



## **Internet addiction antecedents: Self-control as a predictor**

**Mohammad Sadegh Shirinkam<sup>1\*</sup>, Amir Mohammad Shahsavarani<sup>2</sup>, Leila Moayer Toroghi<sup>2</sup>, Mahdiye Mahmoodabadi<sup>2</sup>, Alireza Mohammadi<sup>2</sup> and Kolsum Sattari<sup>2</sup>**

<sup>1</sup>*Iranian Psychiatric Rehabilitation Center, Rasht, Iran*

<sup>2</sup>*Institute of PsychoBioSocioEconomic Sciences, Tehran, Iran*

*Corresponding email: [misagh\\_global@yahoo.com](mailto:misagh_global@yahoo.com)*

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### **ABSTRACT**

*Internet addiction is a result of penetration of internet technology to the modern world and has inundated a substantial proportion of human societies, so that many of mental professionals have considered it as amounting threatening issue of mental health. Many factors are suggested to be of capability of predicting internet addiction, include self-efficacy and self control, whose roles are evaluated in this study. This survey study was conducted on 395 female and male university students of SardarJangalUniversity, Rasht, Iran. Instruments comprised Internet Addiction Test , and Self-Control Scale (Tangney, 2004), which were administered by all participants. findings of regression analysis showed that self-control has significant negative relation with internet addiction ( $p < .05$ ) and male students gained higher scores in internet addiction than females. Moreover, no significant difference was found among students of different university majors in internet addiction scores. It appears that self-control abilities can reduce the rate of internet addiction in university students. Therefore, future programs and plans of tri-layer prevention can focus on teaching for self-control among university students as well as school-aged students and families to deliberately decrease internet addiction in various sectors of society.*

**Keywords:** Internet addiction, self-control, internet addiction disorder (IAD), Problematic internet use (PIU), internet addiction prevention, university students.

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### **INTRODUCTION**

Internet and its usage have changed human life in various dimensions and aspects; communication methods, commercial affairs, and entertaining activities have totally differed these days. In spite of these positive outcomes, a new issue has emerged; an increasing number of people are devoting excessive daily life hours on internet. A growing number of studies in psychosocial domains are now involved in inappropriate use of internet and revealed that such trend truly has characteristics of addictive behaviors[27]. The phrases Internet addiction, pathological internet use, internet abuse, internet compulsion, internet obsession, problematic internet use, addiction to internet, excessive use of internet, etc., are all aimed to describe/explain the situation in which individual is absorbed and involved in using virtual/cyber space and/or its related components so that she/he neglects other aspects/domains of life[57].

Young was one of the pioneers of investigation of internet-related problems and addressed it as "Internet addiction" to describe those who are inundated in internet use and suffer from its negative outcomes [59]. Afterwards, criteria of internet addiction were classified and introduced under the name "Pathological/Problematic Internet Use (PIU)" according to diagnostic criteria of pathological gambling[61]. Although there is no unique and totally accepted definition of PIU, various authors have suggested descriptions and explanations of key features and characteristics of PIU in which there are similarities such as tolerance, withdrawal, and mood adjustment. Some major dimensions and criteria of PIU are presented in table 1.

