

THE RELATIONSHIP BETWEEN SEXUAL BEHAVIOR AND INTERNET ADDICTION SEVERITY IN A SAMPLE OF HETEROSEXUAL UNIVERSITY STUDENTS FROM ITALY

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Abstract

Objective: The aim of the present study was to investigate the association between specific sexual attitudes and Internet addiction scores.

Method: Participants were 115 men and 163 women recruited from the University of Messina; sexual behavior was assessed by the Sex and the Average Woman (or Man) Scale whereas Internet addiction was measured by the Internet Addiction Test.

Results: The results of the study showed that higher Internet addiction scores were associated with low levels of sexual satisfaction and high levels of sexual nervousness, sexual shyness and sexual detachment.

Conclusions: It is suggested that specific sexual attitudes may act as one of the different factors predisposing to the development of Internet addiction symptoms.

Key words: internet addiction, sexual behaviour, negative emotions, sex differences

Declaration of interest: none

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Introduction

Internet addiction (IA) is excessive and uncontrollable use of the Internet which disrupts everyday functioning including academic and professional performance and results in emotional instability, relational maladjustment, missed sleep (Chou et al. 2005, Craparo 2011, Pani et al. 2010, Schimmenti and Caretti 2010, Scimeca et al. 2014, Young 1998) and psychiatric symptoms (Black et al. 1999, Shapira et al. 2000).

It has been suggested that there is a close link between sexual behaviour and Internet use; it has been shown that pursuit of sexual interests over the Internet is very common among both Internet users (Cooper 1998, Cooper et al. 2000) and Internet abusers (Cooper et al. 1999, Morahan-Martin and Schumacher 1997). Approximately 33% of all Internet users report online sexual activity (Cooper et al. 2000, Egan 2000). Young (1999) recognised cybersexual addiction (compulsive use of the Internet for cybersex and cyberporn) as one of the five subtypes of IA, along with cyber relationship addiction, net compulsions, information overload, and

computer addiction. More recently, it has been suggested that the Internet can be used for a variety of sexual purposes, from searching for sex-related material for educational use, through entertainment, masturbation, and looking for sexual partners for transitory or enduring relationships, to engaging in cybersexual interactions in delayed or real time, seeking out partners for sex-related Internet crimes, and exploring gender or identity roles (Griffiths 2000, 2012).

The aim of the present research was to investigate the association between sexual behavior and Internet addiction symptoms in a sample of University students. It was hypothesized that specific sexual attitudes would be significantly correlated with IA scores. Initially, we considered two different aspects of sexual response: sexual excitement and satisfaction (Pfaus 1999). Sexual excitement refers to the psychomotor stimulation elicited from a sexual incentive; it is a complex construct which implies a subjective motivational state (Regan and Berscheid 1999), a physiological arousal (Masters et al. 1994), and subjective sexual arousal (Green and Mosher 1985). IA is associated with a tendency to be engaged in sexual activities (Cooper et al. 1999,

Morahan-Martin and Schumacher 1997, Young 1998), so it was hypothesized that *sexual excitement* would be positively associated with IA. Sexual satisfaction is the general fulfillment that a person derives from his or her sex life; it includes subjective pleasure or sensations, the ability to focus on erotic and sexual sensations, the sexual exchange, emotional connection, and related sexual behaviors (Bancroft et al. 2003). Quinn and Forsyth (2005) argued that “technology has transformed vicarious sex into an increasingly viable and attractive substitute for interpersonal forms of sexual fulfillment” (p. 197). Cybersexual consumption and interactions are often associated with sexual gratification, which generally takes the form of masturbation or delayed sexual gratification (Young 2008). As a consequence, people who are not satisfied with their sexual lives may turn to the Internet in search of sexual fulfillment. For all these reasons, it was hypothesized that general *sexual satisfaction* would be negatively associated with IA.

Moreover, both qualitative and quantitative studies showed that IA and compulsive cybersex are associated with different kinds of sexual difficulties: past sexual abuse experiences, post-traumatic stress disorder, and sexual disorders such as paraphilias or hypersexuality (Cooper et al. 2001, Cooper et al. 2004, Orzack and Ross 2000, Schwartz and Southern 2000). For this reason, we predicted that high IA scores would be positively correlate with a generic propensity to have a distressed sex life. It was consequently hypothesized that individuals with high IA scores would have difficulties in achieving sufficient sexual gratification because of the tendency to experience disturbing thoughts, emotions, and actions arising from their sexual life (*sexual nervousness*).

