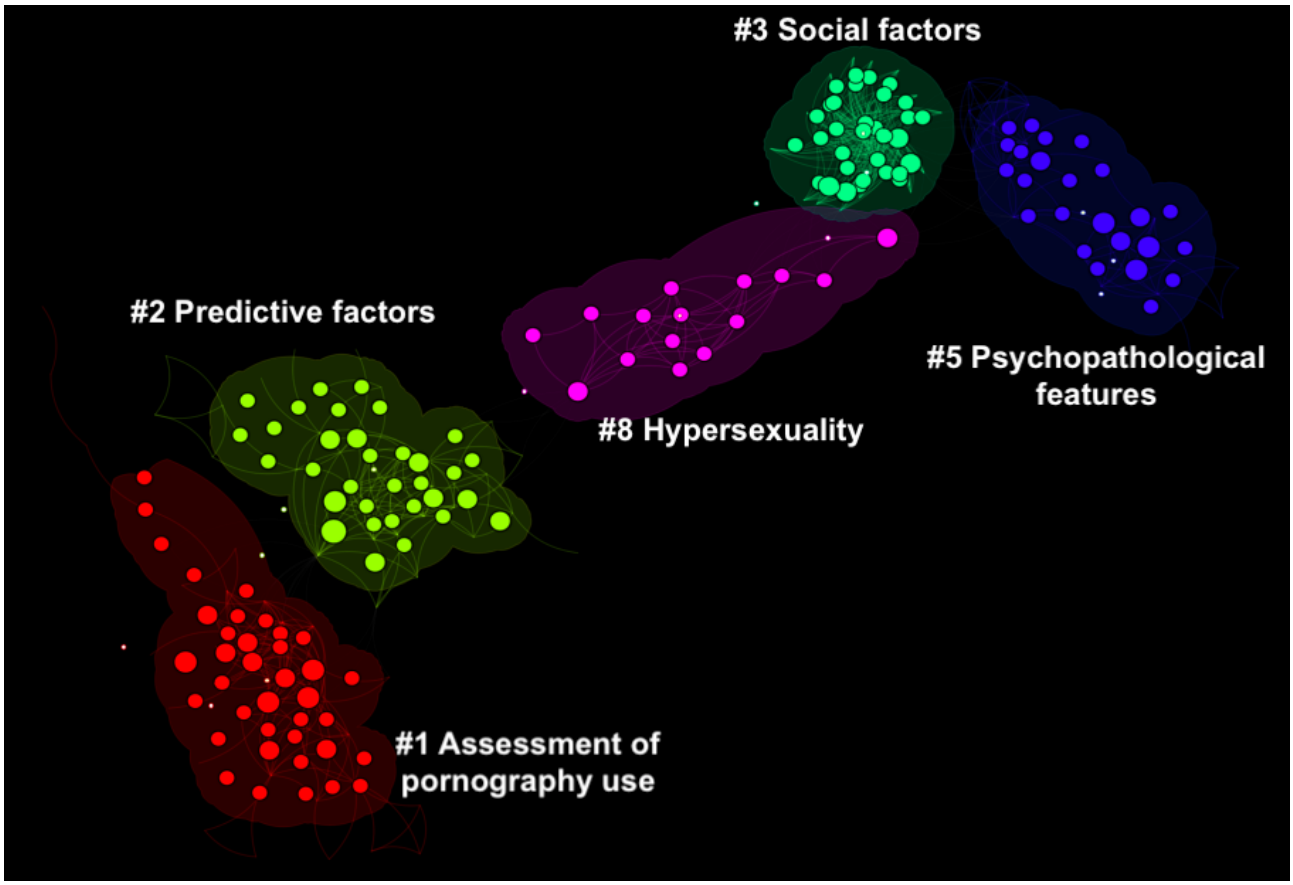
3.3.2 Properties of the DCA network

The optimal DCA generated a network with 407 nodes (i.e., documents) and 1321 links. Therefore, each document was, on average, connected to another 3.25. The network had a modularity of 0.865 and an average silhouette score of 0.9635. Thus, the network was highly divisible into homogeneous and separate thematic domains of research (clusters). The network is represented in Figure 5.

3.3.3 Citation burstness

A total of 3 documents were found to exhibit a citation burstness, when setting the γ parameter to 0.70. All these documents belonged to cluster #5. The articles with the highest burst strength were authored by Patterson et al. in 2012 and Grubbs et al. in 2015 with a score of 3,34. Both articles focused on self-perceived pornography addiction and possible consequences on mental well-being. The personal perception of pornography addiction, in fact, may be associated with negative mental health outcomes (Grubbs et al., 2015). The article suggest that perceptions of personal pornography use may impact well-being more than the use of pornography itself (Grubbs et al., 2015). The article by Patterson and colleagues identifies religiosity as one of the possible factors of "lower levels of reported happiness". This negative relationship is the strongest among individuals who are part of religious groups that show strong attitudes against the use of pornography. The relationship between religious services attendance, pornography use, and happiness is similar for both men and women (Patterson et al., 2012). For both, the burst began in 2018 and ended in 2019.

Figure 5 - Document co-citation analysis network of the literature on Problematic Pornography Use. The network represents the existing literature on PPU by using documents as nodes and co-citation patterns as edges. The major clusters are grouped by color. The image was generated with CiteSpace software.



3.3.4 Major thematic clusters of research

Six major thematic clusters of research were detected in the network and automatically labeled by CiteSpace's log- likelihood ratio (LLR) algorithm. LLR tends to provide good results in terms of uniqueness and coverage of cluster-related topics (Chen, 2014). However, we also conducted a qualitative inspection of the clusters' content to assess the accuracy of the LLR label and, when the LLR label was not representative of a cluster's content, we labeled the cluster manually. In this network, the three largest clusters were cluster #1 ("Assessment of pornography use", size = 38 documents; silhouette = 0.993; mean publication year = 2018), cluster #2 ("Predictive Factors",

size = 33 documents; silhouette = 0.938; mean publication year = 2015), and cluster #3 ("Social Factors", size = 32 documents; silhouette = 0.944; mean publication year = 2015). The three clusters with the highest silhouette scores were cluster #14 ("Moral Incongruence", size = 4 documents; silhouette = 0.996; mean publication year = 2017), cluster #1 ("Assessment of pornography use", size = 38 documents; silhouette = 0.993; mean publication year = 2018), and cluster #5 ("Psychopathological Features", size = 24 documents; silhouette = 0.973; mean publication year = 2013). Metrics for all the six major thematic clusters of research are presented in Table 2.

Table 2 - Metrics of the seven thematic clusters of research. For each cluster, the number of included documents (i.e., size), the silhouette score, the mean publication year, the log-likelihood ratio (LLR) label, and the suggested label are reported.

Cluster ID	**Size**	**Silhouette**	**Mean year**	**LLR label**	**Suggested label**
1	38	0.993	2018	Psychometric properties	Assessment of pornography use
2	33	0,938	2015	Pornography use	Predictive Factors
3	32	0,944	2015	Moral Incongruence	Social Factors
5	24	0,973	2013	Pornography use	Psychopathological Features
8	15	0,961	2010	Online Study	Hypersexuality
14	4	0,996	2010	Chinese Population	Moral Incongruence

3.4 Discussion

Each cluster was analyzed in detail. The aim was to elucidate the temporal trajectories and sequence of the thematic domains identified in the literature of interest. Each cluster was analyzed in terms of both the citing articles and the cited references, highlighting the main citing articles together with their coverage and Global Citing Score (GCS). "Coverage" refers to the number of articles in the cluster that were cited by the citing article and "GCS" refers to the total number of citations received by a paper as indexed on Scopus.

