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Online sexual activities: An exploratory study of problematic and non-problematic usage patterns in a sample of men



Aline Wéry*, J. Billieux

Laboratory for Experimental Psychopathology, Psychological Science Research Institute, Université Catholique de Louvain, Louvain-la-Neuve, Belgium

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ABSTRACT

Involvement in online sexual activities (OSAs) is ubiquitous, especially in males, and can under certain circumstances become problematic. The risk factors associated with problematic OSAs remain, however, poorly explored. The current study aimed to investigate the characteristics, usage patterns, and motives for men to engage in OSAs and to disentangle the risk factors associated with problematic OSAs. To this end, 434 men completed an online survey measuring socio-demographic information, OSAs consumption habits, motives for engaging in OSAs, symptoms of problematic OSAs, and sexual dysfunctions. Results showed that watching pornography is the most prevalent OSA, and sexual gratification is the most frequent motive for OSAs involvement. Additional multiple regression analyses indicated that the following characteristics are associated with problematic use of OSAs: (a) partnered-arousal activities (e.g., sex chat) and solitary-arousal activities (e.g., pornography); (b) anonymous fantasizing and mood regulation motives; and (c) higher sexual desire, lower overall sexual satisfaction, and lower erectile function. This study sheds new light on the characteristics, motives, and sexual function of men involved in OSAs, emphasizing that problematic OSAs are heterogeneous and depend on interrelated factors. The findings support tailoring of preventive actions and clinical interventions to both OSA type and individual risk factors.

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1. Introduction

The Internet is now an accessible medium used by most people for a wide range of recreational activities, among them online sexual activities (OSAs). OSAs were initially defined by Cooper, Griffin-Shelley, Delmonico, and Mathy (2001) as the use of the Internet (via text, audio, video, and graphic files) for any activity that involves human sexuality, including—but not limited to—having sexual chats, looking for or participating in sex webcam, watching pornography, or trying to find sexual partners. It has been proposed that these activities can be subdivided into (a) solitary-arousal activities (e.g., watching pornography), (b) partnered-arousal activities (e.g., sex chat), and (3) non-arousal activities (e.g., information search; Shaughnessy, Byers, & Walsh, 2011).

Research focusing on cybersexuality has explored the characteristics of OSAs users, showing that they are mostly young male

heterosexual adults, who have a high level of education, are involved in a relationship (Cooper, Scherer, Boies, & Gordon, 1999), and tend to be more interested in consuming pornography (Cooper, Månsson, Daneback, Tikkanen, & Ross, 2003; Ross, Månsson, & Daneback, 2012; Schneider, 2000). A few researchers (Cooper et al., 2001; Goodson, McCormick, & Evans, 2001) were interested in determining the motivations for using OSAs. Among them, Goodson et al. (2001) found that curiosity about sex represented the most frequently acknowledged motivation for accessing sexual websites, followed by looking for sexual arousal as the second most frequent. In another study, Cooper et al. (2001) emphasized that the main motives to use OSAs were distraction/relaxation on the one hand and education/support on the other. In a study on men who have sex with men, Ross, Rosser, McCurdy, and Feldman (2007) found that OSAs were favored for their structural specificities (used for ease of access, anonymity, and safety); for their commodity (used by shy people, as they allow avoidance of interpersonal contact); and for hedonic purposes (excitement and opportunity for sexual experimentation). Nonetheless, these studies are now outdated in terms of the latest developments in OSAs. These developments thus prompt the design of new studies

* Corresponding author. Laboratory for Experimental Psychopathology, Psychological Sciences Research Institute, Université Catholique de Louvain, Place du Cardinal Mercier, 10B–1348, Louvain-la-Neuve, Belgium.

E-mail address: aline.wery@uclouvain.be (A. Wéry).

to explore usage patterns and disentangle user motives, as it appears that OSAs can become problematic in a small but significant proportion of users, warranting consideration from a public health perspective (Griffiths, 2012).

1.1. Problematic involvement in OSAs

In most cases, OSAs involvement is unproblematic in both sexes and does not engender negative outcomes at the social, personal, or professional level (e.g., Albright, 2008; Ballester-Arnal Castro-Calvo, Gil-Llario, & Giménez-García, 2014). Nevertheless, OSAs can become excessive and affect several facets of daily life (Cooper, Delmonico, Griffin-Shelley, & Mathy, 2004; Grov, Gillespie, Royce, & Lever, 2011; Philaretou, Mahfouz, & Allen, 2005). Problematic use of OSAs is generally defined as an excessive involvement associated with the following symptoms: loss of control; persistent desire or unsuccessful efforts to stop, reduce, or control OSA-related behaviors; sexual behavior used as a primary coping strategy; withdrawal (occurrence of negative mood states when OSAs are unavailable); tolerance (need for more hours of use and more extreme sexual content); and several social, physical, and psychological negative consequences (Carnes, 2000; Goodman, 1998). In accordance with its symptoms, problematic use of OSAs is often conceptualized as a “behavioral” addiction (Cooper et al., 2004; Orzack & Ross, 2000), similar to gambling disorders or other excessive online activities (e.g., excessive video game use). At present, convincing evidence for the prevalence of problematic use of OSAs is lacking. About a decade ago, Cooper, Morahan-Martin, Mathy, and Maheu (2002) reported a prevalence of 9.6% for problematic use of OSAs, whereas Daneback, Ross, and Månsson (2006) found a prevalence of 5.6%. More recently, a study conducted by Ross et al. (2012) reported a prevalence of problematic involvement in OSAs of 5% in women and 13% in men. Nonetheless, the diagnostic criteria and instruments used in previous studies varied, suggesting that the results are tentative and their comparison difficult (Karila et al., 2014; Wéry, Karila, De Sutter, & Billieux, 2014). On the whole, available epidemiological studies suggest that the prevalence of problematic use of OSAs has increased since the expansion of the Internet and with increased availability of new and free sexual websites (Wetterneck, Burgess, Short, Smith, & Cervantes, 2012). More than a decade ago, Cooper et al. (1999) argued that the growing involvement in OSAs can be allotted to their specific structural characteristics, summarized in the “Triple A” model: *accessibility* (millions of sexual sites constantly accessible), *affordability* (free or low prices on adult sites), and *anonymity* (the online user is not physically seen and may consider him- or herself to be undetectable to others).

