Problematic Pornography Use: Narrative Review and a Preliminary Model

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Abstract

**Introduction:** There are no current comprehensive models related to problematic pornography use (PPU) that can directly assist psychological therapists who work with people with these issues. The absence of psychological models results in the therapist being unable to benefit from evidence-based practice and having to work completely idiosyncratically.

**Methods:** A non-systematic narrative review of peer reviewed published research literature related to PPU was undertaken.

**Results:** PPU is introduced with a focus on classification, epidemiology, how it is experienced, causes and associated factors, measurement and treatment. This paper culminates with a preliminary model that attempts to illustrate the main research findings from both this paper and a previous paper written by the authors (Binnie & Reavey, 2019). Recommendations are then made for both practice and research.

**Conclusions:** This review highlights not only what we know so far about PPU but also what we do not know. There are indications from the research literature as to the experience of PPU, but these are lacking; many voices have not been heard. There are indications of developmental factors but no real clarity, and maintenance factors are imprecise. Having an accepted model that helps explain both these factors is essential in developing further research with the ultimate goal of eventually helping people suffering with PPU.

**Key words:** problematic pornography use, literature review, model

Introduction

An important component within the process of psychological therapy is the role of case formulation; the method of theorising and discussing the development and maintenance of client issues. The problems, the characteristics, and elements of the histories that clients present with often share similarities and the clinician can choose to apply psychiatric diagnoses if required to, and/or if it will benefit the client or the process of therapy. Although there are multiple issues with the medical model or disease model of mental health, this system of grouping shared aspects of presenting problems and client characteristics is the foundation of evidence based practice. Psychological models of formal psychiatric disorders (e.g. obsessive compulsive disorder) and what can be viewed as transdiagnostic disorders (low self-esteem) are developed through various research methodologies, theoretical considerations and evidence drawn through clinical practice (practice based evidence). For example, the cognitive model of post-traumatic stress disorder (Ehlers & Clark, 2000) can be seen as research based whereas the cognitive model of depression (Beck, 1967) is theoretically derived. These models can influence the process of developing individualised formulations and the associated treatment protocols can be incorporated into practice. Despite the proliferation of psychological models of mental health there are still many disorders and client issues that have no established psychological understandings that can be applied to the process of formulation or to guide interventions. One such area is what may be termed the behavioural addictions.

Behavioural addictions (Marks, 1990) refers to non-chemical addictions; although there is an ever increasing multitude of classifications (Billieux, Schimment, Khazaal, Maurage & Heeren, (2015), there is some consensus that the main behavioural addictions focus on gambling, sex, the internet/gaming, shopping and food (Karim & Chaudhri, 2012). Given the lack of applied research into behavioural addictions and the absence of practical psychological models, the psychological therapist is unable to benefit from evidence based practice and has to work completely idiosyncratically. What is needed is a greater psychological understanding of what it is like to experience behavioural addictions. Ideally such an understanding would be applied to behavioural addictions per se; however, as many of the concepts surrounding addiction are relatively disputed (e.g. Lewis, 2015) and that so many different problems are subsumed under the umbrella term of behavioural addictions it is better to take a more nuanced approach and focus on a particular presentation. This review paper focuses on problematic pornography use (PPU), often referred to as pornography addiction; of all the behavioural addictions this has been the issue most encountered in clinic and thus the most familiar.

In a previous paper by the authors (Binnie & Reavey, 2019) it was suggested that standard hardcore pornography on the whole is not currently harmful, however there are not many benefits associated with it either. Historically there seems to have been a class battle for the ownership of pornography, with the assumption that the more educated or powerful can view pornography without harm but the working classes are vulnerable and have to be protected from it; with developments in technology this battle has been lost. Research suggests that pornography is not harmful for the individual, however, like any substance or behaviour when taken to excess there may be problems that arise. From the research literature and from clinical experience it is clear that for some individuals their relationship with pornography is problematic. We now focus on this central and important aspect. PPU is introduced with a focus on classification, epidemiology, how it is experienced, causes and associated factors, measurement and treatment. This paper culminates with a preliminary model that attempts to illustrate the main research findings from both papers with recommendations made for both practice and research.

Methods

A narrative review of the research literature was undertaken. Whilst a non-systematic approach was adopted, the search terms were comprehensive and reference lists were scrutinised. The terms ‘porn\*’, ‘internet porn\*’, ‘sex\*’, ‘cybersex’ were combined with ‘addict\*’, ‘compul\*’, ‘problem\*’ using the Embase and Psychinfo databases; the same terms were expanded (without truncation) and inputted into Google Scholar. An inclusive approach was used and all relevant peer reviewed articles were reviewed; although not all are presented in this paper. Reasons for excluding studies were that many did not contain any data or that the remit was too wide, thus not focusing on pornography. Despite potential omissions, the narrative approach highlighted the main research findings, themes, and debates surrounding PPU.

Results

As has been put forward in a previous paper by the authors pornography is not inherently problematic, however the research literature suggests that it can become problematic for certain people (Twohig, Crosby & Cox, 2009; Cooper, Delmonico & Burg, 2000; Ross, Månsson & Daneback, 2012) and has significant consequences for the individuals involved (Twohig & Crosby, 2010). PPU can be defined as any use of pornography that leads to significant negative interpersonal, intrapersonal or extrapersonal consequences for the user (Sniewski, Farvid & Carter, 2017). Most studies found through the search tended to focus on how to classify PPU; this therefore seems a sensible place to begin.

**Classification**

Classifying PPU can be challenging as it can be considered a behavioural addiction (Marks, 1990) and also as an impulse control disorder/sexual impulsivity/sexual compulsivity (Grant & Potenza, 2007; Mick & Hollander, 2006; Cooper, Putman, Planchon & Boies, 1999); it has also been linked theoretically with obsessive compulsive disorder (OCD) (Black, 1998). However, this link with OCD is problematic as the obsessive element of OCD is often ego-dystonic or incongruous and the compulsive element within OCD is maintained solely through negative reinforcement, whereas PPU is linked with desire thinking and has a strong element of positive reinforcement. Classifying PPU as an addiction and classifying PPU within impulsivity/compulsivity will now be explored.

Addiction

The DSM V (APA, 2013) stipulates eleven criteria for substance use disorders. These include: 1) hazardous use, 2) social/interpersonal problems related to use, 3) neglected major roles due to use, 4) withdrawal, 5) tolerance, 6) used larger amounts/longer, 7) repeated attempts to quit/control use, 8) much time using, 9) physical/psychological problems related to use, 10) activities given up to use, 11) craving (Hasin et al., 2013). It has to be noted that the DSM V does not use the word addiction, however these criteria are often used within the academic literature when referring to addiction.

Within the addiction literature PPU is often subsumed within either sexual addiction (Orzack and Ross, 2000) or within internet addiction (Block, 2008); this is conceptually weak, as both contain behaviours not commonly found in PPU, for example visiting sex workers or excessive social media usage. In addition, neither are recognised by the DSM V; the only behavioural addiction that it includes is gambling disorder. To see if the addiction definition applies to PPU each criteria for substance use disorders will be examined. To begin with several of the criteria’s seem to overlap; social/interpersonal problems related to use, neglected major roles due to use and activities given up to use can be described as impact on functioning; and tolerance, used larger amounts/longer and much time using can be described as tolerance and increased use; these will be examined first.

*Impact on functioning:*

Several studies state that excessive or problematic pornography use has a negative impact on functioning, i.e. within the user’s relationships, work domain, and effecting legal or financial issues. However, the studies that they refer to, for example Schneider, (2000a), focus on the general aspect of cybersex and thus include a range of behaviours not usually found when PPU is the primary concern. It has been put forward that PPU may be distinct and different from other sexual activity related issues (Duffy, Dawson, & das Nair, 2016); one example of this is that PPU differs from what is termed sex addiction in that the latter involves direct human contact, whereas for PPU this may be too anxiety provoking as compared to the accessible, anonymous, affordable experience offered through online pornography (Short, Wetterneck, Bistricky, Shutter, & Chase, 2016).

From a thorough investigation of the academic literature that focuses specifically on PPU there are some studies that do give support that there is a link with functioning. Cavaglion (2009) in his analysis of an internet forum for people with PPU found several narratives that indicated a relationship between PPU and problems regarding productivity, and within relationships; many users reported that they were feeling isolated as a result of PPU. Although these findings have to be taken with caution due to the methodology this does support the idea that PPU is linked directly to problems associated with functioning. Levin, Lillis and Hayes (2012) in their sample of college males found that frequency of viewing pornography predicted several outcome variables including social functioning, with increased viewing leading to more problems. However, the effect sizes were only modest, the sample size relatively small and the population was ‘non-clinical’ i.e. not treatment seeking. Twohig, Crosby and Cox (2009) found in their sample of male college students considered to have PPU one of the strongest negative effects was on behavioural outcomes; damage to relationships and problems at work or college. Interestingly the negative outcomes did not increase with increased use of pornography, but were mediated by attempts to control thoughts and urges associated with pornography. This goes against the straightforward idea that PPU directly impacts functioning due to the time spent using pornography, i.e. user’s have less time to devote to other aspects of their lives. Rather, functioning is reduced due to a cognitive and affective component.