We also investigated sexual behaviors which involve an emotional interaction, given the effects of emotions on psychological adjustment (Di Maggio et al. 2016). It has been shown that Internet is a milieu well suited to individuals who have difficulty relating to others; this is probably because the absence of physical presence gives the Internet user greater control over the communication process (McKenna and Bargh 2000). Similarly, there are several studies showing that shyness is one of most important personality traits associated with IA (Chak and Leung 2004, Scealy et al. 2002). Interestingly, IA has been associated with online sexual activities that allow the user to experience erotic or sentimental interactions with other ‘netizens’ in the absence of a physically present interaction partner, for example text-based chat or video-linked conversations. This may explain why individuals who tend to feel discomfort, fear, and embarrassment in the presence of a partner, i.e. are sexually shy, turn to cybersexual behaviour as a source of sexual pleasure which is free from the emotional ‘threat’ posed by a physically close partner. We therefore hypothesized that IA would be associated with sexual shyness.

Further, several studies showed that IA is associated with patterns of insecure attachment (Lei and Wu 2007, Lin et al. 2011, Schimmenti et al. 2014) which, in turn, positively predicts the development of internalizing problems (Pace et al. 2016). It has also been found that IA is associated with an interpersonal style characterized by coldness, distance, avoidance and detachment (Ha et al. 2007) and so we hypothesized that IA severity would be associated with a tendency to consider one’s partner as a sexual object, which results in neglect of the partner’s personality and failure to establish a close emotional relationship with sexual partners (*sexual detachment*).

As Griffiths (2012) suggested, IA is also associated with novel sexual activities that do not have an offline equivalent, such as sexual interactions within adult chat rooms. Accordingly, Cooper et al. (2000) found that their sample of cybersexually compulsive individuals was differentiated from moderately sexually compulsive and non-sexually compulsive individuals by a high tendency to sexual sensation seeking (the tendency to explore new or dangerous sexual activities). IA has also been associated with sexual promiscuity (Kingston et al. 2011). We therefore hypothesized that IA would be associated with a very tolerant attitude to sexual behaviour and sexual rules (*sexual permissiveness*).

Further, it has been shown that IA is associated with a tendency to engage in newsgroups for sexual activities which in turn is associated with particular and hard core sex preferences, such as sadism and masochism (Delmonico 1997). For this reason, it was hypothesized that IA would be associated with the tendency to express hostility and aggression during sexual acts (*aggressive sex*).

As previously discussed, looking for pornographic material for entertainment/masturbatory purposes is very common among Internet abusers, probably because both image (e.g., picture libraries, videos, live online, strip shows, Web-cam sites) and text-based (e.g., chat rooms) pornographic materials can be easily accessed online. Thus, it was hypothesized that IA would be associated with the tendency to appreciate explicit erotic images, both of verbal and graphic nature (*pornography*).

There are reasons to suppose that the hypothesized associations between sexual behavior and Internet addiction scores would be stronger in men than in women. In women, sexual behaviour is more likely to be associated with intimacy and committed relationships (Peplau 2003), and women usually report a greater need to feel and express love towards a sexual partner than men (Regan and Berscheid 1999). Women are significantly more likely than men to transfer their online sexual activities offline, suggesting that they do not find Internet sex activities entirely satisfying (Schneider 2000) and men are six times more likely than women to engage exclusively in online sexual activities (Cooper et al. 2004). Men tend to act out sexual fantasies online, whereas women look for romance and deep relationships in cyberspace (Young 1998) and although Young (1998) claimed that both men and women engage in cybersex, women seem to be more likely than men to want to establish some sort of relationship prior to cybersex. We therefore expected that the associations we predicted between IA severity and the sexual behaviour scales would be stronger in men than women. For this reason, we examined gender as a potential moderator of these associations, predicting that the effect of Internet addiction scores on sexual behaviors would be different among men and women.

We were also interested in assessing whether depression and anxiety affected the association between IA severity and sexual behaviour, as there is some evidence of an association between IA and depression or anxiety (Black et al. 1999, Shapira et al. 2000, Young and Rogers 1998). Both depression and anxiety have been shown to predict low sexual motivation and sexual dysfunction (Bancroft et al. 2003, Beck 1967, Beck and Bozman 1995, Bozman and Beck 1991, Carvalho and Nobre 2011, Nobre and Pinto-Gouveia 2006). On the basis of this research we investigated whether IA severity was associated with maladaptive behaviour when depression and anxiety were taken into account.

