

Internet addiction is associated with social anxiety in young adults

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BACKGROUND: Problematic Internet use (PIU) or excessive Internet use is characterized by excessive or poorly controlled preoccupations, urges, or behaviors regarding computer use, and Internet access that leads to impairment or distress. Cross-sectional studies on samples of patients reported high comorbidity of Internet addiction with psychiatric disorders, especially affective disorders (including depression), anxiety disorders (generalized anxiety disorder, social anxiety disorder), and attention-deficit/hyperactivity disorder.

METHODS: We have investigated the association between Internet addiction and social anxiety in 2 samples of 120 university students (60 males and 60 females in each sample).

RESULTS: We found a correlation between Internet addiction and social anxiety in the 2 samples ($r = .411, P < .001$; $r = 0.342, P < .01$) respectively. Secondly, we found no difference between males and females on the level of Internet addiction. Finally we did not find a preference for social networks among participants with high levels of social anxiety.

CONCLUSIONS: The results of the study support previous evidence for co-occurrence of Internet addiction and social anxiety, but further studies need to clarify this association.

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INTRODUCTION

Problematic Internet use, or Internet addiction, is characterized by excessive or poorly controlled preoccupations, urges, or behaviors regarding Internet use that lead to impairment or distress. The increased use of the Internet over the past 15 years has attracted the attention of researchers

METHODS

and clinicians in the field. Young¹ and Griffiths^{2,3} were the first to define this disorder and have done extensive research on it. There are at least 3 subtypes of Internet addiction: excessive gaming-gambling, sexual preoccupations (cybersex), and socializing or social networking including e-mail/text messaging. Internet addicts may use the Internet for extended periods, isolate themselves from other forms of social contact, and focus almost entirely on the Internet rather than broader life events.

Cross-sectional studies on samples of patients report high comorbidity of Internet addiction with psychiatric disorders, such as affective disorders, anxiety disorders (including generalized anxiety disorder, social anxiety disorder), and attention-deficit/hyperactivity disorder (ADHD). Some have suggested⁴ that the relationship between loneliness and preference for online social interaction is spurious and that social anxiety is the confounding variable in Internet addiction.

There is evidence for co-occurrence of Internet addiction with depressive disorders in adults.⁵⁻⁷ Anxiety disorder was found in several studies of adult problematic Internet users.^{8,9} Among adolescents, Internet addiction was associated with depression among South Korean adolescents,¹⁰ along with high levels of depression and suicidal ideation.^{11,12} ADHD symptoms, depression, social phobia, and hostility were high among adolescents with Internet addiction in Taiwan.^{13,14} Excessive gaming was associated with severe depressive social phobia and Internet addiction symptoms in Taiwan. Female online gamers had fewer weekly online gaming hours and a shorter previous online gaming history, but tended to have more severe somatic, pain, and social phobic symptoms.¹⁵ (See Weinstein et al¹⁶⁻¹⁸ for reviews on Internet addiction and co-occurrence with psychiatric disorders.)

Our purpose in this study was to assess Internet addiction and social anxiety in 2 cohorts of university students in Israel. Based on previous studies in adults,^{8,9} we hypothesized first that Internet addiction would be associated with social anxiety in both samples. Secondly, based on previous evidence for sex differences between anxious Internet addicted individuals,¹⁹⁻²¹ we predicted that men would show higher levels of Internet addiction than females. Third, based on studies showing that Internet-addicted individuals with high levels of social anxiety prefer socializing online than real-life communication,^{22,23} we predicted that such individuals would prefer using social networks over other forms of Internet addiction.

