Abstract

The advent of the internet has added another medium in which people can engage in sexual behaviour. This ranges from the passive consumption of online pornography to the interactive exchange of sexual content in cybersex chat rooms. It is believed that access, affordability and anonymity are critical factors that make the Internet viable for the acquisition, development and maintenance of online sexuality. For some, sexual behaviours online are fulfilling, whereas for others, they may take on addictive qualities. Internet sex addiction can be conceptualized as the intersection between Internet addiction and sex addiction and the current literature suggests that there does not appear a clear dividing line between these psychopathologies. The aim of this paper was to provide a comprehensive overview of the empirical studies that have investigated Internet sex addiction in adults. Based on these, it was concluded that engaging in sexual behaviours on the Internet can go awry and result in Internet sex addiction, as it can lead to a wide variety of negative consequences for the individuals affected. Particular attention is drawn to the implications for future research in order to establish the pathological status of Internet sex addiction as a sub-form of Internet addiction, that shares characteristics of real life sex addiction, but which is not to be equated with it. Accordingly, the need for a clear diagnostic framework to clinically assess Internet sex addiction is emphasized as the first step towards understanding the potentially psychopathological qualities and repercussions of sexual behaviours on the Internet.

Keywords: *Internet sex addiction, cybersex, sexual behaviour, literature review, sexual addiction, empirical research*

Introduction

The advent of the internet has enabled the engagement of a wide variety of potential online sexual behaviours. People can engage in different behaviours that may take on addictive qualities, including, but not restricted to Internet sex. Before initiating an analysis of the empirical knowledge about addictive sexual behaviour on the Internet, it is essential to set a conceptual framework for the latter. Initially. Young (1999) claimed that Internet sex addiction or cybersexual addiction is one of five sub-types of Internet addiction. These are cyber-relationship addiction, net compulsions, information overload, computer addiction and cybersexual addiction. Young (1999) claimed that: (i) *cyber-relationship addiction* is an excessive engagement with relationships online, (ii) *net compulsions* are compulsive behaviours, including, but not restricted to, online stock exchange dealing, online gambling and online shopping, (iii) *information overload* is disproportionate surfing of the web and searching for information online, such as the habitual use of search engines, (iv) *computer addiction* is pathological computer game playing, and (v) *cybersexual addiction* is the excessive use of the Internet for cybersex and cyberpornography.

From a psychopathological perspective, it is essential to understand on what basis cybersexual or Internet sex addiction can be diagnosed. So far, there exists no clear diagnostic category in the international diagnostic manuals, the American Psychiatric Association's (APA) Diagnostic and Statistical Manual of Mental Disorders IV (American Psychiatric Association, 2000) and the World Health Organization's (WHO) International Classification of Diseases 10 (ICD-10; WHO, 1992). However, the APA considers including "hypersexual disorder" in the new version of the DSM-V (American Psychiatric Association, 2010), which approximates to sexual addiction, while heavily relying on criteria for obsessive-compulsive disorders. It includes obsessions in the form of recurrent sexual fantasies and urges, and compulsions in the repeated engagement in sexual behaviours for the purpose of coping, which are continued despite knowledge of their detrimental effects in the addicts' lives.

Goodman (1998) and Orzack and Ross (2000) take an approach that is in line with behavioural addictions in that they include key diagnostic items, such as tolerance and withdrawal, in their conceptualizations. The diagnostic criteria for sexual addiction are presented in the table below.

Table 1: Diagnostic criteria for Sexual Addiction

A maladaptive pattern of sexual behaviour, leading to clinically significant impairment or distress, as manifested by three or more of the following, occurring at any time in the same 12-month period

1) Tolerance

    a) A need for markedly increased amount or intensity of the sexual behaviour to achieve the desired effect

    b) Markedly diminished effect with continued involvement in the sexual behaviour at the same level of intensity

2) Withdrawal

    a) Characteristic psychophysiological withdrawal syndrome of physiologically or psychologically described changes upon discontinuation of sexual behaviour

    b) The same or a closely related sexual behaviour is engaged in to relieve or avoid withdrawal symptoms

3) The sexual behaviour is often engaged in over a longer period, in greater quantity, or at a higher level of intensity than was intended

4) There is a persistent desire or unsuccessful efforts to cut down or control the sexual behaviour

5) A greater deal of time is spent in activities necessary to prepare for the sexual behaviour, to engage in the behaviour, and to recover from its effects

6) Important social, occupational, or recreational activities are given up or reduced because of the sexual behaviour

7) The psychological problem that is likely to have been caused or exacerbated by sexual behaviour continues despite knowledge of its consequences

Based on Goodman (1998)

It appears that the proposed criteria can (hypothetically at the very least) be applied to any sexual behaviour that occurs online, including engaging in interactive cybersex and using cyberporn. Thus, Internet sex addiction may not merely be a sub-form of Internet addiction, but also a sub-form of sex addiction. Therefore, Internet sex addiction represents an intersection between these two potentially pathological types of behaviours.

