

Gender and Sensation Seeking as Predictor Variables of Problematic Internet Use by High School Students

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Abstract

This research investigated the impacts of gender and sensation seeking on predicting the causes of problematic Internet use by high school students. This study's sample group included 458 students (262 girls and 196 boys) studying at Anatolian High Schools located in the Konak district of Izmir city. Participants filled out self-evaluation documents incorporating the Scale for Internet Use by Adolescents, the Zuckerman Sensation-Seeking Scale, and personal data forms. Hierarchical regression was used for data analysis, and the findings revealed that sensation seeking and gender accounted for 47% of the variance related to Internet addiction. Examination of these results indicated that the most powerful variable leading to problematic Internet use was the pursuit of new experience under the sub-dimension of thrill seeking, followed successively by boredom susceptibility, gender, thrill and adventure seeking, and disinhibition. Even though this research contributes to previous studies on the role of gender and sensation seeking in problematic Internet use, more research is needed on this subject.

Keywords: Problematic internet use • Sensation seeking • Gender • High school students • Regression

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The Internet serves for transmission of information, academic research, entertainment, communication, and trade. Indeed, the frequency and purpose of Internet use as a part of modern life are significant criteria in determining Internet addiction (Shaw & Black, 2008). Internet addiction is typically identified as the irresistible desire for extreme use of the Internet, failure to control the time spent on Internet use, continuous increases in the time spent, extreme anger and aggressiveness when not connected to the Internet, and a deteriorating social and business life (Young, 1998, 2004). As yet, no consensus has been reached in the literature as to any one term for defining Internet addiction, regarded as a problem since the 1990s. Frequently used terms include “Internet addiction” (Young, 1998), “pathological Internet use” (Morahan-Martin & Schumacher, 2000), and “problematic Internet use” (Davis, Flett, & Besser, 2002). In this research, the term “problematic Internet use” is employed in tandem with the corresponding scale. Nevertheless, in the literature review here, the term used in the original study is retained.

The frequency of Internet use, and possibly ensuing problematic Internet use, increases with every passing day. The most significant groups at risk of Internet addiction are comprised of adolescents and undergraduate students.

When the 2013 data collected by the Turkish Statistical Institution on “Use of Information Technologies by Households” was evaluated for “frequency of Internet use,” high school students came second with 74.5%, following only higher education students. Local research conducted in China indicated that approximately 63% of 162 million Internet users were younger than 24, and 9.72% to 11.06% of these users were seriously addicted to the Internet to a varying extent—in other words, almost 10 million young people were addicted (Cui, Zhao, Wu, & Xu, 2006).

Another decisive criterion for Internet addiction is the purpose of Internet use. Developing Internet addiction is more likely when the Internet is used to establish online social interactions with others, for instance, meeting new people, talking to those with similar interests, and chatting (Ceyhan, 2007; Siyez & Uz Bas, 2013). Kim and Davis (2009) demonstrated that Internet use to keep in touch with family and friends had small negative impact on

young people's problematic use; getting to know new people, however, did negatively impact youth. Furthermore, adolescents are increasingly likely to text messages in chat rooms and share their experiences in messages (Ekşi, 2012). Kayri & Günüç (2010) found that for high school students, the most decisive factor in Internet addiction was the "purpose of [individuals] Internet use." Furthermore, recent research found high risk for adolescents because of a growing interest in Internet gambling. A study with 8,017 English adolescents by Griffiths and Wood (2007) ascertained that 8% played National Lotto games on the Internet. These studies verified that high school students are an important risk group for Internet addiction.

Besides, Internet addiction itself can lead to psychological and mental illnesses such as anxiety, depression, stress, drug addiction, and obsessive compulsive disorder (Akin & Iskender, 2011; Ko et al. 2006; Yadav, Banwari, Parmar, & Maniar, 2013) as well as to physical symptoms such as sleeping disorders, backaches, and burning eyes (Azher et al., 2014). In addition to these negative outcomes, recent studies also proved that Internet addiction causes changes in adolescents' brain structure (Lin et al. 2012; Yuan et al., 2011). Negative consequences of Internet addiction paved the way for more studies to identify factors related to this problem so that it can be prevented.

