



Conceptualizations of Craving and the Pornography Craving Questionnaire: A Scoping Review

Bailey M. Way¹ · Shane W. Kraus^{1,2}

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Abstract

Purpose of Review Research has demonstrated that craving is a salient aspect of behavioral and substance use addictions. In 2014, the Pornography Craving Questionnaire (PCQ) was published as the first comprehensive scale to assess craving for pornography. This review was undertaken to understand conceptualizations of craving in behavioral addictions and identify all research studies assessing the subjective experience of craving for pornography using the PCQ.

Recent Findings Craving has been conceptualized as a passionate attachment, ambivalence, and desire thinking. The PCQ has been administered in multiple studies in various countries. These investigations have indicated that the PCQ is positively related to desire thinking, passionate attachment (i.e., obsessive and harmonious passion), future pornography use (e.g., duration and frequency), mental health concerns (e.g., anger, anxiety, depression, behavioral and substance use addictions), dysfunctional coping (i.e., the tendency to use sex in response to negative mood states and stressors), and problematic pornography use.

Summary Craving is a salient dimension of pornography use. Additionally, the PCQ appears of value to measure craving for diagnostic and outcome evaluation purposes. We recommend further evaluation of the PCQ in clinical settings to predict the course and prognosis among help-seeking patients for problematic pornography use.

Keywords Pornography craving questionnaire · Pornography craving · Craving · Problematic pornography use · Scoping review

Introduction

In 2014, the Pornography Craving Questionnaire (PCQ) was created to assess the subjective experience of craving to view pornography [1•]. Rather than measuring craving for pornography with a single item, Kraus and Rosenberg conceptualized craving as a multifaceted construct and developed a 12-item self-report questionnaire reflecting five elements of craving. These elements include a) perceived control over use (e.g., “If I watched porn right now, I would have difficulty stopping”), b) somatic experiences (e.g., “My heart would beat faster if I were watching porn right now”), c) current desire to use (e.g., “I want to watch porn right now”),

d) mood (e.g., “I would feel less stressed if I watched porn right now”), and e) intentions to use (e.g., “I will watch porn as soon as I get the chance”). The PCQ was initially evaluated in three samples of American male college students, but since then has been evaluated with samples of people of varying ages (adolescents and adults) from multiple countries. Given that an increasing number of studies are using the PCQ to assess pornography craving [2•, 3•, 4•, 5•, 6•, 7•, 8•, 9•, 10•, 11•, 12•, 13•, 14•, 15•, 16•, 17•, 18•, 19•, 20•, 21•, 22•, 23•, 24•], a review is needed to summarize current findings and identify future research directions. Notably, several conceptualizations of craving were integral to the development of the PCQ. Thus, the following paragraphs discuss the conceptualizations of craving used in developing this measure.

✉ Shane W. Kraus
Shane.kraus@unlv.edu

¹ Department of Psychology, University of Nevada, 4505 Maryland Parkway, Las Vegas, NV 89154, USA

² Department of Psychiatry, UNLV School of Medicine, Las Vegas, NV, USA

Conceptualizations of Craving Informing the Initial Development of the PCQ

Craving to view pornography has been conceptualized as a passionate attachment [19••], approach-avoidance conflict [25–27], and desire thinking [2••, 3••, 16••]. Many conceptualizations of craving for pornography are similar to those for craving for psychoactive substances [1••].

Passionate Attachment: Preoccupation vs. Transient Urge

According to Vallerand, passionate attachment has been conceptualized as a preoccupation rather than a transient urge to engage in an activity or behavior [28•]. In general, preoccupation is a stable desire or inclination to engage in an activity or substance [29]. Specifically, individuals will engage in activities they enjoy, and their pleasure will reinforce their continued engagement in those activities [28•, 30•]. With repetition, such activities (e.g., reading, running, playing sports) become a “passion” and part of one’s identity. Vallerand proposed two different types of passions: harmonious and obsessive [28•]. Harmonious passion is characterized by the activity being valued and enjoyed by the individual, but not self-consuming; it is viewed as a healthy passion. Obsessive passion is characterized by the activity being uncontrollable and self-consuming for the individual, often causing social-occupational impairments; it is considered an unhealthy passion. To assess these two types of passion, Vallerand developed the 14-item Passion Scale [28•]. Previous research using the Passion Scale has noted obsessive and harmonious passion are significantly and positively correlated with behavioral addictions (e.g., gambling disorder and video gaming disorder) [31–33]. Conversely, a transient urge is craving fluctuating (waxing and waning) over time, depending on an individual’s mood, availability of the substance or behavior, and physiological factors [34]. The PCQ [1••], unlike the Passion Scale [28], was developed to assess transient craving for pornography.

Approach-Avoidance Model

The approach-avoidance, temptation-restraint, and ambivalence models of craving assume that craving arises from the conflict between desire (“I want to consume”) and restraint (“I shouldn’t use”) [34, 35•]. In this model, craving is defined as an inclination to approach and use the behavior or substance [35•, 36•]. Previous researchers have noted that this conflict is a crucial component of craving [37]. Evidence for the model of approach and avoidance in craving has been demonstrated in substance use disorders

(e.g., alcohol and tobacco) [36•]. Given the desire to use pornography, social disapprobation, moral disapproval, and shame some pornography users experience, the temptation-restraint view of craving may also apply to pornography use [25–27].