In sum, the hypotheses (H) of this research are listed as follows: it was hypothesized that IA scores would be positively associated with *sexual excitement* (H1), *sexual satisfaction* (H2), *sexual nervousness* (H3), *sexual shyness* (H4), *sexual detachment* (H5), *sexual permissiveness* (H6); *aggressive sex* (H7), *pornography* (H8). Furthermore, it was predicted that the associations between Internet addiction scores and the sexual behavior scales would be stronger for men than for women (H9), and that the association between Internet addiction scores and sexual behaviour would be moderated by anxiety and depression (H10).

Method

Participants

A total of 278 volunteer students (115 men and 163 women) recruited from the University of Messina participated in the study. Out of all of them, 18 had their data excluded because their Minnesota Multiphasic Personality Inventory (MMPI-2; Butcher et al. 2001, Nencini and Belcechi 1973, Tellegen et al. 2003) profiles indicated severe mental illness (i.e., schizophrenia) (defined on the MMPI-2 as T score >65). Inclusion criteria were the absence severe mental illness, heterosexuality, and a sexual history including at least one episode of heterosexual intercourse; this last criterion was selected to exclude persons who never had sexual intercourses as the hypotheses related to interpersonal sexual behavior.

The mean age of participants was 23.55years±4.59 (range, 18–47); men and women did not differ significantly in age, $F(1,277) = .75$, $p = ns$. Mean age of first intercourse was 17 years (SD = 3.02). The mean frequency of sexual intercourse was 4.21 for men and 3.74 for women while median frequency of sexual intercourse was 4 for both men and women (4 refers to 2–3 times/week). For more detailed socio-demographic characteristics of this sample, see **table 1**. Participants were recruited through advertisements placed on noticeboards and on the University website. To avoid bias in responses to psychodiagnostic tests students of psychology and medicine were excluded from the study as they usually receive basic psychometric training during their degree course.

Procedure

The study was introduced to the participants as an investigation into heterosexuality and personality; they were asked to answer self-report questionnaires anonymously. All the measures were administered under anonymous conditions and the participants provided written informed consent after a full explanation of the protocol design. The protocol had been previously approved by the local ethics committee. The sample was divided into groups of 25–50 participants and the questionnaires were administered to groups in large rooms to ensure confidentiality. Each group attended one session. Two trained psychologists, under blinded conditions about the aim of the study, administered the semi-structured interviews to single participants in single sessions. The MMPI-2 (Butcher et al. 2001, Nencini and Belcechi 1973, Tellegen et al. 2003) was used to detect psychopathological symptoms that might affect the reliability of the results. Participants did not receive any reward or compensation for participation, but they were told that they would receive a brief

summary of the results of tests at the end of the research. The entire procedure lasted about 180 minutes.

Measures

Sociodemographic variables. A sociodemographic questionnaire was used to collect data on age, sex, marital status, occupation, habitual residence, religion and socioeconomic status (socioeconomic status was inferred from data on parental income). Three questions were related specifically to sexual behaviour, these asked about experiences of sexual intercourse, age at first experience of sexual intercourse and frequency of sexual intercourses. Three other questions were related specifically to Internet use and concerned the number of hours spent on the Internet per week, current main Internet activity (social network; chat room activity; virtual games; news groups; mail; information search; adult web sites; other) and problems caused by Internet use (financial; legal; romantic; academic; occupational; sleep; relationship). Items about Internet activities and problems were rated on a five-point Likert scale anchored by 'never' and 'always'.

Sexual behavior. Sexual behaviour was measured using the Italian version of the Sex and the Average Woman (or Man) Scale (SAWM), a questionnaire that assesses sexual attitudes and sexual behaviour in non-clinical individuals (Eysenck and Wilson 1977). The questionnaire consists of 159 questions organised into 11 scales. It has closed answers (yes/no) and explores the different domains of sexual behaviour. For the purposes of this research we used the following scales: 1. Sexual Excitement (EXC: easiness and degree of arousal in response to sexual stimuli; 9 items, e.g. 'I get sexually excited very easily'); 2. Sexual Satisfaction (SAT: the general satisfaction that a person derives from his/her sex life; 12 items, e.g. 'All in all, I am satisfied with my sex life'); 3. Sexual Nervousness (NERV: the inability to achieve sufficient sexual gratification due to disturbing thoughts, emotions, and actions related to one's sex life; 13 items, e.g. 'Thoughts about sex disturb me more than they should'); 4. Sexual Shyness (SHY: the discomfort felt in the presence of the opposite sex; 6 items, e.g. 'I am afraid of sexual relationships'); 5. Sexual Detachment (DET: the tendency to consider a sexual partner as a sexual object, neglecting his/her personality and the importance of establishing an emotionally close relationship with him/her; 6 items, e.g. 'I believe in taking pleasure where I find it'); 6. Sexual permissiveness (PERM: a very tolerant attitude toward sexuality and its rules; 13 items, e.g. 'A naked body is pleasing'); 7. Aggressive Sex (AGGR: hostility during the sexual act; 13 items, e.g. 'I usually feel aggressive with my partner'); 8. Pornography (PORN: the appreciation of, or pleasure in, explicit verbal and graphic erotic material; 8 items, e.g. 'I like to look at sexy pictures'). The scales represent continua and no thresholds for pathological sexual behaviour are suggested. The questionnaire has been validated against other sexual, personality and social attitudes inventories (Eysenck 1976). The SAWM has already been used to investigate the relationship between personality and sexuality in a variety of clinical (Bruno et al. 2012, Eysenck 1971, 1973, La Torre et al. 2003) and non-clinical populations (Eysenck 1972, 1976, Martin et al. 1977; Micò et al. 2013; Muscatello et al. 2010; Schmitt and Buss 2000; Scimeca et al. 2013). It has shown good psychometric properties (Eysenck 1976). The Italian translation has demonstrated adequate reliability and discriminant and convergent validity. The scales