A literature review revealed that personality traits might play a role in addiction and that people with certain characteristics might have a disposition for addiction (Griffiths, 2009; Walther, Morgenstern, & Hanewinkel, 2012). Research on high school students indicated that narcissistic (Ekşi, 2013; Kuss & Griffiths, 2012) and introverted personalities (Xiuqin et al., 2010) instigated Internet addiction. Another personality trait supposed to relate to Internet use is sensation seeking (Zuckerman, 1994). "Sensation seeking" means pursuing various extraordinary and highly stimulating lifestyles, and being eager to take risks to achieve them (Zuckerman, 1979).

According to Dahl (2004), sensation seeking is a developmental area influenced by puberty. Those who have a high ambition for seeking sensation eagerly act impulsively to experience intense and different sensations (Arnett, 1992). These persons fail to cope with boredom;

they seem to need greater external stimulation, and, therefore, surfing the Internet, texting messages in chat rooms, and other online activities appeal to them (Lin & Tsai, 2002; Shi, Chen, & Tian, 2011). Likewise, Shaffer (1996) stated that the Internet is a means of seeking sensation. In the literature, studies on sensation seeking and Internet addiction (Guo, Mei, & Zhang, 2009; Lavin, Marvin, McLorney, Nola, & Scott, 1999; Mei & Liu, 2009; Rahmani & Gholamali Lavasani, 2001) were mostly conducted with university students. Although the majority of these studies demonstrated that Internet addicts have greater ambition for sensation and adventure (Guo et al., 2009; Mei & Liu, 2009; Rahmani & Gholamali Lavasani, 2001), one study found that Internet addicts received lower scores on a scale measuring intensity of sensation seeking (Lavin et al., 1999).

Although sensation seeking increases in puberty (Zuckerman, 1969), relatively few studies have been conducted with adolescents (Chou, Condrón, & Belland, 2005). One study suggested that a high level of experience seeking, high anxiety about being harmed, and being a reward addict at low levels were among the most important variables resulting in Internet addiction (Ko et al., 2006). However, many believe that future studies with adolescents will greatly contribute to the field because adolescents and university students possess different psychosocial characteristics and face different responsibilities. Meanwhile, the present research can fill a gap in the literature since no studies have been conducted with Turkish adolescents to investigate sensation seeking and problematic Internet use.

The literature indicates that gender is likewise an important factor in problematic Internet use by adolescents (Zamani, Abedini, & Kheradmand, 2011). Studies examining high school students' addiction to the Internet and based on the gender variable found that the average points on addiction by male adolescents were higher than for female adolescents (Esen & Siyez, 2011; Üneri & Tanı, 2011).

Likewise, compared to girls, boys demonstrated greater eagerness for sensation (Zuckerman, Eysenck, & Eysenck, 1978). In summary, since the gender variable seems associated with both sensation seeking and

problematic Internet use, taking gender into consideration will contribute to this research. Therefore, this research proposes to determine the extent to which such variables as gender and sensation seeking (thrill and adventure seeking, experience seeking, disinhibition, and boredom susceptibility) play a role in high school students' problematic Internet use.

Method

For investigating the impact of sensation seeking and gender on adolescents' problematic Internet use, this research adopted a descriptive relational screening model to identify underlying reasons. The screening model is an approach taken to describe the situation as it was or is (Karasar, 1998).

Population and Sample

This research population consisted of students at Anatolian High Schools in the Konak district of Izmir city, Turkey—in total, 5700 students at 11 Anatolian High Schools in the 2013–2014 academic year. In the first stage, sample size was calculated with a sample-size calculator. The required sample size was 359 for a population of 5700 individuals at the level of $\alpha = 0.05$ and the confidence interval of 95%. A random numbers chart was used to select three Anatolian High Schools based on a simple random sampling method and, thereafter, to choose one class from 9th to 12th grades at each school.