**Table 1: Features and criteria of PIU**

<b>Author</b>	<b>Definition/Description criteria</b>
Lu, & Yeo (2015)	<ol style="list-style-type: none"> <li>1. tolerance, time management problems &amp; neglect of duty</li> <li>2. neglect of social life</li> <li>3. problematic use &amp; reality substitute</li> <li>4. withdraw &amp; emotional conflict</li> <li>5. intentionally concealing behavior</li> <li>6. lack of control</li> </ol>
Widyanto, Griffiths, & Brunsten (2011)	<ol style="list-style-type: none"> <li>1. Psychological/emotional conflict</li> <li>2. Time-management problems</li> <li>3. Mood modification</li> </ol>
Chang and Law (2008)	<ol style="list-style-type: none"> <li>1. withdrawal &amp; social problems</li> <li>2. time management &amp; performance</li> <li>3. reality substitute</li> </ol>
Ferraro, Caci, D'Amico, & Di Blasi (2007)	<ol style="list-style-type: none"> <li>1. compromised social quality of life</li> <li>2. compromised individual quality of life</li> <li>3. compensatory usage of the Internet</li> <li>4. compromised academic/working careers</li> <li>5. compromised time control</li> <li>6. excitatory usage of the Internet</li> </ol>
Widyanto, & Griffith (2007)	<ol style="list-style-type: none"> <li>1. Salience</li> <li>2. Mood modification</li> <li>3. Tolerance</li> <li>4. Withdrawal symptoms</li> <li>5. Conflict</li> <li>7. Relapse</li> </ol>
DiNicola (2004)	<ol style="list-style-type: none"> <li>1. Preoccupation with the Internet or Internet related activities</li> <li>2. Tolerance in terms of a need to spend increasing amounts of time online in order to achieve desired excitement</li> <li>3. Repeated attempts to control, reduce, or stop Internet use or to avoid a particular type of content</li> <li>4. Withdrawal symptoms including restless or irritability when attempting to cut down or stop Internet use</li> <li>5. Internet use to escape problems or as a means of relieving dysphoric mood (e.g., helplessness, guilt, anxiety, depression)</li> <li>6. Lying to family members, significant others, employers, or therapist to conceal extent of involvement with the Internet or type of content accessed online</li> <li>7. Has committed illegal acts online (e.g., hacking into computer networks, copying files illegally, downloading illegal content), but not including swapping or sharing of music files</li> <li>8. Has jeopardized or lost a significant relationship, job, or educational opportunity because of involvement with the Internet</li> <li>9. Guilt about the amount of time spent online and/or guilt related to the activities engaged in online.</li> </ol>
Widyanto and McMurran (2004)	<ol style="list-style-type: none"> <li>1. Salience</li> <li>2. Excessive use</li> <li>3. Neglect work</li> <li>4. Anticipation</li> <li>5. Lack of control</li> <li>6. Neglect social life</li> </ol>
Shapira et al (2003)	<p>Maladaptive preoccupation with Internet use, as indicated by at least one of the following:</p> <ol style="list-style-type: none"> <li>1. Preoccupations with use of the Internet that are experienced as irresistible</li> <li>2. Excessive use of the Internet for periods of time longer than planned</li> <li>3. The use of the Internet or the preoccupation with its use causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.</li> <li>4. The excessive Internet use does not occur exclusively during periods of hypomania or mania and is not better accounted for by other Axis I disorders.</li> </ol>
Young (1998)	<ol style="list-style-type: none"> <li>1. Neglect of routine duties</li> <li>2. social isolation</li> <li>3. being secretive about online activities</li> </ol>
Goldberg (1996)	Internet Addiction Disorder Diagnostic Criteria regarding to DSM-IV substance abuse and dependence or pathological gambling.

According to Young, internet addiction is a broad term which comprises a wide range of behaviors and impuls control actions. She has classified internet-addictive behaviors into five subtypes[60].

1. **Cybersexual addictive behaviors:** Obsessive/compulsive use of adult websites in order to cybersex and/or cyberporn.
2. **Cyber-relationships addictive behaviors:** Over-involvement in online relationships
3. **Net compulsive behaviors:** Obsessive/compulsive online daily gambling, shopping, and/or trade-offs.
4. **Information overload:** Compulsive web-surfing and/or database searching(s)
5. **Computer addictive-behavior:** excessive and obsessive playing with computer such as cards, minesweeper, and/or online gaming.

However, some authors believe that some of these addictive obsessive/compulsive behaviors are not internet addiction and instead, people are using internet as an instrument to satisfy their other addictive behaviors. Therefore, it appears to be sound to distinguish between “addiction to the internet” and “addiction on the internet” [16]. Meanwhile, some authors in their studies have found true signs and symptoms of internet addiction, not its usage as a medium to other addictive behaviors [16,59].