Metacognitive Model and Desire Thinking

According to Caselli and Spada [38•], desire thinking shares similarities with rumination. Research has demonstrated desire thinking occurs among those with alcohol, nicotine, gambling, and pornography use disorders [2••, 39•]. Desire thinking is a voluntary thought process of thinking about a desired or craved behavior to reach an ideal internal state (i.e., homeostasis), which involves consideration of achieving a desired behavior and mentally planning how to engage in the behavior [39•, 40•]. This thought process occurs through information, prefigure images, and memories, categorized into verbal perseverations and imaginal prefiguration. Verbal perseverations are repetitive self-talk regarding desired behavior. Imaginal prefiguration is focusing on information related to the craved behavior. For example, an individual might think about viewing pornography to reduce their current stress.

In 2015, Caselli and Spada proposed a metacognitive model of desire thinking and increased craving [41•]. Metacognitions are “thinking about thinking” that impact desire thinking. Positive metacognitions are thoughts believed to improve negative thoughts, emotions, and behavior (e.g., “I need to think about viewing pornography to avoid feeling overwhelmed”). Whereas negative metacognitions are desire thinking that is uncontrollable (e.g., “When I begin thinking about viewing pornography, I cannot stop”). Past research has found support for the metacognitive model in treatment-seeking samples for gambling disorder, internet use disorder, tobacco use disorder, and alcohol use disorder [2••, 39•].

Preliminary Evaluation of the Pornography Craving Questionnaire

In the initial publication of the PCQ, Kraus and Rosenberg reported on three studies with three different samples of male college students [1••]. In Study 1, they reduced the PCQ from 20 items to 12 due to lower endorsement of eight items. In Study 2, they modified the phrasing of four of the 12 items on the PCQ to increase the applicability of the items to broaden the range of possible experiences to describe craving for pornography. Results from Study 2 indicated that those who watched pornography more frequently endorsed higher rates of craving for pornography than those who used pornography less often. Mean inter-item correlations supported the unidimensionality of the PCQ, and other analyses lent support to elements of convergent, criterion,

and discriminant validity. Notably, PCQ scores were significantly and positively correlated with both subscales of the Passion Scale (obsessive and harmonious) [1••, 28•]. Results from Study 3 indicated that the PCQ scores were stable over a one-week interval and previous pornography use significantly predicted pornography use the following week (one indication of predictive validity) [1••].

Current Study

Given the near decade since the publishing of the PCQ, the following sections will describe our literature review, the current understanding of craving for pornography using the PCQ and summarize the current gaps in the literature.

Methods

Search Strategy

To conduct the scoping review, we followed the guidelines outlined by the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) [42]. We used a single search term ('pornography craving questionnaire') in several electronic databases (PubMed/Medline, EBSCO (PsycARTICLES, PsycINFO, SocINDEX), and Scopus) to identify potentially relevant articles for review. All articles were published

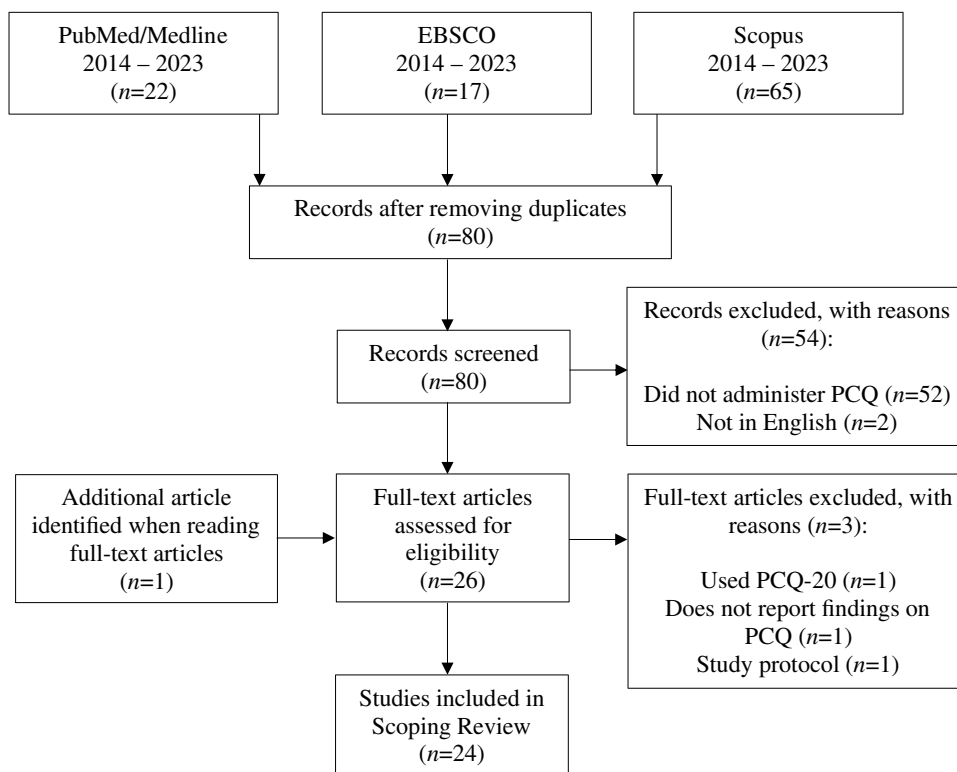
between 2014 (after the PCQ was published) and May 2023. We employed Mendeley and Rayyan to identify duplicates and track the number of articles from each database.

Inclusion Criteria and Review Process

For an article to be included, it had to be in English, appear in a peer-reviewed journal, and administer the PCQ to a sample of participants. See Fig. 1 for the number of articles included/excluded and the reasons for exclusion. To identify articles to be included, the first author read the abstract to determine the purpose of the article (e.g., review or research) and the methods section to determine if the PCQ was administered to participants. Once a potential article was confirmed, it was read in full and relevant aspects were summarized. Articles were grouped based on themes and craving conceptualizations.