The sample group consisted of 262 (52.2%) girls and 196 boys (42.8%), aged from 15 to 19 years ($\bar{X} = 16.33, ss = 1.03$). Included were 25.8% ($n = 118$) students in the 9th grade, 27.7% ($n = 127$) in the 10th grade, 30.8% ($n = 141$) in the 11th grade, and, finally, 15.7% ($n = 72$) in the 12th grade.

Data Collection Tools

Problematic Internet Use Scale-Adolescent (PIUS-A): PIUS-A was devised by Ceyhan and Ceyhan (2009) to identify problematic Internet use. Consisting of 21 items, this scale is scored on a five-point Likert scale (1-Strongly disagree, 5-Strongly agree). Scale scores range between 27 and 135. A high score indicates that negative impacts of the Internet, social comfort felt by Internet users during use, and extreme increased Internet use. Exploratory factor analysis on adolescents revealed that the scale involves three sub-factors (negative impacts of Internet, extreme use, social benefit/social comfort). Results of confirmatory factor analysis confirmed this three-factor structure, which accounted for 49.35% of variance. Additionally, the internal consistency coefficient of this scale was 0.93 (Ceyhan & Ceyhan, 2009). In this research, the Cronbach alpha reliability coefficient of this scale was 49.35%.

Zuckerman Sensation-Seeking Scale (ZSS): ZSS, a consisting of 40 items was devised by Zuckerman et al. (1978) to assess the level of sensation during puberty and youth. Each item requires a response to either of two options (A and B). The scale has four sub-dimensions (thrill and adventure seeking, experience seeking, disinhibition, and boredom susceptibility), each with 10 articles. The thrill-and-adventure seeking scale measures an individual's interest in new or dangerous physical activities like water skiing and mountain climbing. The experience-seeking sub-scale examines an individual's passion for traveling, desire for leading life unconventionally, and seeking for unconventional life through new sensory or mental experiences. The disinhibition sub-scale deals with social drinking, interest in noisy parties, and sexual behaviors. The boredom susceptibility sub-scale assesses to what extent individuals dislike repetitive, routine, and unexciting people and situations. If a high score is received on the sub-scales, then thrill and adventure seeking, experience seeking, disinhibition, and boredom susceptibility likewise increase. This scale was interpreted in and adapted to Turkish by Öngen Erol (2007). Cronbach alpha reliability coefficient was calculated within the scope of scale reliability and individual coefficients were determined

as 0.82, 0.55, 0.75 and 0.56, respectively, for the sub-scales of thrill and adventure seeking, experience seeking, disinhibition, and boredom susceptibility. For this research, the Cronbach alpha reliability coefficients of these sub-scales ranged between 0.53 and 0.75.

Personal Data Form: A personal data form was used to determine age, gender, and class level of the participants.

Data Collection

After obtaining necessary permissions from the schools, the researcher conducted experiments in the appropriate classes. Before distribution of the scale forms, the researcher explained to the participants that participation was voluntary and that even if they began to fill out the scale forms, they could withdraw at any time. All the students agreed to participate in the research. The experiment lasted 25–30 minutes.

Data Analysis

Stepwise regression analysis, one of the multivariate regression analysis methods, was applied for data analysis. It depends completely on mathematical criteria to decide which variables will be included in the model when stepwise regression analysis is employed (Field, 2009). Prior to analysis, the dependent variable (problematic Internet use) and independent variables (thrill and adventure seeking, experience seeking, disinhibition, and boredom susceptibility) were assessed pursuant to multivariate regression analysis assumptions. The primary assumption expected in the multivariate analyses is the number of participants. Stepwise regression analysis requires 40 participants for each and every variable (Tabachnick & Fidell, 2007). Given five independent variables, the minimum number of participants is 200, and this study achieved this minimum number of participants.