1.2. Risk factors for problematic involvement in OSAs

Most previous studies have focused on risk factors related to socio-demographic variables or comorbid psychopathology. First, several studies that did not take the various types of OSAs into account showed that addiction symptoms are 3–5 times more frequent in male users than in female users (Ballester-Arnal, Castro-Calvo, Gil-Llario, & Giménez-García, 2014; Black, Kehrberg, Flumerfelt, & Schlosser, 1997; Carnes, 2000). Studies having considered gender differences in terms of preferred OSAs found that women tend to be more interested in interactive OSAs (e.g., sexual chat), whereas men prefer OSAs that include visual content, especially pornography (e.g., Green, Carnes, Carnes, & Weinman, 2012; Cooper et al., 2003; Schneider, 2000). Second, an association between higher education (bachelor’s or master’s degree) and problematic use of OSAs was frequently reported (Cooper et al., 1999; Daneback et al., 2006; Ross et al., 2012). However, this finding is

likely, at least in part, because participants included in the studies were generally self-selected undergraduates and/or individuals interested in academic research. Third, it was shown that men who were in a relationship tend to be recreational OSAs users (i.e., whose usage patterns are not associated with negative outcomes), whereas problematic use was more frequent for single men (Ballester-Arnal et al., 2014). More recently, several studies have highlighted that problematic use of OSAs is associated with a variety of comorbid psychopathological conditions, including substance abuse, attention deficit hyperactivity disorder, mood disorders, and anxiety disorders (see Wéry & Billieux, 2015; for a review).

Only a few studies have investigated the type of usage patterns (e.g., solitary versus partner arousal) in the context of problematic use. A qualitative study conducted more than 10 years ago by Schneider (2000) in 45 males and 10 females displaying problematic OSAs use revealed that 78% of them consumed online pornography, 46% were involved in sexual chat rooms, and 27% were engaged in real-time sexual activities with other people online. In a recent study, Ross et al. (2012) showed that watching pornography is the OSA most highly correlated with negative outcomes. In fact, to date, most studies have been conducted by considering OSAs globally (without taking into account the various types of OSAs and their heterogeneity), or by focusing solely on consumption of pornography (without comparing it with other types of OSAs). Conducting a study that tackles the complexity and multifaceted nature of OSA use would thus be timely.

The psychosocial factors that may be related to problematic use of OSAs have also received little attention. In particular, two factors that could play an important role in the development and maintenance of problematic usage have rarely been investigated: (a) the individual motives that drive involvement in OSAs and (b) the presence of sexual dysfunctions (i.e., the inability of a person to experience sexual desire, excitement, and/or orgasm, or to achieve sexual satisfaction under appropriate circumstances).

To the best of our knowledge, only two empirical studies have explored the motives related to problematic involvement in OSAs. First, in a randomly selected sample of 7000 individuals, Cooper et al. (2001) highlighted that the motives associated with non-problematic use of OSAs comprise distraction and sexual education/support (e.g., advice, information), whereas problematic involvement in OSAs was related to motives such as stress reduction, emotional coping, or engaging in specific sexual activities that cannot be accomplished offline. In another more recent study conducted in a sample of 1913 men and women recruited online, Ross et al. (2012) showed that three main types of motives predict the problematic use of OSAs: (a) having a special interest in pornographic content that is only available online (e.g., paraphilic content); (b) relaxation; and (c) sexual satisfaction.

To date, studies are lacking that have explored the role of sexual dysfunction (e.g., erectile or orgasmic disorders) in the onset of problematic OSAs. Nevertheless, some inferences can be drawn from the few studies that pointed out the importance of sexual gratification or sexual excitation in problematic OSAs. Indeed, Brand et al. (2011) reported an association between sexual arousal ratings during the viewing of Internet pornographic cues and self-reported tendencies towards problematic OSAs. In another study, Laier, Pawlikowski, Pekal, Schulte, and Brand (2013) emphasized that OSA-related addiction symptoms are associated with greater sexual arousal, craving, and compulsive masturbation resulting from pornographic cue presentation. These findings support the gratification hypothesis of problematic OSAs, in which positive reinforcement associated with OSAs leads to the development of heightened cue reactivity and craving. Other studies explored the role of sexual inhibition (i.e., sexual concerns) and sexual excitation

(i.e., arousability) in relation to proneness to problematic OSAs. Bancroft and Vukadinovic (2004) found, in a sample of 31 self-defined “sex addicts” a higher level of general sexual excitation (i.e., arousability) than in matched control participants, whereas the two groups did not differ in terms of sexual inhibition scores (i.e., inhibition due to threat of performance failure and inhibition due to threat of performance consequences). A recent study by Muise, Milhausen, Cole, and Graham (2013) investigated the role of sexual inhibition and sexual excitation, reporting a correlation between inhibitory cognitions (indicating greater anxiety during sex) and a high level of sexual compulsivity in men, but not in women. This study also showed that independent of gender, a higher level of arousability (ease of becoming aroused from a variety of sexual stimuli) was associated with a higher level of sexual compulsivity.