Twenty-six studies appeared to meet eligibility criteria, however, after the full-text review, we removed three articles resulting in 23 articles. One of the three removed articles used the 20-item version of the PCQ [43], rather than the final 12-item version of the PCQ reported by Kraus and Rosenberg [1••]. The other two articles removed did not report their findings on the PCQ [44, 45]. However, one of these studies was a preregistration of a study protocol and the final publication is included in our scoping review [5••]. Additionally, another article was identified during the full-text article reading that was not identified in the database

Fig. 1 PRISMA flow diagram of the scoping review phases



search [18••]. This resulted in a total of 24 articles for the scoping review.

Results

Characteristics of the Included Studies

Since its initial publication, the PCQ has been administered to samples in Australia [2••, 3••], Italy [16••, 21••], Denmark [20••, 22••, 24••], the United States [4••, 5••, 15••, 19••, 23••], India [5••, 11••], Korea [14••], England [5••], Canada [5••], Hungary [5••], China [7••, 8••, 9••, 10••, 12••], Iran [13••, 17••], Pakistan [6••] and the Netherlands [18••]. Several studies recruited special populations, including treatment-seeking clients [5••], adolescents [12••, 24••], American military veterans [15••, 23••], and those with comorbid addictions [11••, 20••, 22••, 24••]. Additionally, 18 studies included the mean PCQ score; scores ranged from 1.43 to 4.80 [1••, 2••, 3••, 5••, 6••, 7••, 9••, 10••, 11••, 12••, 14••, 15••, 16••, 18••, 19••, 20••, 22••, 24••]. Across studies, men, relative to women, reported higher PCQ scores [7••, 14••, 15••, 16••, 18••], with the exception of one study, where men and women endorsed similar levels of craving [6••].

Many studies in this review include measures of problematic pornography use (PPU). PPU often involves excessive viewing of pornography, difficulty controlling the use of pornography, the experience of urges or cravings for pornography, use of pornography to cope with dysphoric mood, and social-occupational impairments due to excessive pornography use [15••, 46–48].

In the following paragraphs, we will describe the studies that have published results with the PCQ. The studies have been grouped into domains identified by the authors: a) psychometric properties and evaluation of another scale, b) conceptualizations of craving (metacognitive model/desire thinking and passionate attachment), c) mental health (negative emotions, PPU, comorbid addictions, and impulsivity), d) sexual functioning, e) parental factors, and f) personality characteristics. Refer to Table 1 for additional demographic and pornography history characteristics of the 24 studies included in the review.

Domain 1: Psychometric Properties and Evaluation of Another Scale

Eighteen of the 24 studies included the alpha coefficient of the PCQ in their sample, and in general, alphas ranged from 0.80 to 0.95, indicating good to excellent reliability of the PCQ across the samples [1••, 5••, 6••, 7••, 8••, 9••, 10••, 12••, 13••, 14••, 15••, 16••, 17••, 18••, 19••, 20••, 21••, 23••]. Two articles specifically focused on the

psychometric properties of the scale. Kim and colleagues translated the PCQ into Korean and explored the psychometric properties of the PCQ in a sample of 226 Korean university students [14••]. They conducted a goodness of fit test, differential item functioning analysis, exploratory factor analysis, and confirmatory factor analysis. Results of a confirmatory factor analysis demonstrated a near adequate fit for a one-factor model ($\chi^2(54) = 241.95$, $p < 0.05$; CFI = 0.91, TLI = 0.87, RMSEA = 0.12). The Korean version of the PCQ demonstrated excellent internal reliability and supported some elements of criterion validity.

In 2020, Molavi and colleagues translated the PCQ into Persian and explored selected psychometric properties in a sample of 234 Iranian participants from the general population [17••]. Exploratory factor analysis and principal component analysis were conducted using the Persian version of the PCQ. Results indicated that a two-factor scale, labeled “Psychological reactions” and “Desire,” best fit the data. Molavi and colleagues deleted Item 3 (“My heart would beat faster if I were watching porn right now”) and Item 4 (“I would feel less bored if I watched porn right now”) from their analyses because cross-loading values were below the set threshold (0.2).

The PCQ has been used in two studies to examine the validity of another scale [8••, 10••]. Specifically, in a Chinese community sample, a subclinical Chinese sample, and a Hungarian community sample, the Problematic Pornography Consumption Scale and the PCQ were significantly and positively correlated [10••]. The PCQ is also significantly and positively correlated with the Brief Pornography Screen, which is used to measure probable PPU [15••]. Lastly, the PCQ was used to examine the external and convergent validity of the Problematic Pornography Consumption Scale [49], Problematic Pornography Use Scale [50], and the Short Internet Addiction Test Adapted to Online Sexual Activities [51]. The PCQ was significantly positively associated with all three measures [8••]. These results suggest that the craving for pornography is related to measures of problematic pornography and internet use but should not be used as a proxy for PPU.

Domain 2: Conceptualizations of Craving

Passionate Attachment Rosenberg and Kraus assessed the relationship of craving for pornography using PCQ scores with scores indicating harmonious and obsessive passion for viewing pornography in a sample of American male pornography users [19••]. More frequent viewers of pornography had higher mean scores on both passion subscales. Similar to the results of Kraus and Rosenberg [1••], PCQ scores were positively associated with both passion subscales [19••].