3.4.1Cluster #8 – Hypersexuality

Cluster #8 contains the earliest studies on the concept of Compulsive Sexual Behaviour Disorder and consequently on its clinical manifestations such as Problematic Pornography Use. CSBD has been known since 1983 (Carnes, 1983) under the term "sexual addiction," over the years it has been called by various names in the scientific literature: "hypersexuality," "hypersexual disorder," "compulsive sexuality disorder." Around 2010, interest in this phenomenon began to grow, with academics questioning whether hypersexuality should be considered as a disorder per se and whether it should be included in major diagnostic manuals. The major citing articles in Cluster #8 were authored by Štulhofer, et al. (2016) with a coverage of 7 articles and GCS of 50, Reid et al. (2016) with a coverage of 7 articles and GCS of 18, and Short et al. (2016) with a coverage of 6 articles and GCS of 32. The studies included in this cluster strived to give a theoretical background to the phenomenon both before and after the non-inclusion of "Hypersexual Disorder" in the DSM-5 (American Psychiatric Association, 2013). In his 2010 retrospective study, Levine analyzes 30 men who sought help for a "sex addiction" issue, identifying numerous patterns of sexual behaviors that could hardly be described as an "addiction." The patients showed traits of paraphilia, impulsivity, compulsivity, relationship disorders and personality disorders and the author acknowledged the need to better describe the heterogeneity of hypersexual subjects (Levine, 2010). Other authors suggested instead that considering HD within an addiction framework might be theoretically appropriate and helpful in treatment (Kor et al., 2013). In 2010, Kafka proposed Hypersexual Disorder (HD) as a new psychiatric disorder for consideration in the Sexual Disorders section of DSM-V. HD is described

as a "sexual desire disorder characterized by an increased frequency and intensity of sexually motivated fantasies, arousal, urges, and enacted behavior in association with an impulsivity component" (Kafka, 2010). In this study pornography dependence was identified in 50% of the sample and was significantly associated with compulsive masturbation. Despite a growing number of studies, hypersexuality remained controversial and empirically elusive and some scholars wondered whether the pathological phenomenon of hypersexuality might not be overlapped with the presence in some individuals of a higher sexual interest. A study revealed that Hypersexual individuals, compared to individuals with a high sexual desire, had significantly higher odds of being single, not exclusively heterosexual, religious, depressed, prone to sexual boredom and experiencing substance abuse, suggesting higher mental distress (Štulhofer et al, 2016). To confirm previous findings, religiosity was positively correlated with greater levels of depression among the religious group of hypersexual patients (Reid et al., 2016). Finally, the study conducted by Short et al in 2016 addressed how hypersexuality and problematic pornography use were very challenging for mental health professionals, who mainly felt "not competent" to treat these conditions due to diagnostic ambiguity and insufficient knowledge (Short et al, 2016).

3.4.2 Cluster #3 - Social Factors

The cluster #3 explores the social factors that may contribute to or exacerbate a problematic behavior towards pornography. The major citing articles in Cluster #3 were authored by Willoughby et al. (2018) with a coverage of 11 articles and GCS of 32, Maas et al. (2018) with a coverage of 11 articles and GCS of 46, and Perry (2018) with a coverage of 10 articles and GCS of 64. From a sociodemographic point of view problematic pornography users are mainly younger males (Willoughby et al. 2018; Perry, 2018), with higher chances of being single (Willoughby et al. 2018), divorced or in an "unhappy" marriage (Doran and Price, 2014). Race and social minorities (black, Asian, Latino and others), compared with white Caucasians, were less likely to use pornography in a pathological way (Willoughby et al. 2018). Moreover, individuals with a PPU revealed low frequency or poor-quality social interactions and lower educational attainment (Sallie et al., 2021; Shirk et al., 2021). Problematic pornography use has been also positively linked with child and partner abuse and a personal or family history of alcohol consumption (Malaeb et al., 2023). Religiosity also plays a major role in the problematic use of pornography: religious individuals tend to use pornography less than non-religious individuals but report greater mental distress

(Borgogna, 2018). This led to the theorization of the concept of "moral incongruence," which will be further discussed in the next section.

3.4.3 Cluster #14 – Moral Incongruence

The term "Moral Incongruence" refers to the emotional distress caused by the enactment of certain acts or behaviors that cause moral judgments and disapproval in the value system to which the individual belongs. This Cluster includes papers between 2015 and 2021. The major citing articles were authored by Grubbs et colleagues, both in 2018. The first, published in February and co-authored by Perry, has a coverage of 32 articles and GCS of 202. The second, published in May and co-authored by Perry, Wilt and Reid shows a coverage of 32 articles and GCS of 141. A growing body of literature suggests that many individuals, particularly religious individuals, express a strong disapproval towards pornography while still using it. The moral disapproval is associated with negative outcomes, like depression, mental distress, and relational problems (Borgogna et al., 2018). For this reason, Grubbs and Perry suggested that moral incongruence might be a driving factor in the experience of self-perceived pornography and correlated psychopathology (Grubbs and Perry, 2018). The same year they proposed a pathway model. This model describes how pornography-related problems could be explained as functions of discrepancies between pornography-related beliefs and pornography-related behaviors. According to this, religiousness strongly contributes to moral incongruence around pornography use (Grubbs et al., 2018).

3.4.4 Cluster #1 - Assessment of pornography use

The major citing articles in Cluster #1 were authored by Sallie et al. (2021) with a coverage of 11 articles and GCS of 34, Rousseau et al. (2021) with a coverage of 7 articles and GCS of 22 and Shirk et al. (2021) with a coverage of 7 articles and GCS of 17. This cluster comprehends recent papers (between 2018 and 2023) with a specific focus on the assessment of Problematic Pornography Use. The most comprehensive tools for the assessment of problematic pornography use (based on their coverage of specific addiction components) are the Problematic Pornography Use Scale (PPUS; Kor et al., 2014) and Problematic Pornography Consumption Scale (PPCS; Bőthe et al., 2018). The PPUS evaluates the key elements of addiction: (1) distress and functional

problems, (2) excessive use, (3) control difficulties, (4) use to escape/avoid negative emotions. The scale showed high internal consistency, convergent validity, and construct validity (Kor et al., 2014). The PPCS is the only tool to evaluate each of the six Griffiths (2005) components: salience, mood modification, conflict, relapse, withdrawal and tolerance. In order to distinguish between problematic and non-problematic pornography users, the PPCS also offers a verified cut-off score (76), which increases its research and clinical utility (Bőthe et al., 2018).

3.4.5 Cluster#5 - Psychopathological Features

Cluster #5 includes recent papers that explore the psychopathological features of Problematic Pornography Use. The major citing articles were authored by Su et al. (2023) with a coverage of 4 articles and GCS of 3 and Hernández-Mora Ruiz Del Castillo et al. (2023) with a coverage of 4 articles and GCS of 0. From the studies included in this cluster, it strongly emerged how problematic pornography users are more likely to experience mental health problems and psychological distress (Grubbs et al., 2015; Su et al., 2023). PPU has been positively linked with ADHD symptoms, anxiety symptoms, depressive symptoms and compulsive/obsessive tendencies (Hernández-Mora Ruiz Del Castillo et al., 2023). Individuals with ADHD often report episodes of "hyperfocus", defined as a period of long-lasting, highly focused attention (Hupfeld et al., 2019), which could facilitate the loss of control and escalation in use. Furthermore, these patients tend to be sensation seekers and susceptible to boredom, both of which might be motivations behind the use of pornography. Through the years researchers have consistently found a link between porn use and anxiety and depressive symptoms. According to some lines of research, bouts of depression may influence people to view pornography and masturbation as a way to relieve stress or cope with negative feelings. However, other scholars suggest that habitual pornography use may be a contributing factor to depression, possibly due to the associated self-isolation (Owens et al. 2012). This suggests that the relationship between anxiety, depression and pornography is complex and bidirectional: the repetitive use of sexual behaviors to minimize anxiety and depression may indicate maladaptive coping mechanisms. Conversely, continued engagement in pornography may lead to increased anxiety, along with other psychological distress (Dickenson et al., 2018). Regarding OCD, a tendency towards obsessivity or compulsivity appears to be present but weakly associated with PPU (Bőthe et al., 2019), in opposition to the hypothesis that PPU might be an obsessive-compulsive spectrum disorder.