2. The current study

It thus appears that additional research is needed to explore the heterogeneity of OSA behaviors and to identify specific psychosocial risk factors associated with problematic use, as most available studies have restricted their analysis to socio-demographic variables and comorbid psychopathology. In the current study, we aimed to fill this gap, first by determining the characteristics, usage patterns, and motives of male OSAs users, and second by identifying specific risk factors (e.g., type of OSAs practiced, motives, or sexual factors) associated with problematic involvement (reflected by negative outcomes and addiction symptoms). To this end, we conducted a large-scale online survey in a sample of male OSAs users. Despite the exploratory nature of the current study, we could formulate several hypotheses on the basis of previous research. First, as the sample comprises male participants, we expected that solitary-arousal activities would be favored in comparison to partnered-arousal activities. Second, we expected that the main motives to engage in OSAs would be related to sexual curiosity, sexual arousal, distraction/relaxation, mood regulation, and education/support. Among these motivations, we predicted that mood regulation and interest in OSAs that were only available online would be associated with problematic OSAs. Third, we expected that problematic use would be associated with a higher level of arousability/desire and more sexual dysfunctions (e.g., erectile and/or orgasmic disorder).

3. Method

3.1. Participants and procedure

The study consisted of a survey that was accessible online and circulated on a university messaging service, social networks, research networks, and sexuality-related forums. All participants were informed about the study and gave online consent before starting the online survey. Anonymity of the participants was guaranteed (no personal data or Internet Protocol [IP] address was collected). No compensation was given for participating in the study. The ethical committee of the Psychological Science Research Institute, Université catholique de Louvain, approved the study protocol. Some results from the online survey, unrelated to the objective of the current study, have been published elsewhere (Wéry, Burnay, Karila, & Billieux, 2015).

Inclusion criteria were being a French-speaking man, aged 18 years or older, who used OSAs during the previous 3 months. A total of 511 participants completed the entire study (679 participants started the survey, hence a completion rate of 75.3%). Among this sample, the 434 participants (84.9%) who reported having been involved in OSAs during the last 3 months were retained for the study.

3.2. Online survey

The online survey was composed of 91 items subdivided into six sections:

1. Socio-demographic and general sexuality-related variables (14 items), including gender, age, nationality, education and occupation, relationship status, sexual orientation, number of sexual partners during the last year, and type of sexual partners (e.g., girl/boyfriend, sex friend, sex worker).
2. OSAs use and related behaviors during the last 3 months (25 items), including weekly time devoted to OSAs, places where OSAs are done (e.g., at home, at work), involvement in each type of OSA (e.g., pornography, sexual chat) assessed on a 5-point Likert scale ranging from *never* to *very often*, types of favored pornographic content (e.g., oral sex, bondage, amateur videos) assessed on a 4-point Likert scale ranging from *not interested* to *very interested*, amount of money spent in relation to OSAs use (open question), frequency of masturbation during OSAs use assessed on a 6-point Likert scale ranging from *never* to *always*, potential influence of OSAs on offline sexuality (four possible responses: no influence, positive influence, negative influence, or don't know), viewing/using sexual content previously considered as not interesting or disgusting assessed on a 5-point Likert scale ranging from *never* to *very often*, and experiencing feelings of shame related to OSAs use assessed on a 5-point Likert scale ranging from *never* to *very often*.
3. Problematic use of OSAs, assessed by the 12-item short Internet Addiction Test adapted for OSAs (s-IAT-sex; Wéry et al., 2015), which measures an addictive pattern of use, including loss of control, cognitive salience, or negative impact on daily life. All items are scored on a 5-point Likert scale ranging from *never* to *always*. The internal reliability (Cronbach's alpha) of the s-IAT-sex in the current sample is .89.
4. Motives to use OSAs (23 items), assessed on a 5-point Likert scale ranging from *never* to *always*. The study used a comprehensive list of motives that was established from previous studies (Daneback, Cooper, & Månsson, 2005; Goodson et al., 2001; Ross et al., 2012). New items were added from previous work on sexual motivations and cybersexual behaviors (Cooper, Shapiro, & Powers, 1998; Cooper et al., 2001) and from studies that investigated the motives related to other online activities such as video game involvement (Billieux et al., 2013). The following items were created for the current study: (1) to feel better when I feel alone, (2) to avoid being depressed/sad, (3) to escape from daily-life problems, (4) to avoid boredom, (5) to stimulate fantasies, (6) to learn new sexual techniques, (7) to improve offline sexual intercourse, and (8) to be involved in sexual behaviors when it is not possible to have other types of sexuality.
5. Sexual dysfunctions, assessed by the 15-item International Index of Erectile Function (IIEF; Rosen et al., 1997), which assessed five dimensions of sexual dysfunction: (1) erectile function (six items), (2) orgasmic function (two items), (3) sexual desire (two items), (4) intercourse satisfaction (three items), and (5) overall sexual satisfaction (two items). Items are assessed on 5-point Likert scales, depending on the items. Only men who had sexual intercourse during the last month answered this scale ($n = 276$). The internal reliability (Cronbach's alpha) of the IIEF in the current sample is .79.
6. Self-perceived problematic involvement in OSAs, assessed by two specific items: (1) whether involvement in OSAs is considered problematic by the participants (assessed on a 4-point Likert scale ranging from *not problematic* to *very problematic*); and (2) when OSAs use is considered problematic,

whether the participants had already thought to ask for professional help regarding OSAs (assessed through a dichotomous “yes” or “no” question).