A second assumption in multivariate analyses is univariate and multivariate normality and linearity (Tabachnick & Fidell, 2007). The Kolmogorov-Smirnow Test was used in analysis of univariate normality, while a variance homogeneity test was used in assessment of univariate homogeneity. Since the significance level of Kolmogorov–Smirnov Test in regard to the Problematic Internet Use Scale was lower than 0.05, the data was not customarily plotted. Therefore, the data were subjected to the logarithmic transformation process, after which the data were observed to be customarily plotted. Multivariate normality and linearity were examined with a scatter diagram matrix. Since it resulted in ellipse distributions, multivariate normality and linearity were ensured.

A third assumption in multivariate analyses is removing extreme values from the dataset. One-dimensional extreme values related to the dependent variable (problematic Internet use) and the independent variables were examined according to z points; multidimensional extreme values were examined with Mahalanobis distances. Z points are deemed an extreme value if over 3.29 (Tabachnick & Fidell, 2007). According to this criterion, no one-dimensional extreme value was identified. After calculation of Mahalanobis distances, degree of freedom was found to be 5, and significance was assigned as .001, and the value was 20.515 in the square value table. Since no greater value existed, it was deduced that there was no extreme value.

A fourth assumption in multivariate analyses is correlation. The correlation between dependent and independent variables was examined with Pearson correlation analysis. This examination demonstrated that the correlation between variables ranged between 16 and 57; this showed no correlation problem between variables.

As gender, one independent variable, was actually a categorical variable, it was changed into a dummy variable. Thus, the codes were regenerated as girl = 1 and boy = 0. The level of significance was deemed to be $p < .05$ in data analysis.

Findings

First, this section explains the findings related to the descriptive statistics and then, to the stepwise regression analysis.

Findings related to Descriptive Statistics

Table 1 indicates the mean, standard deviation, and minimum–maximum values with regard to dependent (problematic Internet use) and non-categorical independent variables (thrill and adventure seeking, experience seeking, disinhibition, and boredom susceptibility).

Table 1
Arithmetical Average, Standard Deviation, Minimum–Maximum Values Related to Dependent and Independent Variables

Variables	\bar{X}	ss	Min	Max
Problematic Internet use	1.76	.14	1.43	2.09
Thrill and adventure seeking	16.95	2.41	10	20
Experience seeking	14.82	2.34	10	20
Disinhibition	13.31	2.49	10	20
Boredom susceptibility	13.73	2.27	10	20

Findings related to Stepwise Regression Analysis

Five different regression models were devised as a result of stepwise linear regression analysis related to problematic Internet use. Multi-correlation and regression coefficients and R^2 values of these models, which demonstrated that experience seeking, boredom susceptibility, gender, thrill and adventure seeking, and disinhibition points lead to problematic Internet use, are indicated in Table 2.

Table 2
Stepwise Regression Analysis in Predicting Causes of Internet Addiction

Predictor Variable	B	R	R ²	F	t
Experience seeking	.039	.628	.394	297,709*	12.42*
Boredom susceptibility	.017	.673	.451	188,389*	6.87*
Gender	.038	.68	.458	129,879*	3.58*
Thrill and adventure seeking	.005	.685	.465	100,348*	2.35*
Disinhibition	.005	.69	.470	82,156*	2.33*

* $p < .001$

As seen in Table 2, the correlation coefficient was $R = .628$ for the experience-seeking sub-scale, included in the analysis as a predictor variable at the first stage in predicting points of problematic Internet use based on thrill-seeking and gender variables. At the second stage, the joint correlation coefficient rose to $R = .678$ when boredom susceptibility was included in the analysis as a predictor variable; then to $R = .68$ with the addition of the gender variable at the third stage; to $R = .685$ with the addition of the thrill-and-adventure variable at the fourth stage; and to $R = .690$ with the addition of the disinhibition variable as the fifth variable.

Examination of R^2 values in Table 2 indicates that the most exploratory variable of problematic Internet use was experience seeking with 39% variance; experience seeking is a sub-dimensions of sensation seeking, which is followed successively by boredom susceptibility with an exploratory variance of 6%; gender, with an exploratory variance of .09%; thrill and adventure seeking with an exploratory variance of .08%; and finally, disinhibition with an exploratory variable of .06%. Common exploratory variance that predicts the extent of life satisfaction for all variables was 47%.