With regards to the potential sexual usages the Internet can be put to, they do include, but move beyond passive engagements such as downloading and watching pornography. Young (2008) distinguishes between viewing, downloading and trading

online pornography, and taking part in fantasy role-playing rooms for adults and thus implements an interactive element beyond masturbating while consuming pornography on the Internet. This interactive element is what makes the Internet a novel space indispensable for researching pathological online sexual behaviours. Although pornographic images and videos can be accessed offline, sexual interactions within adult chat rooms do not have an equivalent in real (offline) life.

Additionally, Griffiths (2000, 2001) has outlined further potential usages the Internet can be put to with regards to engaging in sexual activities. He supplements those already mentioned with other sexual behaviours related to criminal activities, namely displaying, downloading or distributing illegal material such as paedophilic images and movies, and sexual menace online, that includes harassment and cyberstalking (Griffiths, 2001). Therefore, it appears necessary not only to distinguish between active and passive Internet sex usage, but also between "normal" and deviant online sexual behaviours. Deviant, in this respect, refers to any behaviour that can potentially result in criminal prosecution. Therefore, it would appear that there are a wide variety of sexual activities the Internet can be used for. Some of those may take on addictive qualities as individuals begin to compulsively engage with them because "anything that can safely, quickly, and completely satisfy such a basic human desire [sex] is bound to be addictive to some" (King, 1996).

Why the Internet is used for sex: A scientific view

As far back as the 1890s, von Kraft-Ebbing (1893) published a series of case studies on the diversity of sexual behaviours analyzed from the perspectives of psychopathology and forensics. Although this work was the first of its kind, scientific interest in human sexual behaviour is generally thought to have begun with Alfred Kinsey's famous studies (Kinsey, Pomeroy, & Martin, 1948; Kinsey, Pomeroy, Martin, & Gebhard, 1953). With Kinsey's studies, activities that traditionally belonged in a married couple's bedroom were de-tabooed in that they were investigated from a scientific perspective. This not only opened up new avenues for researchers concerned with studying sex, but it also brought the topic into more general day-to-day discussion. In a similar vein, the late 1990s and early 2000s experienced a proliferation of studies investigating how human sexual behaviour is enacted on the Internet (e.g., Cooper, 1998; Cooper, Delmonico, & Burg, 2000;

Daneback, Cooper, & Mansson, 2005; Delmonico, 1997a; Goodson, McCormick, & Evans, 2000). Some claim that "technology has transformed vicarious sex into an increasingly viable and attractive substitute for interpersonal forms of sexual fulfilment" (Quinn & Forsyth, 2005, p. 197). Such an assertion suggests that what happens online is not the real thing: It is a substitute for real life behaviours. It also suggests that what happens online may be very fulfilling to some people.

Sex on the Internet is particularly viable because of the inherent qualities of the Internet, that Cooper (1988) has referred to as the Triple A Engine: Access, Affordability and Anonymity. The online world including explicit sexual material as well as potential online and offline sexual partners can be accessed anytime and anywhere, as long as there is an Internet connection is in place. Most of the time, sexual activities can be pursued at no cost online, clearly demarcating online sex from offline sex, considering the expenditures involved in buying sex tapes or paying for sex workers. As the infamous cartoon says, "online no one knows you're a dog" (Steiner, 1993). Steiner's cartoon illustrates the fact that online, disembodiment dissolves people's real life characteristics, such as their personal details, gender, age, race, socioeconomic status, etc. It liberates individuals from the imminent fear of engaging in something that is charged with a variety of taboos in real life and provides the option to freely explore their (sexual) selves.

Young and colleagues (Young, Pistner, O'Mara, & Buchanan, 1999) adapted Cooper's initial concept (1998) into their ACE model, incorporating Anonymity, Convenience and Escape as factors salient to the Internet, and which facilitate the engagement in sex by decreasing the inhibition thresholds present in offline sexual relations. Not only is a person anonymous online, but accessing the Internet is convenient and ubiquitous, and can be done from a safe base, such as the person's home. Furthermore, the Internet can serve as a space of refuge, somewhere to escape to when faced with daily hassles. This clearly resonates with the idea of any addiction, including technological addictions, originating in a need to cope with everyday stressors via escaping into alternative mood states induced by substances, activities, or alternative worlds provided by virtual environments (e.g., Batthyány, Müller, Benker, & Wölfling, 2009; Wölfling, Grüsser, & Thalemann, 2008). With regards to pornography use, Cooper's (1998) and Young's (Young et al., 1999) salient factors can be extended even further by integrating sophistication and monitoring, factors which may further limit actual usage. Both sophistication, operationalized as

occupational prestige and education, and external monitoring, for instance by the spouse, contribute to a reduction of the probability to use pornography and/or engage in other types of online sexual behaviour (Buzzell, 2005).

In addition to the allures and attractions of the Internet to users, there is also the issue of the etiology of associated pathological behaviours. A number of idiographic factors have been identified as vulnerabilities to developing addictions, such as sex addiction. These include traumatic experiences (Carnes, 1993; Robinson, 1999; Whitfield, 1998), and biological risk factors, such as hormone levels (Grubin & Mason, 1997). These may play a similar role in the pathogenesis of Internet sex addiction. Furthermore, there appear to be comorbidities between sexual compulsion and (sub)clinical conditions, such as affective and anxiety disorders, and impulsivity (Raymond, Coleman, & Miner, 2003; Stein, Black, Shapira, & Spitzer, 2001). There may also be substance-related comorbidities as well as behavioural addictions (Sealy, 1999). Psychosocial risk factors include stress coping and interpersonal problems (Cooper, Putnam, Planchon, & Boies, 1999a; Putnam, 2000). In combination with the previously outlined factors inherent to the medium of the Internet, these vulnerabilities may very well serve to initiate online sexual compulsivity (Putnam, 2000).