3.3. Data analysis strategy

Analyses were computed with SPSS 21. Descriptive statistics (percentages, means, standard deviation, histograms) were applied to socio-demographic data and OSAs usage patterns. Continuous variables were transformed into dichotomous variables when appropriate (e.g., to determine prevalence rates). Principal component analyses (PCAs) were then computed to reduce the number of variables used in subsequent analyses and to identify categories or related OSA types (12 types of OSA were measured) and motives (23 motives were measured). Promax rotation was applied, as the variables included in the analysis were not considered orthogonal. Finally, a series of multiple regression analyses were performed to determine the predictors (types of OSAs, motives to engage in OSAs, sexual dysfunction) of problematic use of OSAs (assessed with the s-IAT-sex). Regression analyses were preferred over correlation analyses, as the former take into account the interrelations between the variables and allowed us to avoid giving too much weight to correlations, which would have increased the risk for Type 1 errors. Separate regression analyses were computed to avoid mixing variables related to distinct types of factors in the same analysis (e.g., types of OSA used vs. types of sexual dysfunction experienced) and to avoid incorporating too many variables in the same regression model. As no valid cutoff exists for the s-IAT-sex, we considered the score on this measure as a dimensional index of cybersexual addiction symptoms in order to avoid relying on an arbitrary cutoff. Pairwise treatment of missing data was applied. Indeed, we preferred not to make answers mandatory to all items, to avoid potentially biased data (e.g., when a participant does not want to answer an item or has not totally understood the meaning of an item). For all analyses, the significance level was set at $p < .05$.

4. Results

4.1. Descriptive statistics

Socio-demographic characteristics of the participants are reported in Table 1. The mean age of the sample was 29.5 years ($SD = 9.5$; range 18–72). Most respondents had a bachelor's or master's degree (81.8%) and were active workers (44.3%) or students (46.9%). At the time of the survey, 78.3% of the sample reported living with someone (e.g., friend, partner), 59% reported being in a stable relationship, and 89.2% reported being heterosexual. Fig. 1 depicts the prevalence of each type of OSA. Prevalence rates were determined on the basis of OSAs in which the participant was involved at least once during the previous 3 months ($n = 419$ due to missing data). The most ubiquitous OSA was “viewing pornography” (99%), followed by “searching information” (67.7%) and “reading sexual advice” (66.2%). Fig. 2 illustrates the pornographic content favored by the participants. The principal types of content reported (i.e., for participants who answered being at least “rather interested” or “very interested”; $n = 396$ due to missing data) were vaginal intercourse (87.9%), oral sex (77.8%), amateur videos (72%), teen (67.7%), and anal sex (56.3%). Table 2 summarizes self-reported involvement in OSAs and associated negative impact on daily life and offline sexuality. The mean time devoted to OSAs weekly was 3 h ($SD = 4.54$ h; range: 5 min to 33 h). Most respondents (99%) used OSAs at home and reported masturbation behaviors during the practice of OSAs (97%). Forty-nine percent

Table 1
Sample characteristics ($N = 434$).

Characteristics	<i>M (SD) or %</i>
Age	29.5 (9.5)
Nationality	
Belgian	44.7%
French	35.3%
Canadian	16.1%
Other European country	2.7%
Other non-European country	1.2%
Education	
Primary school	1.2%
College	15.5%
High School	21.8%
University	60%
Other	1.5%
Occupational status	
Employed	44.3%
Student	46.9%
Unemployed	6%
Retired	1.7%
Housework/Parental leave	.5%
Other	.5%
Current living arrangements	
Alone	21.7%
Parents	30%
Partners	32.5%
Friends/Flat mates	15.8%
Sexual orientation	
Heterosexual	89.2%
Homosexual	8.8%
Bisexual	2.1%
Relationship	
Never been in a relationship	5.1%
Single (without occasional sexual partner)	18.9%
Single (with occasional sexual partner(s))	16.4%
In a stable relationship	59.6%
Type of sexual partner during last year	
Couple partner	65.7%
Unknown	16.6%
Ex-partner	10.8%
Sex friend	27.9%
Sex worker	5.8%
Number of sexual partner(s) during last year	3.53 (7.4)

mentioned at least sometimes searching for sexual content or being involved in OSAs that were not previously interesting to them or that they considered disgusting, and 61.7% reported that at least sometimes OSAs were associated with shame or guilty feelings. Finally, 27.6% of the sample self-assessed their consumption of OSAs as problematic. Among them ($n = 118$), 33.9% considered asking for professional help regarding their OSAs.

Respondents were also questioned about their motives to engage in OSAs (see Table 3). The three most ubiquitous motives reported were “sexual satisfaction” (94.4%), “feeling arousal” (87.2%), and “achieving orgasm” (86.5%). Each participant who reported being involved in OSAs for a specific motive at least “sometimes” was considered to be endorsing this motive.

4.2. Data grouping

Separate PCAs were conducted to cluster the data and optimize subsequent analyses, as well as to identify categories of OSAs and OSA-related motives.

