



Journal of Fundamentals  
of Mental Health



Mashhad University  
of Medical Sciences



Psychiatry and Behavioral Sciences  
Research Center

*Original Article*

## Evaluating the role of sensation seeking and brain-behavioral systems in internet addiction among college students

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### Abstract

**Introduction:** The Internet is one of the most powerful tools of development in the contemporary world, but excessive use of the Internet will causes Internet addiction. Given that various factors can be influential on the Internet addiction; this research aimed to evaluate the role of sensation seeking and brain-behavioral systems in Internet addiction among students of Islamic Azad University, branch of Mashhad.

**Materials and Methods:** In this correlational research conducted on 92 students of Islamic Azad University, branch of Mashhad during 2016, questionnaire including: demographic characteristics data, Young Internet Addiction Test, Zuckerman's Sensation Seeking and Brain-Behavioral Systems. Data analyzed through descriptive statistics and regression analysis using SPSS software.

**Results:** There is a correlation between Internet addiction and the components of female student's brain-behavioral systems, including drive, searching for entertainment, behavioral activation system, behavioral inhibition system but this correlation was not significant and there is only a positive relationship with the response to reward component. No significant relationships between these components have been found among male students. The correlation between Internet addiction and sensation seeking has been significant and positive and this correlation between internet addiction and disinhibition component was significant and negative, while the correlation coefficient between Internet addiction and boredom susceptibility and experience seeking components was not significant.

**Conclusion:** According to the results, there was a direct and significant relation between Internet addiction and sensation seeking. This relationship was weaker about the role of brain behavioral systems and Internet addiction.

**Keywords:** Internet addiction, Brain behavioral systems, Sensation seeking, Students.

### Please cite this paper as:

Soltanifar A, Salimi Z, Mashhadi A, Teymouri S, Ghaffari Z. Evaluating the role of sensation seeking and brain-behavioral systems in internet addiction among college students. *Journal of Fundamentals of Mental Health* 2019 Mar-Apr; 21(2):87-93.

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Received: Nov. 22, 2018

Accepted: Jan. 10, 2019

## Introduction

The Internet is a cultural and social scene that puts individuals in different situations, roles, and lifestyles. In this general space, a new cultural skill is needed to play role according to its symbolic settings. The Internet is a two-edged blade that emits people through the creation and provision of a virtual space to create a relationship between people away from inconveniencing confrontations with others and their real world's position (1).

On the other hand, addiction to the Internet includes addiction to chat rooms, pornography, online gambling, online shopping, games, etc. as well as other addictions, would isolate person from family and people. Behavioral addictions like Internet addiction, can lead to the destruction of individual's health, relationships, emotions and eventually, his/her mental state.

While internet progressively vast its influence in our daily life, we should take steps to face the disadvantages of this new technology indeed (2).

Global growth and competitiveness are a function of insight and awareness that the Internet is its tool of extension.

The Internet is one of the most powerful tools in the context of progress, nutrition, maintenance and development of this awareness in the contemporary world. Our society is now moving from the industrial forms of production to a new form of informational social order.

As a result, what is nowadays depicted as Internet addiction may be considered as a common practice in the coming years. "Internet addiction", "the disparity of overuse of the Internet" and "pathological use of the Internet" are the terms go to the one of the newest disorders caused by the Internet. No matter what suggested name is, it's hard to find a physician or psychiatrist who has never encountered this modern and digital complication. Providing relatively comprehensive definition, Internet addiction refers to a wide range of behavioral problems and troubles in control of the motivation for Internet usage and is addressed as an obsessive behavior, or the desire to establish a connection, or perhaps even an expression of transference or a reflection of relationships in order to fulfill the needs.

Over the past decade, the concept of Internet addiction has emerged in terms of its acceptance

as a valid clinical disorder that often requires treatment (1).