Table 1. Socio-demographic characteristics of participants by gender

Factor	Total	Males	Females
	(n=278) N (%)	(n = 115) N (%)	(n = 163) N (%)
Age (years)			
Mean (SD)	23.62 (4.39)	25.17 (4.18)	21.87 (4.21)
Median	22.00	25.00	21.00
Parents' income (euro)			
Mean (SD)	17580 (7688.84)	17460 (6692)	17620 (6667)
Marital Status			
Single	229 (89.5)	96 (37.5)	133 (52)
Married	23 (9)	12 (4.7)	11 (4.3)
Divorced	2 (.8)	0 (0)	2 (.8)
Widowed	2 (.8)	2 (.8)	0 (0)
Religion			
Catholic	223 (80.8)	84 (30.4)	139 (50.4)
Protestant	3 (1.1)	1 (.4)	2 (.7)
Jewish	1 (.4)	0 (0)	1 (.4)
Other	10 (3.6)	5 (1.8)	5 (1.8)
None	39 (14.1)	25 (9)	14 (5.1)
Residence			
Living with parents	202 (73.2)	80 (29)	122 (44.2)
Living with a family	3 (1.1)	3 (1.1)	0 (0)
Cohabiting	18 (6.5)	10 (3.6)	8 (2.9)
Sharing an accommodation	32 (411.6)	13 (4.7)	19 (6.9)
Living alone	15 (5.4)	8 (2.9)	7 (2.5)
Other	6 (2.2)	1 (.4)	5 (1.8)
Age at first sexual relation			
<14	11 (4.2)	6 (2.3)	5 (1.9)
15-16	80 (30.3)	41 (15.6)	39 (14.8)
17-18	100 (37.9)	40 (15.2)	60 (22.8)
>19	72 (27.)	28 (10.6)	44 (16.7)
Frequency of sexual intercourse			
2. 1 time/day	10 (3.8)	7 (2.6)	3 (1.1)
3. 4-6 times/week	34 (12.8)	18 (6.8)	16 (6)
4. 2-3 times/week	91 (34.3)	43 (16.2)	48 (18.1)
5. 1 time/week	37 (14)	12 (4.5)	25 (9.4)
6. 1 time/2 weeks	29 (10.9)	12 (4.5)	17 (6.4)
7. Rarely	45 (17)	16 (6)	29 (10.9)
8. Hardly never	19 (7.2)	7 (2.7)	12 (4.6)
Time being spent for Internet use per week	17.96 (17.94)	20.89 (19.62)	15.83 (16.44)
Internet users			
Minimal	195 (70.1)	83 (29.9)	112 (40.3)
Moderate	64 (23)	21 (7.6)	43 (15.5)
Excessive	19 (6.8)	11 (4.0)	8 (2.9)

used in this study had acceptable internal consistency (Cronbach's alpha coefficients between .82 and .88) in our sample; confirmatory factor analyses have provided evidence of the 11-factor structure of the SAWM (Micò 2010). The Internal consistency and reliability of the SAWM scales in our sample was estimated using Cronbach's alpha; the seven scales used in this study showed acceptable internal consistency, EXC: $\alpha = .82$; SAT: $\alpha = .84$; SHY: $\alpha = .81$; DET: $\alpha = .86$ NERV: $\alpha = .84$; AGGR: $\alpha = .82$; PERM: $\alpha = .84$; PORN: $\alpha = .87$. Because the questionnaire was originally applied to a sample of heterosexual students we decided to limit our investigation to heterosexual students.