Dealing with all types of addictive behaviors are difficult and costly. Internet addiction is one of such pathological features which is rising according to incremental widespreading of computer technology. Such type of addictive behavior, as a result of internet technologies to modern life, has concerned many experts in psychosocial domains. In Iran, alike all other developing countries, studies about internet addiction are in their beginning stages and there is a great need to investigate diverse aspects of such new-coming phenomenon and at-risk populations [11].

Studies have shown that internet and computer are becoming the major entertaining activity of young adults' life in Asian nations and have resulted in many issues such as decrease in daily activities, mistrust of parents towards their children, decrease of face-to-face communications, social anxiety, impaired attachment styles, social withdrawal, fear of others' evaluation, drop in academic achievement, decline in social activities and psychosocial well-being [28, 2015; 52, 54].

Recent studies on internet addiction are mainly emphasize on three domain of problems including individual (intrapersonal), societal (interpersonal), and internet-related factors. Individual/ intrapersonal factors contain psychological issues such as personality, self-confidence, identity formation life-style, social anxiety, creativity, depression, etc. [1,9,31,42,46,56]. Societal/interpersonal factors comprise parenting styles, attachment styles, family systems, family-members relationship styles, interpersonal relations, interpersonal coping styles, quality of relation with parents, etc. [2,7, 20, 31, 33, 43]. Internet-related factors include a wide range of components which are mostly contain qualities of internet content and/or the quality of its usage [6,13, 23, 33]. The most important factor in the class of internet-related factors is the duration of internet use. Authors have found that the more daily usage of internet, the more risk of internet addiction. In addition men are 8.1 times more likely than women to be at risk of internet addiction. Moreover, singles are 5.3 times more likely at risk of internet addiction than married ones [3].

The prevalence of internet addiction is a matter of consideration among young Iranian population with various rates. In a recent study, authors have found the prevalence of 7.83% of internet addiction among a large sample (1430) of female university students of the city of Tehran [11]. In a study on 150 male students of the dormitories of Tehran University of Medical Sciences, authors reported 41.33% of mild internet dependence, 35.33% of moderate internet dependence and 10% of severe internet dependence [49]. In a sample of 597 university students (female: 430, male: 167) of PayamNour University of Semnan province, authors have found the prevalence rate of 23.8% from moderate and 1.8% from severe internet addiction. Some research on 330 students of medical sciences (female: 178, male: 152) in the city of Tehran have shown the rate of 17.7% of internet addiction (Kiani et al., 2014). In a study on a sample of 100 university students (female: 51; male: 49) of University of Tehran, 18% of participants had internet addiction behaviors [50]. In a study on high school students in Tehran, authors have found the prevalence of 25% among this population [7]. In a study on medical students of Qom University of Medical Sciences, authors reported the prevalence rate of 10% in a sample of 250 students [38]. These studies indicate that overall, it could be concluded that nearly more than 20% of young population of Iran suffer from internet addiction which would be considered as a serious health issue.

Increasing number of studies have shown that within the process of most of addictive behaviors, there is a lack of control on addictive and habituated actions. In other words, it appears that individuals have low levels of self control, which is the capability of managing emotional reactions towards situations/things/events/people during interactions [41]. Self-control could be considered as the result of internal conflict between rationale and lust, cognition and motive, and internal planning and internal executive, self-control could be divided into individual and interpersonal dimensions. Low self-control is an outcome of inefficiency of family system and weak sociability of person; when accompanied with low self-esteem, conscience, and internal control as well as high levels of hopelessness, the intrapersonal dimension would be presented. While, mixing up with anger presentation, hurry, self-centeredness, apathy, high levels of risk-taking, delinquency, and impulsive actions would demonstrate the interpersonal dimension of low self control (Arian-Pour, Shahabi-Zadeh, & Bahreynian, 2015; Zare, Alipour, Qobari Bonab, & Asemi, 2015). Several studies have shown the importance of the role of self-control on internet addiction among Asian population. In a structural equation model (SEM) analysis on a Turkish undergraduate population, it has been revealed that loneliness would increase internet addiction via low self-control [39]. In a study on Korean students, it has been revealed that self-control significantly moderates social relations and problematic internet use [40]. These findings were supported by an alike study among Chinese students in which internet addiction was positively explained by low levels of self-control in individual via SEM analysis [29].