Therefore, despite the common assumption and the numerous citations within the academic literature that PPU is directly associated with impaired functioning there is little empirical evidence to support this claim once the referencing trail has been followed and taking into consideration the methodological weaknesses of many of the studies. Another concern is that the temporal aspect of the relationship between PPU and functioning is not clear; it could just as easily be suggested that those with poor functioning are more likely to turn to online pornography, than it is that PPU leads to poor functioning. What can be suggested however is that there are indirect mechanisms that relate to the possible decrease in functioning, such as attempts to control thoughts and feelings associated with pornography use.

*Tolerance and increased use:*

The frequency of viewing or use is often one of the defining features of PPU within the academic research (Duffy, Dawson, & das Nair, 2016). The variation in frequency varies wildly between studies as do definitions of excessive use (Twohig, Crosby and Cox, (2009) equate excessive or high use as 10 times in three months; whereas Pyle and Bridges, (2012) stated 90 times in three months). A critique of defining a behaviour as excessive in this context comes from Humphreys’ (2018) critique of Gola et al.’s (2017) study in which they defined excessive masturbation as 5.7 times a week. Humphreys (2017) put forward that this level of masturbation is hardly excessive given that the average age was 31; suggesting that rather than the participants tormenting themselves about being abnormal that they should be reassured that their frequency of masturbation is the same as the one in six US men in their age group.

Therefore it can be put forward that there is no direct evidence of tolerance in regards to amount used; there have not been the required longitudinal studies to demonstrate increasing use over time. In fact, studies have suggested that perceived addiction to pornography is related more to morality rather than the amount used (Grubbs, Wilt, Exline, Pargament & Kraus, 2018). However, common sense suggests that those that use an extreme amount of pornography did not start by doing so. It remains unknown whether the process of PPU involves tolerance and an increasing time using. If the amount of pornography may not increase, the form or content may well change over time. As discussed in a previous paper, research suggests that users of non-violent and degrading pornography can move onto more extreme forms due to becoming desensitised to the content of frequency viewed material (Linz, Donnerstein & Penrod, 1987; Bridges, 2010). This tolerance effect regarding the content of the pornography consumed is supported by Doidge’s (2007) theory of neuroplasticity and the related release of dopamine associated with engaging in new experiences.

*Hazardous use:*

To the best of the authors’ knowledge, no one has ever died as a result of watching pornography. The ‘death grip’ is associated with frequent masturbation, but the most this results in is a sore penis or lack of proper function. There have been deaths associated with sexual practices or fetishisms, such as auto-erotic asphyxiation, but these practices are not usually classed as pornographic.

*Withdrawal:*

Physiological dependence on pornography is obviously impossible and as such there cannot be physiological withdrawal symptom associated with PPU. Possible psychological or emotional withdrawal symptoms will be covered in the sub-section physical/psychological problems related to use.

*Repeated attempts to quit/control use:*

Within the literature on PPU that centres on the concept of addiction there are descriptions of individuals reporting difficulties when trying to control their use of pornography (for example the case study by Wéry, Schimmenti, Karila, & Billieux, 2018); if a parallel to addiction is to be made then pornography itself should be difficult to inhibit (Ley, Prause & Finn, 2014). However, a relationship between self-regulation of sexual arousal and hypersexual problems has not been identified (Winters, Christoff & Gorzalka, 2009). One study has suggested that levels of sexual desire rather than hypersexual problems predict regulation of sexual responses to pornography (Moholy, Prause, Proudfit, Rahman & Fong, 2015). Although hypersexual patients report problems with executive functioning (Reid, Karim, McCrory & Carpenter, 2010) they do not actually demonstrate them when tested (Reid, Garos, Carpenter & Coleman, 2011). It has been put forward that those reporting more problems with pornography have better control over their sexual response (Moholy et al., 2015; Winters, Christoff, & Gorzalka, 2009). Ley, Prause & Finn (2014) put forward that other factors may account for the reported problems in regulating pornography use. One factor described in the literature is personal religious values being in conflict with the use of pornography. This is supported by Twohig, Crosby and Cox (2009) who found that religious conflict was the main reason given for PPU. Also, individuals that seek treatment for PPU are more likely to be religious followers and hold strong religious beliefs (Winters, Christoff & Gorzalka, 2010; Ross, Månsson & Daneback, 2012); and those that identify as religious report higher levels of perceived addiction to pornography when compared with atheists or agnostics (Bradley, Grubbs, Uzdavines, Exline & Pargament, 2016).

Difficulty to control the use of pornography therefore seems to be experienced by users rather than demonstrated. In terms of repeated attempts to quit, Kraus, Martino and Potenza (2016) found within their sample of men interested in seeking help for PPU that 6.4% reported previously seeking treatment. When help seekers have been investigated it has been put forward that it is the negative symptoms associated with pornography use rather than the frequency of use that accounts for the help seeking (Gola, Lewczuk & Skorko, 2016); however, for females, frequency may be related to seeking help alongside negative symptoms, personal beliefs and social norms (Lewczuk, Szmyd, Skorko & Gola, 2017). It can be put forward then that for some quitting or being abstinent from pornography is difficult, especially if this is their only sexual outlet; which is unsurprising given the dominant role of sexuality within our species.

*Physical/psychological problems related to use:*

Internet forums and the media often claim sexual problems regarding excessive use of pornography. The term ‘PIED’ (Pornography Induced Erectile Dysfunction) is frequently discussed and reported on self-help sites and within self-help books (for example Wilson, 2014). There are also several studies that correlate internet pornography use with erectile dysfunction and other sexual dysfunction such as delayed orgasm (Park et al., 2016). Qualitative studies of pornography users and their partners report sexual dysfunctions associated with PPU (Cavaglion, 2009; Cavaglion & Rashty, 2010). Although these studies contain rich data and will be addressed later in this review, claims of causation cannot be supported. In fact, no empirical studies directly linking erectile function and PPU have ever been found (Ley, Prause & Finn, 2014) and erectile problems are not caused by viewing more pornography (Landripet & Štulhofer, 2015; Prause & Pfaus, 2015; Sutton, Stratton, Pytyck, Kolla, & Cantor, 2015). Despite high levels of erectile dysfunction in young men found in two studies (Capogrosso et al., (2013), who found 26% in those under 40; Mialon, Berchtold, Michaud, Gmel & Suris, (2012); 30% age 18-25) the main predictors were found to be smoking and illegal drug use, and again drug use and also depression and poor physical health. Neither study conjectured about pornography use. A recent study by Grubbs and Gola (2019) that used a cross-sectional and longitudinal design found that there was no evidence that mere pornography use was associated with erectile dysfunction. They did find however, that self-reported problematic pornography use was associated with erectile dysfunction but without causation, thus suggested other factors such as mood, anxiety or stress might be contributing to the erectile problems.

This leaves a research/practice gap. PIED is so frequently reported both online and in clinic there must be more to examine regarding this experience. Ley, Prause and Finn (2014) suggest that it is not the pornography that directly effects users in this way; they propose that as pornography use is nearly always accompanied by masturbation it is the refractory period and the associated conditioning that occurs in frequent pornography viewing that explains any reported sexual performance issues. This makes intuitive sense and moves the narrative away from pathology towards basic physiology and learning theory.

In regards to psychological problems associated with PPU, again this is often stated within the general literature. However, the actual links between psychological distress and pornography use are not clear (Grubbs, Stauner, Exline, Pargament & Lindberg, 2015). There are some studies that have examined the relationship, each finding mediating factors. Levin, Lillis, and Hayes, (2012) found that frequent use of pornography was associated with depression, anxiety and stress, and that experiential avoidance acted as the mediating factor amongst participants with ‘clinical’ levels of PPU. The relationship between pornography use and distress has been found to be mediated by loneliness by Kim, LaRose and Peng (2009); and by relational conflict by Gwinn, Lambert, Fincham and Maner (2013). Grubbs et al. (2015) found that the relationship between frequency and distress was mediated by perceived addiction, i.e. psychological distress associated with pornography use might not occur from pornography use itself but might be due to the attitudes individuals hold about their pornography use. Other judgements related to pornography use have also predicted distress, in particular if a moral transgression has occurred (Grubbs et al., 2018). This highlights the role of social shame and guilt attached to using pornography; Grubbs, Exline, Pargament, Hook and Carlisle (2015) found that distress related to viewing pornography was strongly related to conservative values and being religious. Grubbs, Perry, Wilt and Reid (2018) propose two pathways to PPU. One is behavioural dysregulation or using excessive amounts of pornography and masturbating which leads to reduced functioning and distress. The other, and more novel, is that of moral incongruence, that people, often religious, will disapprove of their pornography use and it is this judgement that leads to the distress. Of note, the connection between pornography use and depressive symptoms has been suggested to arise through this mechanism (Perry, 2018). It is therefore put forward that for the individual user their psychological problems are indirectly linked to PPU, the causation is due to related issues and consequences. However, there are some studies that suggest that PPU can directly lead to psychological distress within the user’s relationships; these include worry (Twohig, Crosby & Cox, 2009); and reduced confidence, concentration, self-esteem and identity (Cavaglion, 2009).