Internet addiction. The Italian version of the Internet Addiction Test (IAT) has been used to measure Internet use during the preceding month (Ferraro et al. 2006, 2007; Craparo 2011). The IAT consists of 20 items scored on a five-point Likert scale (Young 1998) and takes about 15 minutes to complete; total scores range between 20 and 100. Thresholds were defined to classify Internet users as minimal users (scores from 20 to 39), moderate users (scores from 40 to 59) or excessive users (scores from 60 to 100) users on the basis of their reported addiction-related Internet behaviour (Young 1998). The Italian translation of the IAT has good reliability and discriminant and convergent validity (Ferraro et al. 2006, 2007). We used the six-factor model of the Italian version of the IAT, which assesses crucial aspects of Internet addiction: (1) the extent to which social life is compromised; (2) the extent to which individual quality of life is compromised; (3) compensatory use of the Internet; (4) the extent to which the user's academic or paid employment is compromised; (5) the extent to which time management is compromised and (6) excitatory Internet use (Ferraro et al. 2006, 2007). The six factors showed acceptable internal consistency (Cronbach's alpha coefficients between .80 and .87).

Negative emotions. The Hamilton Depression Scale (Ham-D) (Hamilton 1960) and the Hamilton Anxiety Scale (Ham-A) (Hamilton 1959) were used to assess symptoms of depression and anxiety. Scores were based on a semi-structured interview in which

the participant was asked about experiences over the previous week. Each item consists of an initial question and potential follow-up questions which can be used to explore or clarify symptoms. The Ham-D is a 17-item semi-structured interview that evaluates depressive symptoms such as depressed mood, health concerns, loss of interests, insomnia or psychomotor retardation. The items were rated on three- or five-point scales and scores on the scale range from 0 to 53; higher scores indicate higher levels of depression. Scores between 0 and 7 suggest no or minimal symptoms of depression, scores in the range 8–17 suggest mild depression, scores in the range 18–25 suggest moderate depression and scores of 26 or more are associated with severe depression. The validity of the Italian version of the scale has been confirmed (Pancheri et al. 2002). Internal consistency of the scale in this study was acceptable ($\alpha = .79$).

The Ham-A is a semi-structured interview protocol consisting of 14 items, each defined by a series of symptoms including anxiety, fear or phobias, insomnia, depression, palpitations, breathing difficulty, and restlessness. Symptoms are scored on a five-point scale, ranging from 0 (absent) to 4 (severe). Total score ranges from 0 to 56 and higher scores are associated with higher anxiety. Scores ranging from 0 to 7 suggest no or minimal symptoms of anxiety, whilst scores of 8 or above indicate anxiety. Previous research has documented the reliability and diagnostic validity of the Italian version (Albert et al. 2004, Maina et al. 2005). Inter-rater reliability for Ham-D and Ham-A was tested repeatedly during the study period and ranged from .74 to .88. The internal consistency of the scale in this study was good ($\alpha = .88$).

Statistical analyses

Gender differences in sexual behaviour scores and IA scores were assessed with separate MANOVAs using Pillai's criterion. Gender differences in qualitative variables (such as Internet activities) were investigated with chi-squared tests. Regression was used to analyse associations between Internet addiction and

Table 2. Descriptive statistics of sexual behavior, Internet addiction, anxiety, and depression test scores by gender

	Total (<i>n</i> =278)	Males (<i>n</i> = 115)	Females (<i>n</i> = 163)	<i>P</i> ^a
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	
SAWM				
Sexual excitement	4.43 (1.72)	5.52 (1.75)	3.67 (1.21)	<.0001
Sexual satisfaction	8.64 (2.12)	8.74 (2.13)	8.56 (2.12)	.49
Sexual nervousness	3.06 (1.96)	3.47 (2.16)	2.77 (1.76)	.003
Sexual shyness	1.4 (1.09)	.91 (1.04)	1.75 (.99)	<.0001
Sexual detachment	3.45 (2.61)	4.75 (2.89)	2.53 (1.94)	<.0001
Sexual permissiveness	8.91 (2.08)	9.71 (2.11)	8.34 (1.86)	<.0001
Aggressive sex	2.11 (1.47)	2.02 (1.44)	2.17 (1.51)	.41
Pornography	4.16 (2.08)	5.64 (1.74)	3.13 (1.63)	<.0001
IAT	36.81 (11.80)	37.59 (12.71)	36.27 (11.13)	.360
Ham-A	36.03 (9.09)	33.56 (8.98)	37.75 (8.8)	<.0001
Ham-D	36.22 (10.51)	34.29 (10.48)	37.53 (10.37)	.01

Note. SAWM Sex and the Average Woman (or Man) IAT Internet Addiction Test, Ham-A Hamilton Anxiety Scale, Ham-D Hamilton Depression Scale.