Table 1 Characteristics of studies using the Pornography Craving Questionnaire with a sample of participants

Author, year	Sample characteristics	PCQ score and alpha coefficient	Pornography viewing characteristics
Psychometric Properties			
Kraus & Rosenberg, 2014 [1••]	Three US male college student samples $N_1 = 109$ Age: $M = 24.2$, $SD = 7.8$ $N_2 = 224$ Age: $M = 21.8$, $SD = 3.8$ $N_3 = 44$ Age: $M = 20.2$, $SD = 2.4$	Sample 1: $\alpha = 0.89$ $M = 2.76$, $SD = 1.13$ Sample 2: $\alpha = 0.91$ $M = 3.63$, $SD = 1.35$ Sample 3: Time 1 $\alpha = 0.92$ Time 2 $\alpha = 0.94$	Sample 1: Age 1st saw pornography: $M = 12.6$, $SD = 2.8$ Typical weekly pornography use: 0: 6% 1–2 times: 30% 3–5 times: 39% 6–10 times: 19% 11 + times: 7% Sample 2: Age 1st saw pornography: $M = 12.4$, $SD = 2.5$ Typical weekly pornography use: 0: 5% 1–2 times: 33% 3–5 times: 30% 6–10 times: 20% 11 + times: 12% Sample 3: Age 1st saw pornography: $M = 12.3$, $SD = 2.9$ Typical weekly pornography use: 0: 9% 1–2 times: 43% 3–5 times: 27% 6–10 times: 11% 11 + times: 10%
Kim et al., 2021 [14••]	$N = 226$ Korean adults (136 male, 90 female) Age broken down into age groups: 18–19 years = 56 20–21 years = 82 22 + years = 88	$\alpha = 0.94$ Men: $M = 28.51$ (2.38), $SD = 13.6$ (1.13) Women: $M = 22.50$ (1.88), $SD = 8.4$ (0.70) Age Scores: 18–19 years: $M = 23.68$ (1.97), $SD = 9.71$ (0.81) 20–21 years: $M = 27.06$ (2.26), $SD = 11.70$ (0.98) 22 + years: $M = 26.78$ (2.23), $SD = 14.32$ (1.19)	None provided
Molavi et al., 2020 [17••]	$N = 234$ Iranian (135 male, 97 female) Age: $M = 29.7$, Range = 13–51	Factor 1 (Psychological Reactions): $\alpha = 0.89$ Factor 2 (Desire): $\alpha = 0.71$	Age 1st saw pornography: < 12 = 12.8% 12–18 = 61.7% > 18 = 25.5% Time spent on pornography: < 30 min = 84.5% 30–60 min = 11% > 1 h 4.5% Typical weekly pornography use: 1–2 times: 67.6% 3–10 times: 25.6% 11 + times: 6.8%
Chen & Jiang, 2020 [8••]	$N = 972$ adults from China (560 male, 412 female) Age: $M = 24.8$, $SD = 7.2$, Range = 18–48	$\alpha = 0.92$	None provided
Kraus et al., 2020 [15••]	$N = 220$ US veterans (180 male, 40 female) Age: $M = 35.1$, $SD = 9.2$	$\alpha = 0.83$ Men: $M = 2.95$, $SD = 1.34$ Women: $M = 2.03$, $SD = 0.95$	None provided

Table 1 (continued)

Author, year	Sample characteristics	PCQ score and alpha coefficient	Pornography viewing characteristics
Chen et al., 2021 [10••]	Three male samples: 1) $N=695$ Chinese community Age: $M=25.39$, $SD=7.18$, Range = 18–48 2) $N=4651$ Chinese subclinical samples for PPU (cutoff of 4 on BPS) Age: $M=22.70$, $SD=4.33$ 3) $N=9395$ Hungarian commu- nity samples Age: $M=23.35$, $SD=3.34$	Community sample: $\alpha=0.92$ $M=2.94$, $SD=1.30$ Subclinical sample: $\alpha=0.91$ $M=4.23$, $SD=1.37$	None provided
Conceptualizations of Craving Rosenberg & Kraus, 2014 [19••]	$N=221$ American men Age: $M=21.8$, $SD=3.8$	$\alpha=0.91$ $M=3.6$, $SD=1.3$	Typical pornography use over a week: 0: 5% 1–2 times: 33% 3–5 times: 30% 6–10 times: 20% 11 + times: 12% Length of pornography use session: < 15 min: 39% 15–30 min: 28% 30–59 min: 16% 60 + min: 7% Passion Scale: Harmonious: $M=3.3$, $SD=1.1$ Obsessive: $M=2.4$, $SD=1.2$
Allen et al., 2017 [2••]	$N=192$ Australian adults (182 male, 10 female) Age: $M=26.65$, $SD=8.52$, Range = 18–60	$M=57.65$ (4.80), $SD=15.90$ (1.33)	Reported pornography use in the past six months and functional impairment because of pornogra- phy use Participants wanted to stop (52.1%) or reduce (47.9%) pornography use 44.8% of participants had received treatment for pornography use Age first viewed pornogra- phy: $M=14.64$, $SD=5.24$, Range = 7–45 Hours viewed pornography per week: $M=6.56$, $SD=5.63$, Range = 0–44
Allen et al., 2021 [3••]	$N=192$ Australian adults (182 male, 10 female) Age: $M=26.65$, $SD=8.52$, Range = 18–60	$M=57.65$ (4.80), $SD=15.90$ (1.33)	Reported pornography use in the past six months and functional impairment because of pornogra- phy use Participants wanted to stop (52.1%) or reduce (47.9%) pornography use 44.8% of participants had received treatment for pornography use Age first viewed pornogra- phy: $M=14.64$, $SD=5.24$, Range = 7–45 Hours viewed per week: $M=6.56$, $SD=5.63$, Range = 0–44

Table 1 (continued)

