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Problematic cybersex: Conceptualization, assessment, and treatment

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HIGHLIGHTS

- A systematic review examined conceptualization, assessment, and treatment of cybersex is realized.
- There is no consensus in the literature regarding the conceptualization and labeling of problematic cybersex.
- Only a few validated questionnaires are available to measure problematic cybersex.
- Evidence regarding treatment options and efficacy is lacking.

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ABSTRACT

Problematic involvement in cybersex is generally considered to be an excessive and uncontrolled use of online sexual activities associated with tangible negative outcomes and functional impairment. To date, there is no consensus in the literature regarding the conceptualization and labeling of this disorder, or of its diagnosis and assessment (e.g., screening questionnaires and diagnostic criteria). Through a systematic examination of the literature, we emphasize that problematic cybersex is an umbrella construct that regroups various types of distinct dysfunctional online behaviors. Despite a considerable increase in studies on problematic cybersex, no clear diagnostic guidelines exist for clinicians and researchers. Moreover, the factors involved in the development and maintenance of the disorder remain poorly examined, and the evidence regarding valid assessment and treatment are lacking.

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1. Introduction

Since the appearance of cybersex, the use of online sexual activities has drastically increased, with 13% of the terms entered in Internet search engines being sex related (Ogas & Gaddam, 2011). Moreover, existing studies show that between 33% and 75% of community members have reported the use of cybersex (Albright, 2008; Cooper, Månsson, Daneback, Tikkanen, & Ross, 2003; Goodson, McCormick, & Evans, 2001; Shaughnessy, Byers, & Walsh, 2011). Cybersex corresponds to the use of the Internet to engage in sexually gratifying activities (Cooper, Delmonico, Griffin-Shelley, & Mathy, 2004). It comprises a variety of activities, including watching pornography, engaging in sex chats, using sex webcams, searching for sexual partners, or engaging in 3D sexual role playing (Cooper et al., 2004; Döring, 2009; Wéry, Karila, De Sutter, & Billieux, 2014). Among these, the most popular activity is watching pornography, especially for men (Fisher & Barak, 2001; Janssen, Carpenter, & Graham, 2003; Ross,

Månsson, & Daneback, 2012), with an infinite number of sexual scenarios immediately accessible (Riemersma & Sytsma, 2013). The ubiquity of Internet sexuality has been related to its low cost and easy access, as well as the almost infinite variety of sexual activities and content available online (Beyens & Eggermont, 2014; Cooper et al., 2004; Rosenberg & Kraus, 2014). Another reason for the attractiveness of cybersex is the fact that the Internet provides a secure space for engaging in sexual experiences without individuals being faced with the risks associated with offline sexuality (e.g., sexually transmissible infections; Griffiths, 2012). According to Cooper, Scherer, Boies, and Gordon (1999), the specific structural characteristics of the Internet contribute to the appealing nature of cybersex. Such a view is summarized in the Triple A model that emphasizes the importance of three specific characteristics: *accessibility* (millions of sexual sites constantly accessible), *affordability* (free or low prices on sexual sites), and *anonymity* (the online user is not physically seen and may consider himself as undetectable to others).

In most cases, cybersex is unproblematic and not associated with negative consequences (e.g. social, personal; Albright, 2008; Ballester-Arnal, Castro-Calvo, Gil-Llario, & Giménez-García, 2014). Nevertheless, for a small but significant subgroup of individuals, cybersex can become excessive and affects several facets of their lives (Cooper

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et al., 2004; Grov, Gillespie, Royce, & Lever, 2011; Philaretou, Mahfouz, & Allen, 2005). Although it is now acknowledged that excessive involvement in cybersex can become dysfunctional and associated with addiction symptoms (e.g., loss of control, mood regulation), no consensus exists regarding its conceptualization and diagnosis. For instance, numerous terms have been used to describe the phenomenon (e.g., Internet sex addiction, problematic cybersex, compulsive cybersex).

Faced with this conceptual chaos, our aim is to provide an overview of current knowledge about problematic cybersex or “cybersexual addiction,” more precisely, to synthesize the available data regarding (1) its conceptualization and etiology, (2) its assessment and related validated screening questionnaires, and (3) the existing treatment options and their efficacy. To reach this objective, we performed a systematic literature review on two representative databases (Scopus, PsycINFO). First, the terms “Internet sexual addiction,” “online sex addiction,” “cybersexual addiction,” “compulsive online pornography,” and “compulsive cybersex” were used to identify relevant studies in order to address the questions related to the conceptualization, prevalence, and etiology of the condition. Second, the terms “cybersex,” OR “online sexual activity,” OR “online pornography,” OR “Internet pornography” AND “Assessment” were used to identify relevant studies in order to address the questions related to assessment and available screening questionnaires. Third, the terms “cybersex,” OR “online sexual activity,” OR “online pornography,” OR “Internet pornography” AND “treatment” were used to identify relevant studies in order to address the questions related to treatment options and efficacy. Other articles identified in the reference lists of the articles selected through the systematic literature search were also considered when relevant.