Within the academic literature PPU is often shown to occur alongside or comorbid with other psychological disorders and problems; in the study by Kraus, Potenza, Martino and Grant (2015) 94% of the sample met criteria for at least one psychiatric disorder, and 57% met the criteria for two of more. In addition, those that self-report with PPU are more likely to have current or past contact with mental health services, have suicidal ideation (Cooper, Griffin-Shelley, Delmonico & Mathy, 2001), more drug and alcohol problems (Svedin, Åkerman, & Priebe, 2011) and have symptoms of attention deficit hyperactivity disorder (Bőthe et al., 2019). Given the high comorbidity Griffiths (2012) question whether PPU can be seen as a primary disorder at all and whether it is a related symptom of more established disorders.

*Craving:*

Sexual images create stronger motivation than other pleasant images, and have several physiological indicators (Vrana, Spence & Lang, 1988; Weinberg & Hajcak, 2010). Examples of these indicators include increased blood flow in areas of the brain associated with reward (Kühn & Gallinat, 2011) and increases in dopamine (Bocher et al., 2001; Georgiadis et al., 2006). This suggests that viewing pornography is a liked behaviour and similar to the initial process of substance addictions (Robinson & Berridge, 1993; Blum et al., 2000). However, these neural patterns are also found in those that enjoy extreme sports (Fjell et al., 2007) and occur in any enjoyed activity (Salamone & Correa, 2013) and are both expected and non-pathological (Ley, Prause & Finn, 2014). The transition and long term neural changes from pleasure seeking to relieving craving common in most addictive disorders has not been found to date for PPU (Ley, Prause and Finn, 2014). Some differences in changes in brain activity associated with the terms wanting and liking have been found within PPU participants (Gola et al. 2017) with inferences made that this correlates to an addiction model; however this has been disputed within the literature (for example Prause, 2017; Prause et al, 2017). Therefore, it can be put forward that there may be psychological ‘craving’ rather than biological correlates, and as such it would be better to use the term liking rather than wanting.

Can an addiction model be used?

In summary, it is unclear whether PPU use has an impact on functioning; hazardous use, withdrawal, and craving all have to be rejected; tolerance and increased use, repeated attempts to quit or control use and physical/psychological problems related to use can only be partially accepted. Although PPU shares some similarities with an addiction model, there are important aspects of PPU that do not. Once elements such as craving, withdrawal and hazardous use are taken out of the equation then we are left with a set of behaviours that are liked/pleasurable, difficult to stop and once taken to excess may lead to problems in functioning. If we use a falsification approach (Popper, 1963), as Prause et al. (2017) does, in that every major criteria of a model should hold true otherwise the entire model falls apart, then the addiction model of PPU must ultimately be rejected.

The concept of pornography addiction, rather than simply PPU, is often subsumed by the term hypersexual disorder (often called sex addiction). The DSM V rejected the term hypersexual disorder; one of the developers has been quoted to say “To include this as an addiction would require published scientific research that does not exist at this time” (Charles O’Brien, as cited in Ley, Prause & Finn, 2014). Similarly, several organisations have rejected the addiction model or concept of sex and/or pornography addiction: The American Association of Sexuality Educators, Counselors and Therapists (AASECT), The Association for the Treatment of Sexual Abusers (ATSA), The Center for Positive Sexuality (CPS), The Alternative Sexualities Health Research Alliance (TASHRA), and The National Coalition for Sexual Freedom (NCSF).

Furthermore, as the addiction model is situated within the same frame of reference as the disease or medical model there are connotations in terms of perceived self-control and intervention (Agich, 1983); which therapeutically may become problematic themselves. Applying interventions primarily designed for substance based addictions to PPU, which is based on ‘excessive’ behaviour, is likely to be unsuccessful and may even harm the clients involved; through adopting a disease or diagnostic approach and thus ignoring key psychological processes (Billieux, Schimmenti, Khazaal, Maurage & Heerne, 2015). Another potential issue with PPU being treated as an addiction is the addiction private treatment centres and the practice of staff often being in recovery themselves; research has shown that practitioners in recovery over diagnose addiction related disorders (Culbreth, 2000). The private addiction industry is a large, lucrative business that will benefit (in terms of US medical insurance) from the inclusion of PPU as an addiction; once the addiction label is applied then the users will therefore be required to pay for treatment (Ley, Prause & Finn, 2014).

Another aspect of classifying PPU as an addiction is the role of morality and sociocultural function. Seeing the use of pornography as addiction is a morally constructed viewpoint that aims to maintain the current sexual order and protect society from supposed harm (Clarkson & Kopaczewski, 2013); and implies that experts are required to treat those that transgress (Duffy, Dawson, & das Nair, 2016). The label addiction supports moral judgements about pornography and the suppression of sexual expression. Conflict with an individual’s sexual preferences and imposed social norms does not equate to pathology (Moser, 2013); such ideas have been applied in the past regarding sexuality, with the past diagnosis of homosexuality (Humphreys, 2017). What is normal or pathological is a social construction dependant on current theories, place and time (Foucault, 1978; Keane, 2004).

Impulsivity/compulsivity

Impulsivity can be defined as “a predisposition toward rapid, unplanned reactions to internal or external stimuli without regard to the negative consequences” (Moeller, Barrat, Dougherty, Schmitz & Swann, 2001. p. 1784). In pornography use this translates to becoming aware of a sexual cue and beginning to use pornography without thinking about the consequences, e.g. other demands on time (Ley, Prause & Finn, 2014). Whereas compulsivity is defined by the American Psychiatric Association as the performance of repetitive behaviours with the goal of reducing or preventing anxiety or distress, not to provide pleasure or gratification (APA, 2013). Although pornography use can definitely be repetitive, the function of the behaviour is more contentious. Whilst pornography use has been theoretically linked with emotional regulation or reducing anxiety and distress, experimentally the opposite has been found, with those reporting PPU having less baseline negative affect than controls (Prause, Staley & Fong, 2013). It has also been suggested that over time any goal-directed behaviour may become habitual, and controlled via a stimulus-response association (Fineberg et al., 2010; Everitt & Robbins, 2005). This further negates the role of compulsivity in PPU and challenges the classification of PPU as a compulsive sexual behaviour, often operationalised as hyper-sexual disorder (e.g. Potenza, Gola, Voon, Kor & Kraus, 2017). Hyper-sexual disorder was rejected by the DSM V, however the latest version of the International Classification of Diseases has included compulsive sexual behaviour disorder but under the category of impulse control disorders (WHO, 2018). Impulse control disorders are defined as “the repeated failure to resist an impulse, drive, or urge to perform an act that is rewarding to the person (at least in the short-term), despite longer term harm either to the individual or others” (Grant et al., 2014. p. 125). The DSM-IV-TR elaborates on this definition by adding that the behaviour is preceded by a rise in tension or when resisting the behaviour and followed by relief of tension (APA, 2000).

The role of both impulsivity and compulsivity in PPU has been challenged by Bőthe et al. (2018a), who found only weak associations between the three concepts. This finding contradicts several previous studies and commentaries. They suggest that other factors, such as personality or other individual difference factors, may be worthy of further research. However, it has to noted that Bőthe et al. (2018a) relied upon self-report questionnaires of varying quality rather than taking a more rigorous experimental methodology.

How best to classify PPU?

The reasons for not classifying PPU as a form of addiction or as a compulsive sexual disorder have been outlined. To classify PPU is an impulse control disorder makes more theoretical sense, especially if the longer term habitual nature of PPU is taken into account, i.e. the pleasure and gratification element decreases over time and the user is left with a repetitive behaviour that is stimulus controlled and relieves an urge to use. However, classifying any set of behaviours or emotions as a disorder implies that there is a cut off between ‘normal’ use and disordered use and that a professional is required to assess this distinction before a diagnosis is given. Classifying PPU as a disorder redefines pornography use as a medical problem (Voros, 2009) and has several implications that have been put forward already.

How to classify PPU has been given a thorough examination. The justification of this is that despite the ‘explosion’ of publications focused on behavioural addictions since the 1990s (Voros, 2009) there is still little consensus regarding how to classify PPU. Some authors such as Schneider (2000b) believe that the terms can be used interchangeably, whereas others put forward that it matters a great deal as empirically supported treatments are developed through the process of making predictions generated by models (Prause, 2017). This latter distinction has to be fully accepted as the rationale for publishing articles concerning PPU has to be assumed to be beneficence and thus ultimately the design of interventions or recommendations. With this in mind it is suggested that PPU is taken away from the medical domain and classified simply as PPU.