Author, year	Sample characteristics	PCQ score and alpha coefficient	Pornography viewing characteristics
Marino et al., 2023 [16●●]	<i>N</i> = 414 Italian adults (222 male, 192 female) Age: <i>M</i> = 27.55, <i>SD</i> = 6.13, Range = 18–58	$\alpha = 0.93$ Overall: <i>M</i> = 29.01 (2.42), <i>SD</i> = 16.11 (1.34), Range = 12–84 (1–7) Women: <i>M</i> = 24.13 (2.01), <i>SD</i> = 12.89 (1.07) Men: <i>M</i> = 33.24 (2.77), <i>SD</i> = 17.40 (1.45)	None provided
Mental Health			
Chen et al., 2018 [7●●]	<i>N</i> = 1070 Chinese college students (622 male, 448 female) Age: <i>M</i> = 20.19, <i>SD</i> = 1.18	$\alpha = 0.92$ Men: <i>M</i> = 2.67, <i>SD</i> = 1.23 Women: <i>M</i> = 1.99, <i>SD</i> = 0.99	Nonproblematic pornography users: <i>n</i> = 470 Low risk for PPU: <i>n</i> = 375 At risk for PPU: <i>n</i> = 225
Bibi et al., 2022 [6●●]	<i>N</i> = 280 Pakistani participants (157 male, 123 female) Age: <i>M</i> = 25.40, <i>SD</i> = 5.27, Range = 18–50	$\alpha = 0.89$ Overall: <i>M</i> = 57.24 (4.77), <i>SD</i> = 16.05 (1.34), Range = 12–71 (1–5.91) Men: <i>M</i> = 57.26 (4.77), <i>SD</i> = 15.31 (1.28) Women: <i>M</i> = 57.22 (4.77), <i>SD</i> = 16.99 (1.42)	Time spent viewing pornography (<i>n</i>): < 30 min: 142 60 min: 70 1–2 h: 48 3+ hours: 20
Shirk et al., 2021 [23●●]	<i>N</i> = 172 male American veterans Age: <i>M</i> = 33.9, <i>SD</i> = 8.52	$\alpha = 0.92$	None provided
Chen et al., 2021 [9●●]	<i>N</i> = 8845 help-seeking males for PPU Age: <i>M</i> = 25.82, <i>SD</i> = 7.83 Three subgroups: 1) Self-perceived PPU (<i>n</i> = 2089): highest moral incongruence group 2) Impaired Control group (<i>n</i> = 4180): high on impaired control, but average PPU levels (met cutoff on BPS, but lower than cutoff on PPCS) 3) PPU Group (<i>n</i> = 2576): highest impaired control and PPU levels (met cutoff for BPS and PPCS)	$\alpha = 0.92$ Baseline: <i>M</i> = 3.92, <i>SD</i> = 1.40 Follow-up: <i>M</i> = 3.90, <i>SD</i> = 1.42	None provided
Jiang et al., 2022 [12●●]	<i>N</i> = 3486 help-seeking Chinese male adolescents Age: <i>M</i> = 16.64, <i>SD</i> = 1.24, Range = 13–18 Three subgroups: Self-perceived PPU group (<i>n</i> = 755) Impaired control group (<i>n</i> = 1656) PPU group (<i>n</i> = 1057)	$\alpha = 0.91$ Overall: <i>M</i> = 46.4 (3.87), <i>SD</i> = 16.7 (1.39) Self-perceived group: <i>M</i> = 31.6 (2.63), <i>SD</i> = 11.7 (0.98) Impaired control group: <i>M</i> = 44.8 (3.73), <i>SD</i> = 11.4 (0.95) PPU Group: <i>M</i> = 59.4 (4.95), <i>SD</i> = 15.1 (1.26)	None provided
Böthe et al., 2021 [5●●]	<i>N</i> = 264 (254 male, 10 female) Intervention Group: <i>n</i> = 123 Control Group: <i>n</i> = 141 US (<i>n</i> = 100), England (<i>n</i> = 41), Canada (<i>n</i> = 20), Hungary (<i>n</i> = 18), India (<i>n</i> = 10), Other (<i>n</i> = 75) Age: <i>M</i> = 33.2, <i>SD</i> = 10.6	$\alpha = 0.88$ Overall: <i>M</i> = 46.9 (3.91), <i>SD</i> = 15.7 (1.31) Intervention group: <i>M</i> = 46.7 (3.89), <i>SD</i> = 15.9 (1.33) Control group: <i>M</i> = 47.0 (3.92), <i>SD</i> = 15.6 (1.30)	None provided
Rømer Thomsen et al., 2018 [20●●]	<i>N</i> = 109 Danish young adults (75 male, 34 female) Age: <i>M</i> = 21.7, <i>SD</i> = 2.7, Range = 15.8–26.7	$\alpha = 0.83$ <i>M</i> = 17.2 (1.43), <i>SD</i> = 14.5 (1.21), Range = 12–84 (1–7)	None provided

Table 1 (continued)