The selection criteria of the systematic literature search were as follows: (1) articles published in a peer-reviewed journal; (2) articles focusing specifically on cybersex and/or Internet pornography consumption in adult or adolescent samples; (3) articles specifically focusing on dysfunctional cybersex (accordingly, articles focusing on other topics such as Internet infidelity, paraphilia, or offline hypersexuality, along with articles focusing on broader concepts such as “Internet” or “behavioral” addictions were not retained); and (4) articles written in English or French (the languages known by the authors). Eventually, articles that treated cybersex and/or Internet pornography consumption as a consequence of a disease (e.g., Parkinson) were excluded.

The systematic literature search conducted led to the identification of 1432 potentially relevant articles. More precisely, the first literature search (conceptualization and etiology) yielded 859 articles, the second literature search (assessment) 251 articles, and the third literature search (treatment) 308 articles. All articles were screened from their abstracts to determine whether they matched the selection criteria. On this basis, 155 articles were retained and read in their entirety. Relevant articles were then selected and included in the current review to address the three above-mentioned objectives.

2. Conceptualization and diagnostic criteria

From the existing literature, it appears that no real consensus exists regarding the conceptualization and diagnosis of problematic cybersex. In fact, it appears that several conceptualizations have been proposed, yet little empirical evidence regarding their validity is available. Dysfunctional involvement in cybersex was most often conceptualized as a “behavioral” addiction (Cooper et al., 2004; Orzack & Ross, 2000), similar to gambling disorder or other excessive online activities (e.g., excessive video game use). This was mainly because excessive use of cybersex presents symptoms that are similar to those of other addictive disorders. Problematic cybersex is generally defined as an uncontrolled and excessive involvement in online sexual activities associated with the following symptoms: a persistent desire or unsuccessful efforts to stop, reduce, or control cybersexual behaviors; cognitive salience (persistent and intrusive cybersex-related thoughts and

obsessions); using cybersexual behavior for mood regulation purposes; withdrawal (occurrence of negative mood states when cybersex is unavailable); tolerance (need for more hours of use or for new sexual content); and negative consequences (Carnes, 2000; Grov et al., 2008).

Given the absence of recognized criteria to diagnose dysfunctional cybersex, some studies relied on the criteria that have been formulated to define sexual addiction or hypersexual disorder. Three proposed sets of criteria could be identified in the literature, namely, those formulated by Carnes (1991); Goodman (1998), and, more recently, Kafka (2010, 2013). As shown in Table 1, only three criteria are shared by the various existing conceptualizations, namely, loss of control, excessive time dedicated to sexual behaviors, and significant negative consequences in daily life. In contrast, important discrepancies exist among the other proposed criteria (see Table 1). Despite similarities among the various proposed conceptualizations (for sexual and cybersexual behaviors), no clear and validated diagnostic guidelines exist for clinicians and researchers. Indeed, because of the inconsistencies in classification, especially the limited evidence regarding the etiology of the condition, none of the proposed sets of criteria were retained for potential inclusion in the *Diagnostic and Statistical Manual of Mental Disorders*, 5th edition (American Psychiatric Association, 2013), as a diagnostic or even a tentative condition in Section 3 of the manual, which groups conditions requiring further research before definitive inclusion.

The various conceptualizations proposed to define “sexual addiction” or “hypersexual disorder” had only limited influence in the field of dysfunctional cybersex research and these conceptualizations are rarely cited in related studies. Indeed, among the articles retained for the current review ($N = 155$), Carnes' criteria were cited four times, Goodman's criteria three times, and Kafka's criteria two times. In fact, empirically derived criteria are lacking that can take into account the unique factors that characterize excessive involvement in online (versus offline) sexual behaviors. Such an approach is required, as most online sexual activities have no equivalent offline activities (e.g., interactive sex chat or sex webcams, 3-D sexual role-playing games). In this vein, Chaney and Dew (2003) have emphasized, through a qualitative study conducted with excessive Internet pornography users, the relevance of phenomena that are not incorporated into existing conceptualizations of offline sexual addiction or hypersexual disorder. In particular, this qualitative study emphasized the presence of an *online dissociation* (defined as being mentally and emotionally detached when engaged in online sexuality and associated with compromised time control and depersonalization), a phenomenon that has also been described in relation to other online activities (Schimmenti & Caretti, 2010). Such types of evidence are in accordance with the position that cybersexual addiction could probably be related to both Internet addiction and sexual addiction (Griffiths, 2012).