R^2 value shows to what extent the regression model explained the independent variable in this sample. The literature recommends that the result obtained from the regression analysis should be tested by a cross-validation method so that it can be generalized to population (Field, 2009; Tabachnick & Fidell, 2007). One cross-validation method is to check whether the model can generate similar results with the same variables in a different sample. Another method is to use R^2 adjusted in the light of

a then-current dataset or to divide the data into two (Field, 2009). While testing reliability of the acquired model, this research scrutinized R^2 values adjusted with the Stein equation. Adjusted R^2 value indicates to what extent the population from which the sample is chosen can explain the independent variance. The Stein equation assesses how well the R^2 value fulfills cross-validation of the model (Field, 2009).

$$\text{Adjusted } R^2 = 1 - \left[\left(\frac{n-1}{n-k-1} \right) \left(\frac{n-2}{n-k-2} \right) \left(\frac{n+1}{n} \right) \right] (1 - R^2)$$

In the Stein equation, n denotes the number of the sample, while k denotes the number of predictor variables. Accordingly, when the values of these symbols are deemed $n = (458)$ and $k = (5)$, the equation result will be as follows:

$$\text{Adjusted } R^2 = 1 - \left[\left(\frac{458-1}{458-5-1} \right) \left(\frac{458-2}{458-5-2} \right) \left(\frac{459+1}{458} \right) \right] (1 - 0.47)$$

$$\text{Adjusted } R^2 = 1 - [(1.01)(1.01)(1.00)](0.53)$$

$$\text{Adjusted } R^2 = 0.46$$

The value from the Stein equation was close to $R^2 = .47$ value observed. This result proves that the cross validation of the model was quite good.

Discussion

Having examined the power of sensation seeking and gender in problematic Internet use by high school students, this research established that sensation seeking and gender played a substantial role. Review of stepwise regression analysis revealed that the most influential variable in predicting problematic Internet use was experience seeking, a sub-dimension of the sensation-seeking scale. Experience seeking reflects the need for unconventional personal and inner life, embodied in mental and

sensory experiences such as drug addiction and the desire to travel to different places (Zuckerman et al., 1978). High school students who are ambitiously seeking new experiences spend more time on the Internet because the possibility of its new experiences highly appeals to them. According to David's cognitive behavioral approach model (2001), a theory created to explain Internet addiction, the key factor in continuation of Internet activities is the reinforcement the individual finds in the activity. In other words, if a positive outcome is obtained when an individual tries a new Internet feature, then the individual's activity continues. Therefore, this finding was not surprising. One study that examined the relationship between Internet addiction and sensation seeking through meta-analysis asserted that experience seeking relates to Internet addiction. However, studies that investigated the relationship between experience seeking and Internet addiction have obtained differing results. For instance, a US study conducted with university students by Lavin et al. (1999) revealed that the experience-seeking level of non-addicts is higher than that of Internet addicts. In contrast, a study conducted with high school students in Taiwan by Lin and Tsai (2002) did not detect any significant difference between levels of experience seeking of both Internet addicts and non-addicts. This difference might have stemmed from either the participants' ages or their cultural differences.

In this research, the second predictor variable of problematic Internet use was boredom susceptibility, a sub-dimension of the sensation-seeking scale. Boredom is a troublesome feeling, characterized as lack of value for or stimuli in an activity (Harris, 2000). Boredom susceptibility indicates the level of an individual's dislike for repetitive, boring, and unexciting people or situations. Shi and Ark (2005) asserted a positive relationship between boredom susceptibility and Internet addiction (as cited in Rahmani & Gholamali Lavasani, 2011). Moreover, Lin, Lin, and Wu (2009) stated that boredom is a probable cause of Internet addiction for adolescents. According to the theory of free time boredom (Iso-Ahola & Crowley, 1991; Iso-Ahola & Weissinger, 1987), an individual's interest in risky behaviors results from non-fulfillment of the need for thrill and challenge seeking in appropriate or acceptable social circles. In this context, when high

school students with high levels of boredom susceptibility cannot find the stimuli they need in their social circles, they might become interested in the Internet. Availability of rich stimuli might increase the time spent on the Internet and, consequently, the development of addictive behavior.