**Epidemiology**

Authors such as Carnes (1991) put forward that up to 6% of the population of the US are addicted to sex; this is similar to the 3% to 6% put forward by Kuzma and Black (2008) concerning compulsive sexual behaviour; however these extreme estimates are based upon clinical speculation. Skegg, Nada-Raja, Dickson and Paul (2010) propose an empirical estimate of 0.8% of men and 0.6% of women reporting problematic sexual behaviours. In terms of PPU specifically, Ley, Prause and Finn (2014) calculate the prevalence to be 0.58% and 0.43% of men and women respectively.

Studies based in the US and in Sweden indicate that between 2% and 17% of pornography users meet established criteria for compulsive and/or problematic pornography use (Albright, 2008; Ross, Månsson & Daneback, 2012). In a sample of 1102 members of a general Facebook group who had used pornography in the last six months, 3.6% were identified as having problematic use (Bőthe et al., 2018b); in a larger representative sample of 9963 men and 10131 women, 4% and 1% respectively, self-reported as addicted to pornography (Rissel et al., 2017). However, as discussed, how PPU is defined varies and as such, specific findings have to be taken with caution.

**The experience of PPU**

Face to face, one to one interviews with qualitative analysis of people who experience PPU have not been found to date within the academic literature. There are several case reports (for example; Cooper, Putnam, Planchon & Boies, 1999) contained within studies but these seem to be an amalgamation of different clients and do not contain enough personalised information to be classed as a case study (Yin, 2009); in addition many do not focus on PPU specifically and include other behaviours associated with the term sex addiction. These case reports do give a descriptive overview of some of the issues that people can present with but seem to be more concerned with proving the theoretical leanings of the author, and add little to what has been presented already within this review.

One study by Cavaglion (2009) undertook a narrative and interpretative analysis of 2000 messages from an Italian self-help forum for PPU. Although there are methodological issues raised with the quality of data, such as the inability to check the authenticity, there are several interesting findings. There is the idea of isolated users and due to the isolation there is escalation in their pornography consumption. One group of users were described as shy, introverted, lacking self-esteem. They often used pornography instead of other activities such as studying and also report developing a tolerance for the type of pornography used, with a search for ever more extreme content. Another group is defined as having a double life; these tended to be older users, some with partners and children. This group reports that their ‘normal’ life gets eroded with increasing pornography consumption. All groups tend to be disgusted with their behaviours and often use scatological language to describe themselves. This labelling of the self morphs into demonization if the users are particularly religious, and if not religious then a disease metaphor is used, that they are mentally unwell. The majority of users report a decrease in functioning and isolation from the outside world and missing out on life. Many users report difficulties in sexual relationships caused by their frequent masturbation. Whereas for some the pornography is not just for masturbation but they also become fixated with collecting and organising their downloaded pornography collection.

It is interesting to note the majority of accounts of the lived experience of PPU are focused on the partner’s perspective. Zitzman and Butler (2009) interviewed 14 women who were attending couples therapy for their partners pornography use. The interviews were analysed qualitatively, but the analytical framework was not specified. Themes centre on attachment and the idea of a fault line developing into a rift and then estrangement. These themes relate to the discovery of pornography use and perceived infidelity; a sense of disconnection within the relationship; and finally the end of the relationship due to feeling emotionally unsafe. From the same self-help forum as Cavaglion (2009), Cavaglion and Rashty (2010) focused on the narratives of female partners posting on the forum. 1130 messages were analysed and themes of trauma, betrayal, being in limbo, loss (of the partner and of sex life), an idealised past relationship with partner, and inadequacy feeding their own low self-esteem. Taking an addiction perspective on PPU, King (2003) focused on the experiences of female partners of clergy that use pornography. 40 participants completed a survey, with some open ended questions. Although there was no analysis of the data there were some interesting quotes and summaries that focus on self-blaming attitudes, shame and isolation. Finally, Bergner and Bridges (2002) collected one hundred written accounts made by the partners of men who were heavy users of pornography. The reports were gathered from various online forums for sex and pornography addiction. Generalised themes were presented that focused on a typical presentation. Findings suggested that due to the partners pornography use, women perceived themselves, their partner and their relationship in a negative way. Discovery of the PPU seems to have been a traumatic betrayal, and either the female partners felt rejected or used sexually. The female partners took one of two positions regarding their partners that they were either addicted/had a mental health problem and therefore not as responsible or that they were bad and selfish and ultimately making a choice by putting the pornography before their relationship.

Although scant, the lived experiences of PPU do support elements that have been put forward already in this review and also give a richer account of the distress of being a problematic user or living with one. A word of caution does have to expressed, all of the above studies recruited from sources whereby individuals were seeking support or intervention for their pornography use, and as such cannot be said to representative, in addition all studies excluded non-heterosexuals.

**Causes/associated factors**

Several factors associated with PPU have already been explored within this review. Other important factors to consider will now be put forward and there will also be a review of possible causational or predisposing factors.

High sex drive is one aspect not addressed so far and is supported by several researchers. Sexual arousal and desire has been found to account for more variance than concepts such as hypersexuality for the sexual behaviours investigated (Walton, Lykins & Bhullar, 2016); and also more than gender (Wehrum et al., 2013). Prause (2017) puts forward that not enough studies account for sexual desire or high sex drive and if this factor were to be put within the models then the effects due to sexual behaviours or pornography consumption would disappear. This idea is supported by Winters, Christoff and Gorzalka (2010) who highlight the role of sexual desire within problematic sexual behaviours in a sample of self-identified sex addicts.

Loneliness has been associated with pornography use (Yoder, Virden & Amin, 2005) and it has also been put forward that participants who view pornography are more likely to experience loneliness and that being lonely was a predictor of pornography use, that there is a bidirectional role (Butler, Perevra, Draper, Leonhardt & Skinner, 2017). In regards to problematic use, Bőthe et al. (2018b) found that problematic users had the highest levels of loneliness compared to non-problematic users and those at risk of problematic use.

In regards to predisposing factors it has been suggested that having a history of traumatic experiences and/or poor attachments to caregivers is influential in developing PPU. This is a frequently occurring idea within much of the addiction related literature. However, again once the referencing trail is complete there is no supporting data, only opinion. The only actual research (Ybaraa & Mitchell, 2005) that suggests a link between trauma, attachment and pornography is survey based, researched with adolescents and focuses on pornography use generally rather than PPU. Of note the online forum based research by Cavaglion (2009) highlighted that in their sample 302 online users with PPU there were no histories of traumatic events, and co-morbid substance misuse was rare.

**Measuring PPU**

Several scales have been produced to measure PPU; 95% of studies that investigate PPU have used researcher generated questionnaires (Kor et al., 2014). There is blurring between subject matters; often attempts are made to measure PPU specifically using a measure that encapsulates a wider set of behaviours, for example the Internet Sex Screening Test (Delmonico & Miller, 2003), or existing measures are adapted to focus on PPU, e.g. the Short Internet Addiction Test adapted to Online Sexual Activities (Wéry, Burnay, Karila & Billieux, 2016). There are measures that attempt to assess pornography use generally and also those that focus purely on PPU. However, each tends to focus on certain aspects such as overall use/consumption, cravings, or are designed to ascertain whether an individual meets a proposed ‘diagnosis’. How PPU is conceptualised is an important factor to consider when reviewing the measures, those with a strong addiction ideology will subsequently focus on factors that signify addiction, whereas those that conceptualise PPU as compulsivity will take a different approach. The main measures detailed within the academic literature that are focused on PPU will now be presented.

The Cyber Pornography Use Inventory (Grubbs, Sessoms, Wheeler & Volk, 2010) is a 31 item scale with a focus on addictive patterns, guilt and online sexual behaviour within religious populations. Although, the title indicates a measure of pornography there are also several questions that relate to cybersex more generally. The Cyber Pornography Use Inventory 9 (Grubbs, Volk, Exline & Pargament, 2015) is a revised, shorter version. Several questions, including those concerning non-pornography related behaviours are removed. The remaining questions, although relevant are so focused on an addiction model that several are not supported through research, e.g. “I feel depressed after viewing pornography”.

The Compulsive Pornography Consumption (Noor, Rosser & Erickson, 2014) is a five item scale that focuses on the concept of lack of control and also thoughts about pornography viewing. The scale was derived from a sample of MSM and as such can be therefore classed as non-representative. In addition, having only five questions means that it cannot be comprehensive enough to encapsulate all aspects of PPU.

The Pornography Craving Questionnaire (Kraus & Rosenberg, 2014) is a 12 item scale that focuses on the concept of craving and questions assess desire thinking. Although, useful for research purposes its narrow scope reduces its clinical utility and also fails to cover enough aspects of PPU.