A first PCA was computed to regroup types of OSAs (12 types of OSAs were measured in the study; see Fig. 1). We decided to remove “contacting sex workers” from the analysis, as this behavior was reported by only a small proportion of participants (5.6%) and is thus not representative in the current sample in comparison to other types of identified OSAs (all other OSAs were reported by at

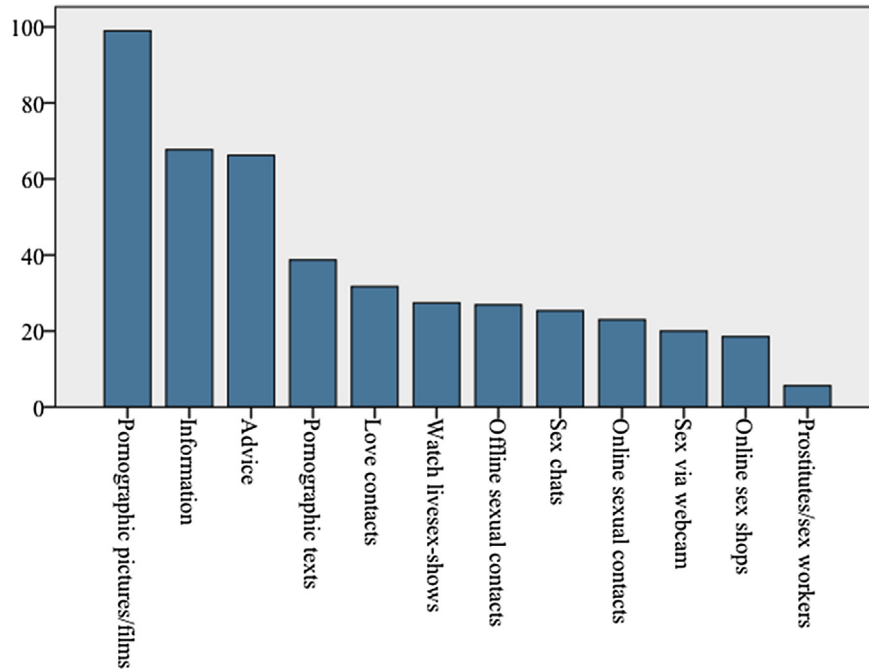


Fig. 1. Percentage of online sexual activities used (N = 419).

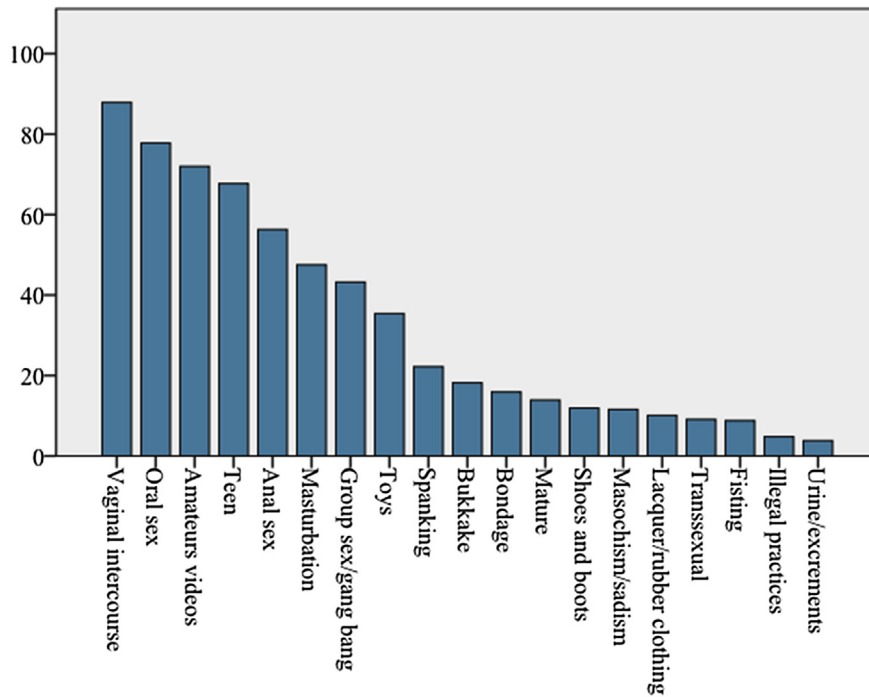


Fig. 2. Percentage of pornographic content (N = 396).

least 18.5% of the participants). The analysis suggested the extraction of three factors. The minimum loading of each item was greater than .30. The sums of squared loadings were 3.65, 1.70, and 1.03, respectively. The three factors accounted for 57.99% of the variance (Factor 1: 33.15%; Factor 2: 15.44%, and Factor 3: 9.40%). The first factor corresponded to partnered-arousal activities and gathered six items that evaluated involvement in interactive OSAs (looking for online sexual contacts, looking for offline sexual contacts,

looking for love contacts, engaging in sex chats, engaging in sex via webcam, watching live sex shows via webcam). The second factor corresponded to non-arousal activities and grouped three items measuring involvement in educational/informative OSAs (reading online advice for sexual practices, searching for sex-related information, reading pornographic texts). The third factor corresponded to solitary-arousal activities and was the only item that referred to pornographic images and/or videos. These factors are similar to

Table 2
Use of online sexual activities (OSAs) and self-reported influence on daily life.

Characteristics	N valid	M (SD; range) or %
Time spent on OSAs weekly	420	3 h (4.54 h; 5 min to 33 h)
s-IAT-sex	434	22.54 (9.3; 12–59)
Place of OSA use	420	
At home		99%
In public place (e.g., via smartphone)		15.9%
At work		14.7%
Masturbation during OSA use	433	97%
Spending money for OSAs	427	4.2%
Influence on offline sexuality	434	
No influence		49%
Did not know		21.7%
Positive influence		17.5%
Negative influence		11.8%
Being involved in practice or seeing pornographic content assessed as previously not interesting (and even disgusting)	433	46.9%
Feel ashamed/guilty with regard to OSA use	433	61.7%
OSAs estimated as problematic	428	
Not problematic		72.4%
Problematic		27.6%
Consider asking help for problematic OSAs	118	33.9%

Note. s-IAT-sex = short Internet Addiction Test adapted for OSAs.