^a Multivariate and univariate analysis with GLM.

sexual behaviors. The hypotheses relating to gender, depression and anxiety were tested in two hierarchical multiple regression analyses. Statistical analyses were performed in SPSS for Windows 16.0 (SPSS 2007).

Results

The demographic data and prevalence rate of Internet addiction are shown in **table 1**. According to the IAT cut-off score, 195 students (70.1%) were classified as minimal users, 64 students (23.0%) as moderate users, and 19 students (6.8%) as excessive users. A chi squared test revealed no gender differences in the distribution of Internet users among the various IAT classes ($\chi^2 = 4.186$, d.f. = 2, $p = 0.123$). **Table 2** reports descriptive statistics for sexual behavior, IA, anxiety, and depression by gender. All scores were within the normal range for Italian normative samples (Ferraro et al. 2006, Bruno et al. 2014, Micò 2010). MANOVA using Pillai's criterion was used to assess the effects of gender on SAWM score and the eight SAWM factors; this yielded a multivariate significant effect, $F(8, 265) = 272.192$, $p < 0.0001$. Univariate comparisons revealed gender differences in scores on six scales; women had higher scores for sexual shyness whereas men had higher scores for sexual excitement, sexual nervousness, sexual detachment, sexual permissiveness and pornography. ANOVA also revealed gender differences in anxiety and depression; women reported higher levels of anxiety, $F(1, 262) = 14.185$, $p < .0001$, and depression, $F(1, 259) = 6.068$, $p = .014$, but there was no gender difference in IAT scores. No effect of socioeconomic status was found. **Table 3** reports descriptive statistics related to current main Internet activities and Internet problems by gender. Men reported spending more time on virtual games, $F(1, 272) = 8.03$, $p = .005$; information search, $F(1, 271) = 6.859$, $p = .009$; adult web sites, $F(1, 273) = 218.434$, $p < .0001$ and downloading, $F(1, 274) = 5.863$, $p = .016$.

Men also reported more sleep problems, $F(1, 273) = 4.524$, $p = .034$.

As a preliminary to hierarchical regression analysis we assessed multicollinearity with the variance inflation factor (VIF). VIF scores ranged between 1.34 and 1.68 and the largest condition index (CI) was below 10, suggesting a lack of significant multicollinearity (Belsley 1991). Then, to test our hypotheses, we performed a hierarchical multiple regression analysis in which sexual variables were entered in Step 1, gender was added in Step 2, and the interaction terms between the sexual variables and gender (calculated with partialled products based on centered variables) were added in Step 3. **Table 4** shows the results of the hierarchical multiple regression analysis: sexual behavior (sexual satisfaction, sexual nervousness, sexual shyness, and sexual detachment) was a significant predictor of IAT scores, accounting for 28.8% of the variance (Model 1); adding gender in the second step did not significantly increase the explained variance in IAT scores (Model 2), as did the interaction between predictors and gender (Model 3).

Finally, in order to verify whether the depression and anxiety affected the association between sexual behavior scores and IA scores, a hierarchical multiple regression analysis was performed. Anxiety and depression were added in the first step and the sexual scores scales in the second step in order to determine whether the sexual scales predicts IA scores, over and above the variables entered in the first step. **Table 5** shows that, in line with our predictions, the sexual scales significantly predicted variance in IA scores (Model 2), beyond that predicted by the anxiety and depression (Model 1). Adding the sexual scales in the second step significantly increased by 20.8% the explained variance in IA scores (Model 2), with sexual satisfaction ($sr = .16$), sexual nervousness ($sr = .15$), sexual shyness ($sr = .12$), and sexual detachment ($sr = .19$), contributing significant unique variance to the prediction of IA scores.