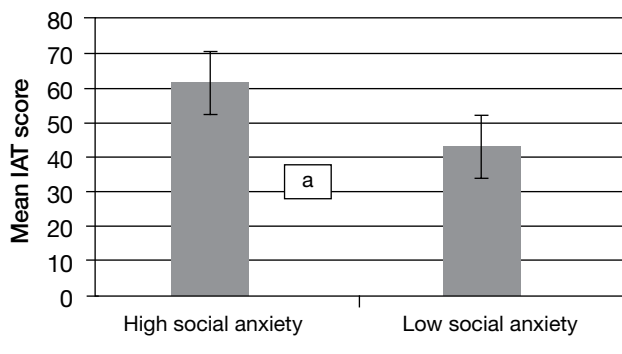
Study 1

A total of 120 students participated in our first study, 60 males and 60 females, age 20 to 60 with mean age of 29 years and 1 month (SD = 9.47). The male mean age was 29 years and 8 months (SD = 9.83), female mean age was 28 years and 5 months (SD = 9.15). Reported use of the Internet in all participants included 46.7% for social networks, 48.3% mainly for studies, work, and e-mail, 5% for playing computer games. Among males, 55% reported main use for studies, work, and e-mail whereas among females 57.6% reported main use for social networks. Among the participants, 49.2% were students earning a bachelor's degree, 35.8% had a high school certificate, 10% had advanced post-high school education, 4.2% had master's degree and above, and 0.8% had not finished high school. Employment status included 44.2% with a full-time job, 33.33% with a part-time job, and 22.47% were unemployed. Marital status included 67.5% single, 27.5% married, and 5% divorced. The majority of participants (82.5%) were born in Israel; the rest were born in the Ukraine, United Kingdom, Switzerland, United States, Lithuania, Morocco, Argentina, and Russia.

We used a demographic questionnaire with details on sex, age, year of birth, country of birth, marital status, employment, education, and Internet use. Social anxiety was measured using the Liebowitz Social Anxiety Scale,²⁴ which evaluated anxiety and avoidance of social situations and has been validated.²⁴⁻²⁶ The questionnaire has 24 items: 13 describe situations in which performance is required and 11 describe social interactions. The responses of fear or avoidance are from 1 (never) to 4 (very much). In our study, the questionnaire had a Cronbach internal validity of $\alpha = 0.966$.

We measured Internet addiction using the Young Internet Addiction Test (IAT),¹ which consists of 20 items measuring compulsive use of the Internet on a scale of 1 (never) to 6 (always). The cut-off point of Internet addiction is score ≥ 80 . The questionnaire has been validated in many studies in the United Kingdom,²⁷ United States,^{28,29} Finland,³⁰ Germany,³¹ and Iran.³² In our study, the IAT had a Cronbach internal validity of $\alpha = 0.927$. The questionnaires were delivered on the Internet using special groups and forums dedicated to social anxiety and Internet addiction. A demographic questionnaire also was administered and it was made clear in advance that participation was anonymous and voluntary. The study

FIGURE 1
Difference in IAT scores between low and high social anxiety participants in Study 1



* $P < .05$.

IAT: Young Internet Addiction Test.

was approved by the institutional review board (IRB-Helsinki committee) of the university.

Results

We found a positive moderate Pearson correlation ($r = 0.342$; $P < .001$) between Internet use and social anxiety. To examine further the association between Internet use and social anxiety, participants were divided into high social anxiety (mean score >1.5) and low social anxiety (mean score <1.5) groups. A post-hoc t test found that those with a high social anxiety score had a higher level of Internet addiction compared with low social anxiety ($t [2,118] = 2.991$, $P < .05$). Mean IAT scores were 61.5, (SD = 20.82) and 43 (SD = 15.01) for the high and low social anxiety groups respectively. See **FIGURE 1** for a comparison of IAT scores between low and high socially anxious participants.

To test the second hypothesis that men are more addicted to the Internet than women, we did a comparison between IAT scores in men and women and found no significant difference between them ($t [2,116] = 1.529$, $P = ns$). Frequency measures of Internet use showed that among those who have a high social anxiety score, 75% were men and 25% women.

To test the third hypothesis that those with high levels of social anxiety would use social networks on the Internet more often, we compared frequencies of Internet use between the high and low social anxiety groups and found no significant differences. The **TABLE** shows frequencies of Internet use in low and high social anxiety participants.

To test a possible difference between men and women in social anxiety, we did a repeated measures analysis of variance (ANOVA) on social anxiety scores and sex. It revealed a significant social anxiety effect ($F_{1,115} = 10.14$, $P < .05$) but no significant sex effect ($F_{2,115} = 0.718$, $P = ns$) or sex by social anxiety interaction ($F_{1,115} = 0.079$, $P = ns$).