The Problematic Pornography Consumption Scale (Bőthe et al., 2018b) is an 18 item scale that follows Griffith’s addiction components model (Griffiths, 2005), which details three groups of pornography users: non-problematic, low-risk and at-risk. Despite strong psychometric properties there are weaknesses, apart from a relatively low sample size based in one religious European country, there is also the inclusion of factors that are not supported within the academic literature; tolerance (in term of amount consumed) and withdrawal.

The Problematic Pornography Use Scale (Kor et al., 2014) is a 12 item scale containing four factors: distress and functional problems, excessive use, control difficulties, use for emotional regulation. Although an addiction framework is implied the questionnaire does not contain the word addiction. Overall the questionnaire is comprehensive and can be used to both assess severity and also treatment outcomes. In addition, the scale has excellent psychometric properties (Kor et al., 2014).

Overall, despite several published questionnaires related to pornography use and also some that focus on PPU it can be put forward that most can be discounted due to methodological or ideological constraints. The only questionnaire that seems to have enough merit for clinical use is the Problematic Pornography Use Scale.

**Interventions**

Intervention studies that focus specifically on PPU are well described within a recent systematic review (Sniewski, Farvid & Carter, 2017). Their review is relatively comprehensive but does not explore the grey literature or detail excluded studies, however no known published studies seem to be missing from the review and as such a brief summary will now be presented.

Naltrexone, a competitive antagonist, has been studied in three case studies (Bostwick & Bucci, 2008; Capurso, 2017; Kraus, Meshberg-Cohen, Martino, Quinones & Potenza, 2015) with mixed results; decline in ‘addictive symptoms’, sexual urges and pornography viewing, improvement in functioning, but also anhedonia (inability to feel pleasure). Paroxetine, a selective serotonin reuptake inhibitor, was studied in a case series with three participants (Gola & Potenza, 2016); initially successful in reducing pornography and anxiety, but ultimately resulted in new unwanted sexual behaviours. Pharmacological interventions for PPU are seen as promising by Sniewski, Farvid and Carter (2017) but more far more evidence is required. Indeed, for two of the case studies real improvement was indicated, especially given the quite severe level of PPU the participants were experiencing.

Psychodynamic (Adlerian) counselling has been described in a case study (Fall & Howard, 2015) but outcomes are unclear. Systemic/structural therapy was used in another case study (Ford, Durtschi & Franklin, 2012) with a decrease in pornography use and improved marital satisfaction. Another study investigating the role of couples counselling, with six couples (Zitzman & Butler, 2005), was found to be effective in several relationship based domains.

A pluralistic group integrating Cognitive Behavioural Therapy (CBT) and motivational interviewing was detailed in a case study with 35 participants (Orzack, Voluse, Wolf & Hennen, 2006); with reported increases in quality of life, decrease in depressive symptoms but no reduction in pornography use. Young (2007) investigated the use of CBT within an addiction clinic for people with internet addiction. Of the 114 participants, 34 were identified as having a primary problem relating to pornography. Behavioural and cognitive interventions were offered over 12 sessions, with a six month follow up. Improvement across all goals were seen by the third session, effective ‘symptom’ management by the eight and improvements maintained at six month follow up. An online psychoeducational and recovery program based on CBT was investigated by Hardy, Ruchty, Hull and Hyde (2010) with improvements made in pre and post measurement of a range of different aspects. All three studies based upon a CBT approach show promise but all lack a rigorous methodology, i.e. no control group.

Finally, Acceptance and Commitment Therapy (ACT) was investigated by Twohig and Crosby (2010) using a multiple baselines across participants design, thus creating a control; and by Crosby and Twohig (2016) in the first Randomised Control Trial (RCT) conducted for this population. The first study demonstrated encouraging results in eight, hour and a half sessions; five out of six participants had notable reductions in pornography use by the end of treatment, four at follow up; all participants reported improvements in measures of quality of life and decreases in measures of OCD and scrupulosity. The RCT offered the 26 participants a twelve session, one hour, treatment based on the earlier study in a waitlist control condition. Results indicated that pornography viewing significantly reduced, with modest gains at follow up; there was no impact on measures of functioning suggesting that quality of life may take longer to develop after pornography viewing has decreased. Although, again these studies show promising results they suffer from a lack of diversity within the samples, all were white men with a strong religious affiliation; the small sample size is also a limitation.

In summary, there is some limited evidence of the effectiveness of interventions for PPU. Far more research is required before making any recommendations. The most promising approaches seem to be based on CBT or ACT. Both of these focus on behavioural change and the beliefs that maintain PPU. CBT will work with these directly whilst an ACT approach will encourage a sense of acceptance and present moment focus, both of which make intuitive sense given the mechanisms which seem to maintain PPU elicited from this review.

**Towards a preliminary model**

There are models of PPU in the academic literature. One, Grubbs, Perry, Wilt and Reid (2018), has already been described and focuses on either excessive use or moral incongruence. Two other models are often cited, both of which focus on behavioural dysregulation. The Interaction of Person-Affect-Cognition-Execution (I-PACE) model (Brand, Young, Laier, Wölfling & Potenza, 2016) is a theoretical framework for the development and maintenance of the addictive use of internet applications; namely gaming, gambling, pornography, shopping or communication. Whilst the model can be seen as comprehensive and makes intuitive sense, there are not many unique factors that distinguish it from a general model of addiction or even a generic model of mental health. The ‘Sexhavior Cycle’ (Walton, Cantor, Bhullar & Lykins, 2017) describes a cycle of sexual behaviour based upon common sense; however they add the element that some people with ‘hypersexuality’ will experience what they define as ‘cognitive abeyance’. These individuals with a high sex drive when in a state of sexual arousal will fail to engage in logical cognitive processing thus engaging in behaviour that might be incongruent with their morality, be otherwise risky, or they may regret later. Although the term cognitive abeyance sounds new, the relationship between sexual arousal and decision-making has already been studied (Peters, Västfjäll, Gärling & Slovic, 2006). All three models have merit but do not seem to fully encapsulate the processes that would help explain both the development and maintenance of PPU; they are either too specific or generic.

Figure 1. demonstrates an attempted diagrammatical display of the main research findings rather than a coherent model or theory. It can be seen that there are several mechanisms that effect PPU, key mediating factors between pornography use and distress/functioning, and also there are significant consequences or outcomes associated with PPU. Please note that figure 1. also includes findings from a previous paper by the authors (Binnie & Reavey, 2019).

Insert figure 1 here

This review and the above diagram highlight not only what we know so far about PPU but also what we do not know. There are indications from the research literature as to the experience of PPU, but these have been taken from homogenous groups and lacking real depth; many voices have not been heard. As to the development and maintenance of PPU, again there are indications of developmental factors but no real clarity, and maintenance factors are only alluded to.

The likely impact of developing this summary of research findings and preliminary model of PPU is that it will act as an aid to counsellors/psychotherapists and other practitioners when working with clients with PPU. As put forward earlier the lack of a comprehensive model hinders professionals in their work with clients. A psychological model of a problem or disorder allows for a wider conceptualisation or formulation of the clients difficulties and gives a direction for the therapeutic work. Often models contain information or nuances that can be missed from simply being with the client. The creation of a model does not however mean that it will fit all clients or that thorough assessments and individualised formulations become redundant. A model drawn through research can be integrated to the benefit of both the client and the professional.

It can be put forward that practitioners should discuss aspects of the preliminary model with their clients. Of note would be the clients’ first exposure to pornography and the historical pattern of use. This would allow an exploration of how normalised their attitudes and behaviours concerning pornography are. It may be that clients hold particularly negative attitudes to pornography per se and as suggested it is these attitudes that relate to the distress associated with pornography use within relationships or indeed where there is conflict with their faith or belief system. Why clients use pornography is a vital aspect to explore; practitioners should focus on whether positive or negative reinforcement is maintaining their use. Individual factors leading to problematic use should be discussed, as suggested in the model these may centre on high sexual desire, impulsivity and/or loneliness; these will have different interventions or strategies associated with them. A greater awareness in clients of the outcomes associated with PPU may be enough alone to reduce them, e.g. that it is masturbation that leads to sex related problems or being aware and pulling back from the gravitation towards more extreme material. From a psychological perspective having a focus on the mediating factors involved in the levels of distress experienced and the reduced functioning associated with PPU can lead to intervention. This suggests exploring identities, the role of experiential avoidance and intolerance with perhaps meta-cognitive or acceptance and commitment approaches is one way forward rather than on ‘symptom’ or distress management.

Conclusion

A preliminary model has been put forward and it is suggested that far more research is required. There is a need within the research and therapeutic community to have an accepted model of PPU. As things currently stand even defining PPU is contentious. If a consensus can be reached then any model would be central to the development of evidence based practice focused on PPU. Having an accepted model may lead to case studies, case series, and the beginnings of a recommended treatment approach. This treatment approach can then be tested with multiple baselines across participants design studies and ultimately with a randomised control trial. Once a level of evidence is created then self-help books and treatment manuals for therapists can be published. All of which can be put to use to help people suffering with PPU.