Table 3. Descriptive statistics on Internet activities and Internet problems

	Total (n=278)	Males (n = 115)	Females (n = 163)	
	M (SD)	M (SD)	M (SD)	p ^a
Internet activity				
Social network	3.88 (1.04)	3.75 (1.04)	3.98 (1.03)	.082
Chat room activity	3.21 (1.77)	3.19 (2.4)	3.23 (1.17)	.824
Virtual games	2.13 (1.84)	2.5 (2.5)	1.87 (1.11)	.005
News groups	2.33 (1.21)	2.4 (1.24)	2.28 (1.19)	.442
Mail activity	3.43 (.99)	3.42 (1.06)	3.44 (.93)	.912
Information search	2.88 (1.18)	3.1 (1.13)	2.72 (1.13)	<.0001
Adult web sites	1.82 (1.11)	2.7 (1.08)	1.2 (.58)	.009
Download	3.66 (.95)	3.82 (.97)	3.54 (.92)	.016
Other	3.83 (.87)	3.81 (.88)	3.54 (.92)	.666
Internet problems				
Financial	1.28 (.64)	1.30 (.64)	1.27 (.64)	.628
Legal	1.14 (.49)	1.09 (.32)	1.17 (.58)	.169
Romantic	2.01 (1.14)	1.91 (1.05)	2.07 (1.19)	.245
Academic	2.24 (1.27)	2.21 (1.27)	2.25 (1.27)	.805
Occupational	1.65 (1.3)	1.75 (1.61)	1.58 (1.04)	.300
Sleep	2.3 (1.22)	2.49 (1.27)	2.17 (1.17)	.034
Relationship	1.54 (.84)	1.63 (.89)	1.48 (.81)	.149

Note. SAWM Sex and the Average Woman (or Man) IAT Internet Addiction Test, Ham-A Hamilton Anxiety Scale, Ham-D Hamilton Depression Scale.

^a Multivariate and univariate analysis with GLM.

Table 4. Hierarchical multiple regression analysis predicting Internet addiction scores

	Model 1					Model 2					Model 3				
	β	t	p	r	sr	β	t	p	r	sr	β	t	p	r	sr
Sexual excitement	-.00	-.06	.953	.09	-.00	.00	.00	.996	.09	-.00	.01	.23	.815	.09	.01
Sexual satisfaction	-.19	-3.34	.001	-.30	-.17	-.19	-3.3	.001	-.30	-.20	-.19	-3.22	.001	-.30	-.17
Sexual Nervousness	.2	3.16	.002	.37	.16	.20	3.16	.002	.37	.17	.22	3.25	.001	.37	.17
Sexual Permissiveness	.04	.68	.492	.12	.04	.04	.71	.481	.13	.04	.06	.96	.336	.13	.05
Sexual shyness	.18	3.29	.001	.23	.17	.18	3.29	.001	.23	.17	.19	3.46	.001	.24	.18
Sexual detachment	.26	3.51	.001	.36	.19	.26	3.51	.001	.36	.19	.26	3.26	.001	.36	.17
Aggressive Sex	.11	1.68	.093	.31	.09	.10	1.54	.124	.31	.08	.12	1.75	.080	.31	.09
Pornography	-.11	-.15	.128	.17	-.08	-.11	-1.36	.174	.17	-.07	-.11	-1.36	.173	.17	-.07
Gender						-.01	-.18	.852	.07	-.01	-.01	-.17	.861	.07	-.01
Interaction											-.04	-.59	.555	.24	-.03
Model R ²	.288					.288					.317				
R ² Change	.288					0					.029				
F	(8,269) =12.800*					(9,268) = 11.338*					(10,267) =6.264*				

Note. * $p < .001$; Male coded as 1, female coded as 2

Table 5. Hierarchical multiple regression analyses predicting Internet addiction scores from sexual behavior controlling for negative emotions

	Model 1					Model 2				
	β	t	p	r	sr	β	t	p	r	sr
Ham-A	.08	.88	.38	.29	.05	.01	.16	.869	.29	.01
Ham-D	.26	2.69	.007	.33	.16	.14	1.51	.130	.33	.08
Sexual excitement						-.01	-.02	.979	.07	-.01
Sexual satisfaction						-.17	-2.97	.003	-.32	-.16
Sexual nervousness						.18	2.91	.004	-.39	-.15
Sexual permissiveness						.06	.967	.335	.11	.05
Sexual shyness						.13	2.34	.020	.22	.12
Sexual detachment						.26	3.52	.001	.37	.19
Aggressive sex						.082	1.31	.190	.31	.07
Pornography						-.122	-1.61	.108	.16	-.08
Model R ²	.112					.320				
R ² Change	.112					.208				
F	(2,275) =15.752*					(10,267) =11.414*				

Note. * $p < .001$

Discussion

The aim of this study was to verify whether specific sexual attitudes were associated with Internet addiction scores in a sample of Italian University students. The role of gender, depression and anxiety was also taken into account. The hypotheses of this research were partly confirmed. First, the association between sexual response and IA scores was considered and it was found that excessive Internet use was associated with low levels of sexual satisfaction but not with sexual excitement. This result is consistent with case studies showing that individuals who are dissatisfied with their sexual lives turn to excessive Internet sexual activities - sexual chats or sexual websites - to compensate for their frustrated sexual desires (Orzack and Ross 2000). As suggested by McKenna et al. (2001), individuals who are dissatisfied with their sexual relationships may turn to the net to express their needs, and thus locate their sexual selves in the net rather than in the framework of offline sexual intimates.