Study 2

Procedure. The second study included 120 students, age range 20 to 40. There were 60 women, mean age 23 years and 8 months (SD = 2), and 60 men, mean age 25 years and 8 months (SD = 2.5). The questionnaires were the same as in the first experiment, including a demographic questionnaire with details on sex, age, year of birth, country of birth, marital status, employment, education, and Internet use. Social anxiety was measured using the Liebowitz Social Anxiety Scale,²⁴ which in our study had a Cronbach internal validity of $\alpha = 0.88$. Internet addiction was measured using the IAT,¹ which in our study had a Cronbach internal validity of $\alpha = 0.84$. Questionnaires were administered to students at the university. Participants were informed that the questionnaire was anonymous and they were free to withdraw from the study any time. The study was approved by the university's institutional review board for human experiments (Helsinki).

Results. To test our first hypothesis, the team looked for a correlation between social anxiety scores and Internet addiction scores; there was a positive moderate Pearson correlation ($r = 0.410$, $P < .001$) between Internet use and social anxiety. We have performed separate correlation analysis between social anxiety and Internet addiction scores for men and women and found a moderate positive correlation for men ($r = 0.531$; $P < .001$) and a weak correlation for women ($r = 0.301$; $P < .001$).

To test the second hypothesis that men are more addicted to the Internet than women, we did a post-hoc comparison using a t test and found no significant difference between men and women ($t [2,118] = -0.817$, $P = ns$). In our analysis of sex differences in social anxiety, a post-hoc comparison using a t test found no significant differences between men and women ($t [2,118] = 2.273$, $P = ns$). To examine further the association between Internet use and social anxiety, participants were divided into high social anxiety (mean score >1.5) and low social anxiety (mean score <1.5) groups. A post-hoc t test found that those with a high social anxiety score had a higher level of Internet addiction compared with low social anxiety

mean IAT score ($t [2,118] = 3.26, P < .05$). Mean IAT scores for the high social anxiety group were 30.55, ($SD = 2.48$) and the mean IAT score of the low social anxiety group was 23.54 ($SD = 1.3$). See **FIGURE 2** for differences in IAT scores between the low and high social anxiety participants.

DISCUSSION

The main finding in this study, which evaluated 240 men and women, was a moderate positive association between Internet addiction and social anxiety in a sample of participants in Internet forums for Internet addiction and social anxiety and a second sample of university students. Secondly, there was no sex difference in Internet addiction scores between males and females. Third, among those with high levels of social anxiety there was no preference for social networks over other forms of Internet use, indicating that they do not use the Internet mainly for social purposes necessarily.

Our results support findings of previous research showing an association between poor social skills and excessive Internet use³³ and that in males fear, anxiety, and depression were correlated positively with cognitions about problematic Internet use.³⁴ Also, adolescents with Internet addiction have high levels of social anxiety.³⁵ There is supporting evidence for a positive correlation between problematic Internet use and shyness, loneliness, and avoiding social relationships,³⁶⁻⁴⁰ and dating anxiety.⁴¹ Furthermore, problematic Internet users were more neurotic and less extraverted, more socially anxious and emotionally lonely, and gaining greater support from Internet social networks than average Internet users.⁴²

Specifically, social anxiety is associated with a lack of confidence in presentation skills and an intention to create a positive impression on others. To reduce anxiety, socially anxious individuals prefer encounters with low-risk social communication. They therefore choose online interaction over face-to-face communication because of the lower risk involved in online communication, which enables them to hide and control the less positive aspects of their appearance and behavior.⁴³ Furthermore, students who were lonely or did not have good social skills could develop strong compulsive Internet use behaviors resulting in negative life outcomes (eg, harming other significant activities such as work, school, or significant relationships) instead of relieving their original problems. Such augmented negative outcomes were expected to isolate indi-

TABLE
Frequencies of Internet use in low and high social anxiety participants in Study 1

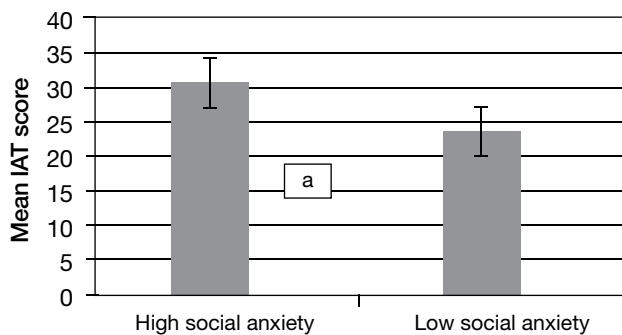
Social anxiety		Frequency	Percent
Low	Studies, work, e-mail	52	48.6%
	Computer games	5	4.7%
	Social networks	50	46.7%
	Total	107	100.0%
High	Studies, work, e-mail	6	50.0%
	Computer games	1	8.3%
	Social networks	5	41.7%
	Total	12	100.0%

viduals from healthy social activities and lead them into more loneliness.²² These studies support our main finding that the higher the level of social anxiety the greater becomes the occupation and addiction to the Internet.