Hospitals and clinics present outpatient services for outpatients suffering from internet addiction as well as addiction rehabilitation centers which have been adopted new cases of online addicts, furthermore college campuses have set up support groups for helping these type of students. Holmes, in his definition of Internet addiction, explains the natural use of the Internet and considers 19 hours a week as the normal amount of internet usage cutoff. Thus, according to Holmes's definition, an individual who uses the Internet for more than 19 hours per week is an Internet addict. Young considers the cut off at least 38 hours a week or 8 hours a day. Goldberg argues that Internet addiction is a pathological and obsessive use of the Internet, in which negative consequences such as tolerance and withdrawal symptoms are well-known and would be associated with depression, social isolation, anxiety, loneliness and increase in impulsivity (3,4). One of the most important aspects of addiction is the sensation seeking that can be extended to all types of addictions.

Sensation seekers are individuals who have characteristics such as extraversion, autonomy, fearlessness and inconsistency. In religious and political attitudes, they tend to be free-thinking and have more tolerant facing ambiguous situations and their physiological responses to new stimuli are more intense than others (5). Some studies suggest the relationship between sensation seeking and behavioral brain systems can be useful in predicting Internet addiction. The behavioral brain systems studied by Gary have three emotional systems. The first system is behavioral activation system associated with positive affect and is defined by positive behavioral tendencies, extroversion and impulsivity. The second system; Behavioral inhibition system associated with negative affects like inertia and behavioral fears and tendencies, introversion, depression and anxiety. The third system is a fight and flight system that produces anger, fear and rage (6).

Internet addiction has unwanted physical and mental complications and consequences. The growing amount of researches focused on internet trends and they suggest that Internet addiction disorder is a socio-psychological disorder

characterized by its tolerance, withdrawal symptoms, emotional disturbances, and the breakdown of social relationships.

However, Internet addiction phenomenon is more common as daily access to online resources increases. The necessity of evaluating predictive factors for internet addiction among young students leads us to run current research.

### Materials and Methods

Stratified random method has been used for this essay's sampling. Thus, two out of the whole faculties of Azad University of Mashhad were selected including Shahin-Far Medical Faculty and engineering faculty.

Number of 50 (25 female and 25 male) students who were studying in 2016 were selected from each faculty. The inclusion criteria included: aged between 18 to 28 years, lack of comorbid psychiatric disorder at the time of the study based on structural psychiatric interview based on DSM-5 criteria and completing informed consent for joining the research. All students completed the research questionnaires and checklists including; demographic characteristics data, Young internet addiction, Zuckerman's sensation seeking and brain-behavioral systems.

### Research instrument

*A) Young Internet Addiction Test:* This is a 20-item self-reported inventory which measures the level of dependency to Internet. The internet users are divided into three groups: normal user, user with problem due to more use of Internet, addict user who need treatment. This inventory has good psychometric properties in Iranian population (Cronbach alpha=0.88) (7,8).

*B) Zuckerman's Sensation Seeking Scale:* This 40-item scale is associated with different personality traits, conceptual and cognitive aspects, experience of alcohol and substance abuse, sexual behavior, smoking, tendency to schedule, voluntary abnormal activities or tests. This questionnaire measures the four subscales as adventure seeking, experience seeking, disinhibition and boredom susceptibility (each subscale has 10 questions). The highest total score of this questionnaire is 40. This instrument has been normalized in Iran (9,10).

*C) BAS/BIS Scales:* This scales provided by Carver and White and they have three subscales

as drive, response to reward and searching for entertainment and 24 self-reported questions in four-point Likert scale. Mohammadi et al. indicated that this instrument had acceptable Cronbach alpha among Iranian society (11). Due to the importance of the issue, the incomplete questionnaires, has been deleted from the research. Thus, a correlation with regression analysis research has been performed on 92 students of Azad University of Mashhad, including 44 men and 48 women. Data were then analyzed using SPSS software. The data were analyzed in two levels of descriptive statistics including mean, standard deviation and other characteristics and inferential statistics using regression and correlation analysis. The significance level was considered to be  $P$  value  $<0.05$ .