Table 3
Motives to engage in online sexual activities (N = 410).

Motives	%
For sexual satisfaction	94.4
To feel arousal	87.2
To achieve orgasm	86.5
Because it's easy	81.7
For curiosity	75.3
To relax/decrease stress	73.8
Because I get bored	70.8
To stimulate fantasies	69
To satisfy fantasies	63.2
To forget daily problems	53
To talk about sex	51.4
To learn new sexual techniques	50.6
To get educated about sex	46.9
To feel better when I feel alone	44.9
Interest for pornography only available online	42.4
To not feel depressed/sad	38.1
To get support/advice in sexual matters	36.6
To improve offline sexual intercourse	36.6
Only way to have sexuality	33.8
To meet people with same sexual interests	28.9
To engage in sexual activities that I would not engage in offline	25.3
Difficult to buy pornography offline	21.4
To maintain arousal with my partner	20.3

those obtained in a previous study by [Shaughnessy et al. \(2011\)](#). Of note is that the item “using online sex shops” was removed after the analysis because it loaded similarly on both Factor 2 and Factor 3, suggesting that the item cannot be related to a specific factor.

A second PCA was computed to identify categories of OSA-related motives. The analysis suggested the extraction of six factors. The minimum loading of each item was greater than .30. The sums of squared loadings were 6.25, 2.95, 1.77, 1.34, 1.19, and 1.04, respectively. The six factors accounted for 63.20% of the variance (Factor 1: 27.17%; Factor 2: 12.80%, Factor 3: 7.70%, Factor 4: 5.82%, Factor 5: 5.18%, and Factor 6: 4.53%). The first factor corresponded to mood regulation and regrouped six items (to relax/decrease stress; to not feel depressed/sad; to feel better when I feel alone; to forget daily problems; because I get bored; only way to have sexuality). The second factor corresponded to anonymous fantasizing and regrouped five items that measure motivations tied to Internet characteristics (anonymity, affordability, and accessibility) that allow fantasizing and appeasing fantasies that cannot be

appealed offline (to engage in sexual activities that I would not engage in offline; because it's easy; difficult to buy pornography offline; to stimulate fantasies; to satisfy fantasies). The third factor related to sexual pleasure and regrouped three items that evaluate the search for sexual gratification/pleasure (to feel arousal; to achieve orgasm; for sexual satisfaction). The fourth factor related to curiosity and socializing and brought together three items that measure both curiosity and desire to socialize with people sharing similar sexual interests (to talk about sex; because I'm curious; to meet people with the same sexual interests). The fifth factor related to improving offline sexuality and regrouped three items assessing learning about sexuality and improving sexual intercourse (to learn new sexual techniques; to improve offline sexual intercourse; to maintain arousal with my partner). The sixth and last factor related to education and grouped together two items measuring the need for advice or sexual education (to get support/advice in sexual matters; to get educated about sex). One motive (the interest for material only available online) was not taken into account for further analyses as it loaded similarly on several factors (Factors 2, 3, and 4).

4.3. Risk factors associated with dysfunctional involvement in OSAs

Three distinct regression analyses were computed to predict addictive use (based on the s-IAT-sex¹) with respect to three types of risk factors: (a) the types of OSA (three variables), (b) the motives to use OSAs (six variables), and (c) sexual dysfunctions (five variables). Inspection of residuals and multicollinearity effects showed that the conditions of application for regression analyses were respected. [Table 4](#) shows the results of all computed regression analyses. The first regression analysis showed that partnered-arousal activities and solitary-arousal activities are strongly related to problematic use. The variables retained explained 22% of the variance ($p < .001$). The second regression analysis revealed

¹ The validation study of the s-IAT-sex ([Wéry et al., 2015](#)) supported a two-factor factorial structure. However, the current study reports only those results related to the total score, as separate regressions computed on the subscales yielded similar results. Binary logistic regressions were also computed to identify the predictors of (a) self-reported problematic involvement in OSAs and (b) self-reported need for external help regarding OSA use, but the related findings are not reported, as they are similar to those obtained with the regression computed to predict scores on the s-IAT-sex (i.e., the significant predictors are the same).

Table 4
Multiple Linear Regression Analyses With s-IAT-sex as the Dependent Variable.

Independent variable	N valid	B	SE	Beta	t	p
OSAs	419					
Partnered-arousal activities		.60	.09	.29	6.54	.000
Non-arousal activities		.28	.17	.07	1.65	.099
Solitary-arousal activities		2.96	.44	.29	6.66	.000
Motives to engage in OSAs	410					
Mood regulation		.72	.07	.47	10.47	.000
Anonymous fantasizing		.40	.10	.19	4.00	.000
Sexual pleasure		.19	.12	.07	1.55	.121
Curiosity and socializing		.09	.13	.03	.69	.488
Improve offline sexuality		-.15	.17	-.04	-.89	.371
Educational		-.09	.22	-.02	-.39	.698
IIEF	276					
Erectile function		-.35	.15	-.15	-2.40	.017
Orgasmic function		.25	.33	.04	.74	.460
Sexual desire		1.05	.33	.19	3.19	.002
Intercourse satisfaction		-.19	.31	-.05	-.62	.538
Overall satisfaction		-.70	.27	-.19	-2.57	.011

Note. OSAs = online sexual activities; IIEF = International Index of Erectile Function; s-IAT-sex = short Internet Addiction Test for OSAs. Significant results are in bold.

that two types of motives predict problematic involvement in OSAs, namely, mood regulation and anonymous fantasizing. The variables retained explained 40% of the variance ($p < .001$). The third regression analysis revealed that higher sexual desire, lower overall sexual satisfaction, and lower erectile function predict problematic use of OSAs. The variables retained explained 11% of the variance ($p < .001$). Among the factors considered, it thus appeared that the motives to engage in OSAs explain the greatest part of the variance in addiction symptoms.

