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Extended Abstract

Differences in Problematic Internet Use based on Depression, Anxiety, and Stress Levels

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Abstract

Problematic Internet use has been assessed as a significant factor that negatively affects people's lives, and it is increasing to worrying levels. This study aims to investigate the differences in problematic Internet use based on depression, anxiety, and stress levels among late adolescent university students. The research group for the study is comprised of 543 university students, 378 females (69.6%) and 154 males (28.4%); 11 people's gender was undetermined (2%). The ages of students in the research group ranged from 17 to 28 with a mean age of 18.49 (SD = 1.06). The Problematic Internet Use Scale; Depression, Anxiety and Stress Scale, and a personal information form were used to collect data. The results show that problematic Internet use behaviors vary depending on depression, anxiety, and stress levels. As depression, anxiety, and stress levels increase, problematic Internet use increases. The results are discussed in light of the literature, and recommendations have been made for researchers and professionals working in the field of mental health.

Keywords

Problematic Internet use • Depression • Anxiety • Stress • Mental health

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Internet access is becoming more available every day, and nearly half the world's population is reported to use the Internet (Internet World Stats, 2016). The Internet has made many areas of life easier (education, shopping, communication, etc.; Caplan, 2007). Chou, Condron, and Belland (2005) stated that the Internet presents countless opportunities to the individual at home, school, and work, while also creating the etiology of some negative effects. Spending more time on qualitatively poor activities in the virtual environment has caused individuals' psychosocial behavior to change and required the definitions of healthy and pathological Internet use. Accordingly, healthy Internet use is defined as using the Internet for a specific time interval and aim (Davis, 2001). Healthy Internet use allows many cognitive and social skills like collecting information, making choices, reading, writing, communicating, sharing, and classifying to be used (Caplan, 2002). Additionally, pathological, problematic, and compulsive Internet use, conceptualized as problematic Internet use, is defined as a multi-dimensional syndrome that negatively affects the social, psychological, and occupational life of the individual (Caplan, 2005). In recent years, the positive effects of the Internet for human life have been emphasized more than the negative effects. Those who use the Internet excessively may display behaviors such as spending less time with other people, being argumentative and intolerant, and experiencing strains in relationships (Young, 1998). Additionally, excessive Internet use may cause a range of psychological and physiological disorders in individuals (Caplan, 2005; Young, 1998).

Problematic Internet use is accepted as a serious reality that should not be neglected. With children and adolescents at the lead, excessive Internet use can be seen in nearly all age groups (Üneri & Tanıdır, 2011). Pioneering studies have stated that excessive Internet use may negatively affect psychological arousal levels, sleep patterns, nutritional habits, and physical activity (Young, 1998). As time passes, the correlations between problematic Internet use and the variables of loneliness (Odacı & Kalkan, 2010), well-being (Odacı & Çikrıkci, 2014), eating disorders (Berber-Çelik, Odacı, & Bayraktar, 2015), shyness (Odacı & Berber-Çelik, 2013), depression (Kim et al., 2006; Young & Rogers, 1998), and anxiety (Lee, Oh, Cho, Hong, & Moon, 2001) are revealed. The majority of studies collect data from high school and university students. When assessing adolescence (the developmental period from 12 to 21; Erikson, 1968), the majority of these studies have been performed on children in middle (ages 15-17) and late adolescence (ages 18-21). A tendency toward excessive Internet use can be observed in adolescents who lack psychological maturity (Cao & Su, 2007; Johansson & Götestam, 2004; Tsai & Lin, 2003).

In parallel with excessive Internet use, the social and psychological constructs of the individual are negatively affected. Some approaches have been used to assess the interaction between Internet use and psychological processes. Firstly, cognitive behavioral approaches can be useful for explaining the development of problematic

Internet use. According to this approach, irrational cognition related to the self and world causes problematic Internet use (Şenol-Durak & Durak, 2011). In this way and in addition to irrational cognition, the dysfunctional behavior and Internet use that an individual displays are ways of avoiding psychological problems. At the end of this process, problematic Internet use usually occurs (Caplan, 2002). According to another approach, problematic Internet use forms the etiology of psychopathology. Kraut et al. (1998) found that lonely and depressed individuals tend to use the Internet excessively; these people show increased levels of loneliness and depression. As can be seen, the interaction between problematic Internet use and psychopathological processes is still a rich area of research.

This study researches the state of problematic Internet use for children in late adolescence based on differences in depression, anxiety, and stress levels. Studies investigating the correlation between problematic Internet use and depression (Shapira, Goldsmith, Keck, Khosla, & McElroy, 2000), anxiety (Caplan, 2007) and stress (Akın & Iskender, 2011) exist. However, when considered in light of the approaches mentioned above, the interaction between variables has not been fully revealed. With the aid of results obtained in our study, interpreting how excessive Internet use varies depending on depression, anxiety and stress levels becomes possible.