### Results

The mean age of male students was 21.42 years comparing to 21 years among the female students, which had a significant difference between two groups in terms of age ( $P=0.028$ ). The groups were homogeneous in terms of education level ( $P=0.08$ ) and marital status ( $P=0.067$ ). There was no significant difference in sensation seeking between the two groups as well as disinhibition component, boredom susceptibility, experience seeking, response to reward, behavioral activating system (BAS) and behavioral inhibition system (BIS). The difference between the two groups in terms of drive variable was significant ( $P=0.001$ ) as well as searching for entertainment ( $P=0.032$ ). The correlation between internet addiction and sensation seeking components was positive, and between the disinhibition components was significant and negative. But the correlation coefficient between Internet addiction and boredom susceptibility components and experience seeking was not significant.

**Table 1.** The correlation between internet addiction and sensation seeking components in male students

Variables	Numbers	Correlation coefficient	P
Sensation seeking	44	0.45	0.001
Disinhibition	44	-0.333	0.27
Boredom susceptibility	44	0.109	0.48
Experience seeking	44	0.142	0.357

**Table 2.** The correlation between internet addiction and sensation seeking components in female students

Variables	Numbers	Correlation coefficient	P
Sensation seeking	48	0.56	0.001
Disinhibition	48	0.297	0.04
Boredom susceptibility	48	-0.126	0.393
Experience seeking	48	-0.48	0.746

The correlation between Internet addiction and brain behavioral systems components in male students including responsiveness to reward, drive, searching for entertainment, behavioral activating system (BAS), behavioral inhibition system (BIS), exist but it is not significant.

**Table 3.** The correlation between Internet addiction and brain behavioral systems components in male students

Variables	Numbers	Correlation coefficient	P
Responsiveness to reward	44	0.014	0.926
Drive	44	-0.103	0.505
Searching for entertainment	44	-0.023	0.882
Behavioral activating system (BAS)	44	-0.061	0.696
Behavioral inhibition system (BIS)	44	-0.007	0.966

Among female students, the correlation between internet addiction and brain behavioral systems components including responsiveness to reward, drive, searching for entertainment, behavioral activating system (BAS), behavioral inhibition system (BIS), exist but it is not significant and there is only a positive relationship with the response to reward component.

**Table 4.** The correlation between Internet addiction and brain behavioral systems components in female students

Variables	Numbers	Correlation coefficient	P
Responsiveness to reward	48	0.329	0.022
Drive	48	-0.233	0.111
Searching for entertainment	48	0.085	0.565
Behavioral activating system (BAS)	48	-0.047	0.753
Behavioral inhibition system (BIS)	48	0.224	0.126

**Discussion**

Internet addiction has unwanted physical and mental complications and consequences. The growing amount of researches focused on internet trends suggests that Internet addiction disorder is a socio-psychological disorder characterized by its tolerance, withdrawal symptoms, emotional disturbances, and the breakdown of social relationships. However, Internet addiction phenomenon is more common as daily access to online resources increases. On the other hand, addiction to the Internet includes addiction to chat rooms, pornography, online gambling, online shopping, games, etc. as well as other addictions, would isolate person from family and people around. Behavioral addictions like Internet addiction, can lead to the destruction of individual's health, relationships, emotions and eventually, his/her mental state (2).

In this research, we will address the results of the discussion about Internet addiction and its relevance to sensation seeking and behavioral brain systems. According to Table 1, the highest age frequency was 20 years-old and the lowest frequency in male group was 26 years comparing to female group (23 years old). That seems logical with respect to a certain age range that exists for students participating in our study.

In our study, single students have more abundance than married ones among both groups. About 90% of both groups were single, indicating a lack of willingness to marry under the age of 25,

which could be directly related to the pathological Internet usage and the impact of Western culture among students.

Evaluating educational levels of participations, the highest frequency is related to master degree and the lowest frequency is related to the higher than master degree level. It is in line with other research works in the field of student research, given the multiplicity of expertise in the Azad University (12,13).