3.4.6 Cluster #2 – Predictive Factors

Cluster #2 includes the most recent papers regarding problematic pornography use and analyzes its predictive factors, giving us a good overview of the aforementioned topics. The major citing articles were authored by Su et al. (2023) with a coverage of 16 articles and GCS of 3, Islam et al. (2022) with a coverage of 11 articles and GCS of 4, and Briken et al. (2022) with a coverage of 10 articles and GCS of 15. The quantity of pornography used (frequency and time spent per session) is positively related to the severity of pornography use and is a predictor of PPU and worst mental health outcomes (Su et al., 2023). In fact, PPU consistently showed a significant correlation with psychological distress (particularly depression and anxiety) in both cross-sectional (Grubbs & Perry, 2019) and longitudinal studies (Grubbs et al., 2015). In addition, moral disapproval of pornography use could significantly predict PPU (Su et al., 2023). Impulsivity has been identified as a predictive factor in the development and maintenance of specific addictive disorders. It can be differentiated between "trait impulsivity", stable and related to personality trait and "state impulsivity" which is dependent on environmental and affective factors such as craving. High scores of both trait and state impulsivity were related to a higher risk in the development of PPU as well as high craving reactions (Antons et al., 2022). A machine learning analysis of compulsive cyberporn use, identified five predictors, in line with previous literature. The most important predictors of problematic usage of online pornography were related to: a strong craving for pornography experiences, a tendency to suppress negative emotions through the use of pornographic material, a high frequency of porn use over the past year, an acceptance of rape myths, and an anxious attachment style. (Brahim et al., 2023).

The discussion of the most influential publications and the main thematic research domains revealed a broad and growing interest in the topic, particularly over the past decade. Researchers have primarily focused on establishing a solid theoretical framework and on identifying the psychopathological and etiopathogenetic factors that contribute to the development of PPU. A key role has also been played by the development and rapid standardization of assessment tools, which have significantly improved the understanding and clinical recognition of this phenomenon. Notably, the findings of this study point to a significant gap in the literature concerning the psychopathological dimensions of PPU in relation to gender differences. Addressing this gap is essential for developing more nuanced, inclusive, and effective clinical and theoretical models.

3.5 Limitations

Although the scientometric approach has proven valuable for achieving research objectives, it also presents some limitations. The document co-citation analysis does not provide a qualitative perspective for the citation patterns, since it is based on the quantity of citations and co-citation patterns in the retrieved references. Therefore, an extensive discussion of the patterns obtained was carried out. Moreover, the outcomes of the scientometric analysis are strictly dependent on the data utilized as input. For this reason, some relevant publications (e.g., older publications) might have not been collected. Despite our efforts in using a wide set of key terms commonly associated with problematic pornography use, there is a possibility that some relevant terms were inadvertently omitted.

3.6 Conclusion

In the past few years, it strongly emerged how Compulsive Sexual Behaviour Disorder, particularly Problematic Pornography Use, has become a major cause of concern n clinical settings (Bőthe et al., 2019). The current manuscript, which adopts a scientometric approach (Carollo et al., 2024), outlined the knowledge structure around PPU in the available literature. We identified and discussed the most impactful documents and the main research thematic domains, revealing a wide interest in the topic, especially in the past decade. Researchers' efforts have focused on establishing a theoretical background and defining the psychopathological and etiopathogenetic factors that promote the development of problematic pornography use. A key role has also been played by the creation and rapid standardization of assessment tools, which facilitate the understanding and diagnosis of this specific phenomenon. PPU is still widely studied and some areas, such as diagnosis and treatment, are still debated among scholars. Such an analysis can underline the research gaps in the literature, facilitating future research on this topic. In addition, informing both practitioners and the general population is crucial to producing targeted responses to protect public health.

CHAPTER 4 – Depression, Anxiety and Problematic Pornography Use: evidence from International Sex Survey

4.1 Abstract

Introduction:

Problematic Pornography Use (PPU) has increasingly been recognized as a risk behaviour associated with symptoms of depression and anxiety. These associations have been studied in some clinical and adolescent samples, but not attention was paid to the examination of how they present across different gender identities in the general population samples. This study aims to examine the associations between PPU, anxiety symptoms, and depression symptoms, with a specific focus on potential gender differences.

Method:

Data were obtained from the International Sex Survey (ISS), a large-scale, cross-sectional study conducted across 42 countries. It involved 82,243 participants (Mean $_{age}$ = 32.39 years, SD = 12.52; 39.6% men, 57.0% women, 3.4% gender diverse). Participants completed validated measures, including the Problematic Pornography Consumption Scale (PPCS) and the Brief Symptom Inventory's (BSI-18) depression and anxiety symptoms subscales. A one-way ANOVA was used to assess gender differences, while regression analysis examined the role of gender (i.e., men, women, and gender-diverse individuals) in the associations between psychological distress (i.e., depression and anxiety symptoms) and PPU.

Results:

Results showed that men reported the highest levels of PPU, whereas depression and anxiety were significantly higher among women and gender-diverse individuals. Furthermore, both anxiety and depression were positively correlated with PPU, with weak associations (r = 0.207 and r = 0.249, respectively). Moderation analysis revealed that men exhibited the strongest association between psychological distress and PPU, suggesting that they may rely more heavily on pornography as a maladaptive coping mechanism.

Conclusions:

This study underscores the complex interplay between PPU and mental health across

gender identities. While gender-diverse individuals experience the highest levels of psychological distress, men demonstrate the strongest link between such distress and PPU. These findings highlight the need for gender-sensitive mental health interventions addressing PPU and its psychological implications.

4.2 Knowledge gaps, study aims, and hypotheses

Despite growing evidence linking PPU to psychological distress (i.e., depression and anxiety symptoms), much of the existing literature relies on narrow or specialized samples, such as clinical populations (Kafka, 2000; Stein et al., 2001) or adolescents (Owens et al., 2012; Peter & Valkenburg, 2016). This focus limits the generalizability of findings regarding the prevalence and correlates of PPU across gender identities, sexual orientations, and cultural contexts. For instance, most studies centre on cisgender men (Grubbs et al., 2020), potentially overlooking unique psychological and social factors that may result in pornography use in women, gender-diverse individuals, and sexual minorities (Bőthe et al., 2019; Lewczuk et al., 2023). Additionally, while some studies have documented elevated mental health risks in specific groups (e.g., college students, clinical samples, sexual and gender minorities; Borgogna et al., 2019; Ferlatte et al., 2019), these findings are typically derived from smaller convenience samples and are not always replicated in cross-national, large-scale surveys. Consequently, there remains a clear gap in our understanding of how PPU and related mental health concerns, such as depression and anxiety symptoms, vary across diverse populations. This limitation restricts the generalizability of existing findings to the broader population, underscoring the need for more representative research to inform public health interventions and clinical guidelines. This study was the first to be conducted across a large, heterogeneous sample of the general population to compare and examine the association between PPU, anxiety and depression symptoms, with particular attention to potential gender differences. The primary objective was to examine whether PPU, depression, and anxiety symptoms differ across genders (i.e., men, women, and gender-diverse individuals). Basing on pre-existing literature, we hypothesized that PPU would be higher in men compared to other genders, while depression and anxiety symptoms would be higher among women and gender-diverse individuals compared to men. The second objective was to examine the associations between anxiety, depressive symptoms, and PPU. Specifically, we hypothesized that higher levels of anxiety and depression symptoms would be linked to higher levels of PPU. Finally, we examined the potential moderating role of gender in these associations. We hypothesized that the associations of anxiety and depressive symptoms

with PPU would be stronger among men, followed by gender-diverse individuals, and women. The study's research question and hypotheses were preregistered on OSF: https://doi.org/10.17605/OSF.IO/9UD2C.

4.3 Methods

The ISS (http://internationalsexsurvey.org/) is an international, multi-lab, multi-language study that uses cross-sectional and self-report survey methods in 42 countries (preregistered study design: https://osf.io/uyfra/?view_only=6e4f96b748be42d99363d58e32d511b8). The survey was disseminated through a secure online platform (Qualtrics Research Suite) and was translated into 25 country-specific languages from English. The time required to complete it ranged from 25 to 45 minutes. Inclusion criteria were a) being at least 18 years old (or the legal age to provide informed consent) and (b) understanding any of the languages in which the survey is available. Exclusion criteria were: (a) fail two out of three attention questions (Thomas & Clifford, 2017), and/or (b) produce contradictory response patterns. At the end of the survey, participants received a list of mental health services if they felt the need to consult a professional. As an incentive, we informed participants that we donate 50 cents to non-profit, sexuality-related international organizations (e.g., World Association for Sexual Health) for every completed survey, with a maximum of a $1,000 donation. The list of collaborating countries, detailed description of the translation and data collection procedures, and more details about the eligibility criteria are described in the study protocol (Bőthe et al., 2021). For complete transparency of data use, all published papers and conference presentations are reported on the OSF pages (https://osf.io/uyfra/). The study was approved or deemed exempt by all collaborating countries' national/institutional ethics review boards (https://osf.io/n3k2c/?view_only=83814 6f6027c4e6bb68371d9d14220b5) and was conducted in accordance with the Helsinki Declaration.