Researchers and clinicians are thus faced with the challenge of identifying individuals experiencing psychological distress and/or functional impairment because of their dysfunctional use of online sex while the condition is not recognized as an actual disorder. As an illustration,

Table 1
Synthesis of Carnes' (1991); Goodman's (1998), and Kafka's (2013) diagnostic criteria.

Criteria	Carnes (1991)	Goodman (1998)	Kafka (2013)
1. Loss of control	✓	✓	✓
2. Excessive time spent on SBs	✓	✓	✓
3. Negative consequences to self/others	✓	✓	✓
4. Escape	✓	□	✓
5. Tolerance	✓	✓	□
6. Mood changes	✓	□	□
7. Tension prior to SBs	□	✓	□
8. Pleasure/relief during SBs	□	✓	□
9. Preoccupations	□	✓	□
10. Withdrawal	□	✓	□
11. SBs not due to a substance	□	□	✓
12. At least 18 years old	□	□	✓

Note: SBs = sexual behaviors.

Grubbs, Stauner, Exline, Pargament, and Lindberg (2015) have recently emphasized that a subgroup of Internet pornography users, characterized by (1) compulsive and uncontrolled involvement in online pornography, (2) continuous use despite negative outcomes, and (3) emotional distress (e.g., guilt, shame, regret) related to their consumption of pornography, more often perceived themselves as "Internet porn addicts" and experienced frequent psychopathological symptoms (e.g., anxiety, depression), independently of the average daily time spent in cybersex-related activities.

2.1. Epidemiology

Some studies were conducted to determine the prevalence of problematic cybersex in self-selected sample surveyed online. In 2002, Cooper, Morahan-Martin, Mathy, & Maheu, identified a prevalence of 9.6% on the basis of excessive time spent online and self-reported concerns about cybersex. In 2006, Daneback, Ross, and Månsson reported a prevalence rate of problematic cybersex of 5.6% from the Sexual Compulsivity Scale (Kalichman & Rompa, 1995). More recently, on the basis of five items evaluating control, dysphoria, feeling addicted, and feeling the need for treatment, Ross et al. (2012) found a prevalence of 4.9% in women and 12.9% in men for some Internet sexual problems (using a cutoff score of ≥ 2) and a prevalence of 1.8% of women and 4.9% of men for serious Internet sexual problems (using a cutoff score of ≤ 4). Finally, Rosser, Noor, and Iantaffi (2014) found that 7% of individuals in a sample of men who have sex with men are characterized by obsessions and lack of control regarding their sexually explicit media consumption. An important limitation of the current studies, with the notable exception of the one conducted by Ross et al. (2012), is that they have not taken into account the different types of online sexual activities. For example, it has been shown that watching pornography is the sexual activity most highly correlated with negative outcomes and addiction symptoms (Ross et al., 2012; Wéry, Burnay, Karila, & Billieux, 2015). Accordingly, this finding indicates that studies should be conducted by using comparable screening tools and by considering the type of online activities that people are involved in.

Epidemiological and quasi-epidemiological studies also emphasized that problematic cybersex is often associated with depression, anxiety, relational/intimacy difficulties (Corley & Hook, 2012; Levin, Lillis, & Hayes, 2012; Morgan, 2011; Philaretou et al., 2005; Voon et al., 2014), professional and financial problems (Schneider, 2000; Voon et al., 2014), interpersonal isolation (Levin et al., 2012; Yoder, Virden, & Amin, 2005), a decrease of sexual satisfaction (Stack, Wasserman, & Kern, 2004), a decrease of interest in offline sexuality (Albright, 2008; Voon et al., 2014; Young, 2007), diminished erectile function in physical relationships (Voon et al., 2014), risky sexual behaviors (Carroll et al., 2008; Häggström-Nordin, Hanson, & Tyden, 2005; Peter & Valkenburg, 2008), and feelings of shame or guilt (McBride, Reece, & Sanders, 2007). Existing studies thus stressed that problematic cybersex is often comorbid with other psychiatric disorders and is related to negative outcomes and functional impairment (e.g., intimacy and sexual problems, professional and financial difficulties).

A consequence of the lack of recognized criteria to define dysfunctional cybersex is the absence of valid prevalence data. Thus, it is impossible to compare the results obtained in the few available studies because of theoretical and methodological discrepancies among them, for example, regarding the diagnostic criteria or screening instruments used (Griffiths, 2012; Karila et al., 2014; Wéry et al., 2014). It is also worth noting that most existing studies were conducted on convenience or very specific samples (e.g., men who have sex with men), which precludes their generalization.