Author, year	Sample characteristics	PCQ score and alpha coefficient	Pornography viewing characteristics
Weidacker et al., 2020 [24●●]	<i>N</i> = 86 adolescents from Denmark (58 male, 28 female) Baseline: Age: <i>M</i> = 21.8, <i>SD</i> = 2.8, Range = 15.8–26.7	Baseline: <i>M</i> = 17.28, <i>SD</i> = 15.11, Range = 0–53 One-year follow-up: <i>M</i> = 18.63, <i>SD</i> = 17.50, Range = 0–78 Two-year follow-up: <i>M</i> = 18.97, <i>SD</i> = 18.14, Range = 0–75	None provided
Schmidt et al., 2021 [22●●]	<i>N</i> = 53 Danish men (25 gambling disorder, 28 healthy non-gambling) Age: <i>M</i> = 27.4, <i>SD</i> = 7.6, Range = 18–50	Healthy non-gambling: <i>M</i> = 4.1, <i>SD</i> = 1.2 Gambling disorder: <i>M</i> = 5.0, <i>SD</i> = 1.4	None provided
Khalegian et al., 2020 [13●●]	<i>N</i> = 123 Iranian men Age: <i>M</i> = 40, <i>SD</i> = 10.49	$\alpha = 0.95$	None provided
Sexual Functioning			
Russo et al., 2021 [21●●]	<i>N</i> = 478 Italian men Age: Median = 24, Range = 21–30	$\alpha = 0.80$	None provided
Berger et al., 2019 [4●●]	Men: <i>N</i> = 314 Age: <i>M</i> = 30.7, <i>SD</i> = 5.9 Women: <i>N</i> = 48 Age: <i>M</i> = 28.1, <i>SD</i> = 6.3 US sample	None provided	Men: Pornography Viewing Frequency (<i>n</i> = 301): None: 18.9% Less than weekly: 25.9% 1–2/week: 24.6% 3–5/week: 21.3% 6–10/week: 5.0% 10+ /week: 4.3% Pornography Duration (<i>n</i> = 245): < 15 min: 62.9% 16–30 min: 24.5% 31–59 min: 8.2% 60–119 min: 2.9% 120–179 min: 0.8% 180+ min: 0.8% Women: Pornography Viewing Frequency (<i>n</i> = 44): None: 61% Less than weekly: 25% 1–2/week: 9% 3–5/week: 2% 6–10/week: 2% 10+ /week: 0% Pornography Duration (<i>n</i> = 245): < 15 min: 72% 16–30 min: 22% 31–59 min: 0% 60–119 min: 6% 120–179 min: 0% 180+ min = 0%
Parental Factors			
Doshi et al., 2019 [11●●]	<i>N</i> = 123 adults from India (58 males, 65 females) Age: <i>M</i> = 21.24, <i>SD</i> = 2.32, Range = 18–30	<i>M</i> = 30.07 (2.51), <i>SD</i> = 15.58 (1.30), Range = 12–75 (1–6.25)	None provided

Table 1 (continued)

Author, year	Sample characteristics	PCQ score and alpha coefficient	Pornography viewing characteristics
Personality Characteristics			
Muris et al., 2020 [18••]	<i>N</i> = 121 (46 male, 75 female) Age: <i>M</i> = 25.16, <i>SD</i> = 6.28, Range = 18–65	$\alpha = 0.91$ Overall: <i>M</i> = 26.47 (2.21), <i>SD</i> = 9.81 (0.82) Men: <i>M</i> = 30.46 (2.54), <i>SD</i> = 11.36 (0.95) Women: <i>M</i> = 24.03 (2.00), <i>SD</i> = 7.86 (0.66)	Frequency of pornography use: Less than once a month = 32.2% 1–2/month = 24.0% 1–2/week = 24.8% 3+ /week = 19.0% Age of 1st pornography exposure: <i>M</i> = 15.20, <i>SD</i> = 3.71

Numbers in brackets have been converted to the mean PCQ score. *M* = mean, *SD* = standard deviation, PPU = problematic pornography use, BPS = brief pornography screen, PPCS = problematic pornography consumption scale

Metacognitive Model and Desire Thinking Three studies using the PCQ were focused on the metacognitive model of craving [2••, 3••, 16••]. Results from these studies indicated craving, assessed using the PCQ, was significantly and positively correlated with positive and negative metacognitions about desire thinking, imaginal prefiguration (i.e., imagery of the activity (e.g., viewing pornography)), verbal perseveration (i.e., self-talk about reasons to use pornography), anger, depression, and anxiety [2••, 3••]. Relatedly, Marino and colleagues explored the role of desire thinking (i.e., imaginal prefiguration and verbal preservation) and craving for pornography in a sample of Italian adults [16••]. Marino and colleagues completed a series of Welch's *t*-tests, correlations, and path analyses to examine their model of desire thinking (i.e., imaginal prefiguration and verbal perseveration), pornography craving, and PPU. Results indicated craving for pornography was positively correlated with PPU (measured using the Cyber Pornography Addiction Test [52]), imaginal prefiguration, verbal preservation, and problematic internet use [16••]. The path analyses demonstrated that craving mediates the relationship between the two dimensions of desire thinking (imaginal prefiguration and verbal perseveration), though the sample was cross-sectional. Notably, path analyses indicated craving predicted PPU in both men and women. Imaginal prefiguration predicted craving in adults, whereas craving predicted verbal preservation in men, but not women.

Domain 3: Mental Health

Negative Emotions and Dysfunctional Coping Chen and colleagues tested a mediation model of craving for pornography in which pornography craving leads to increased frequency and duration of pornography use, subsequently leading to PPU (measured using the short Internet Addiction Test adapted for online sexual activities [51]) and negative emotions in a cross-sectional sample of Chinese men and women [7••]. Results supported the mediation model and suggested that craving for pornography is positively associated with

loss of control over pornography use, frequency and duration of pornography use, and negative emotions.

The PCQ has also been used in a sample of Pakistani men and women to explore the relationship between predisposing factors, pornography craving, dysfunctional coping, stimulus-specific inhibitory control, and PPU (measured using the Brief Pornography Screen [15••]) [6••]. In this study, they found that craving for pornography was positively and significantly correlated with PPU, dysfunctional coping, loneliness, depression, anxiety, self-esteem, and stimulus-specific inhibitory control. Using path analysis, depression, anxiety, and self-esteem significantly predicted craving for pornography. Notably, loneliness was the only variable that did not significantly predict craving for pornography.