4.4 Participants

After data cleaning (detailed data cleaning procedure: https://doi.org/10.17605/OSF.IO/DK78R), a total of 82,243 participants (Mean age = 32.39 years, SD = 12.52, 39.6% men, 57.0% women, 3.4% gender diverse) were included in the final dataset. Participants' detailed sociodemographic characteristics by country can be found at https://osf.io/n3k2c/?view_only=838146f6027c4e6bb68371d9d14220b5. For this

study, all participants who completed the Problematic Pornography Consumption Scale (PPCS) and the Brief Symptom Inventory (BSI-18) were included.

4.5 Measures

Participants were asked questions about their socio-demographic characteristics. For this study, we considered gender identity (Bauer et al., 2017) as a variable of focus, while other sociodemographic characteristics were used to describe the sample. Participants were then asked specific questions about their use of pornography. The wording of each sociodemographic and sexuality-related question and answer option, and all scales in all languages can be seen at https://osf.io/jcz96/?view_only=9af0068dd e81488db54638a01c8ae118.

The severity of the PPU in the past six months was assessed using the Problematic Pornography Consumption Scale (PPCS, Bőthe et al., 2018). The 18-item PPCS includes six factors: salience (three items, e.g., "I felt that porn is an important part of my life."), tolerance (three items, e.g., "I felt that I had to watch more and more porn for satisfaction."), mood modification (three items, e.g., "I used porn to restore the tranquillity of my feelings."), conflict (three items, e.g., "Watching porn prevented me from bringing out the best in me."), withdrawal (three items, e.g., "I became agitated when I was unable to watch porn."), and relapse (three items, e.g., "I unsuccessfully tried to reduce the amount of porn I watch."). Participants indicate their answers on a seven-point scale (1= "never"; 7= "all the time"). Scoring 76 points or more indicates risk of PPU (Bőthe et al., 2018; 2024). The study assessed the presence of depression and anxiety symptoms (Brief Symptom Inventory - BSI-18) (Asner-Self et al., 2006; Quintana Zunino et al., 2024) in the past seven days. Participants had to indicate their answers on a five-point scale (0 = "not at all"; 4 = "extremely"). Scores range between 0 and 24 points for both scales.

4.6 Statistical Analysis

Analyses were performed using the software IBM SPSS Statistics (version 29.0.2, IBM Corp., 2023) and Jamovi (version 2.3.28, The Jamovi Project, 2023). Prior to conducting the analyses, the assumptions of normality and homoscedasticity were examined. Although some variables did not follow a normal distribution, skewness and kurtosis values were within acceptable thresholds (Hogg & Craig, 1995; West, Finch, & Curran, 1993), and the large sample size ($N > 30$) justified the use of parametric tests

based on the central limit theorem. To address the study objectives, we performed: (a) group comparisons, (b) regression on the total sample and (b) moderation analysis. We conducted a one-way ANOVA using Welch's correction to examine differences in PPU, anxiety, and depression symptoms across gender groups (men, women, gender-diverse). Games-Howell post hoc tests were applied to assess pairwise group differences, given the unequal sample sizes and variance heterogeneity. To explore the overall associations between psychological distress and PPU, bivariate Pearson correlations were computed between PPU scores and both anxiety and depression symptoms. We then performed a moderation analysis to examine the moderating role of gender in the relationship between anxiety and depression symptoms (independent variables) and PPU (dependent variable). Gender was included in the moderation analysis, given the adequate sample sizes of gender groups and was dummy coded to allow for comparison across the three groups. Anxiety and depression symptoms were included as predictors in two separate regression models to examine their effect on PPU. Gender was included in the moderation analysis, given the adequate sample sizes of gender groups. The R-squared (R2; e.g., higher values indicating better fit) was used to assess model fit while the 95% confidence intervals were considered for the interpretation of the analysis of simple effects.

4.7 Results

4.7.1 Gender Differences in PPU, Depression Symptoms, and Anxiety Symptoms

The one-way ANOVA analysis revealed significant differences across gender groups for all three study variables. PPU scores showed a significant main effect of gender, $F(6703)=6805$, $\eta p2 = 0.664$, $p<0.001$. Men reported the highest PPU scores ($M = 38.55$, $SD = 19.85$), followed by gender-diverse individuals ($M = 32.06$, $SD = 18.54$), and women with the lowest levels ($M = 24.24$, $SD = 11.03$). Games–Howell post-hoc tests indicated that every gender group differed significantly from the others (See Table 2). The effect size was very high, indicating a strong influence of gender on PPU scores (see Table 3). Anxiety levels also differed significantly across gender groups, $F(1766)=6988$, $\eta p2 = 0.336$, $p<0.001$. Women reported higher anxiety levels ($M = 7.42$, $SD = 5.76$) compared to men ($M = 5.27$, $SD = 5.13$), with gender-diverse individuals having the highest anxiety levels ($M = 9.75$, $SD = 6.28$). These results align with the hypothesis that anxiety would be elevated in women and gender-diverse individuals compared to men. The effect size was high, reflecting a strong association

between gender and anxiety symptoms (see Table 3). Depression scores varied significantly by gender, F(676)=6976, ηp = 2 0.162, p<0.001. Gender-diverse individuals reported the highest depression scores (M = 10.64, SD = 6.77), followed by women (M = 7.04, SD = 5.99) and men with the lowest levels (M = 6.08, SD = 5.87). Post hoc analyses indicated significant differences between all groups, supporting the hypothesis that depression levels are higher among women and gender-diverse individuals compared to men. The effect size was medium-high, indicating substantial gender-based differences in depression symptoms (see Table 3). For both anxiety and depression symptoms, all post-hoc comparisons remained significant at p <0.001, suggesting significant differences between all genders. Women and gender-diverse participants reported higher symptom levels than men, and gender-diverse participants differed significantly from women as well (Table 4). One-way ANOVAs were performed on complete records. Participants with missing data on any of the dependent variables or on gender were list-wise deleted.

Table 3 - Gender Differences in Problematic Pornography Use, Depression and Anxiety Symptoms. Results of the One-Way ANOVA Analysis

Measure	Group	N	Mean (min-max)	SD	SE	ηp^2
Problematic Pornography Use	Men	31426	38.55 (18-126)	19.85	0.112	0.664
	Women	40988	24.24 (18-126)	11.03	0.054	
	GD individuals	2609	32.06 (18-126)	18.54	0.363	
Anxiety	Men	30051	5.27 (0-24)	5.13	0.029	0.336
	Women	43377	7.42 (0-24)	5.76	0.027	
	GD individuals	2590	9.75 (0-24)	6.28	0.123	
Depression	Men	30049	6.08 (0-24)	5.87	0.034	0.162
	Women	43372	7.04	5.99	0.029	

		(0-24)		
GD individuals	2589	10.64 (0-24)	6.77	0.133

Note. N values reflect complete cases for each outcome; total sample size before list-wise deletion = 82 243, GD = Gender-diverse, SD = Standard Deviation, SE = Standard Error, ηp^2 = partial eta squared.

Table 4 - Games–Howell Post-hoc Pairwise Comparisons by Gender

Measure	*Men/Women MD*	*Men/GD MD*	*Women/GD MD*
PPU	14.3***	6.5***	-7.8***
Anxiety	-2.15***	-4.48***	-2.33***
Depression	-0.96***	-4.56***	-3.60***

Note. N values reflect complete cases for each outcome; total sample size before list-wise deletion = 82 243, *GD = Gender-diverse, PPU = Problematic Pornography Use, MD = mean difference,* ***$p < .001$.

4.7.2 Associations Between Anxiety Symptoms, Depression Symptoms, and PPU

The correlation analysis revealed significant positive correlations between PPU scores and both anxiety and depression symptoms in the total sample. Specifically, the correlation between PPU and anxiety symptoms was r = 0.207, $p<.001$, and was r = 0.249, $p<.001$ between PPU and depression symptoms (see Table 4). According to Cohen's (1988) guidelines, these represent weak, but nevertheless statistically significant associations. These findings support the hypothesis that higher levels of anxiety and depression are significantly associated with higher PPU in the overall population. This step provides an estimate of the raw association between psychological distress and PPU across the entire sample, before examining the potential moderating role of gender.