2.2. Profile of dysfunctional cybersex users

Most available studies showed that problematic use of cybersex is three to five times more frequent in men than in women

(Ballester-Arnal et al., 2014; Carnes, 2000; Ross et al., 2012). Gender was also related to the type of online sexual activities favored, as women seem to be more interested in partnered activities (e.g., sexual chat), whereas men are prone to favoring solitary activities (e.g., pornography; Green, Carnes, Carnes, & Weinman, 2012; Cooper et al., 2003; Schneider, 2000). In another study, Wetterneck, Burgess, Short, Smith, and Cervantes (2012) found that men spend more time than women on Internet pornography per week and are characterized by more impulsive and compulsive usage patterns. This study also highlighted that men reported both more positive (e.g., "pornography has added something positive to my sex life") and more negative (e.g., "pornography has added something negative to my sex life") outcomes associated with use of Internet pornography. Similarly, Weinstein, Zolek, Babkin, Cohen, and Lejoyeux (2015) found that men reported a higher frequency of cybersex use and heightened self-reported craving for consuming pornography. Higher education was also associated with problematic cybersex (Cooper et al., 1999; Daneback, Ross, & Månsson, 2006; Ross et al., 2012). However, it is likely that this finding partly resulted from past studies that frequently surveyed self-selected undergraduate students or people interested in scientific research, or perhaps reflected increased Internet availability in higher educated persons, which raised doubts regarding the generalizability of these findings. Eventually, it was shown that individuals displaying problematic cybersex are frequently in a stable relationship (Cooper et al., 1999; Daneback et al., 2006). These findings have, however, recently been nuanced. First, Ballester-Arnal et al. (2014) showed that men involved in a stable relationship tend to be recreational cybersex users, whereas addictive use was more frequent for single men. Second, Sun, Bridges, Johnason, and Ezzel (2014) emphasized that men who reported being in a stable relationship reported significantly less frequent use of pornography than did single men.

2.3. Risk factors

Most available studies that investigated the correlates of problematic cybersex restricted their analysis to socio-demographics and comorbid psychopathology, and the quantity of published studies that have focused on other types of risk factors (e.g., social, biological, psychological, contextual) is currently limited. Most of these studies have explored the relationships between psychological factors and symptoms of cybersex addictions.

Several studies have investigated the motives to engage in cybersexual behaviors. In one such study, Cooper et al. (2004) investigated motives for using cybersex and showed that recreational users were involved in cybersex especially for sexual arousal, to relax/as a distraction, or for educational reasons, whereas problematic users were involved in cybersex to decrease stress, to regulate emotions, and to compensate for unfulfilled sexual fantasies in real life. These findings highlight that problematic cybersex might reflect a mood regulation strategy (i.e., to reduce aversive thoughts, feelings, or sensations), and not necessarily be an addiction per se. This hypothesis is in accordance with the numerous studies showing that a wide range of activities incorporated in addictive disorders are actually displayed as a way to regulate negative moods (Billieux, Gay, Rochat, & Van der Linden, 2010; Deleuze et al., 2015; Selby, Anestis, & Joiner, 2008). More recently, Ross et al. (2012) showed that being characterized as someone with a special interest in pornography that was available only online, searching for relaxation, and searching for sexual satisfaction were the motives mostly associated with problematic cybersex. These results strengthen initial findings obtained by Cooper et al. (2004) regarding the mood regulation function of cybersex, but also highlight that online sexual activities allow access to a large amount of sexual content, including "uncommon" (e.g., group sex, teen) and/or paraphilic content. According to existing preliminary studies, it seems that the motives for engaging in cybersexual activities are important predictors of its dysfunctional use, and further (longitudinal) studies should be conducted

to better understand the role of these motives in the etiology and course of dysfunctional cybersex.

Another topic that received much interest in relation to problematic cybersex is the role of past traumatic or negative life events. For example, Schwartz and Southern (2000) described a sample of 40 clinical cybersex users, among whom the prevalence of past sexual abuse was 68% and the prevalence of post-traumatic stress disorder 43%. More recently, Kor et al. (2014) found that problematic pornography use was associated with higher levels of emotional insecurities, either attachment anxiety or avoidance, and more history of traumatic events. These initial findings were corroborated by recent studies, which found associations between sexual addiction symptoms (not restricted to cybersex) and a history of sexual abuse (Ferree, 2003; Giugliano, 2006; Perera, Reece, Monahan, Billingham, & Finn, 2009), as well as with insecure attachment styles, which is a common consequence of trauma and abuse (Cassidy & Mohr, 2001). It is worth noting that both trauma history and insecure attachment were also related to excessive involvement in online activities in general, i.e., not necessarily sexual online activities (Schimmenti, Guglielmucci, Barbasio, & Granieri, 2012; Schimmenti, Passanisi, Gervasi, Manzella, & Famà, 2013; Schimmenti et al., 2015). Such findings are in accordance with the position, discussed earlier, that overinvolvement in online activities can serve to dissociate one from an unbearable real-life situation (Billieux, Schimmenti, Khazaal, Maurage, & Heeren, 2015; Schimmenti & Caretti, 2010).