Although there have been various studies conducted about internet addiction in Iranian population, there are a few studies targeting to evaluate the relation between self-control and internet addiction. In a recent study, it has been revealed that cell-phone overuse in university students is mostly because of their excessive use of internet-based media. The study results of 476 university students (female: 286; male: 190) revealed that self-control has negative relation with internet via cell-phone use. In addition, just one unit increase in self-control would reduce .78 times of internet use via cell-phones among university students [41]. In the contrary, some study on 200 university students (female: 77; male: 123) found no significant relation between internet use and self-control [22].

In fact, there are limited studies about the relation between self-control construct and the broader domain of addictive behaviors in Iranian population, too. In a university population of 400 students (female: 238; male: 162) tendency towards alcoholic drinks were socially analyzed. The results revealed that low levels of tendency towards alcoholic drinks were associated to high levels of self control. Moreover, positive tendencies toward alcohol consumption were related to low levels of self-control [5]. In a study on 650 male youths it has been revealed that self-control had significant inverse relation with (history of) cigarette use, (history of) substance abuse, positive attitudes toward substance abuse, and tendency to substance abuse [10]. A study on a 615 individuals (female: 34; male 581) with substance abuse disorders which had joined to NA groups, revealed that levels of self-control at the initiation of interventions, had significant positive relations with the level of alterations in attitude towards substance abuse as well as efficacy of therapy [4].

These diverse information about the prevalence rate of internet addiction among various population sectors of Iranians suggests that there would be probably various prevalence rates in different population sectors. Moreover, evidence about relations/associations between internet addiction and self-control in Iranian population, especially in university students are unclear and inadequate. These all together resulted in designing the presented study among undergraduate students of the city of Rasht. Authors of the present study primarily try to identify various dimensions of internet addiction status and its related demographic characteristics among undergraduate students of northern part of Iran. In addition, the second step would be determination of the relation between internet addiction and self-control among this population.

## MATERIALS AND METHODS

### 2.1. Design

### 2.2. Participants

The population of the study comprised 1886 undergraduates and post graduate students of SardarJangal University of Rasht in 11 university majors. The sample size according to the population size and method of sample size determination [25] estimated to be 320 and 30% of fall-down estimation added up to the sample. The target participants with the use of stratified sampling, the sample size reached to 416 participants that received the study instruments from which 395 individuals (female: 210; male: 185) returned the instruments.

### 2.3. Procedure

Via the use of stratified sampling method, 416 students were randomly selected and received an invitation letter for a coordination session for next week. In a coordination letter, the structure and process of the study were described to the participants and all of them received the package of the study comprised a written subscription (any participant shall sign), a written procedure and manual of the study, a coded hardcopy of Persian version of Young Internet Addiction Scale, and a coded hardcopy of Persian version of The Self-Control scale (with similar codes of IAT). All participants were asked to return the questionnaires within next week. Two weeks after coordination session, authors contacted those who had not returned the questionnaires and asked them to. In the third week, the procedure was finished and those who had not returned the questionnaires were excluded.

### 2.4. Instruments

#### 2.4.1. Young Internet Addiction Test (IAT)

In order to diagnose addictive behaviors to internet and internet-related issues, based on impulse control disorder and pathological gambling criteria of DSM-IV-TR, Internet Addiction Test (IAT) was designed which is one of the most valid instruments in this domain up to date [3]. This instrument consists of 20 items with a likert scale (0 = rarely, 1 = occasionally, 2 = frequently, 3 = often, 4 = always). The score range is 0 to 80, and the higher score, the greater level of internet addiction. A total score between 0 and 10 is normal Internet use, between 11 and 29 mild Internet use, between 30 and 59 moderate internet addiction, and between 60 and 80 would consider as severe internet addiction. IAT has proved high levels of validity and reliability in various nations. In a study on psychometric characteristics of bilingual Malay/English version of IAT on Malaysian undergraduate students, authors reported Cronbach's alpha and construct validity of .93 and .95, respectively [32]. Polish version of IAT on college students showed Cronbach's alpha of .90 with a high level of construct validity [18]. Various studies have

reported Cronbach’s alpha for Persian version of IAT ranging between .88 and .92 [1,36,51] . In the present study, Cronbach’s alpha was .91.