Table 5 - Descriptive Statistics and Correlations Between PPU, Anxiety, and Depression Symptoms

Variable	*M*	*SD*	1	2	3
PPU	29.97	16.83	—		
Anxiety	6.78	5.70	.207**	—	
Depression	6.96	6.01	.249**	.682**	—

Note. All correlations are Pearson's r. M = mean; SD = standard deviation; PPU = Problematic Pornography Use;
**p < .05. **p < .001.*

4.7.3 Moderating Role of Gender in Associations Between PPU, Anxiety, and Depression

The moderation analysis suggested that gender significantly moderated the association between anxiety symptoms and PPU, $F(2,69269)=782$, $p<0.001$, and between depression symptoms and PPU, $F(2,69263)=674$, $p<0.001$. Specifically, men exhibited the highest slopes in the PPU-anxiety and PPU-depression symptoms relationships. The association between anxiety symptoms and PPU was strongest among men (B = 1.142, 95 % CI [1.108, 1.176], β = .379, p < .001), followed by women (B = 0.295, 95 % CI [0.269, 0.322], β = .098, p < .001), and gender-diverse individuals (B = 0.222, 95 % CI [0.126, 0.317], β = .074, p < .001) (Table 4, Figure 1). Similarly, for depression symptoms, the association with PPU was strongest among men (B = 1.050, 95 % CI [1.021, 1.080], β = .373, p < .001), followed by women (B = 0.341, 95 % CI [0.316, 0.367], β = .121, p < .001), and gender-diverse individuals (B = 0.310, 95 % CI [0.222, 0.399], β = .110, p < .001) (Table 5, Figure 2). The models showed almost equal R2 values respectively for anxiety (.221) and depression (.229). These results indicate that men, relative to women and gender-diverse individuals, might experience a stronger link between psychological symptoms (anxiety and depression symptoms) and their PPU.

Table 6 - Moderation analysis of role of gender in the relationship between depression (independent variables) and problematic pornography use (dependent variable).

Moderators Levels	Estimate	*SE*	95% CI		*β*	*p*	R^2
			LL	*UL*			
Gender							
Men	1.050	0.015	1.021	1.080	0.373	.001	.229
Women	0.341	0.013	0.316	0.367	0.121	.001	
GD individuals	0.310	0.045	0.222	0.399	0.110	.001	

Note. GD = Gender-diverse, CI = confidence interval; LL = lower limit; UL = upper limit, β = standardized coefficient.

Figure 6 - Moderation analysis of role of gender in the relationship between depression symptoms (independent variables) and problematic pornography use (dependent variable).

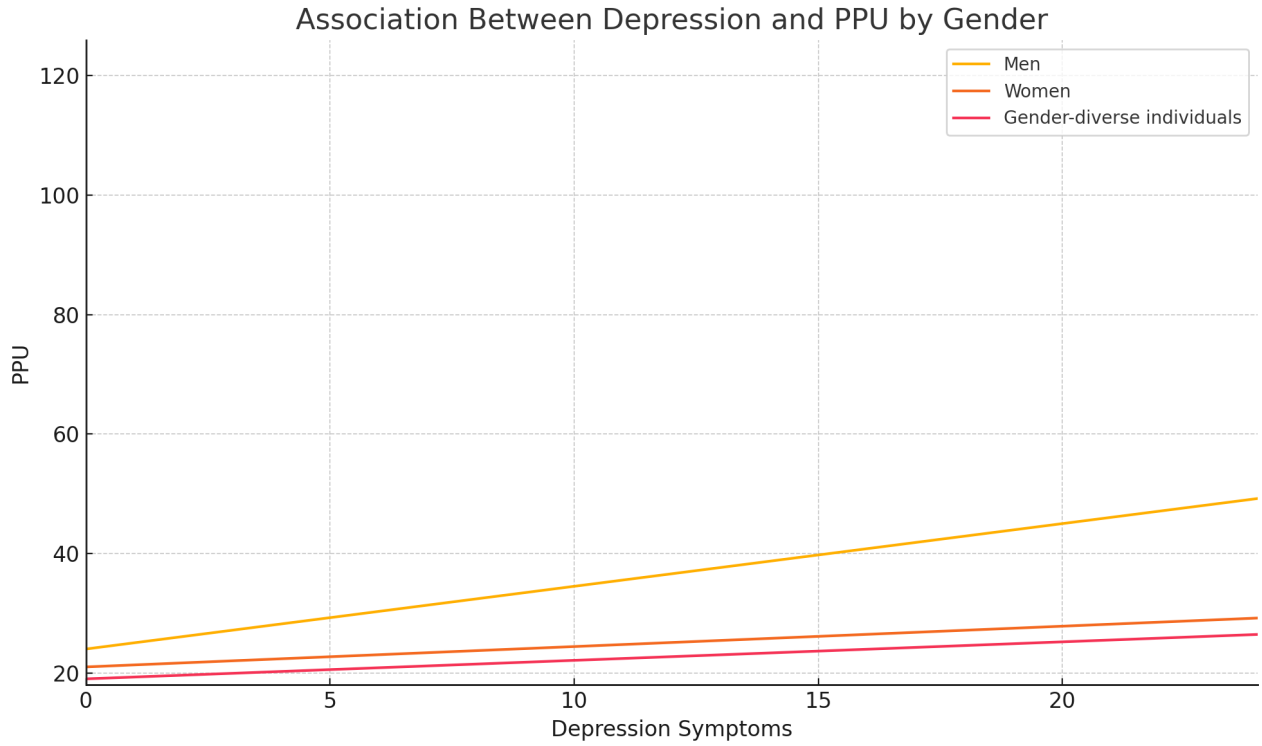
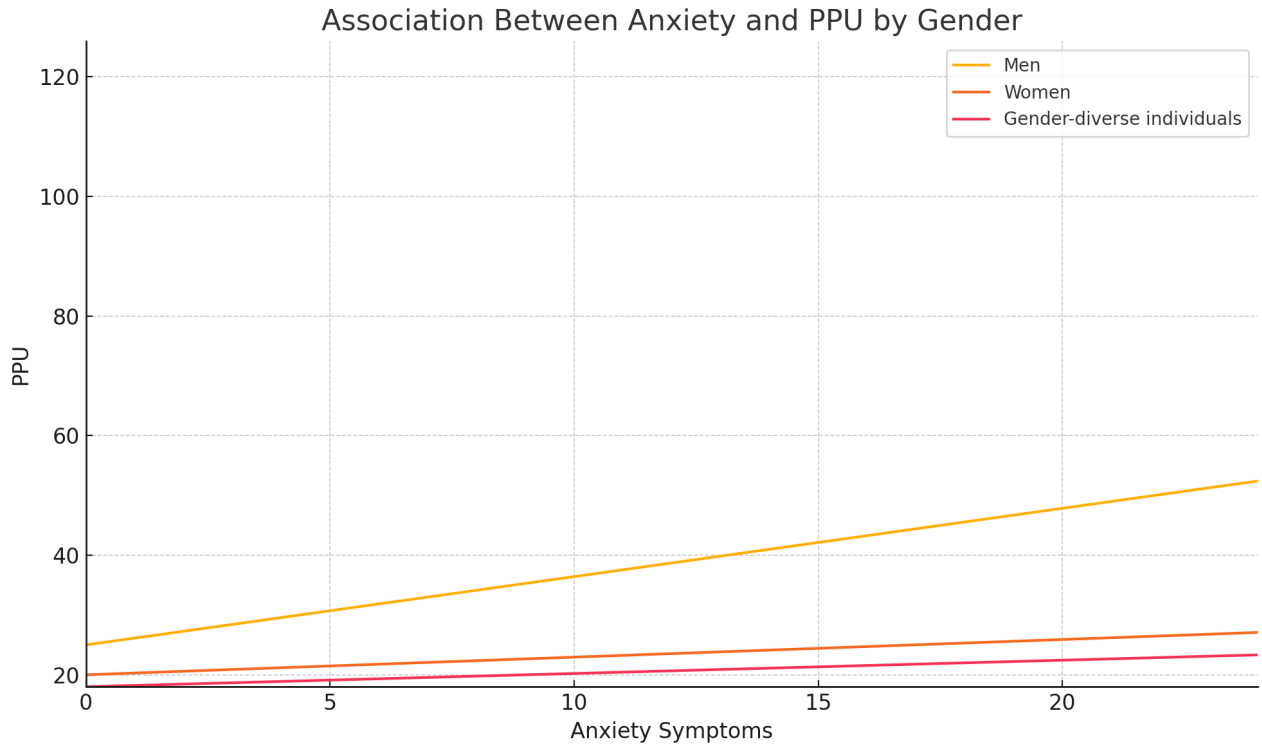


Table 7 – Moderation analysis of role of gender in the relationship between anxiety symptoms (independent variables) and problematic pornography use (dependent variable)

Moderators Levels	Estimate	*SE*	95% CI		*β*	*p*	R^2
			LL	*UL*			
Gender							
Men	1.142	.017	1.108	1.176	.379	.001	.221
Women	0.295	.013	0.269	0.322	.098	.001	
GD individuals	0.222	.048	0.126	0.317	.074	.001	

Note. GD = Gender-diverse, CI = confidence interval; LL = lower limit; UL = upper limit, β = standardized coefficient.