**References**

Agich, 1983 Agich, G.J. (1983). Disease and Value: A Rejection of the Value-Neutrality Thesis. *Theoretical Medicine*, 4, 27-41.

Albright, J. (2008). Sex in America online: An exploration of sex, marital status, and sexual identity in internet sex seeking and its impacts. *Journal of Sex Research*, 45(2), 175–186.

American Psychiatric Association (2000). *Diagnostic and statistical manual of mental disorders, 4th ed, text revision*. Washington: American Psychiatric Association.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders : DSM-5(5th ed.)*. Arlington, VA: American Psychiatric Association.

Beck, A.T. (1967). *Depression: Clinical, experimental, and theoretical aspects*. Pennsylvania: University of Pennsylvania Press.

Bergner, R.M., & Bridges, A.J. (2002). The significance of heavy pornography involvement for romantic partners: Research and clinical implications. *Journal of Sex & Marital Therapy*, 28, 193–206.

Billieux, J., Schimmenti, A., Khazaal, Y., Maurage, P., & Heeren, A. (2015). Are we overpathologizing everyday life? A tenable blueprint for behavioral addiction research. *Journal of Behavioral Addictions*, 4(3), 119.

Binnie, J., & Reavey, P. (2019). Development and implications of pornography use: a narrative review. *Sexual and Relationship Therapy*, 1-17.

Black, D.W. (1998). Recognition and treatment of obsessive-compulsive spectrum disorders. In Swinson, R.P., Anthony, M.M., Rachman, S. & Richter, M.A. (Eds.), *Obsessive-compulsive disorder: Theory, research and treatment.* New York: Guildford press.

Block, J.J. (2008). Issues for DSM-V: Internet addiction. *American Journal of Psychiatry*, 165(3), 306-307.

Blum, K., Braverman, E.R., Holder, J.M., Lubar, J.F., Monastra, V.J., Miller, D., ... & Comings, D.E. (2000). The reward deficiency syndrome: a biogenetic model for the diagnosis and treatment of impulsive, addictive and compulsive behaviors. *Journal of psychoactive drugs*, *32*(sup1), 1-112.

Bocher, M., Chisin, R., Parag, Y., Freedman, N., Weil, Y.M., Lester, H., ... & Bonne, O. (2001). Cerebral activation associated with sexual arousal in response to a pornographic clip: a 15O–H2O PET study in heterosexual men. *Neuroimage*, *14*(1), 105-117.

Bőthe, B., Koós, M., Tóth-Király, I., Orosz, G., & Demetrovics, Z. (2019). Investigating the associations of adult ADHD symptoms, hypersexuality, and problematic pornography use among men and women on a largescale, non-clinical sample. *The journal of sexual medicine*, *16*(4), 489-499.

Bőthe, B., Tóth-Király, I., Potenza, M. N., Griffiths, M. D., Orosz, G., & Demetrovics, Z. (2018a). Revisiting the role of impulsivity and compulsivity in problematic sexual behaviors. *The Journal of Sex Research*, 1-14.

Bőthe, B., Tóth-Király, I., Zsila, Á., Griffiths, M. D., Demetrovics, Z., & Orosz, G. (2018b). The development of the problematic pornography consumption scale (PPCS). *The Journal of Sex Research*, *55*(3), 395-406.

Bostwick, J., & Bucci, J. (2008). Internet sex addiction treated with naltrexone. *Mayo Clinic Proceedings*, 83(2), 226–230.

Bradley, D. F., Grubbs, J. B., Uzdavines, A., Exline, J. J., & Pargament, K. I. (2016). Perceived addiction to internet pornography among religious believers and nonbelievers. *Sexual Addiction & Compulsivity*, *23*(2-3), 225-243.

Brand, M., Young, K. S., Laier, C., Wölfling, K., & Potenza, M. N. (2016). Integrating psychological and neurobiological considerations regarding the development and maintenance of specific Internet-use disorders: An Interaction of Person-Affect-Cognition-Execution (I-PACE) model. *Neuroscience & Biobehavioral Reviews*, *71*, 252-266.

Bridges, A.J. (2010). Methodological considerations in mapping pornography content. In Boyle, K. (Ed.) *Everyday pornography* (pp. 34-49). New York, NY: Routledge/Taylor & Francis Group.

Butler, M.H., Pereyra, S.A., Draper, T.W., Leonhardt, N.D., & Skinner, K.B. (2017). Pornography Use and Loneliness: A Bidirectional Recursive Model and Pilot Investigation. *Journal of Sex & Marital Therapy*, 1-11.

Capogrosso, P., Colicchia, M., Ventimiglia, E., Castagna, G., Clementi, M.C., Suardi, N., ... & Montorsi, F. (2013). One patient out of four with newly diagnosed erectile dysfunction is a young man—worrisome picture from the everyday clinical practice. *The journal of sexual medicine*, 10(7), 1833-1841.

Capurso, N. (2017). Naltrexone for the treatment of comorbid tobacco and pornography addiction. *The American Journal on Addictions*, 26(2), 115–117.

Carnes, P. (1991). *Don’t call it love: recovery from sexual addiction*. New York: Bantam

Cavaglion, G. (2009). Cyber-porn dependence: voices of distress in an Italian internet self-help community. *International journal of mental health and addiction*, *7*(2), 295-310.

Cavaglion, G., & Rashty, E. (2010). Narratives of suffering among Italian female partners of cybersex and cyber-porn dependents. *Sexual Addiction & Compulsivity*, *17*(4), 270-287.

Clarkson, J., & Kopaczewski, S. (2013). Pornography addiction and the medicalization of free speech. *Journal of Communication Inquiry*, 37(2), 128-148.

Cooper, A., Delmonico, D.L., & Burg, R. (2000). Cybersex users, abusers, and compulsives: New findings and implications. *Sexual Addiction & Compulsivity: The Journal of Treatment and Prevention*, *7*(1-2), 5-29.

Cooper, A., Griffin-Shelley, E., Delmonico, D.L., & Mathy, R.M. (2001). Online sexual problems: Assessment and predictive variables. *Sexual Addiction &Compulsivity: The Journal of Treatment and Prevention*, *8*(3-4), 267-285.

Cooper, A., Putnam, D. E., Planchon, L. A., & Boies, S. C. (1999). Online sexual compulsivity: Getting tangled in the net. *Sexual Addiction & Compulsivity: The Journal of Treatment and Prevention*, *6*(2), 79-104.

Crosby, J., & Twohig, M. (2016). Acceptance and commitment therapy for problematic internet pornography use: A randomized trial. *Behavior Therapy*, 47(3), 355–366.

Culbreth, J.R. (2000). Substance abuse counselors with and without a personal history of chemical dependency: A review of the literature. *Alcoholism Treatment Quarterly*, 18, 67–82.

Delmonico, D.L., & Miller, J.A. (2003). The Internet Sex Screening Test: A comparison of sexual compulsives versus non-sexual compulsives. *Sexual and Relationship Therapy*, 18, 261–276.

Doidge, N. (2007). *The brain that changes itself: Stories of personal triumph from the frontiers of brain science*. Penguin: New York.

Duffy, A., Dawson, D.L., & Das Nair, R. (2016). Pornography addiction in adults: A systematic review of definitions and reported impact. *The journal of sexual medicine*, *13*(5), 760-777.

Ehlers, A., & Clark, D.M. (2000). A cognitive model of posttraumatic stress disorder. *Behaviour research and therapy*, *38*(4), 319-345.

Everitt, B.J., & Robbins, T.W. (2005). Neural systems of reinforcement for drug addiction: from actions to habits to compulsion. *Nature neuroscience*, *8*(11), 1481.

Fall, K., & Howard, R. (2015). An Adlerian perspective on problematic internet pornography use. *Journal of Individual Psychology*, 71(3), 273–289.

Fineberg, N.A., Potenza, M.N., Chamberlain, S.R., Berlin, H.A., Menzies, L., Bechara, A., ... & Hollander, E. (2010). Probing compulsive and impulsive behaviors, from animal models to endophenotypes: a narrative review. *Neuropsychopharmacology*, *35*(3), 591.

Fjell, A.M., Aker, M., Bang, K.H., Bardal, J., Frogner, H., Gangås, O.S., ... & Walhovd, K. B. (2007). Habituation of P3a and P3b brain potentials in men engaged in extreme sports. *Biological Psychology*, *75*(1), 87-94.

Ford, J., Durtschi, J., & Franklin, D. (2012). Structural therapy with a couple battling pornography addiction. *American Journal of Family Therapy*, 40(4), 336–348.

Foucault, M. (1978). *The History of Sexuality: An introduction*. New York: Random House Publishing.

Georgiadis, J.R., Kortekaas, R., Kuipers, R., Nieuwenburg, A., Pruim, J., Reinders, A.A. T., & Holstege, G. (2006). Regional cerebral blood flow changes associated with clitorally induced orgasm in healthy women. *European Journal of Neuroscience*, *24*(11), 3305-3316.