**2.4.2.The Self-Control Scale (SCS)**

In order to evaluate self control in participants, The *Self-Control Scale*(SCS) was implemented which consists of 36 likert items (1= not at all, 2= to some extent, 3= so so, 4= alike, 5= most likely)and total score ranges between 36 and 180 (Tangney, Baumeister, & Boone, 2004). Reliability and validity of English version of were estimatedfor Chronbach’salpha and construct validity bewtween .75-.85 and .90-97, respectively (Hasford & Bradley, 2011; Tangney et al., 2004). The Persian version of *The Self-Control Scale* were evaluated by varied studies with Chronbach’s alpha in range of .80-.89 (Honar & Janbozorgi, 2010; Khanzadeh, Alamdarlou, Aqababaei, Moradi, & Rezaei, 2011). The Chronbach’s alpha of Persian version of Self-Control Scale was .88 in the present study.

**2.5. Data Analysis**

Data anlyses in the study were both descriptive and inferential. In descriptive analysis, demographic and descriptive statistical features as well as central tendencies were presented. Inferential statistical analysis comprised multipleregression, T-test for independent samples, ANOVA,and Pearson’s correlation.

**2.6. Ethics**

Anonymity and confidentiality of the respondents’ results were guaranteed via the use of random codes on instruments; participants received study package only with similar codes for each respondent. The procedure and aims of the study were discussed to the participants orally and written. In addition, all participants filled written supscription in which they confirmed their participation in the study.

**3. Findings**

In the present study 395 Individuals (female: 210; male: 185) ranged between 18 and 34 years answered the questionnaires, mostly undergraduates. Table 2 presents demographic characteristics of the study; 53.16% of participants were female and 46.83% were male. In addition, 90.88% of participants were undergraduate, whereas 9.12 were post-graduate.

**Table 2: Demographic descriptives**

		Frequency	%	Valid %	% of cumulative percent
<b>Gender</b>	female	210	53.16	53.16	53.16
	male	185	46.83	46.83	100
<b>Grade</b>	undergraduate	359	90.88	90.88	90.88
	Post-graduate	36	9.12	9.12	100

Descriptive Characteristics of the questionnaires of the study are presented in table 3.

**Table 3: Descriptive Characteristics of Questionnaires**

	Sig.	Mean	median	mode	SD.	Minimum	Maximum
<b>IAT</b>	.95	1.2924	1.2381	.62	.62702	.14	2.67
<b>SCS</b>	.95	3.4740	3.4722	3.33	.44700	2.51	4.50

**Table 4: Results of multiple regression**

Model	Sum of squares	ANOVA			f	sig
		df	Mean squares			
Regression	3.761	1	1.889	5.211	.007	
Residual	33.195	394	.361			
Total	36.956	395				
Multiple regression						
	Unstandardized coefficient β	SE	Standardized coefficient β	t	P value	
constant	2.391	.581		4.117	.0001	
Self control	-4.80	.149	-.343	-3.228	.002	
Model summary						
model	R	R square	Adjusted R square			SE
1	.319	.102	.082			.60069

The main hypothesis of the study (self-control is related to internet addiction of university student) was tested via multiple regression.The results of multiple regression analysis are shown in table 4. According to the findings, the multiple regression equation of the study is linear, so that variations of dependent variable (internet addiction) could be predicted bypredictor variable (self-control) significantly (p<.007). In addition, coefficient β is negative which

indicate an inverse relation between self control and internet addiction; increase in self-control would decrease internet addiction ( $p < .002$ ). Finally, multiple correlation coefficient (R) is about 32% and determinant coefficient (R square) is about 10%; which means that self control can predict 10% of variations of internet addiction in the sample group ( $p < .002$ ).