Figure 7 - Moderation analysis of role of gender in the relationship between anxiety (independent variables) and problematic pornography use (dependent variable).



4.8 Discussion

This study examined the associations between PPU, depression, and anxiety symptoms across different gender identities, with a specific focus on gender differences in these relationships. While prior research has mostly focused on small and homogeneous samples without an emphasis on gender-diverse populations (e.g., Grant Weinandy et al., 2023; Grubbs et al., 2020), this study addressed a key gap by using a large, diverse, cross-national sample to explore how these associations manifest across genders. Understanding these differences is essential to develop tailored mental health interventions and inform public health strategies aimed at reducing PPU and psychological distress. The findings provided empirical support for the three proposed hypotheses, highlighting significant gender-based variations in PPU and psychological distress, as well as the moderating role of gender in the associations between anxiety symptoms, depression symptoms, and PPU.

The first hypothesis proposed that men would exhibit higher levels of PPU, while depression and anxiety would be more prevalent among women and gender-diverse individuals. The results supported this hypothesis, with men reporting significantly higher levels of PPU compared to women and gender-diverse individuals. This finding is consistent with previous research indicating that men are more likely to engage in frequent pornography consumption and exhibit compulsive sexual behaviours (e.g., Grubbs, Kraus, & Perry, 2019). More recent large-scale and cross-national studies have similarly found that men consistently report higher levels of PPU compared to other gender groups (Bőthe et al., 2024; Grubbs et al., 2024; Vieira & Griffiths, 2024), further supporting the robustness of this gender difference across diverse populations. The higher prevalence of PPU in men may be explained by biological and sociocultural factors, including greater exposure to sexually explicit material and the normalization of pornography use as an expression of male sexuality (Martyniuk et al., 2016). Conversely, gender-diverse individuals and women reported significantly higher levels of depression and anxiety symptoms compared to men. This aligns with existing literature showing that gender-diverse individuals are at increased risk for mental health issues due to experiences of minority stress, discrimination, and social exclusion (Borgogna et al., 2019; Ferlatte et al., 2019). Similarly, women tend to exhibit higher levels of internalizing disorders, including depression and anxiety, which may be influenced by biological, social, and psychological factors, for example, hormonal fluctuations across the menstrual cycle (Albert, 2015), gendered socialization emphasizing emotional expressiveness (Chaplin & Aldao, 2013), and greater exposure to interpersonal stressors such as caregiving burden or relational conflict (Hankin et al.,

2007; Van Droogenbroeck, Spruyt, & Keppens, 2018). The elevated levels of psychological distress in these groups underscore the importance of considering gender identity in mental health interventions.

The second hypothesis predicted that higher levels of anxiety and depression would be associated with increased PPU. The results supported this hypothesis, revealing significant positive correlations between PPU and both anxiety and depression across the overall sample. These findings support the self-medication hypothesis (Khantzian, 1985), which suggests that individuals experiencing psychological distress may engage in maladaptive behaviours, such as excessive pornography consumption, to alleviate negative emotions (Cooper et al., 2001). Previous research has similarly found that individuals with higher levels of anxiety and depression are more likely to use pornography as a coping mechanism (Wéry et al., 2019). However, while the association between PPU and psychological distress was significant, the directionality of this relationship remains unclear due to the cross-sectional nature of the study. It is possible that individuals with preexisting anxiety and depression are more prone to PPU as a form of emotional regulation. Conversely, excessive pornography use may contribute to worsening mental health symptoms by reinforcing feelings of isolation, guilt, and diminished self-esteem (Baltazar et al., 2010; Yoder et al., 2005).

The third hypothesis proposed that gender would moderate the associations between PPU and psychological distress. The results indicated that men exhibited higher slopes in the PPU-anxiety and PPU-depression symptoms relationships compared to gender-diverse individuals and women. The prominent moderating role of male gender in these associations may be attributed to several factors. First, men reported the highest levels of PPU, suggesting a stronger reliance on pornography use as a coping mechanism for emotional distress, in line with previous findings (Bőthe et al., 2021; Koós et al., 2024). This also aligns with prior research demonstrating that men are more likely to engage in externalizing behaviours to manage stress and negative emotions (Dickenson et al., 2018). Additionally, sociocultural norms may play a role, as men may be less likely to seek emotional support or utilize adaptive coping strategies, leading to greater engagement in PPU as an outlet for distress (Vaillancourt-Morel & Bergeron, 2019). In contrast, while gender-diverse individuals experienced the highest levels of psychological distress, their PPU levels were not as strongly associated with anxiety and depression symptoms in their case. This may be explained by the unique stressors faced by gender-diverse populations, including discrimination, gender dysphoria, and lack of social support (Lewczuk et al., 2023). These individuals may engage in alternative coping mechanisms beyond pornography use, such as seeking

online communities for validation or accessing mental health resources tailored to their needs. The relatively weaker effect among gender-diverse individuals suggests that while they face significant psychological challenges, their use of pornography may not serve as the primary mechanism for emotional regulation (Jennings et al., 2024; Engelhardt et al., 2025).

The findings of this study have important diagnostic and clinical implications. First, clinicians should consider PPU not merely as a behavioural issue, but as a potential correlate of underlying psychological distress—particularly symptoms of depression and anxiety (Grubbs et al., 2015; Vieira & Griffiths, 2024). Routine mental health assessments should include questions about pornography use, especially in male clients, who may be less likely to disclose emotional difficulties but more likely to engage in avoidant or externalizing coping strategies such as excessive pornography consumption (Dickenson et al., 2018; Vaillancourt-Morel & Bergeron, 2019). For gender-diverse individuals, assessments should also account for minority stress, discrimination, and gender dysphoria, which are known to contribute to psychological distress (Lewczuk et al., 2023; Jennings et al., 2024a), even when not directly associated with elevated PPU levels.

From a treatment perspective, these findings underscore the need for gender-informed therapeutic approaches. Mental health professionals should be trained to recognize how coping behaviours differ by gender and to avoid pathologizing pornography use without contextual understanding (Sniewski & Farvid, 2020). Tailored interventions that address the unique psychosocial realities of each gender group are crucial. For men, treatment may involve promoting emotional literacy and developing alternative coping mechanisms (Dickenson et al., 2018), whereas for gender-diverse individuals, therapy may incorporate identity-affirming care and address structural vulnerabilities, as recommended in minority stress models (Borgogna et al., 2019; Ferlatte et al., 2019; Jennings et al., 2024a). Intervention-based research should explore the adaptation of evidence-based treatments, such as cognitive-behavioural therapy (CBT), mindfulness-based interventions, and acceptance and commitment therapy (ACT), which have shown promise in reducing CSBD and PPU and improving emotional regulation (Kraus et al., 2018; Dickenson et al., 2018; Duffy et al., 2022). However, few studies have tested these modalities in the context of PPU specifically, or among gender-diverse populations, highlighting an urgent need for inclusive, empirically supported treatments.