Problematic Pornography Use Among Specialized Populations Regarding PPU, Shirk and colleagues examined American male military veterans and found that PCQ scores were positively associated with PPU symptom severity [23••]. Chen and colleagues examined the role of impaired control in a sample of Chinese men help-seeking for PPU [9••]. In this study, PPU was measured using the Brief Pornography Screen and the Problematic Pornography Consumption Scale. Results indicated that the help-seeking men could be divided into three groups: a) Self-Perceived PPU, b) Impaired Control, and c) PPU Group. The Self-Perceived PPU group were those with the lowest scores of impaired control and PPU, but highest moral incongruence (i.e., disapproval of behavior in which people engage despite their moral beliefs). The Impaired Control group were those with high impaired control, but average PPU scores (met the cutoff on the Brief Pornography Screen [15••], but below the cutoff on the Problematic Pornography Consumption Scale [49]) [9••]. The PPU group included participants with high impaired control and PPU scores (met the cutoff on the Brief Pornography Screen and Problematic Pornography Consumption Scale). Results indicated that the PPU group had the highest craving for pornography, demonstrating clinical relevance of craving for treating PPU. Similarly, Jiang and

colleagues explored the subgroups of Chinese adolescents help-seeking for PPU [12••]. They noted the same three groups (Self-Perceived PPU, Impaired Control, and PPU) and found that craving for pornography was significantly and positively correlated with all three groups. Notably, craving for pornography was one of the most robust predictor indicators for PPU in all three groups of Chinese men help-seeking for PPU.

Bóthe and colleagues conducted a study to explore the efficacy of a six-week online treatment for PPU [5••]. Results indicated that the six-week online treatment intervention for PPU significantly reduced rates of PPU, pornography use, self-perceived pornography addiction, and craving for pornography, while also increasing reported pornography self-efficacy avoidance at six-week follow-up. However, 89.4% of the intervention group and 44.7% of the control group withdrew from the study. Notably, those who withdrew from the study reported significantly higher craving for pornography at baseline ($M=47.6$, $SD=16.1$) than those who completed the six-week intervention ($M=38.7$, $SD=11.9$). The authors suggest that their online intervention might be triggering for help-seeking clients and craving might play a crucial role in treating PPU, particularly as it relates to premature treatment dropout.

Comorbid Addictions and Impulsivity Regarding addictions, Rømer Thomsen and colleagues explored the role of impulsivity with substance and behavioral addictions in a sample of 109 Danish young adults [20••]. They based their study on a model that assumes impulsivity is comprised of several psychological features (i.e., negative and positive urgency, tendency to act in intense negative/positive emotional states, tendency to act without thought/planning, lack of perseverance, lack of premeditation, tendency not to complete tasks, sensation seeking, and tendency to seek pleasure). Notably, the urgency scales (positive and negative) were highly correlated ($r=0.71$); therefore, the researchers combined them into one urgency variable. Results indicated that PCQ score was significantly and positively associated with urgency, lack of perseverance, sensation seeking, a measure of alcohol use disorder, and a measure of gambling disorder. In a study of Danish adolescents, PCQ scores were positively and significantly correlated with measures of alcohol use disorder, cannabis use disorder, and gambling use disorder [24••]. In a third study, employing Danish men, PCQ scores were higher in the problem gambling group than in the healthy control group [22••]. In terms of impulsivity, Khalegain found that high impulsivity is related to high craving for pornography in a sample of Iranian men [13••]. Altogether, results suggest that craving for pornography is related to impulsivity (a common risk factor of addictions) and other addictions, such as alcohol use disorder, cannabis use disorder, and gambling use disorder.

Domain 4: Sexual Functioning

Russo and colleagues found significant negative correlations between most PCQ items and the Asexuality Identification Scale, designed to measure one's lack of interest in sexual activity [21••]. The investigators also found a positive correlation between PCQ question 1 (“The thought of watching porn makes me sexually aroused”) and the International Index of Erectile Function and the Masturbation Erection Index. In a study of American men and women, no association were noted between the International Index of Erectile Function or Female Sexual Function Index and PCQ scores [4••]. Overall, results suggested that craving for pornography was not related to these specific aspects of sexual functioning in men or women.

Domain 5: Parental Factors

Doshi and colleagues explored the relationship between parental factors (i.e., warmth, involvement, and autonomy support) and videogame addiction, pornography craving, and sexual attitudes [11••]. Similar to mentioned studies [1••, 7••], results indicated PCQ score was a significant predictor of using pornography the following week. Craving for pornography was significantly negatively associated with mother warmth and positively related to permissive sexual attitude, communion sexual attitude, and video game addiction [11••].

Domain 6: Personality Characteristics

Lastly, a study by Muris and colleagues explored the relationships between Dark Triad traits (narcissism, Machiavellianism, and psychopathy), honesty-humility personality traits, pornography craving, and deviant pornography use [18••]. In their male participants, the PCQ score positively correlated with narcissism, Machiavellianism, and psychopathy and negatively correlated with honesty-humility characteristics. Compared to female participants, males reported higher levels of pornography craving, a higher frequency of pornography consumption, an earlier age at which they started to watch pornography, and greater use of deviant forms of pornography.

Study Limitations and Future Directions

One limitation of the present review, we excluded studies using brain imaging [53], though we recommend future studies use brain imaging (e.g., fMRI) and subjective measures of craving (e.g., PCQ) simultaneously to examine physiological changes with subjective experiences. We also excluded other craving measures [47, 54, 55] and single-item measures to assess craving for pornography [56].

Single-item measures are beneficial as they are quick and easy to administer to patients and participants. However, as discussed earlier, we view craving as a multifaceted cognitive, behavioral, somatic, and emotional experience; therefore, we focused on studies using the PCQ for the current review. Consequently, we did not complete a comprehensive systematic review of craving for pornography, though we would recommend such a future undertaking in the literature on craving for pornography.