Gola, M., Lewczuk, K., & Skorko, M. (2016). What matters: Quantity or quality of pornography use? Psychological and behavioral factors of seeking treatment for problematic pornography use. *The journal of sexual medicine*, *13*(5), 815-824.

Gola, M., & Potenza, M. (2016). Paroxetine treatment of problematic pornography use: A case series. *Journal of Behavioral Addictions*, 5(3), 529–532.

Gola, M., Wordecha, M., Sescousse, G., Lew-Starowicz, M., Kossowski, B., Wypych, M., ... & Marchewka, A. (2017). Can pornography be addictive? An fMRI study of men seeking treatment for problematic pornography use. *Neuropsychopharmacology*, *42*(10), 2021.

Grant, J.E., Atmaca, M., Fineberg, N.A., Fontenelle, L.F., Matsunaga, H., Janardhan Reddy, Y.C., ... & Woods, D.W. (2014). Impulse control disorders and “behavioural addictions” in the ICD‐11. *World Psychiatry*, *13*(2), 125-127.

Grant, J.E., & Potenza, M.N. (2007). Impulse control disorders. In Grant, J.E. and Potenza, M.N. (Eds.), *Textbook of men’s mental health*. Arlington, VA: American Psychiatric Publishing.

Griffiths, M. (2005). A ‘components’ model of addiction within a biopsychosocial framework. *Journal of Substance Use*, *10*(4), 191-197.

Griffiths, M.D. (2012). Internet sex addiction: A review of empirical research. *Addiction Research & Theory*, *20*(2), 111-124.

Grubbs, J.B., Exline, J.J., Pargament, K.I., Hook, J.N., & Carlisle, R.D. (2015). Transgression as addiction: Religiosity and moral disapproval as predictors of perceived addiction to pornography. *Archives of Sexual Behavior*, *44*(1), 125-136.

Grubbs, J. B., & Gola, M. (2019). Is pornography use related to erectile functioning? Results from cross-sectional and latent growth curve analyses. *The journal of sexual medicine*, *16*(1), 111-125.

Grubbs, J. B., Perry, S. L., Wilt, J. A., & Reid, R. C. (2018). Pornography problems due to moral incongruence: An integrative model with a systematic review and meta-analysis. *Archives of sexual behavior*, 1-19.

Grubbs, J.B., Sessoms, J., Wheeler, D.M., & Volk, F. (2010). The cyber-pornography use inventory: The development of a new assessment instrument. *Sexual Addiction & Compulsivity*, 17, 106–126.

Grubbs, J.B., Stauner, N., Exline, J.J., Pargament, K.I., & Lindberg, M.J. (2015). Perceived addiction to Internet pornography and psychological distress: Examining relationships concurrently and over time. *Psychology of Addictive Behaviors*, *29*(4), 1056.

Grubbs, J.B., Volk, F., Exline, J.J., & Pargament, K.I. (2015). Internet pornography use: Perceived addiction, psychological distress, and the validation of a brief measure. *Journal of Sex & Marital Therapy,* 41, 83–106.

Grubbs, J.B., Wilt, J.A., Exline, J.J., Pargament, K.I., & Kraus, S.W. (2018). Moral disapproval and perceived addiction to internet pornography: a longitudinal examination. *Addiction*. 113: 496-506.

Gwinn, A.M., Lambert, N.M., Fincham, F.D., & Maner, J.K. (2013). Pornography, relationship alternatives, and intimate extradyadic behavior. *Social Psychological and Personality Science,* 4, 699–704.

Hardy, S., Ruchty, J., Hull, T., & Hyde, R. (2010). A preliminary study of an online psychoeducational program for hypersexuality. *Sexual Addiction & Compulsivity*, 17(4), 247–269.

Hasin, D.S., O’Brien, C.P., Auriacombe, M., Borges, G., Bucholz, K., Budney, A., ... & Schuckit, M. (2013). DSM-5 criteria for substance use disorders: recommendations and rationale. *American Journal of Psychiatry*, *170*(8), 834-851.

Humphreys, K. (2017). Of moral judgments and sexual addictions. *Addiction*. DOI**:**10.1111/add.14066.

Karim, R., & Chaudhri, P. (2012). Behavioral addictions: An overview. *Journal of Psychoactive Drugs*, *44*(1), 5-17.

Keane, H. (2004). Disorders of desire: addiction and problems of intimacy. *Journal of Medical Humanities,* 25, 189-204.

Kim, J., LaRose, R., & Peng, W. (2009). Loneliness as the cause and the effect of problematic Internet use: The relationship between Internet use and psychological well-being. *CyberPsychology & Behavior*, 12, 451– 455.

King, S. (2003). The impact of compulsive sexual behaviors on clergy marriages: Perspectives and concerns of the pastor’s wife. *Sexual Addiction &Compulsivity: The Journal of Treatment and Prevention*, *10*(2-3), 193-199.

Kor, A., Zilcha-Mano, S., Fogel, Y.A., Mikulincer, M., Reid, R.C., & Potenza, M.N. (2014). Psychometric development of the Problematic Pornography Use Scale. *Addictive Behaviors*, 39, 861–868.

Kraus, S. W., Martino, S., & Potenza, M. N. (2016). Clinical characteristics of men interested in seeking treatment for use of pornography. *Journal of behavioral addictions*, 5(2), 169-178.

Kraus, S., Meshberg-Cohen, S., Martino, S., Quinones, L., & Potenza, M. (2015). Treatment of compulsive pornography use with naltrexone: A case report. *The American Journal of Psychiatry*, 172(12), 1260–1261.

Kraus, S. W., Potenza, M. N., Martino, S., & Grant, J. E. (2015). Examining the psychometric properties of the Yale–Brown Obsessive–Compulsive Scale in a sample of compulsive pornography users. *Comprehensive psychiatry*, *59*, 117-122.

Kraus, S., & Rosenberg, H. (2014). The pornography craving questionnaire: Psychometric properties. *Archives of Sexual Behavior*, 43, 451–462.

Kühn, S., & Gallinat, J. (2011). A quantitative meta‐analysis on cue‐induced male sexual arousal. *The journal of sexual medicine*, *8*(8), 2269-2275.

Kuzma, J.M., & Black, D.W. (2008). Epidemiology, prevalence, and natural history of compulsive sexual behavior. *Psychiatric Clinics*, *31*(4), 603-611.

Landripet, I., & Štulhofer, A. (2015). Is pornography use associated with sexual difficulties and dysfunctions among younger heterosexual men?. *The journal of sexual medicine*, *12*(5), 1136-1139.

Levin, M.E., Lillis, J., & Hayes, S.C. (2012). When is online pornography viewing problematic among college males? Examining the moderating role of experiential avoidance. *Sexual Addiction & Compulsivity*, *19*(3), 168-180.

Lewczuk, K., Szmyd, J., Skorko, M., & Gola, M. (2017). Treatment seeking for problematic pornography use among women. *Journal of behavioral addictions*, *6*(4), 445-456.

Lewis, M. (2015). *The biology of desire: Why addiction is not a disease*. Hachette UK.

Ley, D., Prause, N., & Finn, P. (2014). The emperor has no clothes: a review of the ‘pornography addiction’ model. *Current sexual health reports*, 6(2), 94-105.

Linz, D., Donnerstein, E., & Penrod, S. (1987). The findings and recommendations of the Attorney General's Commission on Pornography: Do the psychological" facts" fit the political fury? *American Psychologist*, *42*(10), 946.

Marks, I. (1990). Behavioural (non-chemical) addictions. *British Journal of Addiction*, 85(11), 1389-1394.

Mialon, A., Berchtold, A., Michaud, P.A., Gmel, G., & Suris, J. C. (2012). Sexual dysfunctions among young men: prevalence and associated factors. *Journal of Adolescent Health*, *51*(1), 25-31.

Mick, T.M., & Hollander, E. (2006). Impulsive-compulsive sexual behavior. *CNS Spectr*, *11*(12), 944-955.

Moeller, F.G., Barratt, E.S., Dougherty, D.M., Schmitz, J.M., & Swann, A.C. (2001). Psychiatric aspects of impulsivity. *American journal of psychiatry*, *158*(11), 1783-1793.

Moholy, M., Prause, N., Proudfit, G.H., Rahman, A., & Fong, T. (2015). Sexual desire, not hypersexuality, predicts self-regulation of sexual arousal. *Cognition and Emotion*, *29*(8), 1505-1516.

Moser, C. (2013). Hypersexual disorder: Searching for clarity. *Sexual Addiction & Compulsivity*, *20*(1-2), 48-58.

Noor, S.W.B., Rosser, B.R.S., & Erickson, D.J. (2014). A brief scale to measure problematic sexually explicit media consumption: Psychometric properties of the Compulsive Pornography Consumption (CPC) scale among men who have sex with men. *Sexual Addiction & Compulsivity*, 21, 240–261.