Some studies also explored the role of sexual factors in problematic cybersex. Brand et al. (2011) reported an association between sexual arousal ratings during the viewing of Internet pornographic cues and self-reported cybersex addiction symptoms. In another study, Laier, Pawlikowski, Pekal, Schulte, and Brand (2013) emphasized that, in a sample of heterosexual men, problematic cybersex is associated with greater sexual arousal, craving, and compulsive masturbation resulting from exposure to pornographic cues. Similarly, Laier, Pekal, and Brand (2014) emphasized that women Internet pornography users were more prone to becoming sexually aroused and reported greater craving from pornographic picture presentation than did non-users. Along the same line, Snagowski, Wegmann, Pekal, Laier, and Brand (2015) found that individuals who displayed positive implicit associations (assessed with an implicit association test; see Greenwald, McGhee, & Schwartz, 1998) between pornographic pictures and positive emotions and who reported high subjective craving toward online pornography use are characterized by more cybersex addiction symptoms. In another recent study, Voon et al. (2014) emphasized that men with compulsive sexual behaviors reported heightened subjective sexual desire when faced with explicit sexual cues and that this self-reported degree of subjective sexual arousal is associated with activity of the dorsal anterior cingulate-ventral striatum-amygdala network. These types of data are in accordance with the gratification hypothesis of problematic cybersex, which states that positive reinforcement associated with cybersex transfers to the development of heightened cue reactivity and craving. Nevertheless, Voon et al. (2014) also demonstrated in their study that compulsive sexual behaviors are not related to greater self-reported liking regarding the explicit sexual stimuli presented, which is not entirely consistent with the findings of Snagowski et al. (2015) and could suggest that increased liking (versus wanting) of cybersex material is present in non-problematic users but not in problematic users. These findings are in accordance with the view that in addictive disorders, the positive value associated with a specific behavior (and its related cues) diminishes when it becomes problematic and associated with negative outcomes and functional impairment (Robinson, Robson, & Berridge, 2013).

In light of the limited evidence currently available, studies need to be conducted to better understand the psychological factors involved in the etiology of problematic cybersex, as well as to extend the factors being investigated. For example, current models have emphasized the importance of self-regulation deficits in the development, perpetuation, and relapse of Internet-related disorders (Billieux & Van der Linden,

2012; Brand, Young, & Laier, 2014; Dong & Potenza, 2014). These models are, however, inspired by research conducted on other types of online activities, mainly online gaming disorders. Thus, the relationship between self-regulation and problematic cybersex has received little attention to date, yet in some studies (Reid, Cyders, Moghaddam, & Fong, 2014; Reid, Dhuffar, Parhami, & Fong, 2012), 48% to 55.3% of hypersexual patients are characterized by a high level of impulsivity. In contrast, Wetterneck et al. (2012) found no significant differences between problematic and non-problematic pornography users in impulsivity. Future studies should thus investigate self-regulation in “addicted” cybersex users by means of laboratory tasks measuring inhibitory control and decision-making. These types of data are required to consolidate the assumption that problematic cybersex can, under certain circumstances, be considered as an addictive disorder.

3. Assessment

Several scales are available for researchers and clinicians who need to assess sexual addiction or hypersexuality (see Karila et al., 2014). Yet, to date, only a few validated instruments exist to measure dysfunctional use of cybersex and Internet pornography consumption. Of importance, our literature review revealed that studies focusing on online sexual activities often rely on instruments that were designed to measure excessive sexual behaviors in general, i.e., not online. As previously explained, this is problematic, as those scales are likely to fail in capturing unique aspects of several online sex specificities (e.g., in relation to activities that are not available offline, such as interactive webcams/chat or 3D sexual video games) or symptoms (e.g., the dissociation that can occur through the immersion in online/virtual worlds). Through the systematic review process conducted, we identified three validated scales dedicated to the measurement of problematic involvement in cybersex and five validated scales developed to measure pornography use (see Table 2). We decided to retain the three scales that were developed to measure problematic pornography use, even if they do not specifically refer to *online pornography*, as a large majority of participants used online pornography (e.g., 99% in the study of Kraus & Rosenberg, 2014).