With regards to the maintenance of such problematic/pathological activities, the long-established concepts of behaviourism deserve closer scrutiny. First, operant conditioning plays a role in the continuation of Internet sex addiction. Viewing sexually explicit material online and/or engaging in cybersex with other 'netizens' leads to a sexual outlet and potential sexual gratification and thus it functions as a positive reinforcer. Sex addicts learn that they can satisfy their sexual desires by using the Internet and will seek the engagement with the latter specifically for this purpose. Likewise, these behaviours are negatively reinforced because by means of participating in them, the users can escape from everyday troubles and forget their problems for the time they spend online. In such a way, online sex is used for coping with all sorts of stress. What ties in conveniently with the usage of the Internet is the fact that reinforcement occurs relatively sporadically: It takes place on a variable-ratio schedule, which implies that it is particularly efficient in maintaining the engagement in the specified behaviour (Schwartz, 1984). This means that positive and negative reinforcement increase the probability of sexual online behaviours to be repeated.

In addition to operant conditioning, classical conditioning is also involved in the continuation of problematic sexual activities online. Through repeated pairing of online use for sexual purposes with physical arousal, the latter becomes conditioned in such a way that it is elicited by engaging with the technology, the conditioned stimulus, itself. Thus, the mere sight of a computer screen, the sound of the router connecting to the Internet, and/or the tactile sensations when typing on a keyboard may serve as sources of arousal without necessitating any sexually explicit material to be consumed online (Carnes, 2003). This, in turn, may initiate online sexual pursuits yet again (Putnam, 2000). Consequently, traditional behaviourism is capable of explaining why people continue using Internet sex, even if this results in Internet sex addiction and a wide variety of associated negative consequences (e.g., Barak, Fisher, Belfry, & Lashambe, 1999; Braun-Courville & Rojas, 2009; 2003; Cooper, Safir, & Rosenmann, 2006; Schneider, 2000a, 2000b; Schneider, 2001).

A recent prospective study indicated that it is particularly the engagement with online erotica that predicts compulsive Internet use (CIU). Meerkerk and colleagues (2006) go as far as to claim that "using the Internet for sexual gratification should (…) be regarded as the most important risk factor for the development of CIU" (Meerkerk, Van den Eijnden, & Garretsen, 2006, p. 98). To add to this, Young (2008) claims that "given the widespread availability of sexually explicit material online, Internet sex addiction is the most common form of problem online behaviour among users" (p. 21). Accordingly, if the Internet is used for sexual pursuits for an extended period of time, compulsive Internet use may be the consequence. Due to its longitudinal design, this study seems apt to increase our knowledge about the interdependent relationship between using online sex and using the Internet in a potentially pathological manner.

Nevertheless, this study gives rise to questions about the specificity and sensitivity of using the concept of online erotica and users' engagement therewith. The only question the participants were asked with regards to erotica was related to how much time they spent on "searching for erotic stimuli" online per week. It is not clear what was or was not included in the category of erotic stimuli. Taken at face value, "searching for erotic stimuli" may imply a simple *Google* search for these particular terms. If defined more broadly, it would also include actual viewing or downloading of sexual materials, as well as engaging in online sex (for instance via sex chat rooms). Thus, it lacks sensitivity in that it does not include various sexual behaviours that can be engaged in online. Moreover, the term "erotic" may include

anything as mundane as online advertisements for shampoo or perfume presented by ladies in bikinis or topless men, which in itself may carry erotic connotations. In this regard, the question posed by the researchers lacked specificity in applying to persons who use the Internet for sexual purposes specifically. Consequently, although the study offered novel insights about the addictive qualities of certain Internet applications, it requires a replication that pays particular attention to issues of sensitivity and specificity of online erotic stimuli.

To date, a number of studies have empirically assessed Internet sex addiction in adults. This section presents a comprehensive overview of these studies. Upon careful review of the current scientific literature, fourteen empirical studies of Internet sex addiction in adults were identified, five of which used a qualitative research design. These are presented in chronological order, followed in the next section by the nine quantitative studies. A focus will be placed upon Internet sex usage and potential diagnostic criteria for Internet sex addiction.

Internet sex addiction in adults: Empirical qualitative studies

In 2000, Orzack and Ross described two case studies of typical male virtual sex addiction patients treated at the Program for Sexual and Trauma Recovery at Sierra Tuscon. Both patients made excessive use of sexual chat websites, sexually related emails and instant messages, contacts with prostitutes, as well as offline pornography. Furthermore, they met criteria for Internet Addiction Disorder (IAD) as based upon those established by Orzack (1999) and also met criteria for sexual addiction (SA), as proposed by Goodman (1998). Both patients sought professional help for their problem, and experienced a wide variety of negative consequences as a consequence of their excessive engagement with sexual activities online. This study clearly indicates that for some, Internet sex addiction is a genuine mental health problem that necessitates specialized treatment. Moreover, this study sets the stage for investigating the relationships between online and offline sex addiction in more breadth and depth. It may be that for some, their real life sex addiction is merely transferred to the Internet, thus rendering the latter into yet another (perhaps more convenient) medium for engaging in sexual activities. Alternatively, the Internet's role may be as substantial in this addiction that the activities become problematic, even pathological, without any real life precedence, as suggested by Carnes (2003).