Orzack, M.H., & Ross, C.J. (2000). Should virtual sex be treated like other sex addictions? *Sexual Addiction & Compulsivity: The Journal of Treatment and Prevention*, *7*(1-2), 113-125.

Orzack, M., Voluse, A., Wolf, D., & Hennen, J. (2006). An ongoing study of group treatment for men involved in problematic internet-enabled sexual behavior. *Cyberpsychology & Behavior*, 9(3), 348–360.

Park, B. Y., Wilson, G., Berger, J., Christman, M., Reina, B., Bishop, F., ... & Doan, A. P. (2016). Is Internet pornography causing sexual dysfunctions? A review with clinical reports. *Behavioral Sciences*, *6*(3), 17.

Perry, S. L. (2018). Pornography use and depressive symptoms: Examining the role of moral incongruence. *Society and Mental Health*, *8*(3), 195-213.

Peters, E., Västfjäll, D., Gärling, T., & Slovic, P. (2006). Affect and decision making: A “hot” topic. *Journal of Behavioral Decision Making*, *19*(2), 79-85.

Popper, K. (1963). *Conjectures and Refutations: The Growth of Scientific Knowledge*. London: Routledge & Kegan Paul.

Potenza, M.N., Gola, M., Voon, V., Kor, A., & Kraus, S.W. (2017). Is excessive sexual behaviour an addictive disorder?. *The Lancet Psychiatry*, *4*(9), 663-664.

Prause, N. (2017). Evaluate Models of High-Frequency Sexual Behaviors Already. *Archives of sexual behavior*, *46*(8), 2269-2274.

Prause, N., & Pfaus, J. (2015). Viewing sexual stimuli associated with greater sexual responsiveness, not erectile dysfunction. *Sexual medicine*, *3*(2), 90-98.

Prause, N., Staley, C., & Fong, T.W. (2013). No evidence of emotion dysregulation in “hypersexuals” reporting their emotions to a sexual film. *Sexual Addiction & Compulsivity*, *20*(1-2), 106-126.

Pyle, T.M., & Bridges, A.J. (2012). Perceptions of relationship satisfaction and addictive behavior: Comparing pornography and marijuana use. *Journal of behavioral addictions*, *1*(4), 171-179.

Reid, R.C., Garos, S., Carpenter, B.N., & Coleman, E. (2011). A surprising finding related to executive control in a patient sample of hypersexual men. *The journal of sexual medicine*, *8*(8), 2227-2236.

Reid, R.C., Karim, R., McCrory, E., & Carpenter, B.N. (2010). Self-reported differences on measures of executive function and hypersexual behavior in a patient and community sample of men. *International Journal of Neuroscience*, *120*(2), 120-127.

Rissel, C., Richters, J., de Visser, R. O., McKee, A., Yeung, A., & Caruana, T. (2017). A profile of pornography users in Australia: Findings from the second Australian study of health and relationships. *The Journal of Sex Research*, *54*(2), 227-240.

Robinson, T.E., & Berridge, K.C. (1993). The neural basis of drug craving: an incentive-sensitization theory of addiction. *Brain research reviews*, *18*(3), 247-291.

Ross, M.W., Månsson, S.A., & Daneback, K. (2012). Prevalence, severity, and correlates of problematic sexual Internet use in Swedish men and women. *Archives of Sexual Behavior*, *41*(2), 459-466.

Salamone, J.D., & Correa, M. (2013). Dopamine and food addiction: lexicon badly needed. *Biological psychiatry*, *73*(9), 15-24.

Schneider, J.P. (2000a). Effects of cybersex addiction on the family: Results of a survey. *Sexual Addiction & Compulsivity*, 7, 31–58.

Schneider, J.P. (2000b). A qualitative study of cybersex participants: Gender differences, recovery issues, and implications for therapists. *Sexual Addiction & Compulsivity: The Journal of Treatment and Prevention*, *7*(4), 249-278.

Short, M.B., Wetterneck, C.T., Bistricky, S.L., Shutter, T., & Chase, T.E. (2016). Clinicians’ Beliefs, Observations, and Treatment Effectiveness Regarding Clients’ Sexual Addiction and Internet Pornography Use. *Community mental health journal*, *52*(8), 1070-1081.

Skegg, K., Nada-Raja, S., Dickson, N., & Paul, C. (2010). Perceived “out of control” sexual behavior in a cohort of young adults from the Dunedin Multidisciplinary Health and Development Study. *Archives of Sexual Behavior*, *39*(4), 968-978.

Sniewski, Farvid & Carter, 2017 Sniewski, L., Farvid, P., & Carter, P. (2017). The assessment and treatment of adult heterosexual men with self-perceived problematic pornography use: A review. *Addictive behaviors*.

Sutton, K.S., Stratton, N., Pytyck, J., Kolla, N.J., & Cantor, J.M. (2015). Patient characteristics by type of hypersexuality referral: A quantitative chart review of 115 consecutive male cases. *Journal of sex & marital therapy*, *41*(6), 563-580.

Svedin, C.G., Åkerman, I., & Priebe, G. (2011). Frequent users of pornography. A population based epidemiological study of Swedish male adolescents. *Journal of adolescence*, *34*(4), 779-788.

Twohig, M.P., Crosby, J.M., & Cox, J.M. (2009). Viewing Internet pornography: For whom is it problematic, how, and why? *Sexual Addiction & Compulsivity*, *16*(4), 253-266.

Twohig, M.P., & Crosby, J.M. (2010). Acceptance and commitment therapy as a treatment for problematic internet pornography viewing. *Behavior Therapy*, *41*(3), 285-295.

Voros, F. (2009). The invention of addiction to pornography. *Sexologies*, *18*(4), 243-246.

Vrana, S.R., Spence, E.L., & Lang, P.J. (1988). The startle probe response: a new measure of emotion? *Journal of abnormal psychology*, *97*(4), 487.

Walton, M. T., Cantor, J. M., Bhullar, N., & Lykins, A. D. (2017). Hypersexuality: A critical review and introduction to the “sexhavior cycle”. *Archives of Sexual Behavior*, *46*(8), 2231-2251.

Walton, M.T., Lykins, A.D., & Bhullar, N. (2016). Sexual arousal and sexual activity frequency: Implications for understanding hypersexuality [Letter to the Editor]. *Archives of Sexual Behavior*, 45, 777–782.

Wehrum, S., Klucken, T., Kagerer, S., Walter, B., Hermann, A., Vaitl, D., et al. (2013). Gender commonalities and differences in the neural processing of visual sexual stimuli. *Journal of Sexual Medicine,* 10, 1328–1342.

Weinberg, A., & Hajcak, G. (2010). Beyond good and evil: The time-course of neural activity elicited by specific picture content. *Emotion*, *10*(6), 767.

Wéry, A., Burnay, J., Karila, L., & Billieux, J. (2016). The Short French Internet Addiction Test adapted to online sexual activities: Validation and links with online sexual preferences and addiction symptoms. *The Journal of Sex Research*, *53*(6), 701-710.

Wéry, A., Schimmenti, A., Karila, L., & Billieux, J. (2018). Where the mind cannot dare: A case of addictive use of online pornography and its relationship with childhood trauma. *Journal of sex & marital therapy*, 1-14.

Wilson, G. (2014). *Your brain on porn: Internet pornography and the emerging science of addiction*. Richmond, VA: Commonwealth Publishing.

Winters, J., Christoff, K., & Gorzalka, B.B. (2010). Dysregulated sexuality and high sexual desire: Distinct constructs?. *Archives of Sexual Behavior*, *39*(5), 1029-1043.

World Health Organisation (2018). ICD-11 beta draft. (Mortality and Morbidity Statistics). https://icd.who.int/dev11/l-m/en#/http%3a%2f%2fid.who.int%2ficd%2fentity%2f1630268048 (accessed January 17, 2018).

Ybarra, M.L., & Mitchell, K.J. (2005). Exposure to Internet pornography among children and adolescents: A national survey. *Cyberpsychology & behavior*, *8*(5), 473-486.

Yin, R.K. (2009). *Case Study Research, Design & Methods 4th ed*. Sage: London.

Yoder, V. C., Virden III, T. B., & Amin, K. (2005). Internet pornography and loneliness: An association?. *Sexual addiction & compulsivity*, 12(1), 19-44.

Young, K. (2007). Cognitive behavior therapy with Internet addicts: Treatment outcomes and implications. *Cyberpsychology & Behavior: The Impact of the Internet, Multimedia and Virtual Reality on Behavior and Society*, 10(5), 671–679.

Zitzman, S., & Butler, M. (2005). Attachment, addiction, and recovery: Conjoint marital therapy for recovery from a sexual addiction. *Sexual Addiction & Compulsivity*, 12(4), 311–337.

Zitzman, S.T., & Butler, M.H. (2009). Wives' experience of husbands' pornography use and concomitant deception as an attachment threat in the adult pair-bond relationship. *Sexual Addiction & Compulsivity*, *16*(3), 210-240.