Most of these scales have been validated recently (four in 2014 and two in 2015); therefore, they have not yet been incorporated into many published studies. Moreover, existing scales have important psychometrical limitations (see Table 2 for details). This prompts the performance of further studies to refine and improve existing tools and to develop new instruments (e.g., to have instruments able to take into account the specificities of the various types of online sexual activities).

Among the available questionnaires, one of the most used is the Internet Sex Screening Test (ISST; Delmonico & Miller, 2003). This instrument was the first to be created to specifically evaluate problematic online sexual behavior. The ISST is a 25-item scale designed to assess five distinct dimensions by using dichotomic (yes/no) items: online sexual compulsivity (i.e., online sexual problems), online sexual behavior-social (i.e., engage in interpersonal interactions with others during online sexual behavior), online sexual behavior-isolated (i.e., engage in solitary online sexual behavior), online sexual spending (i.e., purchase sexual material and/or join sex-related groups or websites), and interest in online sexual behavior (i.e., use the computer for sexual pursuits). Despite our systematic literature search revealing that this questionnaire is currently the most used (seven studies using this questionnaire were identified), no validation study of this questionnaire is available, implying that any conclusion can be made regarding the validity and reliability of this scale. Among the three identified scales dedicated to measuring problematic involvement in cybersex, the Short Internet Addiction Test adapted to Online Sexual Activities (s-IAT-sex; Wéry et al., 2015) presented the most convincing psychometric properties, supported by elevated internal consistency and a factorial structure established by relying on confirmatory factorial analyses (which is not

Table 2

Existing measures of problematic use of cybersex/pornography.

Instrument	Author(s)	Subjects	Items	Factor(s)	Validation technique	Limits
Internet Sex Screening Test (ISST)	Delmonico and Miller (2003)	Community members Heterosexual men and women, gay men N = 6088	25-item dichotomous	Online sexual compulsivity; Online sexual behavior-social; Online sexual behavior-isolated; Online sexual spending; Interest in online sexual behavior	Internal consistency: α ranged from .51 to .86	Low to moderate internal consistency Factor analyses not reported No validated cutoff score No validation study available
Cyber-Pornography Use Inventory (CPUI)	Grubbs, Sessoms, Wheeler, and Volk (2010)	College students N = 145	31-item Likert (7 point and 5 point)	Addictive patterns; Guilt regarding online pornography use; Online sexual behavior-social	Internal consistency: α ranged from .83 to .89 Principal components analysis	Small and non-representative sample No validated cutoff score No confirmatory factor analysis available
Compulsive Internet Use Scale (CIUS) adapted to Sexually Explicit Media	Downing, Antebi, and Schrimshaw (2014)	Men who have sex with men N = 265	13-item Likert (5 point)	Unique factor of problem use	Internal consistency: $\alpha = .92$ Principal components analysis, exploratory and confirmatory analyses	Relatively small and non-representative sample No validated cutoff score
Pornography Craving Questionnaire (PCQ)	Kraus and Rosenberg (2014)	Heterosexual men, and men who have sex with men N = 109 (study 1) N = 221 (study 2) N = 44 (study 3)	12-item Likert (7 point)	Unique factor of problem use	Internal consistency: $\alpha = .91$ Principal components analysis	Small and non-representative sample No validated cutoff score No confirmatory factor analysis available
Compulsive Pornography Consumption (CPC)	Noor, Rosser, and Erickson (2014)	Men who have sex with men N = 240 (study 1) N = 1165 (study 2)	5-item Likert (7 point)	Intrusive thoughts; Lack of control	Internal consistency: $\alpha = .85$ Exploratory and confirmatory factor analyses	Non-representative sample No validated cutoff score
Problematic Pornography Use Scale (PPUS)	Kor et al. (2014)	Men and women N = 333 (study 1) N = 300 (study 2) N = 1720 (study 3)	12-item Likert (6 point)	Distress and functional problems; Excessive use; Control difficulties; Use for escape/avoidance of negative emotions	Internal consistency: α ranged from .79 to .92 Principal components analysis and confirmatory factor analysis	No validated cutoff score
Cyber-Pornography Use Inventory-9 (CPUI-9)	Grubbs, Volk, Exline, and Pargament (2015)	College students Men and women Clinical sample N = 269 (study 1) N = 214 (study 2) N = 152 (study 3)	9-item Likert (7 point)	Access efforts; Compulsivity; Emotional distress	Internal consistency: α ranged from .75 to .85 Exploratory and confirmatory factor analyses	Relatively small sample No validated cutoff score
Short Internet Addiction Test adapted to Online Sexual Activities (s-IAT-sex)	Wéry et al. (2015) for the French version ^a	Heterosexual men, and men who have sex with men N = 401	12-item Likert (5 point)	Loss of control/time management; Craving/social problems	Internal consistency: α ranged from .76 to .87 Confirmatory factor analyses	Relatively small and non-representative sample No validated cutoff score