In the same year, Schneider conducted two studies incorporating both cybersex addicts as well as their families and/or significant others (Schneider, 2000a, 2000b, 2001). In the first study (Schneider, 2000a, 2001), significant others were contacted via their partners' therapists and sent questionnaires enquiring into the effects of their partners' cybersex addiction on themselves in addition to efforts to deal with the situation. An informal conceptualization of cybersex addiction was used without referring to potential diagnostic criteria. The results of the study indicated that cybersex addicts ($n = 94$) were downloading pornography and masturbated while doing so, emailed others and placed adverts for sexual contact online, visited sex chat rooms, had interactive online affairs, and used webcams for sexual purposes. The engagement in these online sexual behaviours resulted in serious negative consequences for their relationships. Furthermore, it appeared that 31% of the addicts additionally presented with sexual compulsivity offline (Schneider, 2000a, 2001).

In the second study (Schneider, 2000b), 55 cybersex participants (with a mean age of 39 years, and comprising 45 males) were recruited via their therapists as well as website advertisements, inquiring into topics similar to the first study. The results corroborated the findings of the first study in terms of engagement in sexual activities online. It was reported that 78% of males used online pornography, 46% used chat rooms, and 27% engaged in real-time sexual activities with other people online. Four-fifths of the females (80%) preferred online chatting, 30% engaged in real-time sexual activities online, and only 10% used pornography. Furthermore, women were significantly more likely than men to transfer their online sexual activities offline (80% compared to 33% of males). Of the total sample, 91% self-identified as sex addicts. The study also reported that the participants' problematic behaviours culminated in a wide variety of negative consequences (Schneider, 2000b).

Although the study is not necessarily generalizable to the wider population of Internet sex addicts because of the sampling method and limited number of participants, Schneider's studies (2000a, 2000b, 2001) offer two important insights. Firstly, they reveal that partners (as well as the addicts themselves) suffer as a result of the addictive behaviours. Not only do the addicts fulfil some of the essential criteria for pathology (e.g., significant impairment in at least one area of their lives, compromising of interpersonal relations) but the repercussions of their behaviours have disastrous impacts upon their partners' lives comparable to those of the addicts themselves. Secondly, the established gender differences indicate that women and

men use the Internet differently for sexual purposes. Likewise, the finding that the female addicts in this study were more likely to extend their online behaviours to the real world may tentatively relate to the fact that women's Internet sex usage does not entirely satiate their gratification and they appear to seek contact beyond the virtual sphere. This presumption needs further scientific elaboration and verification.

Stein and colleagues (Stein, Black, Shapira & Spitzer, 2001) presented a case of a man treated for his hypersexual disorder who had a preoccupation with Internet pornography. Specifically, he spent hours every day searching for pornographic images online and increased the frequency of masturbation to this pornographic material substantially in periods where he experienced heightened levels of stress. Moreover, he viewed his behaviour as being ego-dystonic, indicating that he realized that something was wrong with him (i.e., his behaviour was not part of his personality). The patient's preoccupation with Internet pornography resulted in marked levels of distress, loss of control and money, decline in research productivity, real life sexual problems, as well as depressed mood, including symptoms of depression with irritability, anhedonia (an inability to experience pleasure), decreased concentration, and changes in his sleep patterns and appetite (Stein et al., 2001). This study, again, raises questions about the interplay between online and offline sexual addiction. Furthermore, the connection to depressive symptoms needs a more in-depth analysis. However, it must be noted in this context that the patient was initially treated for depression, so a clear-cut sifting out of the direction of the relationship cannot be undertaken. Here again, the presence of depressive symptoms may account for the pathological status of Internet sex addiction.

Grov, Bamonte, Fuentes, et al, (2008) explored the Internet's role in sexual compulsivity by means of conducting qualitative interviews with a sample of 111 homosexual and bisexual men who experienced sexual behaviours and thoughts that were out of control. These men were recruited using a targeted sampling framework (Watters & Biernacki, 1989). Results showed that on average, they were 37 years old, 90% were homosexuals, 40% black, 25% HIV-positive, and they have had a mean average of thirty sexual partners in the previous three months to the study. Moreover, they used pornography for a mean average time of five hours per week, and masturbated nine times per week on average. In terms of their Internet usage, 69% were online in the week prior to the study, 59% used the Internet to find sexual partners in the three months prior to the study, and they spent an average of twelve

hours searching for sex online per week. The symptoms relevant for a diagnosis of addiction experienced by this sample included preoccupations with sexual thoughts and behaviours, strong urges for sex, loss of control, the use of sex as coping mechanism, negative consequences, and a significant loss of time (Grov, Bamonte, Fuentes, Parsons, Bimbi, & Morgenstern, 2008). Overall, the results of this study emphasized the pathological nature of sex addiction. It is difficult to draw conclusions about online sex addiction and its generalizability because of the highly specific sample and the lack of data relating to sexual usage of the Internet other than for the purpose of finding real life sex partners. However, the results highlight that the Internet is put to sexual use by marginalized groups, whose members may find it easier to look for sex partners in the (perceived) safe environment of the Internet rather than in real life, as suggested by other researchers (McLelland, 2002; Schwartz & Southern, 2000).