5. Discussion

This study aimed at investigating the preferences and characteristics of men involved in OSAs and at identifying risk factors for problematic use. The main results can be summarized as follows: watching pornography was the most ubiquitous OSA reported. The most frequent motives identified for engaging in OSAs were sexual satisfaction, feeling arousal, and achieving orgasm, which are consistent with the findings of previous studies (Goodson et al., 2001; Ross et al., 2007, 2012). The proportion of participants who reported experiencing concerns regarding their involvement in OSAs was 27.6% and of these, 33.9% reported that they had already thought to ask for help for OSA use. Regression analyses allowed us to identify specific risk factors. Problematic OSA use was associated with the preferred type of activity (partnered-arousal activities and solitary-arousal activities), specific motives (mood regulation and anonymous fantasizing), and sexual dysfunction (high sexual desire, low sexual satisfaction, and low erectile function). Multiple regression analyses showed that among these risk factors, motives to engage in OSAs were most related to proneness to addiction symptoms.

5.1. Characteristics and preferences of men involved in OSAs

In the current study, most participants were young heterosexual adult men involved in a stable relationship who had a high level of education. Results indicated that a large majority of respondents used pornography, which is consistent with the results of previous studies (Albright, 2008; Cooper et al., 2003; Ross et al., 2012; Schneider, 2000) showing that men favored solitary-arousal OSAs. In the present study, the respondents also reported using the Internet to search for sexual-related information (67.7%) and

online sexual advice (66.2%). It thus seems that it has become a common practice to search for information and guidance on sexual practices through the Internet. This finding probably reflects an evolution in the acquisition of sexual knowledge, potentially supported by the current development and ubiquity of OSAs along with questions about sexuality. The important use of the Internet for education can be partly explained by the lack of comfort in discussing sexual issues during face-to-face interaction and the preference to explore these questions through the anonymity of the Internet. However, even though the Internet can be a convenient medium to find sexual information, online information and guidance can be inadequate. Indeed, a study by Smith, Gertz, Alvarez, and Lurie (2000) on sexual online education indicated that searching for websites by using sexual health keywords (e.g., sex education, sexual health, or sexual intercourse) returned sites in which 63% were devoted to pornography and only 4% were sexual education pages (with significant omissions of important information for a large majority of relevant websites). The poor rate of reliable information and the high prevalence of pornography websites is an obstacle for obtaining valid and accurate online sexual information and guidance. Moreover, other studies found that online pornography can be used as a significant source of sexual education (e.g., to learn about sexual anatomy, to learn new sexual positions) for young people (Hägström-Nordin, Tydén, Hanson, & Larsson, 2009; Hunter, Figueredo, & Malamuth, 2010). A potential related danger is that pornography is, most of the time, far from reflecting healthy and realistic sexual behaviors, which could lead to erroneous and potentially dysfunctional beliefs (e.g., in terms of sexual performance). In such a context, promising preventive interventions could consist of developing websites with accessible, clear, and valid sexual health information (Cline & Haynes, 2001), but also information about the non-representativeness of sexuality in pornography.

Of note is that although the results showed that most pornographic content searched for by men is essentially “traditional” (e.g., vaginal intercourse, oral and anal sex, amateur videos), with paraphilic and unusual content (e.g., fetishism, masochism/sadism) being less frequently searched, some pornographic content that is often considered “unusual” or “deviant” was frequently researched (teen, 67.7%; group sex/gang bang, 43.2%; spanking, 22.2%; bukake, 18.2%; and bondage, 15.9%). In the same way, a recent study by Joyal, Cossette, and Lapierre (2014) showed that among 55 sexual fantasies proposed to 1516 persons, only two fantasies (pedophilia and zoophilia) could be considered statistically rare (endorsed by 2.3% of participants or less), and only nine (e.g., practices with urine/excrement, forced sex) as unusual (endorsed by 15.9% of participants or less). These results are in agreement with those of Ahlers et al. (2011) and highlight that some fantasies are often considered unusual, yet are common in the general population (e.g., fetishism, teen or group sex). In another study not specifically related to online sex, Ellis and Symons (1990) reported that male sexual fantasies, in comparison to those of females, were more frequent, featured imagined partners, were impersonal, were dominated by visual images (particularly genital images), focused on explicit sexual acts, tended to focus outward on the imagined partner as a sexual object, and likely emphasized partner variety. Accordingly, it is possible that the new developments related to OSAs allow men to easily satisfy their sexual fantasies because of the accessibility of almost unlimited content that is renewed daily.

5.2. Risk factors associated with dysfunctional involvement in OSAs

The second aim of the current study was to determine risk factors for problematic use of OSAs. The study showed that both solitary- and partner-based OSAs are associated with problematic

involvement. These results are in accordance with those of Ross et al. (2012) showing that although pornography is the most used OSA in men, both consumption of pornography and partnered-arousal activities can be problematic. However, even though these two types of activities frequently coexist, it is possible that their related motives and consequences differ. Indeed, solitary activities involved self-stimulation and self-eroticism situations, whereas partnered activities involved more complex interpersonal processes. Thus, someone involved in a solitary OSA can easily satisfy his own sexual fantasies, whereas successful partnered OSAs also require one to satisfy the desire of another person. The negative outcomes associated with these two types of activities are also different. For example, partnered OSAs are often expensive, whereas numerous pornographic websites are now free. Even more concerning is that online partnered OSAs may also promote offline sexual encounters with multiple partners, which may be associated with unsafe sexual practices (McFarlane, Bull, & Rietmeijer, 2000).