^a Note: The original (German) version of the s-IAT-sex was created by Laier et al. (2013), but the authors had not explored the factorial structure of the s-IAT-sex.

the case for all the other available questionnaires). This short scale is a 12-item questionnaire that measures two dimensions of problematic use of cybersex. Each item is assessed on a 5-point Likert scale, allowing dimensional answers. The first factor regroups loss of control and time management, and it assesses symptoms involving the failure to control or reduce the amount of time spent online. The second factor regroups craving and social problems, and it measures functional impairment associated with cybersex use. However, the validation of this scale is currently restricted to men, and the relevance of the two factors should be confirmed in further studies. Of the five scales developed to measure problematic pornography use, only two were identified as presenting convincing psychometric properties reflected by good reliability and validation established through the use of confirmatory factor analyses techniques. First, the Problematic Pornography Use Scale (PPUS; Kor et al., 2014), a 12-item scale on a 6-point Likert scale, allows evaluation of

four facets of problematic pornography use. The constructs measured by the PPUS are as follows: (1) distress and functional problems, (2) excessive use, (3) control difficulties, and (4) use for escape/avoidance of negative emotions. Second, the Cyber-Pornography Use Inventory-9 (CPUI-9; Grubbs, Volk, Exline, & Pargament, 2015) is a 9-item scale evaluating three dimensions on a 7-point Likert scale. The three dimensions measured are as follows: (1) access efforts, (2) perceived compulsivity, and (3) emotional distress.

4. Treatment

Only few empirical evidences are available on the treatment options and efficacy of problematic cybersex. This is in part because of the haziness regarding the conceptualization, symptoms, and causes of the condition. Some authors proposed that an integrative approach, combining

psychosocial, cognitive-behavioral, psychodynamic, and pharmacologic methods, is most efficient in the treatment of sexual addiction (Klontz, Garos, & Klontz, 2005; Orzack, Voluse, Wolf, & Hennen, 2006; Wan, Finlayson, & Rowles, 2000). However, such a mixed and non-specific approach reflects the lack of knowledge about the etiology and course of the disorder. In fact, currently, few empirical studies have been reported that tested the efficacy of specific empirically based treatments, as most of the existing literature consists of descriptions of clinical experiences and practices (e.g., from clinicians faced with these disorders; Carnes, 2001; Delmonico, 2002), case studies (Bhatia, Jhanjee, & Kumar, 2012; Orzack & Ross, 2000), or studies involving samples of individuals characterized by mixed offline and online problematic behaviors (Raymond & Grant, 2010).

From the systematic literature search performed, we identified only three published empirical studies that tested treatment programs specifically for cybersex/Internet pornography and that provided a sufficient description of the interventions and measures used (see Table 3). In the first study, Orzack et al. (2006) demonstrated that participating in cognitive and behavioral group therapy of 16 sessions (including motivational interview techniques and elements of psychoeducation) allowed a decrease of depressive symptoms and an increase in quality of life in individuals presenting dysfunctional cybersex, yet their cybersex-related behaviors remained unchanged. The authors speculated that this absence of change in cybersexual behavior is due to the insufficiently inclusive scale used to evaluate changes. Indeed, some participants spend the same time online, but used the Internet in a more adaptive manner after treatment. In the second study conducted on problematic Internet pornography users, Acceptance and Commitment Therapy that was based on eight sessions was found to reduce online pornography use and related obsessions/compulsions and to increase the quality of life (Twohig & Crosby, 2010). In the third study, Hardy, Ruchty, Hull, and Hyde (2010) showed that a 10-session-based, online-delivered psychoeducation intervention was useful in decreasing both pornography use and excessive masturbation. In addition, the intervention was related to improved management of temptation/

craving, increased positive affect, increased perceived self-control, greater ability to be in a relationship, less culpability, reduced obsessive sexual thoughts, reduced negative affect, and reduced denial of the problematic nature of their cybersex use.

The literature review conducted identified only three empirical studies, which differed considerably in terms of methodology and outcomes, and none of them consisted of randomized and controlled trials. Moreover, besides the study by Twohig and Crosby (2010), the two other studies described did not involve follow-up measures, which precludes making any firm conclusions regarding their findings. On the whole, this means that the available evidence regarding the treatment options and efficacy for problematic online sex is scarce.