4.9 Limitations and Future Directions

While this study contributes valuable insights into the relationship between PPU and psychological distress, several limitations must be acknowledged. First, the reliance on self-reported data introduces potential biases, such as social desirability and recall bias, which may affect the accuracy of responses (Thomas & Clifford, 2017). The cross-sectional design of the study also limits causal inference, making it unclear whether psychological distress leads to increased pornography use or whether excessive use contributes to worsening mental health. Further longitudinal studies are needed to clarify these temporal and potentially bidirectional relationships (see Engelhardt et al., 2025). Furthermore, while the sample was large and cross-national, it was not representative at the national level in most participating countries. Recruitment relied primarily on online convenience sampling, which may have introduced selection biases, particularly underrepresenting individuals with limited internet access, older adults, and those with lower digital literacy. These constraints may affect the generalizability of the findings to the broader population. General limitations related to the ISS are discussed further on the study's OSF page (https://osf.io/n3k2c/view_only=838146f6027c4e6bb68371%20d9d1%204220b5).

4.10 Conclusions

The findings of this study underscore the complex and clinically significant relationship between PPU, depression, and anxiety symptoms. Crucially, the results reveal that these associations are not uniform across gender groups: while gender-diverse individuals reported the highest overall levels of psychological distress, it was men who showed the strongest association between their depression and anxiety symptoms and PPU levels. This suggests that pornography use may serve as a maladaptive coping strategy particularly among men, with important implications for both diagnosis and treatment. These findings highlight the need for mental health professionals to systematically assess pornography use in the context of emotional distress, and to consider gender-specific pathways in how individuals regulate negative affect. Clinically, this calls for the development and rigorous testing of gender-responsive treatment packages, such as emotion-regulation-focused modules for men and minority-stress-informed interventions for gender-diverse patients, whose explicit goal is to reduce problematic pornography use and alleviate the co-occurring symptoms of depression and anxiety.

CHAPTER 5 – General Discussion

In this chapter, a concise synthesis of the principal results from each of the two studies will be presented, followed by a critical reflection on these findings. It then delineates the theoretical contributions and practical implications arising from the research, acknowledges the study's limitations, and outlines avenues for future inquiry along with remaining unanswered questions. The chapter closes by presenting the overarching conclusions of this doctoral thesis.

5.1 Brief Summary

The present dissertation advances scholarly and clinical insight into Problematic Pornography Use through two complementary inquiries. Study 1 offers a scientometric mapping of the PPU literature, thereby illustrating how research output has proliferated and organised itself into discrete thematic domains. Study 2 analyses data from the International Sex Survey to examine the associations between PPU and mental distress (specifically, depressive and anxious symptomatology) in a cross-cultural sample of more than 80 000 individuals. In concert, these investigations demonstrate, first, that the evidence base on PPU is rapidly maturing yet remains theoretically fragmented and, second, that the correlation between problematic usage of pornography and psychological distress is mediated by gender. The dual lens, field-level cartography coupled with individual-level epidemiology, furnishes a coherent narrative connecting the intellectual evolution of the discipline to its most pressing clinical questions.

5.2 Main Findings of the Studies

5.2.1 Study 1 – Scientometric Analysis

Drawing on a corpus of 516 Scopus-indexed articles published between 1973 and April 2024 and the 29,133 references they cite, I conducted a scientometric review that traces how scholarship on problematic pornography use has both diversified and coalesced around six thematic domains. Annual publication growth averages roughly 6%, with U.S. authors (particularly Kraus and Potenza) exerting higher influence, while keyword co-occurrence reveals a shift from generic terms such as "pornography" and "internet addiction" toward clinically framed constructs like "compulsive sexual behaviour disorder" and "moral incongruence." Most of the papers are Single Country

Publication, underlining the need of a more comprehensive and cross-cultural perspective. The co-citation network (407 nodes; 1,321 links; modularity = 0.865; mean silhouette = 0.964) partitions the literature into clusters focused on (1) psychometric assessment, (2) psychosocial and neurocognitive predictors (e.g., impulsivity, craving, religious disapproval), (3) wider social correlates (age, gender, minority stress), (4) psychopathological comorbidities (anxiety, depression, ADHD), (5) the foundational debate over whether hypersexuality is addictive or impulse-control in nature, and (6) the emerging construct of moral incongruence that explains why subjective "addiction" distress can exceed objective use patterns. Citation-burst analysis underscores the rapid ascendancy of moral-incongruence scholarship (notably Grubbs et al., 2015/2018), while the proliferation of tools such as the PPUS and PPCS since 2018 signals an assessment-driven turn. Collectively, these findings depict a maturing research landscape that is progressing from definitional disputes toward integrated, measurement-based models linking sociocultural context, individual vulnerabilities and clinical outcomes, yet they also expose enduring gaps in longitudinal evidence and intervention research that warrant future attention.

5.2.2 Study 2 – ISS Cross-Cultural Survey

Drawing on 82,243 adults (39.6 % men, 57.0 % women, 3.4 % gender-diverse) from 42 countries in the International Sex Survey, we show that gender shapes both the prevalence of problematic pornography use and its affective correlates. Men reported markedly higher PPU severity (M = 38.55) than gender-diverse individuals (M = 32.06) and women (M = 24.24), a gap of very large magnitude ($\eta p^2 = .664$), whereas gender-diverse participants registered the heaviest psychological burden, with the highest mean scores for depression (M = 10.64) and anxiety (M = 9.75), followed by women and then men. Across the full sample, PPU related positively, albeit weakly, to anxiety (r = .207) and depression (r = .249), and each symptom dimension independently predicted higher PPU in linear models ($B \approx 1.0$). Crucially, moderation analyses revealed that these distress-to-PPU pathways are not uniform: the slopes linking both anxiety and depression to PPU were steepest for men ($\beta = 1.14$ and 1.05, respectively), attenuated for women ($\beta \approx 0.30–0.34$) and weakest for gender-diverse individuals ($\beta \approx 0.22–0.31$), indicating that men may rely more heavily on pornography as a maladaptive coping mechanism, even though they experience lower absolute distress. Collectively, the findings delineate a gender-differentiated risk profile in which gender-diverse people bear the greatest mental-health load, yet men translate distress into compulsive pornography consumption most strongly, underscoring the need for tailored, gender-sensitive prevention and intervention strategies that address both the emotional antecedents of PPU and minority-stress processes.

5.3 Fulfilment of Research Objectives

The two papers that form the core of this thesis collectively meet the research objectives articulated in Sections 3.3.1 and 3.3.2.

5.3.1 Fulfilment of the Objectives of the Study 1 - Scientometric Analysis of Scientific Literature regarding Problematic Pornography Use

The scientometric analysis of 516 Scopus-indexed papers on problematic pornography use, achieved all three mapping goals:

1) First, by quantifying publication outputs, author networks and keyword co-occurrences, it delineated the structure of knowledge: the United States, United Kingdom and China emerged as the most prolific national contributors; the Journal of Behavioral Addictions, Sexual Addiction & Compulsivity and Journal of Sexual Medicine were identified as core outlets; Kraus and Potenza surfaced as the most productive authors; and the most frequent keywords revealed the field's conceptual drift from generic "pornography" toward clinically framed terms such as "compulsive sexual behaviour disorder" and "moral incongruence"
2) Second, impact analysis isolated the documents that have most shaped the discourse, with foundational works by McKenna & Bargh (2000), Seto & Lalumière (2010) and Király et al. (2020) topping the global-citation rankings.
3) Third, document co-citation and clustering identified six cohesive thematic domains, exposing both consolidating trends and under-researched lacunae.

Together, these outputs provide the systematic, data-driven cartography anticipated in Objective 1 and furnish the specific theoretical gaps that inspired the design of Study 2.

5.3.2 Fulfilment of the Objectives of the Study 2 - Depression and Anxiety Symptoms' Associations with Problematic Pornography Use Across Genders in the ISS cross-cultural sample

Leveraging those insights, Study 2 interrogated International Sex Survey data from 82,243 adults across 42 countries to fulfil all three objectives of the clinical inquiry.