Method

Research Group

The study group in this research comprises 378 female (69.6%) and 154 male (28.4%) university students for a total of 543. Some of the students in the study group did not state their gender (n =11, 2%). The ages of university students in the study group varied from 17 to 28 with a mean age of 18.49 (SD = 1.06). Descriptive findings from the research group include daily Internet use. Accordingly, 56 participants (10%) used the Internet for more than one hour per day, 253 (45.3%) used the Internet for 1-3 hours per day, 163 (29.2%) used the Internet for 3-5 hours per day, and 87 (15.6%) used the Internet for more than 5 hours per day.

Data Collection Tools

The Problematic Internet Use Scale (PIUS); Depression, Anxiety, and Stress Scale (DASS); and a personal information form were used for data collection.

Problematic Internet Use Scale. PIUS was developed by Ceyhan, Ceyhan, and Gürcan (2007) to determine the levels of problematic Internet use among university students. This five-point Likert-type evaluation comprises 88 items. One sample item is "I don't notice the passing of time while using the Internet." The scale has two

items that are scored oppositely (Items 7 and 12). The range of possible scores for the scale is from 33 to 165. With a three factor structure, high scores obtained from PIUS are interpreted as showing unhealthy Internet use behaviors. The internal consistency coefficient (α_{PIUS}) of the scale was determined as 0.94. Within this research, the internal consistency coefficient (α) of data from the study group was found to be 0.93.

Depression, Anxiety, and Stress Scale. DASS was developed by Lovibond and Lovibond (1995) to determine individual levels of depression, anxiety, and stress. The Turkish adaptation of the study was completed by Akın and Çetin (2007). DASS comprises 42 items and is a four-point Likert-type evaluation. Sample items include "I have never experienced positive feelings (depression)"; "There are times when I am very troubled, when it passes I feel more comfortable (anxiety)"; and "I stop enjoying myself due to very unimportant things (stress)". The factor structure of the Turkish form of the scale was reported to coincide with the original's structure. The internal consistency coefficient for the reliability of the scale was assessed and calculated as .89 for the whole scale. Within this study, data related to DASS's reliability have been recalculated. As such, the whole scale ($\alpha_{DASS} = .94$) and its sub-factors ($\alpha_{depression} = .89$, $\alpha_{anxiety} = .83$, $\alpha_{stress} = .88$) were found to be reliable. The research groups' depression, anxiety and stress levels were determined in light of the scores obtained for DASS. The criteria recommended by Lovibond and Lovibond (1995) have been noted in this research and are listed in Table 1.

Table 1
DASS Scores

Level	Variable		
	Depression	Anxiety	Stress
Normal	0-9	0-7	0-14
Mild	10-13	8-9	15-18
Moderate	14-20	10-14	19-25
Severe	21-27	15-19	26-33
Very Severe	28+	20+	34+

Personal information form. Developed by the researchers, the personal information form aims to collect certain demographic information from university students participating in the study. In this way, statements questioning age, gender, smart phone ownership, Internet plan usage, and daily Internet usage were included in the personal information form.

Statistical Approach

Before analyzing the data in the scope of the research, a range of statistical organization is required. In this way, lost value, end value, normal distribution, and linearity analyses were performed (Field, 2013). After completing the required organization of the dataset in line with the aims of the research, statistical analysis

was performed. Firstly, normal distribution was tested for problematic Internet use by late adolescents based on depression, anxiety, and stress. During this process data were assessed with the Kolmogorov-Smirnov and Shapiro-Wilk tests. As data for depression, anxiety, and stress levels did not have a normal distribution in the second stage, the decision was made to use the Kruskall–Wallis test to analyze the differences. To determine the source of differences identified between the groups due to these test results, the two-way comparison Mann-Whitney U test was used. Within the research, statistical analysis was performed using SPSS 22.0 software.

Results

According to the Kruskal–Wallis test results, problematic Internet use varies depending on the levels of depression ($x^2 = 89.36$, $SD = 4$, $p < .001$), anxiety ($x^2 = 86.15$, $SD = 4$, $p < .001$), and stress ($x^2 = 74.05$, $SD = 4$, $p < .001$; see Table 2). To identify the source of these differences, the two-way Mann–Whitney U test was applied.