Internet sex addiction in adults: Empirical quantitative studies

In addition to the qualitative research studies, nine quantitative studies investigating Internet sex addiction in adults were identified in the literature review. These are presented in chronological order. Schwartz and Southern (2000) aimed to describe compulsive cybersex in a sample of 40 cybersex problem patients who were treated for mental health problems at the time of investigation. The sample comprised 19 males, 57% were married, 48% were white collar workers, 20% were blue collar workers, 12% were students, 68% had a history of sexual abuse, 43% suffered from Post-Traumatic Stress Disorder, and 73% suffered from some affective disorder. Furthermore, it was reported that 70% had a sexual addiction, 56% were dependent on some psychoactive substance, and 48% had some kind of eating disorder. The researchers based their analysis on preliminary descriptive data, reviewing clinical files including initial assessments, psychiatric evaluations, psychosocial histories, and other mental health assessments. In terms of the participants' online sexual preferences, 26% had a predilection for some paraphiliac behaviour, 21% wanted romance and/or dating, 16% were looking for extra-marital partners (e.g., swinging), 11% wanted sexual chat, homosexual and/or teenage contacts online. Overall, their compulsive engagement in cybersex resulted in many negative consequences (e.g.,

relationship problems, work problems, personal problems, and excessive time involvement (Schwartz & Southern, 2000).

In terms of general characteristics, cybersex abusers were heavy Internet users, generally married, often well-educated professionals, had experienced sexual abuse, and were depressed. In addition, the authors found a number of gender differences. Females were generally younger with a mean age of 30 years compared to 38 years in males. Male cybersex abuser characteristics corresponded to that of the general cybersex abuser. What distinguished men from women in this respect was the males' higher probability of substance dependence, being in recovery, and being addicted to real-life sex. Females, on the other hand, resembled non-problematic Internet users, experienced PTSD symptoms, and suffered from eating disorders. In addition to the female and male cybersex addiction subtypes, two further profiles were established, namely the loner and the paraphiliac cybersex addict, each of which potentially profits from a different combination of treatment modalities (Schwartz & Southern, 2000).

In summary, this study offers important insights into the clinical population suffering from cybersex addiction and it suggests that for further research, endeavours further research is needed into comorbidities and subclinical problems, such as depression, traumatic experiences, additional substance-related and behavioural addictions including eating disorders, and sexual disorders beyond sex addiction, such as paraphilias. The study also highlights gender differences in the characteristics of cybersex addiction. However, the high comorbidity rates in the present sample call into question how far it is possible to speak of Internet sex addiction as a primary disorder or whether it is more appropriate to view it as a symptom of another underlying mental health problem. On the whole, the study presents many avenues for further scientific inquiry.

There are four quantitative studies based on the data collected by Cooper and colleagues (Cooper et al., 2000; Cooper, Delmonico, Griffin-Shelley, & Mathy, 2004a; Cooper, Galbreath, & Becker, 2004b; Cooper, Griffin-Shelley, Delmonico, & Mathy, 2001) that used the same participant dataset and recruitment process. The invitation to participate in the study was hosted by the American news channel MSNBC website and participants were randomly selected from the site's visitors. Each of the studies had a slightly different purpose. The first study (Cooper et al., 2000) examined the characteristics and usage patterns of online sexual behaviours in a sample of 9,265 adults. Based on their questionnaire scores, they were categorized as non-sexually

compulsive (NSC; n = 7,728), moderately sexually compulsive (MSC; n = 1,007), sexually compulsive (SC; n = 424), and cybersexually compulsive (CSC; n = 96). The first three groups spent a mean average of five hours weekly on the Internet for sexual purposes compared to the cybersex compulsive group spending 20 hours weekly. Furthermore, in terms of usage patterns, the CSC group preferred chat rooms (70% females; 43% males) and the web (36% males; 10% females) to other Internet applications. Moreover, the CSC group was significantly more likely to include females, bisexuals and homosexuals, singles and daters, as well as students. In addition, 24% of the CSC group experienced total life interference, and 9% reported that their behaviours jeopardized all areas of their lives. Finally, it was found that higher sexual sensation seeking differentiated the CSC and the SC from the other two groups (Cooper et al., 2000), which verifies the implicit assumption that they are more likely to explore their sexualities relative to the other groups.