In order to find differences between female and male university students, T-test for independent samples was administered (table 5). Results revealed that with inqualvaruiances (according to Levene’s test) male students gained significantly more scores in internet addiction ( $M = 1.467$ ), compared to female participants ( $M = 1.089$ ;  $p < .002$ ).

**Table 5: comparison of female and male participants’ internet addiction**

	N	M	SD	SE	Levene’s Test		t-test			
					F	sig	t	df	sig	
female	210	1.0890	.50409	.07599	4.337					
male	185	1.4679	.67290	.09422		.040	-3.130	394	.002	

In order to find differences between various university majors in internet addiction, scores of students in 11 majors were compared via implementation of analysis of variance (ANOVA) which indicated no significant difference between these majors ( $p < .374$ ). This indicates that in the sample group of the present study students of different university majors are approximately alike in their internet addiction scores.

**DISCUSSION AND CONCLUSION**

The main finding of the study shows a significant negative association between internet addiction and self control among university students; the lower self control, the higher probability of internet addiction. Results of multiple regression revealed that self control has the power of explanation of about 10% of variance of internet addiction among university students. This finding is in line with previous research in other societies in which authors have suggested the probability of more problematic use of internet in people with lower self-control [14,39,40]. It appears that inhibitory mechanisms and executive functioning in people with internet addiction are to some extent more disturbed than people without internet addiction [37]. Some recent study have provided neural evidence of pathogenesis of internet addiction in close relation with self-control. Authors have found association between internet addiction and some malfunctioning in brain cortices, especially in and between right dorsolateral prefrontal cortex (DLPFC) and between the right DLPFC and the medial prefrontal cortex/rostral anterior cingulate cortex (mPFC/rACC) which suggest the reduced efficiency of cognitive inhibitory and control mechanisms of brain cortex in individuals with high internet addiction scores. Therefore, it could be concluded that self-control have an efficient potential of regulation of internet-use behaviors and therefore can control internet addiction in university students.

Another finding of the study was about gender differences. Results of the present study suggest that male university students gained more scores in internet addiction, comparing to female participants. This finding is in line with previous studies which has shown that gender affects type of internet uses as well as the level of tendency to internet use/internet addiction [24, 26, 35, 47, 48, 55]. Authors have found that men are more likely to use internet in order to satisfy their need to power, status, dominance, and sexual dreams, while women are in reach of supportive firmly groups, romantic relations, and relationships in which they can hide themselves from the others. These differences are to some extent presenting the societies’ different attitude from each gender [44,45, 47].

In conclusion, this study highlights two important issues about internet addiction among Iranian students. First, there is significant, however weak, negative relation between internet addiction and self control as its predictor. It would be sound to suggest incorporation of life skills in university programs in order to improve self-control among students and therefore, reduce the probability of internet addiction in this sector of the society. Because of wide adverse outcomes of internet addiction on individual, this policy would be beneficial both in short- and long-term to improve mental health of next generation.

The second, is the higher rate of internet addiction among male university students. In Iranian society, up to date, the majority of labor force is consisted of men. Therefore, internet addiction mainly targets the next generation labor force and have the potential of reducing gross domestic product (GDP) which would in turn paralyze the country’s healthy economic development. Moreover, these young men would be the future fathers of the society and such addictive behavior would affect the quality of life of the next generation families.

It appears that internet addiction is more than just a simple individualistic addictive behavior and has a wide range of side effects on society. Policy makers shall pay more attention to mechanism of pathogenesis and strategies to

prevent and reduce this new-age addictive problem in line with substance use disorders, so that they can deliver a healthy productive next generation. There is a great need to further research on internet addiction to identify other contributing and regulating variables/components in relation with internet addiction which would be better done in longitudinal studies.

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