Among the factors considered, we found that motives to engage in OSAs explain the largest proportion of addictive use and that mood regulation and anonymous fantasizing are most associated with problematic use. Regarding anonymous fantasizing, our findings are consistent with those of Ross et al. (2012), who showed that specific pornographic interests are associated with problematic use of OSAs. These results are also in accordance with the influential Triple-A theory proposed by Cooper et al. (1999), which states that the accessibility, affordability, and anonymity of the Internet provides a convenient medium to promote sexual behaviors. Along the same line, it can be supposed that Internet sexuality allows individuals to engage in sexual practices or to view sexual content that is taboo offline and thus constitutes an ideal means of satisfying their fantasies. Regarding mood regulation, our results are largely in accordance with previous evidence emphasizing that problematic use of OSAs is often displayed to regulate negative moods and reduce aversive thoughts, feelings, or sensations (Cooper et al., 2004; Kafka, 2010; Levin, Lillis, & Hayes, 2012). Accordingly, dysfunctional OSAs can in certain cases be conceptualized as a maladaptive coping strategy. This hypothesis is supported by numerous data emphasizing that many problematic and addictive behaviors are displayed to regulate negative mood states and should not necessarily be considered as addictive disorders per se (Deleuze et al., 2015; Selby, Anestis, & Joiner, 2008; Spence & Courbasson, 2012). Of note, several recent studies highlighted that a wide range of excessive online behaviors (e.g., problematic use of video games) are displayed to alleviate an aversive or unbearable emotional state (Billieux et al., 2015b; Kardefelt-Winther, 2014). Interestingly, similar results were reported for hypersexual behaviors (Miner, Coleman, Center, Ross, & Rosser, 2007; Reid & Carpenter, 2009).

Results of the current study also emphasized that men displaying problematic OSAs are characterized by lower overall satisfaction and lower erectile function. It can thus be hypothesized that in some cases, men with erectile problems are less confident in their sexual capacities and that their offline partnered sexual experiences are associated with lower sexual satisfaction. They may therefore use OSAs to satisfy their sexual needs while avoiding erection-related problems that they experience during offline sexual intercourse. However, this might result in a vicious circle that has a negative impact on overall sexual satisfaction. Our findings are also in accordance with those of Muise et al. (2013) showing that men reporting higher scores of inhibitory cognition (indicating greater worries and concerns during sex) present high sexual compulsivity, as well as with the results of a recent study emphasizing that higher frequency of pornography use is associated with lower pleasure with sexual intimacy, along with concerns about sexual performance and body image (Sun, Bridges, Johnason,

& Ezzell, 2014). These findings thus prompt the design of new studies to disentangle the role of sexual factors in the development and perpetuation of problematic OSA use.

6. Limitations

Several limitations exist in this study. First, all of the measures were self-report questionnaires that presume respondents are aware of and willing to report their sexual behaviors honestly. However, online studies allow the collection of more respondents through the anonymity offered by the Internet. This is especially true with regard to sexual behaviors that are frequently stigmatized (in their free comments, several respondents stressed that the anonymity of the online method encouraged honest answers). Second, the online survey method implies that the sample is self-selected, which could have affected the representativeness of our sample (Khazaal et al., 2014). In particular, it is possible that people concerned with their involvement in OSAs are more likely to perform the study, as suggested by the elevated proportion of participants reporting that their use of OSAs is problematic or that they have considered asking for professional help. The prevalence rates revealed in the current study should thus not be transposed to the community too quickly to avoid the overpathologization of a common behavior (Billieux, Schimmenti, Khazaal, Maurage, & Heeren, 2015a). Similarly, the data in our study were collected from French-speaking men and thus the results may not be generalizable to OSA users from other groups and cultures.

7. Conclusions

This study is the first to directly investigate the relationships between sexual dysfunctions and problematic involvement in OSAs. Results indicated that higher sexual desire, lower overall sexual satisfaction, and lower erectile function were associated with problematic OSAs. The present data suggest that men with problematic involvement in OSAs may have an intense sexual desire that can be related to the development of excessive sexual behaviors and may explain in part the difficulty of controlling this sexual urge. These results can be linked to those of previous studies reporting a high level of arousability in association with sexual addiction symptoms (Bancroft & Vukadinovic, 2004; Laier et al., 2013; Muise et al., 2013). We cannot exclude the possibility that men with high sexual desire engaged in OSAs in addition to their offline sexual contacts, or that they presented both online and offline compulsive sexual behaviors.

Future research should further investigate the role of specific risk factors in the development and maintenance of men's problematic involvement in OSAs. In particular, the exploration of sexual dysfunctions seems to be an interesting avenue of research. Indeed, future studies are needed in order to better understand the complex interrelationships between offline and online sexual behaviors. To date, the problematic use of OSAs has been essentially conceptualized within the framework of addictive behaviors without considering the uniqueness and specificity of OSAs, or the heterogeneous manifestations of problematic use. For example, qualitative interviews would be a valuable method to understand the phenomenology of problematic OSA use. Future studies should also be conducted with clinical samples, focusing on the most recent types of OSAs such as 3D sexual games involving immersion and role-playing components.

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Conflict of interest

The authors have no conflict of interest.

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