5. Conclusion

Problematic cybersex has emerged since the development of the Internet and related technological advancements. In the current systematic review, we emphasized that cybersexual problematic use is a heterogeneous disorder that regroups various types of online sexual behaviors and that no consensus exists regarding their conceptualization. In addition, only a few validated questionnaires are available to measure problematic online sex, and they do not proposed empirically derived cutoffs to distinguish problematic from non-problematic users. As a consequence of these theoretical and methodological issues, sound epidemiological studies are not available. Moreover, the lack of a longitudinal study hinders any conclusion regarding the course of the condition. Finally, evidence regarding treatment options and efficacy is lacking.

In such a context, several avenues for future research have to be considered. At the conceptual level, a more systematic exploration of the phenomenology of problematic online sex use would be necessary to better account for the uniqueness of this disorder (e.g., in comparison with offline sexual addiction or hypersexuality). Another fruitful technique to improve the conceptualization of the disorder would be to conduct a Delphi study, which is a systematic way of determining expert

Table 3
Therapy interventions.

Authors	Treatment type	Sample and study design	Results
Orzack et al. (2006)	Group therapy, including: Psychoeducation Motivational interview techniques and change training Cognitive-behavioral techniques	Sample: 35 men involved in problematic cybersex Format: 16 group sessions (once a week) No randomized and controlled trials	Increase in quality of life Decrease in depressive symptoms No change in problematic use of cybersex
Twohig and Crosby (2010)	Individual session of Acceptance and Commitment Therapy (ACT), including: Acceptance Defusion Self as a context Being present Values Committed action	Sample: 6 men involved in problematic Internet pornography Format: 8 individual sessions (of 1.5 h each) No randomized and controlled trials	5 of the 6 participants had notable reductions in their viewing 4 of the 5 maintained reductions at 3-month follow-up Increase in quality of life Decrease in obsession and compulsion
Hardy et al. (2010)	Online recovery program (based on a cognitive behavioral therapy approach), including: Psychoeducation, exercises, and homework focused on: — Identifying problematic pornography use as a method of dealing with difficulties in one's life — Restructuring maladaptive cognitions related to problematic pornography use — Presenting strategies for emotion regulation — Establishing healthy outlets — Strengthening relationships	Sample: 138 participants (97% men) with problematic use of online pornography and compulsive masturbation Format: 10 psychoeducation modules online No randomized and controlled trials	Participants self-report: Decrease in their used of pornography and masturbation More constructive reactions to temptation More positive affect More perceptions of self-control More abilities to be in a relationship Less culpability Less obsessive sexual thoughts Less negative affect Less tendency to deny problematic behaviors

Note : Acceptance = willingness to experience inner experiences and not work to regulate them when useful; Defusion = experiencing inner experiences as they are without additional verbal functions; Self as context = experiencing oneself as the context in which inner experiences occur and not being defined by inner experiences; Being present = noticing inner and outer experiences as they occur, nonjudgmentally; Values = defining areas of life that are important that one is willing to work toward; Committed action = moving in the valued direction.

consensus that is useful for answering questions that are not amenable to experimental and epidemiological approaches (Jorm, 2015). These types of studies are required to approach an international consensus on the conceptualization and assessment of problematic online sex. They will also be useful in providing guidance for conducting treatment studies in more homogeneous samples. Of importance, these studies will have to be conducted while taking into account the various forms of cybersex (e.g., solitary versus partnered activities), which will also allow determination of whether some online sexual activities are more “addictive” than others, and whether specific risk factors can be linked to distinct online sexual activities. Additional research is also needed to disentangle the psychological factors (cognitive, affective, motivational, interpersonal) and the socioenvironmental factors (e.g., cultural, social environment, peer influence, education) involved in the development and maintenance of the various forms of problematic cybersex. For example, as suggested by Laier and Brand (2014), relevant conceptualizations of cybersex-related disorders should conjointly consider both the positive (i.e., sexual gratification) and negative reinforcement value (i.e., reducing aversive emotions or states) of cybersex-related activities. In conclusion, we would like to point out that future studies should consider cybersex as it is, i.e., an ubiquitous behavior in the general population, which is in most cases not associated with functional impairment or tangible negative consequences at the personal, professional, or social levels. Otherwise, this might result in the overpathologization of an unnecessary problematic and potentially transient behavior (Billieux et al., 2015; Konkoly Thege, Woodin, Hodgins, & Williams, 2015).

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Contributors

Aline Wéry performed the literature search. Aline Wéry and Joël Billieux together wrote the manuscript.

Conflicts of interest

None.

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