These findings are compatible with the social compensation hypothesis that states the Internet primarily benefits individuals who feel uncomfortable communicating face-to-face. A study among students in the Midwestern United States²³ showed that individuals higher in social anxiety reported greater feelings of comfort and self-disclosure when socializing online than less socially anxious individuals, but reported less self-disclosure when communicating face-to-face. However, in a second study, social anxiety was associated most strongly with lower quality of life and higher depression among individuals who communicated frequently online. Their results suggested that, whereas social anxiety may be associated with using the Internet as an alternative to face-to-face communication, such a strategy may result in poorer well-being.

This explanation also is compatible with the explanation that socially anxious individuals may find it easier to interact online where anonymity can be maintained rather than engage in face-to-face interaction where being observed by others might induce a fear of negative evaluation.⁴⁴ Furthermore, among computer video game addicts in Taiwan, the more severe the symptoms of social anxiety were the greater was the addiction to computer games because they provided the player with alternative virtual reality that enabled him to avoid social difficulties in real life.¹⁵ On the other hand, Internet addiction makes individuals become more introverted, take a step back from family and friends, and enhance social anxiety.^{21,45} Internet addiction can therefore increase the

FIGURE 2
Difference in IAT scores between low and high social anxiety participants in Study 2



* $P < .05$.

IAT: Young Internet Addiction Test.

fear and anxiety of negative social evaluation and delay face-to-face interaction.⁴⁶ The relationships may be bi-directional so perhaps those who suffer from social anxiety turn to the Internet because it is easier to use; but on the other hand, excessive Internet use can exacerbate social isolation in those who are already suffering from it. There also are contradictory findings from a study in Sydney, Australia, showing that the Internet can be used to deal with social anxiety and actually can reduce it. Chatting online therefore can be training for developing better social skills.⁴⁷

The lack of finding of sex differences in Internet addiction scores in both our studies is surprising because a study in South Korea showed that Korean males are more likely to be addicted to the Internet than women.²⁰ In Isfahan, Iran, anxious male science students were reported to have used the Internet to escape from troubling thoughts and consequently developed social anxiety,¹⁹ and anxious male students at the University of Sargodha in Pakistan reported higher incidence of Internet addiction, which was detrimental to their academic achievements and social activity.²¹

An explanation for sex differences could be that sex and cultural expectations differ between men and

women; whereas men are expected to be “bold, tough, and assertive,” women are expected to be “gentle, kind, and sensitive.” The drive to be successful in Internet games and activity therefore may drive ambitious men to be more vulnerable to Internet addiction²⁰ whereas women in Taiwan were more in control than men and therefore less vulnerable to develop Internet addiction.¹³ These cultural differences may not hold for Western societies and perhaps for our population. Yet, other biological and psychological factors may be involved in the propensity to be addicted to the Internet and to sex differences in that respect.

Limitations of the study include the sample size, which although it is adequate to detect an association between Internet addiction and social anxiety, may be too small to detect more subtle effects such as sex differences in Internet addiction and social anxiety. Secondly, the sample of the second study consisted of university students and may not be representative of the general adult population in terms of the frequency of Internet addiction or the prevalence of social anxiety. Third, although there is growing recognition of Internet addiction among clinicians, it is still unrecognized as a psychiatric disorder and there are controversial issues concerning assessment and diagnosis.¹⁶⁻¹⁸ Finally, the participants in both studies were relatively young adults (on average between 24 years and 8 months to 29) and that may have affected rates of Internet addiction and prevalence of social anxiety.

In conclusion, our study found a moderate positive association between Internet addiction and social anxiety in 2 samples of the general population. We did not find any sex difference in Internet addiction or levels of social anxiety in both populations nor did we find any preference for social networks in those with high social anxiety. Further studies will be required to explore further the reciprocal relationship between Internet addiction and social anxiety that run through the fabric of modern society. ■

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