The results of this study also suggest that IA scores are associated with a propensity to have a distressed sex life (sexual nervousness), defined as the tendency to experience disturbing thoughts, emotions, and actions arising from their sex life. This result is consistent with studies showing that excessive Internet use is associated with sexual difficulties, such as past sexual abuse experiences, post-traumatic stress disorders, sexual disorders (e.g., paraphilias and hypersexuality), and sexual compulsivity (Cooper et al. 1999, Cooper et al. 2001, Cooper et al. 2004, Cooper et al. 2006, Guzzo et al. 2014, Orzack and Ross 2000, Schwartz and Southern 2000). It is not easy to understand the direction of this association. It may be that individuals experiencing difficulties in their sexual lives engage in excessive Internet use in order to cope with their inner conflicts. It is also possible that they are able to satisfy their sexual interests via the Internet and thus their Internet use reinforces and aggravates maladaptive sexual attitudes. On the other hand, excessive involvement in the Internet has a severe negative impact on intimate relationships (Young 1998) and may have a deleterious effect on sexual life. Since the direction on this link is not entirely clear, further research is needed to address this issue.

Further, the results of this study suggest that IA scores are associated with the tendency to feel discomfort, fear, and embarrassment in the presence of the opposite sex (sexual shyness). This result is consistent with studies showing that shyness is associated with IA scores (Chak and Leung 2004, Scealy et al. 2002). It is also consistent with case studies evidencing that individuals who have difficulties in approaching partners for sexual purposes turn to excessive Internet use for sexual activities to compensate for the difficulty with interpersonal sexual relationships (Levine 2010). Thus, individuals who are embarrassed by the presence of a sexual partner may share their sexual interests on the net, without the threatening physical presence of another person.

Finally, our study showed that IA scores are associated with sexual detachment, defined as the tendency to consider the partner as a sexual object, neglecting his/her personality and the importance of establishing a close emotional relationship with him/her. This is consistent with studies showing that IA is associated with coldness and avoidant tendencies (Ha et al. 2007). The Internet offers many opportunities to engage in sexual interactions without any affective involvement. Interestingly, Griffiths (2000) noticed that excessive use of the net for sexual purpose is

characterized by a tendency to seek out partners for transient sexual relationships (e.g. escorts, prostitutes, swingers) via chat rooms, online personal advertisements, and escort agencies. This suggests that individuals who feel uncomfortable with emotional closeness to others find such transient sexual contact an easy way to fulfill their sexual needs whilst bypassing emotional involvement which would be at odd with their avoidant sexual style.

No gender differences were detected; gender did not act as a moderator of the associations we found. Although men are more likely than women to develop IA and to engage in online sexual activities, it may be possible that gender may influence the type of Internet activity rather than the extent of addiction. As previously suggested, women are significantly more likely than men to transfer their online sexual activities offline, using the net to search for committed relationships rather than for casual sexual activities (Schneider 2000, Young 1998). Accordingly, Schimmenti et al. (2017) found that women are significantly more likely than men to use the Internet as a way to build relationships with other people. Future research should address this question.

Undoubtedly, this study has several limitations. The research sample consisted of University students recruited from an urban area of Southern Italy: results would have been more valid if the sample was more heterogeneous on age and cultural/socioeconomic variables. Secondly, this study had a correlational design and possible effects of third variables could not be excluded; finally, it was not possible to predict the direction of causality between the variables we studied.

There are several pieces of evidence indicating that sex is important in the context of the Internet, it has been shown that 'sex' is the most researched topic on the Internet (Cooper et al. 1999) and that approximately one-third of all Internet users visit some type of sex-related website (Cooper et al. 2000). Overall, our study supports the hypothesis that sexual behavior may be an important contributor to excessive Internet use; the results of this study showed that on sexual behavior scores accounted for 28.8% of the variance on IA severity scores. Therefore, mental health professionals should consider the possibility that certain sexual attitudes, among other factors, may predispose to the development of IA. Hence, an accurate assessment of sexual behavior of individuals suffering from IA may provide further insight into the psychological approaches that should be used for this growingly prevalent behavioral addiction.

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