The next two studies (Cooper et al., 2004a; Cooper et al., 2001) included the same random sample of 7,037 adults, 5,925 of which were male. The aims of the first of these were to assess online sexual problems and to identify their predictors. Those with online sexual problems (OSP; 6% of the total sample) were compared to those with no online sexual problems (NOSP). The OSP group was found to differ significantly from the NOSP in that they spent more time online, used the Internet to cope with their real life problems, and to explore sexual fantasies. Moreover, the OSP group masturbated online significantly more frequently than the NOSP group. The NOSP group used the Internet significantly more often for buying sex materials and for educational purposes. Finally, the OSP group had significantly higher scores in seeing the Internet as a problem, feeling that it is out of control, being addicted to the Internet (a group total of 13.3%), to sex (21.1%), or both internet and sex (33.3%; Cooper et al., 2001). Compared to the 2000 study (Cooper et al., 2000), this study used no measure of pathology (e.g. sexual compulsivity; Kalichman, Johnson, Adair, Rompa, Multhauf, & Kelly, 1994). Instead, the authors included an online sexual activities questionnaire (Cooper, Scherer, Boies, & Gordon, 1999b), that was used in the other study as well, solely. Thus, a comparison between studies is difficult and it is questionable as to how far the instrument used has good psychometric properties. Furthermore, the authors themselves point to the fact that no assessment instrument exists that specifically measures Internet sexual compulsivity (Cooper et al., 2001).

Devising such an instrument appears to be much needed for any future research in the field.

The aim of the third study was to examine potentially problematic online sexual activities. The problems of the previous study with regards to the measurements utilized (Cooper et al., 2004a) were overcome in that the authors this time included an assessment of sexual compulsivity (Kalichman et al., 1994). In terms of user characteristics, the results indicated that six times more males engaged in online sexual activities (OSA) relative to females, and they preferred different Internet applications for sex: 68% of men used websites compared to 50% of females, whereas females used chat rooms preferably relative to males (26 compared to 13%). Finally, 10% of men engaged in newsgroups compared to only 4% of females. The engagement in newsgroups for sexual pursuits has been linked to particular and hard core sex preferences, such as bondage, dominance, sadism and masochism (Delmonico, 1997a), indicating that men are more likely to look for unusual sex online than women.

Another important finding that came out of this study was the establishment of the distinction between sexually compulsive and at risk users (Cooper et al., 2004a). The former refers to people who excessively engage in sexual activities both online and offline, whereas the latter implies persons who have no history of sexual problems offline. What is more, there appear to be two subtypes of at risk users: the stress-reactive type of person who uses Internet sex to cope with real life stress, and the depressive type of person who uses internet sex in order to take a break from their depressed, dysthymic and/or anxious mood (Cooper et al., 1999a). This distinction highlights the point made previously, claiming that it is necessary to distinguish between those who use the Internet as yet another space to engage in sex, and those whose sexual behaviours reach pathological dimensions on the Internet exclusively. Finally, the study found people using the Internet for sexual purposes experiencing the following addiction-like symptoms: Using OSA to cope (experienced by 6%), obsession with OSA (10%), desire to decrease it (33%), a gradual increase of OSA (15%, which may be similar to the development of tolerance in substance-related dependencies), recognition of problem/addiction (10%), and lack of control (9%). In addition, the reported negative consequences included a decrease in real life sexual activities (5%) as well as relationship problems (65%; Cooper et al., 2004a).

The fourth and final study conducted by Cooper and colleagues (Cooper et al., 2000) investigated the reasons for OSA and preferred Internet applications in 384 men who had online sexual problems (OSP). In terms of demographics, the participants had a mean age of 33 years, 94% were US residents, 60% were in relationships, and 88% were heterosexual. Reported motivations for OSA included distraction (81%), coping (57%), pursuing sexual activities that would not be done offline (43%), for educationl purposes (25%), for socialization (16%), meeting offline sex partners (12%), meeting offline dates (9%), getting support for sexual concerns (8%), and buying sexual materials (6%). The preferred application used was the world-wide web used for browsing sexual content (Cooper et al., 2004b), which corresponds with previous research (Schneider, 2000b).

Furthermore, this final study found two dimensions of problem OSA based on the purpose of the activity, namely the improvement and the substitution of real life sex, each of which may be related to the pathological expression of Internet sex (Cooper et al., 2004b). The findings of this particular study add to the insights from the other three studies conducted (Cooper et al., 2000; Cooper et al., 2004a; Cooper et al., 2001) in that they particularly target men with online sexuality problems, who appear to be an at risk population for developing sexual compulsivity (Cooper et al., 2004b). More specifically, the results highlight the reasons for engagement with online sex, with a large majority of respondents reporting maladaptive motivations traditionally associated with substance-related and behavioural addictions, namely distraction (comparable to escapism/avoidance) and coping (Cooper, Russell, Skinner, & Windle, 1992; Kuntsche, Knibbe, Engels, & Gmel, 2007; Kuss, Louws, & Wiers, in preparation). However, it is unclear whether, and to what extent, these motives do in fact predict Internet sex addiction. The application of more sophisticated statistical techniques may inform future studies investigating similar questions. The study opens up further research paths particularly drawing on the distinction between addicts who use Internet sex to improve their offline sex life and those who use it to substitute their offline sex life.