Considering Table 3, among male students, the correlation between Internet addiction and sensation seeking components was significant and positive, and between the disinhibition components was significant and negative but the correlation coefficient between Internet addiction and boredom susceptibility components and experience seeking was not significant. The significant effect of sensation seeking with internet addiction is consistent with the other researches (14-16).

Table 2 shows that the correlation between Internet addiction and sensation seeking components and disinhibition was significant and positive, but the correlation coefficient between Internet addiction and boredom susceptibility and experience seeking was not significant, which confirms the idea that there is a relationship between Internet addictions with the sensation seeking of female college students, and it can be concluded that sensation seekers are more interested in pathological use of internet. The significant effect of sensation seeking with internet addiction is in line with Rahmani, Khanjani and Soltani studies (14-16). This study showed that there is no significant difference between Internet addiction in the two genders, this results contrary to the Mohsenzadeh, Sepehrian and Barat but has been consistent with many research on internet addiction (2,12,13,17).

There was no significant difference between the components of sensation seeking, disinhibition, boredom susceptibility and experience seeking among male and female students which was in line with the results of Soltani, Khanjani and Rahmani (14-16).

As expected, the sensation seeking influences Internet addiction, the desire to experience the new world using the internet makes it possible for college students to use the internet to increase happiness more than before. The lack of

inhibition towards the constraints, rules, and social requirements, and the sense of boredom that college students experience while doing their routine activities and programs, can make their tendency to Internet addiction clear.

It seems that the sensation seeking, as reviewed by Bancroft et al. on the one hand, increases the risk taking in order to gain pleasure in students, so that they can do high risk tasks for gaining pleasure and resolving boredom and on the other hand, they minimize the predicted risk and negative consequence of this types of behaviors much lower than its actual rate (18).

The results of this study confirmed biomedical theories about high-risk behaviors and the sensation seeking that emphasis common origins in some aspects (19,20). Considering the common time for joining college education, and its coincident with maturity and its physical changes, these theories emphasize on genetic factors, hormonal effects and events of puberty. Eisenck also states that between adolescence and young age, sensation seeking level is more than other stages of life. It can be attributed to the role of biological and genetic causes towards tendency to all types of addictions, including Internet addiction (21).

Our study shows that the correlation between Internet addiction and brain behavioral systems components including responsiveness to reward, drive, searching for entertainment, behavioral activating system (BAS), behavioral inhibition system (BIS), but this correlation is not significant. Like pervious result, the correlation between Internet addiction and brain behavioral systems components exist but this correlation was not significant and there is only a positive relationship with the response to reward component.

Since the role of brain-behavioral systems in Internet addiction has been less widely studied, the generalization the results of this research with other similar research are really challenging. Some researches has been done evaluating the role of brain-behavioral systems in substance abuse like Pourmohseni et al. in which the results were consistent with ours (1).

In explaining the relationship between brain behavioral system and internet addiction, we conclude that one of the factors behind the continuing addiction to the Internet is the

uncontrollable desire of individuals for excessive use of Internet. Therefore, the more active brain-behavioral system can lead to the greater the hunger of individuals for the pathological use of Internet (22).

Also, the findings of this study indicate that the activity of the behavioral inhibition system of addicted individuals (male and female) is more than their non-addicted counterparts. This finding is consistent with the results of some similar studies but is contradictory with some others (18-23).

Also the researchers studied the relationship between behavioral inhibition system and substance abuse among addicted college students. Their research showed that the sensitivity and hyperactivity of the behavioral inhibition system and negative affect system, two

sets of personality traits, are involved in substance addiction (22).

Some limitations about our research was the small sample size due to selecting just two faculties among all faculties of Azad University and not considering other effective factors such as personality traits. It is recommended that further research should be carried out at a wider level and by examining more effective factors.

### Conclusion

According to the results, there was a direct and significant relation between Internet addiction and sensation seeking. This relationship was weaker about the role of brain behavioral systems and Internet addiction.

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