According to the obtained results, significant differences exist between the problematic Internet use levels of university students with normal depression levels and those with mild ($U = 8256.50$; $z = 4.38$; $p < .001$), moderate ($U = 7733.50$, $z = 5.89$, $p < .001$), severe ($U = 3169$, $z = 6.35$, $p < .001$), and very severe ($U = 1862.50$, $z = 6.23$, $p < .001$) depression levels. Additionally significant differences exist in the problematic Internet use levels of university students with mild depression levels and those with severe ($U = 1851.50$, $z = 3.49$, $p < .001$) and very severe ($U = 1150.50$, $z = 3.80$, $p < .001$) depression levels. The final differences in problematic Internet use based on depression levels were between university students with moderate depression levels and those with severe ($U = 2167$, $z = 2.97$, $p < .001$) and very severe ($U = 1361$, $z = 3.33$, $p < .001$) depression levels.

Significant differences in problematic Internet use by university students exist between those with normal anxiety levels and those with mild ($U = 3266.50$, $z = 2.25$, $p < .05$), moderate ($U = 7183.50$, $z = 5.03$, $p < .001$), severe ($U = 3952$, $z = 5.02$, $p < .001$), and very severe ($U = 2636$, $z = 8.49$, $p < .001$) anxiety levels. At the same time, significant differences between problematic Internet use levels of students with mild anxiety levels exists with those having severe ($U = 1976.50$, $z = 2.34$, $p < .05$) and very severe ($U = 1406$, $z = 5.33$, $p < .001$) anxiety levels. Differences in problematic Internet use also exist based on anxiety levels between university students with mild anxiety levels and those with very severe anxiety levels ($U = 4919$, $z = 4.77$, $p < .001$).

Table 2
Classification and Normality Assumption for Depression, Anxiety, and Stress Levels

Variable		Factor	*n*	Normality Assumption	
PIUS		Depression Level	543	Kolmogorov-Smirnov	
M	*SD*			*D*	*df*
57.86	15.30	Normal	242	.10	242
66.09	17.03	Mild	98	.06*	98
68.29	16.73	Moderate	106	.10	106
78.41	22.21	Severe	57	.06*	57
80.22	19.83	Very Severe	40	.11*	40
PIUS		Anxiety Level	543	Kolmogorov-Smirnov	
M	*SD*			*D*	*df*
55.76	12.91	Normal	144	.13	144
60.46	14.58	Mild	57	.13	57
65.80	17.81	Moderate	151	.07	151
67.55	19.02	Severe	90	.11	90
78.42	20.47	Very Severe	101	.07*	101
PIUS		Stress Level	543	Shapiro-Wilk	
M	*SD*			*S-W*	*df*
59.19	15.25	Normal	291	.93	291
65.07	15.26	Mild	80	.96	80
74.01	19.37	Moderate	97	.98	97
74.83	23.38	Severe	55	.95	55
83.63	21.39	Very Severe	20	.93	20

*$p > .05$.

This section of the study researches the differences in problematic Internet use based on differences in stress levels. According to the obtained results, significant differences in students' problematic Internet use exist between those with normal stress levels and those with mild ($U = 8791.50$, $z = 3.35$, $p < .001$), moderate ($U = 7683.50$, $z = 6.72$, $p < .001$), severe ($U = 4821$, $z = 4.67$, $p < .001$), and very severe ($U = 1090$, $z = 4.68$, $p < .001$) stress levels. Additionally, significant differences in problematic Internet use exist between students with mild stress levels and those with moderate ($U = 2805$, $z = 3.17$, $p < .01$), severe ($U = 1698$, $z = 2.24$, $p < .05$), and very severe ($U = 399.50$, $z = 3.45$, $p < .01$) stress levels.

As seen above, problematic Internet use increases based on depression, anxiety, and stress levels. University students' problematic Internet use rose in parallel with increases in their depression, anxiety, and stress levels, as shown in Table 3.

Table 3
Differences in Problematic Internet Use Based on Depression, Anxiety and Stress Levels

Variable	Level	*n*	*MR*	*df*	x^2
Depression	Normal	242	208.37		
	Mild	98	286.52		
	Moderate	106	308.86	4	89.36*
	Severe	57	367.65		
	Very Severe	40	387.44		
Anxiety	Normal	144	190.82		
	Mild	57	237.18		
	Moderate	151	281.78	4	86.15*
	Severe	90	293.28		
	Very Severe	101	373.81		
Stress	Normal	291	22293		
	Mild	80	282.89		
	Moderate	97	346.57	4	74.05*
	Severe	55	336.70		
	Very Severe	20	402.85		

*$p < .001$. MR: mean rank, df: degrees of freedom.

Discussion

This study investigates the differences in problematic Internet use of university students in late adolescence based on their levels of depression, anxiety, and stress. According to the results, differences in problematic Internet use among late adolescents were determined to be based on their depression, anxiety, and stress levels. Thus, as depression, anxiety, and stress levels increase among those in late adolescence, the mean score for problematic Internet use also increases. As a result, individuals who experience depression, anxiety, or stress can be said to have psychological constructs that tend toward excessive Internet use.