Gender, a variable in this research, ranks third in leading to problematic Internet use by high school students. In the literature, many studies have found that gender significantly contributed to Internet addiction (problematic Internet use) (Kormas, Critselis, Janikian, Kafetsiz, & Tsitsika, 2011; Lan & Lee, 2013). Furthermore, a group of studies demonstrated that students' Internet addiction levels varied according to gender (Şahin, Çakır, Demirbaş, Çakır, & Polat, 2013; Yılmaz, Şahin, Haseski, & Erol, 2014; Zorbaz & Tuzgöl Dost, 2014). On the other hand, the majority of these studies proved that gender's impact was relatively low. Zorbaz and Tuzgöl Dost (2014) theorized that gender's impact on Internet addiction might result from social differentiation in gender roles. When traditional gender roles are considered, a strong bond is found among masculinity, Internet use (Charlton, 1999), and online sexual activities (Becerra, Robinson, & Balkin, 2011). Nevertheless, more studies are needed to clarify this issue because boys usually *adopt* a masculine gender role while girls always *adopt* a feminine gender role, in other words, because gender *roles* do not directly depend on gender.

According to the research outcomes, another predictor of problematic Internet use is thrill and adventure seeking. However, this variable contributes little to problematic Internet use. Because the scale items that assess thrill and adventure seeking are related to the desire to try new, risky physical activities, the Internet might not completely meet the need of such individuals. However, that Internet users meet this need with avatars they create in some team games might explain this small, but significant impact. Thousands of players worldwide can simultaneously role-play in these fantasy games. These players can develop their avatars' capacities and accomplish various tasks involving thrills and adventures. They can even interact positively with other players' avatars by chatting or, negatively, by quarreling. Much more information could be obtained about

this subject if special purposes of Internet uses were investigated in new studies on Internet addiction.

In this research, disinhibition was the last predictor variable for problematic Internet use by high school students. The research scrutinizing the relationship between disinhibition and Internet addiction (Lin & Tsai, 2002; Mei & Liu, 2009; Rahmani & Ghomali Lavasani, 2011) showed that Internet addicts have a higher level of disinhibition. Even though disinhibition's contribution to problematic Internet use was low, the Internet might offer an attractive social environment, especially for high school students with restricted access to social circles. This subject might be covered in detail if parental attitudes were examined along with the features of the Internet social environments joined by adolescents.

In evaluation of this research, certain limitations must be taken into account. One is that the sample was selected only from Anatolian High Schools in the Konak district of Izmir City, Turkey. To ameliorate the limitations, the simple random sampling method was used to determine schools and students, and the analytical findings were reassessed with the adjusted R^2 method, a cross validation method. However, replication with different types of high schools in different districts is important for generalization to high school students as a whole. Another limitation was collection of data with self-exploratory scales, for which participants might predict the research assumption, respond to endorse the research assumption, or present themselves in a good light. Notwithstanding, this method was preferred since its implementation is relatively easy and time-efficient, requires no expertise of participants, and is consistent with both psychological counseling and the phenomenological approach of psychotherapy (Heppner, Wampold, & Kivlinghan, 2013). With a view to compensating for this limitation, the participants were not provided with detailed information about the research purpose.

In conclusion, this study established that boredom susceptibility, thrill and adventure seeking, disinhibition, gender, and experience seeking, which is one of the sub-dimensions of sensation seeking, are predictor variables of problematic Internet use. Organizing the daily lives of high

school students in such a way that they involve social and sport activities could lessen experience seeking on the Internet. In this respect, structured school-based activities can contribute both to development of high school students' social skills and creation of new interests for them. Strengthening relationships between parents and adolescents through family training might be influential in helping adolescents spend more quality time at home. Psycho-training programs might be designed to prevent Internet addiction after focus-group interviews with male and female students, given that gender is a significant predictor variable. Finally, the design of a measurement tool particularly for sensation seeking on the Internet could significantly contribute to the literature.

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