1) First, group-mean comparisons confirmed pronounced gender differences: men displayed the highest PPU scores (M = 38.55), gender-diverse participants the highest anxiety (M = 9.75) and depression (M = 10.64), while women scored lowest on PPU yet intermediate on distress, thereby satisfying the mandate to compare mean levels across genders.
2) Second, correlation analysis demonstrated that both anxiety and depression were positively associated with PPU (r = .21 and .25, respectively), accomplishing the goal of clarifying overall associations.
3) Third, moderation analyses showed that gender significantly conditioned these links: slopes were steepest for men (β ≈ 1.14 for anxiety, 1.05 for depression), attenuated for women, and weakest for gender-diverse individuals, thus fulfilling the objective of testing gender moderation and revealing the gender-specific risk architecture that had been flagged as a gap by the scientometric review

To summarize, Study 1 delivered a comprehensive cartography of the PPU knowledge landscape, while Study 2 translated the most salient gaps, particularly the paucity of large-scale, gender-nuanced analyses of affective correlates, into an empirical test that clarifies how depression and anxiety map onto PPU across diverse gender identities. Together, the studies not only satisfy every objective set forth for this thesis but also establish a cumulative research trajectory: from macro-level mapping to targeted hypothesis-driven investigation, thereby advancing both scholarly understanding and the evidence base for gender-sensitive prevention and intervention strategies.

5.4 Theoretical Implications

Situated within the post-ICD-11 debate on where problematic pornography use belongs in the nosology of addictive, impulse-control and obsessive–compulsive conditions, the two studies presented in this dissertation jointly advance theory by stitching together conceptual clarification with large-scale empirical testing. The scientometric cartography of 516 Scopus-indexed papers unravels six coherent knowledge domains, converting a previously fragmented literature into an explicit architecture on which future hypotheses can be precisely located; its documentation of the field's lexical drift from generic "pornography" toward clinically loaded constructs such as "compulsive sexual behaviour disorder" signals an implicit realignment with ICD-11 criteria and refines the very nomenclature that will govern forthcoming diagnostic and prevalence work. These findings move the field beyond the binary question of whether PPU is "really" an addiction toward a more generative inquiry

into the psychological and sociocultural conditions under which pornography use becomes distressing, and they illustrate how conceptualisation, classification and assessment function as mutually reinforcing building blocks that can spawn theory-driven, culturally sensitive models capable of informing the next generation of longitudinal, multi-method research and ultimately, evidence-based clinical practice.

5.5 Clinical Implications

The findings of this research hold important clinical implications. First, the strong associations between PPU and psychological distress, particularly among gender-diverse populations, highlight the need for targeted mental health interventions. Clinicians should be trained in gender-sensitive approaches and encouraged to screen for pornography-related distress when assessing symptoms of depression and anxiety. The identification of specific behavioral patterns associated with PPU, such as mood modification and relapse, may aid in the development of more effective therapeutic protocols. Cognitive-behavioral therapy (CBT) and mindfulness-based interventions have shown promise in treating compulsive sexual behaviours and emotional dysregulation (Kraus et al., 2018; Dickenson et al., 2018), and their tailored application for individuals experiencing PPU should be further developed and evaluated. Moreover, cross-cultural variability in pornography use and mental health outcomes suggests the importance of culturally informed practices. Clinicians should consider the patient's sociocultural context when evaluating pornography-related concerns and avoid pathologizing behaviors that are consistent with cultural norms but do not result in functional impairment.

5.6 Future Directions

Building on the insights of this study, future research should prioritize longitudinal designs to establish the causal direction between PPU and psychological symptoms. The integration of biological and physiological measures, such as neuroimaging or hormonal assessments, may also enhance the understanding of the mechanisms underlying compulsive sexual behaviors.

The scientometric cluster analysis revealed several thematic domains that remain underexplored and should be prioritized in future research. Studies within Cluster #8

(Hypersexuality) underscore the continued ambiguity surrounding diagnostic criteria for compulsive sexual behaviors and the clinical heterogeneity of individuals affected. Future work should aim to refine diagnostic boundaries, particularly in differentiating pathological behavior from normative high sexual desire, and explore the relevance of conceptual frameworks such as impulsivity, compulsivity, and addiction. Cluster #3 (Social Factors) and Cluster #14 (Moral Incongruence) highlight the importance of socio-demographic and moral contexts in the experience of PPU. Further research is needed to better understand how variables such as religiosity, social support, and cultural norms influence the perception and psychological impact of pornography use. In particular, longitudinal and qualitative studies may help clarify how moral incongruence contributes to mental distress and how this varies across cultures and belief systems. Cluster #1 (Assessment) suggests a need for continued development and refinement of assessment tools that are sensitive to different cultural contexts and capable of distinguishing between high but non-problematic use and genuinely compulsive behavior. Additionally, integrating real-time behavioral tracking or physiological monitoring with self-report instruments may enhance diagnostic precision. Cluster #5 (Psychopathological Features) and Cluster #2 (Predictive Factors) indicate that comorbid mental health conditions, such as ADHD, depression, anxiety, and OCD-related traits, should be investigated more systematically as both correlates and potential predictors of PPU. Neurocognitive profiling, emotion regulation strategies, and attachment styles also warrant deeper exploration to inform personalized intervention strategies.

In addition, intervention-based studies are essential to evaluate the efficacy of existing therapeutic approaches and to develop new, digitally delivered treatments that offer anonymity and accessibility. Public health strategies aimed at increasing awareness and reducing stigma around PPU should be prioritized, fostering an environment where individuals can seek help without fear of judgment or discrimination.

5.7 Final Conclusions

The present doctoral research set out to explore the phenomenon of Problematic Pornography Use from both a scientometric and empirical perspective, with particular attention to its psychological correlates and gender-specific manifestations. The results of this work provide meaningful contributions to the current literature and clinical understanding of PPU, a condition that is increasingly recognized as a public health concern (Bőthe et al., 2019).

Problematic Pornography Use can be conceptualised within a trans-diagnostic framework that situates it alongside other behavioural and substance addictions without neglecting its distinctive sexual-content features. Like gambling disorder or gaming disorder, PPU is chacterised by heightened reward sensitivity, deficient inhibitory control, and maladaptive emotion regulation; yet it is further complicated by shame, moral incongruence, and the uniquely potent combination of novelty, immediacy, and anonymity offered by online sexual stimuli. The present thesis advocates an integrated bio-psycho-social model in which constitutional predispositions (e.g., high impulsivity, anxious attachment, psychological distress), developmental and socio-cultural forces (gender identity, pornography normative beliefs, religiosity), and situational stressors (loneliness, negative affect) converge to propel certain individuals along trajectories that culminate in compulsive use. Such an integrative lens might clarifies why prevalence estimates, symptom profiles, and help-seeking patterns vary not only by gender but also across cultural settings with differing levels of sexual permissiveness and digital infrastructure.

Translating these insights into practice yields three clinical priorities. First, routine anxiety- and mood-screening instruments in primary care should include concise items on pornography use, enabling the detection of PPU well before substantial functional impairment arises. Second, interventions must be genuinely gender-responsive, with protocols for gender-diverse individuals explicitly addressing minority stress and identity-related shame. Third, because PPU, depression, and anxiety reinforce one another bidirectionally, treatment should target these internalising comorbidities concurrently, employing integrated interventions that break their reciprocal amplification.

The technological environment is advancing more rapidly than current clinical guidance. Immersive virtual- and augmented-reality pornography may strengthen associative learning by pairing embodied presence with high-fidelity erotic cues. AI-generated sexual content and deepfakes deliver unprecedented personalisation, potentially raising stimulation thresholds. Algorithmic recommendation engines provide continuous novelty, encouraging binge-like consumption. At the same time, these innovations yield valuable research and clinical tools: smartphone-based ecological momentary assessment can capture real-time fluctuations in craving, affect, and context, while machine-learning models applied to multimodal digital traces can generate early-warning signals of escalating risk before a full disorder develops. These technologies therefore constitute powerful resources for studying and assessing PPU.

Accordingly, prevention and policy must proceed on parallel tracks. A comprehensive and developmentally appropriate digital-sexuality education should equip adolescents and young adults with critical media literacy and skills for managing online behaviours. Age-verification tools should be designed to align minors-protection goals with proportional privacy safeguards. Moreover, online platforms should test practical tools such as time-use dashboards, gentle prompts when a session runs long, and safety filters, to preserve adult choice while steering users toward healthier habits.

Problematic Pornography Use spans addiction, emotional disorders, and sexual health. Effective progress demands close cooperation among clinical psychology, public-health policy, and digital ethics, with constant attention to gender and cultural differences. To lessen both personal harm and the wider public-health burden, scientific and social responses must evolve at the same speed as the technology that drives this behaviour.

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