Delmonico and Miller (2003) surveyed 6,088 participants (of which 5,005 were male) seeking help for sexual addiction. The aims of this study were to compare sexual compulsives (SCs) and non-SCs (NSCs) on demographics and subscales of the Internet Sex Screening Test (Delmonico, 1997b). The survey was placed on a website for people seeking help for their sexual addiction. The results showed that 2,992

males and 530 females were classified as SCs. The SCs were significantly older than their NSC counterparts (34 years compared to 31 years), and spent significantly more time on OSAs (10 hours compared to 4 hours per week). Furthermore, the SCs scored significantly higher than NSCs on all seven dimensions of the ISST (online sexual compulsivity, online sexual behaviour both social and isolated, online sexual spending, interest in online sexual material, non-home computer use for online sexual behaviour, and accessing illegal sexual material; (Delmonico & Miller, 2003). This study is useful in that it provided an initial validation of Delmonico's instrument and it established the existence of different dimensions related to OSA. Beyond this, the study merely corroborated previous findings (e.g. Cooper et al., 2000). Furthermore, no general population prevalence estimates can be inferred as the population targeted were those people seeking help for their sexual compulsions. The numbers clearly indicate that this group of people had particularly high prevalence of pathology.

Boies, Cooper and Osborne (2004) reported the results of an online questionnaire hosted by a university website, which was voluntarily filled out by 760 psychology undergraduate students, with a mean age of 20 years. Results indicated that 84% were Caucasian, 95% were heterosexual, and 46% were in a relationship. The aim of this study was to examine differences in Internet-related problems (IRP) and psychosocial functioning in different OSAs. Based on their scores on the questionnaire, participants were categorized into one of four groups: Seekers of (i) entertainment, (ii) information, (iii) both, or (iv) neither. The results demonstrated that the group using the Internet for both sexual entertainment and sexual information had significantly more IRPs than the other three groups. Furthermore, the following OSAs were found to be generally associated with IRPs: seeking sexual relationships, sexual information, and sexual entertainment online. They were also more likely to look for sex information online and masturbating correlated strongly with the participants' discontent with their real lives in terms of social support and mastering their environments. The degree of engagement with others online also correlated with OSA, indicating that students may seek a social outlet alternative to the real world (Boies, Cooper, & Osborne, 2004).

In line with this, excessive Internet usage for sexual and social purposes may result in social and self-alienation and may cause relationship deterioration, as proposed by Carnes (2001). Likewise, the opposite held true for students who neither used the Internet for seeking sexual information nor for sexual entertainment. They

were found to be more content with their lives (Boies et al., 2004). The present study is significant in that it presented data on OSA usage and its relationship with life satisfaction spanning the areas of social support and environmental mastery, thus offering insight into the participants' perceptions of their virtual environments and motives for engaging in OSA. However, the categorization of OSA into entertainment-related and information-related activities appears to be very broad. Future research could therefore investigate the extent to which differences exist in people using more varied forms of applications, spanning both interactive as well as passive venues for OSA (such as viewing and downloading sexual material versus participating in online chat rooms and discussion forums). Moreover, a replication of this study in a population other than students would increase the external validity of the findings.

Daneback, Ross and Mansson (2006) investigated the characteristics of OSA users and whether OSA changed sexual compulsives' real life sexual behaviours. Data were collected from 1,835 adults in Sweden completing an online survey on Internet usage, relationships, and sexuality (931 females, mean age of 31 years, 45% with a university degree, more than 60% employed, 20% students, 90% heterosexuals, 50% in relationships). The results indicated that of the total sample, 6% could be classified as sexually compulsive, of which three-quarters (74%) were male. Furthermore, a number of variables increased the likelihood of sexual compulsivity. This included spending three to ten hours a week on OSA increased the likelihood by a factor of three, spending more than 15 hours increased the likelihood by a factor of 13, having had a sexually transmitted infection increased the likelihood by a factor of 2, being bisexual increased the likelihood by a factor of 2.1, being in a relationship increased the likelihood by a factor of 1.7, and being male increased the likelihood by a factor of 1.6. Furthermore, SCs offline sexual behaviour changed as a consequence of OSA: Significantly more SCs started to consume offline pornography (22%) than their non-SC counterparts (10%; Daneback et al., 2006).

This study is significant for a number of reasons. First, it was the first research study examining cybersex addiction/compulsion outside of the US published in an English language scientific journal. Second, it integrated changes in offline sexual activities other than engagement in real life sex, thus broadening other studies' results (Cooper et al., 2004a). Third, it used sophisticated statistical techniques that demonstrated the likelihood effects of particular variables on sexual compulsivity by

using odds ratios. However, this study did not address specific Internet applications used for the purpose of sexual gratification, nor did it draw a clear distinction between sex addiction and Internet sex addiction. Thus, there is still plenty of scope for future studies to address these questions more specifically.