Another limitation is that studies including treatment-seeking samples for PPU either did not include women [9••, 10••, 12••] or only included a small sample size of women [5••]. Similarly, many studies did not include gender and sexually diverse participants or did not examine differences due to a small sample size of gender and sexually diverse participants [4••, 5••, 6••, 8••, 9••, 10••, 12••, 16••, 17••, 19••, 21••]. No studies using the PCQ included those with physical and/or mental disabilities. Therefore, we recommend that future research examine minoritized groups (i.e., women, LGBTQ+, and those with disabilities) to better understand the experience of craving for pornography in these specific groups. None of the studies using the PCQ examined the impact of religion/religiosity or shame on craving for pornography. As noted in the temptation-restraint conceptualization of craving, some individuals who use pornography experience intense feelings of shame and moral disapproval [26, 27], sometimes the result of religious background. Future research should examine the impact of religiosity and shame on craving for pornography, particularly among individuals where their sexual behaviors may be misaligned with their religious or cultural norms.

We recommend future studies examine the psychometric properties of the PCQ with clinical samples, comparing samples by gender, ethnicity, and sexual behaviors (solitary vs. dyadic activities). Given the multidimensionality of craving, future studies should also conduct item analyses to determine highly endorsed items by specific groups, especially treatment-seeking samples, to aid in targeted interventions. Additional studies using the PCQ with clinical samples could aid in the establishment of a clinical cutoff score for the scale. The creation of a clinical cutoff score on the PCQ would aid in identifying individuals with clinically high levels of craving, who in turn, may benefit from targeted treatment for PPU. See Table 2 for a list of recommended future directions.

Conclusions

The present scoping review discusses the various conceptualizations of craving (i.e., passionate attachment, preoccupation, transient urge, the ambivalence model, and desire thinking) and reviews the findings from 24 studies using the PCQ with participants. There are several strengths in the current literature on the PCQ, such as translations of the PCQ, international studies, and the inclusion of women, veterans, and treatment-seeking samples. Overall, we found that the PCQ demonstrated good psychometric properties of the PCQ in five different samples [1••, 14••]. Specifically, results demonstrated good fit of the scale through exploratory and confirmatory factor analysis, as well as support for predictive, convergent, criterion, and discriminant validity. Altogether, results

Table 2 Current gaps in research using the Pornography Craving Questionnaire and suggestions for future research

Current gaps	Future Recommendations
Psychometric Properties	Current psychometric studies have been conducted on only American males, Persian adults, and Korean adults. Future research should conduct measurement invariance of the PCQ with a heightened focus on clinical samples (e.g., PPU help-seeking) and minoritized groups (e.g., women, LGBTQ+, those with disabilities, and racially and ethnically diverse populations)
Clinical Threshold	Determine a clinical cutoff (threshold) score to aid in increased utility of the PCQ in clinical settings as a possible treatment outcome
Treatment	Given the importance of craving to treatment adherence, future research should explore the reported craving before and after treatment using the PCQ. Various recommended treatments to explore include psychopharmacology and psychotherapy
Diagnostic	Complete item analyses of the PCQ with clinical samples to better understand the experience of craving
Comorbidity	Using the PCQ explore the relationship between pornography craving, other addictions (substance and behavioral), and mental health issues (e.g., anxiety, depression, attention-deficit hyperactivity disorder)
Temptation-restraint	Examine the “temptation-restraint” view of craving using the PCQ with variables, such as shame and religiosity
Technology	Explore the impact of technology triggering craving for pornography to determine the feasibility of online treatment for PPU. One suggestion to explore this would be using cue exposure studies
Brain Imaging	Future research should use brain imaging for an objective measure of craving along with subjective measures of craving, such as the PCQ

LGBTQ+ = lesbian, gay, bisexual, transgender, questioning, PPU = problematic pornography use

support the multidimensionality of craving for pornography among clinical and non-clinical diverse populations.

Among American male college students, Chinese male and female college students, and Indian men and women, craving for pornography routinely predicted later pornography use [1••, 7••, 11••]. Similarly, craving predicted PPU in both men and women [16••]. Generally, men reported higher PCQ scores than women [7••, 14••, 15••, 16••, 18••]. In men, but not women, PCQ scores positively correlated with narcissism, Machiavellianism, and psychopathy and negatively correlated with honesty-humility characteristics [18••]. Regarding conceptualizations of craving, craving for pornography was positively correlated with metacognitions about desire thinking and both passion subscales [2••, 3••, 16••, 19••]. Imaginal refiguration predicted craving in men and women, whereas craving predicted verbal preservation in men, but not women [16••].

In terms of mental health, craving for pornography was positively associated with anger [2••, 3••], depression [2••, 3••, 6••], anxiety [2••, 3••, 6••], impulsivity [13••], other addictions (e.g., gambling disorder [20••, 22••, 24••], alcohol use disorder [20••, 24••], cannabis use disorder [24••], and video gaming disorder [11••]), as well as symptoms associated with PPU [5••, 6••, 7••, 9••, 12••, 16••, 23••]. Also, difficulty coping with negative emotions was significantly correlated with craving for pornography [6••, 7••]. Relatedly, the PCQ is related to several PPU measures (i.e., the Problematic Pornography Consumption Scale, Brief Pornography Scale, Problematic Pornography Use Scale, Short Internet Addiction Test Adapted to Online Sexual Activities, and the Cyber Pornography Addiction Test) [8••, 9••, 15••, 16••]. Notably, a randomized control trial demonstrated the clinical importance of addressing craving within a therapeutic intervention developed for individuals seeking treatment for PPU [5••]. Specifically, those who withdrew from the study reported significantly higher craving for pornography at baseline than those who completed the six-week intervention. Altogether, this suggests that craving may reflect a risk factor for premature treatment dropout for highly symptomatic individuals reporting issues with PPU.

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Declarations

Conflict of Interest The authors declare no competing interests.

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