Depression is a mood disorder characterized by pessimism, amotivation toward daily activities, loss of functionality, eating disorders, and more (Köroğlu, 2006). Anxiety has critical importance for the continuation of life; however, each individual has a unique threshold value. Anxiety experience above this value begins to harm the individual and forms the etiology of a range of psychological problems (Eşel, 2003). Additionally, exposure to stress in daily life is an unquestionable reality. Stress is the physiological and psychological effort an individual expends due to negativities in their environment (Everly & Lating, 2013). In light of the results of this study, one can say that individuals with an increase in levels of depression, anxiety, or stress have a tendency toward excessive Internet use. When examining the symptoms and effects of depression, anxiety, and stress, the virtual environment has priceless value for individuals who do not wish to deal with these effects or who have not accepted their mental state. Şenol-Durak and Durak (2011) showed the Internet may be a way for

the individual to avoid dealing with dysfunctional attitudes and cognitive distortions. Stated differently, instead of the individual dealing with the psychological processes that form their problems, they lose themselves in a cyber environment.

In the related literature, a tendency toward excessive Internet use can be said to be effective during a background search for social support. At the same time, being deficient in terms of social support can cause certain physical and psychological problems (Cohen, 1988; Tovar, Rayens, Gokun, & Clark, 2015). Psychological problems such as depression (Peirce, Frone, Russell, Cooper, & Mudar, 2000), anxiety (Hipkins, Whitworth, Tarrier, & Jayson, 2004), and stress (Glozah & Pevalin, 2014) can be observed in individuals searching for social support. As a result, the tendency to search for social support in the cyber environment may transform depressive, anxious, and stressed individuals into problematic Internet users. In this way, the individual avoids dealing with dysfunctional beliefs and attitudes, and damages interpersonal relationships. Eventually, psychological problems may stagnate or worsen (Durak Batıgün & Kılıç, 2011; Yeh, Ko, Wu, & Cheng, 2008). Research results have shown that depressed individuals in particular tend to use the Internet excessively (Dalbudak et al., 2013; Mayda et al., 2015).

A reduction in terms of an individual's development may be shown through problematic Internet use. Research has determined that the incidence of problematic Internet use in middle and late adolescence (Cao & Su, 2007; Çam & Nur, 2015; Mayda et al., 2015) is higher than among adults (Bakken, Wenzel, Götestam, Johansson, & Øren, 2009). The group at highest risk of Internet addiction or excessive Internet use has been shown to be adolescents between 12-18 years of age (Kaltiala-Heino, Lintonen, & Rimpelä, 2004; Öztürk, Odabaşıoğlu, & Eraslan, Genç, & Kalyoncu, 2007). Risk-taking behaviors are frequently observed in adolescents (Erikson, 1968). These individuals can display risk-taking behavior to gain an identity or to be accepted by a particular group (Steinberg, Lowe Vandell, & Bornstein, 2011). Odacı (2013), in a study of university students, determined a positive significant correlation between problematic Internet use and risk-taking behaviors. As a result, risk-taking behavior can be said to be an important indicator of problematic Internet use, especially in adolescence.

When generally evaluated, middle and late adolescence can be said to have high risk in terms of problematic Internet use and individuals may tend to overuse the Internet due to mental issues. In addition to the effect of mental issues, a range of behavioral patterns resulting from this developmental period can be considered to play a significant role in the development of problematic Internet use. In short, the interaction of these processes is proposed to increase problematic Internet use among adolescents.

This study has a range of limitations. As it is a cross-sectional study, the generalizability of the results is low. Studies completed with similar study groups

could allow for a generalization of results. This study was completed based on quantitative research approaches using scale tools with a self-reporting format and data analysis. With the aim of comprehensively evaluating how the psychological processes of depression, anxiety, and stress push adolescents into the Internet environment, performing studies based on qualitative research approaches on individuals in clinical and non-clinical environments is recommended.

The results of this study on late adolescent university students can help experts working in the fields of mental health and education, especially psychiatrists, psychologists and psychological counselors. Taking into account the effects of children's emotional state in middle and late adolescence who have high risk factors for problematic Internet use, experts should organize psychotherapeutic and psycho-educational programs. At this stage, we wish to state that serious responsibility falls on psychological consulting centers and medico-social units in universities, psychological counseling centers in educational institutions, and clinicians and psychologists in health organizations. Youth shine a light on the development of humanity at a subjective level in Turkey, as well as at a universal level; to ensure they don't complete their personal development as hostages of the virtual environment in the most productive period of their lives, all elements in the system must be made aware of their responsibilities.

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