The final quantitative study identified in the literature review, was conducted by (Schnarrs, Rosenberger, Satinsky, Brinegar, Stowers, Dodge, & Reece, 2010). The aim of this study was to explore the relations between sexual compulsivity, sexual partner-seeking, drug and alcohol use, and sexual behaviours. The participants comprised 309 men with a mean age of 29 years. Of these, 55% were homosexual, 19% were bisexual, 90% were white, 81% were city residents, 64% were single, 27% were in a sexual relationship, 20% were in a sexual relationship with more than one person, and 53% were students. A community-based participatory approach (CBPR) was used in a rural area of Indiana. It integrated multiple recruitment strategies, such as face-to-face, the Internet, flyers and palm cards. Data on demographics, sexual behaviours and sexual compulsivity was collected using a website. In the main, the study revealed several significant differences between SCs and NSCs. The results indicated that the SCs were significantly more likely than NSCs to be married, full-time employed and in a sexual relationship with more than one person. Moreover, there was an increased likeliness of SCs having had sex with other men recently and to have had unprotected sex, as well as having had sex with people they met online (affirmative in total sample amounted to 42%) (Schnarrs et al, 2010). This study highlighted the role of the Internet in finding real life sex partners for marginalized groups, i.e. homosexuals and bisexuals, particularly in rural areas where access to sexual partners may be restricted relative to urban and more cosmopolitan locations.

However, the downside of amplified access is the increased health risk this entails. As has been shown, SCs not only find their potential real life sex partners online, but they also engage in unsafe sex and thus the Internet offers a new pool of people to have unprotected sex with, potentiating the risk of becoming infected with sexually transmitted diseases. Nevertheless, this study did not directly address sexually compulsive behaviour carried out online. Although there appears to be some relation between sexual compulsivity and Internet usage, it remains unclear in how far and to what extent sexual compulsives live out their obsessions specifically online.

Conclusion and research implications

Overall, the studies presented in this review provide a number of avenues for future research in the area of Internet sex addiction. The first concerns the need to distinguish between real life (i.e., offline) sexual compulsivity and sexual compulsivity expressed online only. To date, studies have assessed Internet sex addiction by employing measurements devised for inquiring into real life (offline) sexual compulsivity (Kalichman et al., 1994). The only study using an assessment tool specifically for sexual activities online was a screener (Delmonico, 1997b), thus the tool's specificity and sensitivity was relatively limited. Moreover, it was not based on clinically valid diagnostic criteria. Although no such criteria have been officially established to date, Goodman's (1998) proposition appears fruitful as a framework for establishing an Internet sex addict's pathological status. Therefore, the first step to be taken in future research is to analyze the presence of potential diagnostic criteria in terms of their prevalence. This necessitates quantitative inquiries, as well as assessing their overall expression as experienced by Internet sex addicts, and suggests qualitative research frameworks as being of the most benefit.

Specificity is not only required with regards to demarcating Internet sex addiction from sex addiction and Internet addiction, but the specific Internet applications utilized for sexual purposes require closer scrutiny. It may be the interactive possibilities the Internet offers that may also inform such a distinction. It is relatively simple and appears quite common that people transfer their real-life addictions from the real world to the virtual. Pornography can be accessed both online and offline. However, in real life, no sex chat room equivalent exists. In a similar vein, some online sexual activities, such as searching for information and buying sexual materials, have been found not to facilitate sexual psychopathology (Cooper et al., 2001). By assessing the addictive potential of certain Internet sex applications, prevention efforts can perhaps be initiated.

Furthermore, the motivations of people using online sex activities may further increase our understanding of Internet sex addiction. Here, the distinction between people who use Internet sex to improve their offline sex life and those who use it to substitute their real sex life, plays an important role. Additionally, the issue of the comorbidity of Internet sex addiction with a number of further psychopathologies has been raised. These comorbid conditions include affective disorders, substance-related

addictions, behavioural addictions, PTSD, and eating disorders. Future researchers may therefore be encouraged to pay closer attention to the common factors underlying various types of addictions, including eating disorders. In addition, both researchers and clinicians are advised to investigate the direction of relationship between Internet sex addiction and affective symptomatology for it appears that those people treated for depression may have developed these symptoms as a consequence of their Internet sex addiction. Finally, psychosocial precursors of a full-blown Internet addiction require further exploration likewise. Many sexual disorders including sex addiction appear to have roots in traumatic experiences and sexual abuse histories. Therefore, analyzing similar relationships in the case of Internet sex addiction may provide potential insight.

Finally, the gender dissimilarities found in most of the presented studies indicate that the prevalence of Internet sex addiction as well as the preference for particular Internet applications differ between men and women. This is related to the finding that the Internet seems to be a particularly fertile ground for marginalized groups, such as homosexuals and bisexuals, as well as females, who may feel liberated from real life constraints with regards to exploring their sexuality and finding real life sex partners online. Accordingly, "the Net is an Eden for […] 'erotic minorities', with their specialized tastes and their right to satisfy them. Repository of endless erotic fantasies, promiscuous cyberspace proves that sex is not between our legs but inside our heads" (Gubern, 2000, cf. Carvalheira & Gomes, 2003; p.357).

In the case of females, marginalization does not necessarily indicate that women find themselves at the fringes of society in general, but that they are segregated with regards to the pursuit of sexual behaviours relative to men. The reasons that females may compulsively seek sex online (Cooper et al., 2000) appear to be similar to those of bisexuals and homosexuals, namely the liberating potential of the Internet that enables the almost infinite exploration of sexuality without the latent taboos imposed by societal and cultural environments. In order to address the conceivable relationships between the impacts of perceived socio-cultural structures and the liberating potential of the Internet gone awry, qualitative research is needed. Consequently, pathological use of Internet sex not only requires future research, but the current studies indicate specific areas that may be further explored empirically.

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