Research / Araştırma

Technological Addictions and Social Connectedness: Predictor Effect of Internet Addiction, Social Media Addiction, Digital Game Addiction and Smartphone Addiction on Social Connectedness

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ABSTRACT

Technological addictions and social connectedness: predictor effect of internet addiction, social media addiction, digital game addiction and smartphone addiction on social connectedness

Objective: This study examined the predictor effects of four technological addictions, including Internet addiction, social media addiction, digital game addiction and smartphone addiction on social connectedness.

Method: The study was conducted on 201 adolescents (101 girls, 100 boys) who have been using Internet, playing digital games, and using social media for at least one year, and have at least one social media account and a smartphone. The Young's Internet Addiction Test-Short Form, Social Media Disorder Scale, Digital Game Addiction Scale, Smartphone Addiction Scale-Short Version, Social Connectedness Scale, and Personal Information Form were used as data collection tools. Parametric statistical methods were used to analyze the data, taking into consideration the single and multivariable normality, linearity, and multicolinearity.

Results: The analysis showed that Internet addiction, social media addiction, digital game addiction and smartphone addiction significantly predicted 25% of social connectedness. In addition, it has been determined that the strongest effect on social connectedness is from Internet addiction followed by social media addiction, digital game addiction, and smartphone addiction respectively.

Conclusion: Four technological addictions including Internet addiction, social media addiction, digital game addiction and smartphone addiction significantly affect social connectedness.

Keywords: Digital game addiction, internet addiction, smartphone addiction, social connectedness, social media addiction

ÖZET

Teknolojik bağımlılıklar ve sosyal bağlılık: İnternet bağımlılığı, sosyal medya bağımlılığı, dijital oyun bağımlılığı ve akıllı telefon bağımlılığının sosyal bağlılığı yordayıcı etkisi

Amaç: Bu araştırmada internet bağımlılığı, sosyal medya bağımlılığı, dijital oyun bağımlılığı ve akıllı telefon bağımlılığı olmak üzere, dört teknolojik bağımlılığın sosyal bağlılığı yordayıcı etkisi incelenmiştir.

Yöntem: Araştırma son bir yıldır internet kullanan, dijital oyun oynayan ve sosyal medya kullanan ve en az bir sosyal medya hesabı ve akıllı telefonu olan 201 (101'i kız, 100'ü erkek) ergen üzerinde gerçekleştirilmiştir. Araştırma verileri Young İnternet Bağımlılığı Testi Kısa Formu, Akıllı Telefon Bağımlılığı Ölçeği Kısa Formu, Dijital Oyun Bağımlılığı Ölçeği, Sosyal Medya Bozukluğu Ölçeği, Sosyal Bağlılık Ölçeği ve Kişisel Bilgi Formu ile toplanmıştır. Araştırma verileri tek ve çok değişkenli normallik, doğrusallık ve çoklu bağlantı problemi dikkate alınarak, parametrik istatistiki yöntemlerle çözümlenmiştir.

Bulgular: Analiz sonucunda internet bağımlılığı, sosyal medya bağımlılığı, dijital oyun bağımlılığı ve akıllı telefon bağımlılığının sosyal bağlılığın %25'ini anlamlı düzeyde yordadığı görülmüştür. Ayrıca sosyal bağlılığın açıklanmasında en güçlü etkinin internet bağımlılığından geldiği ve bunu sırasıyla sosyal medya bağımlılığı, dijital oyun bağımlılığı ve akıllı telefon bağımlılığının takip ettiği saptanmıştır.

Sonuç: İnternet bağımlılığı, sosyal medya bağımlılığı, dijital oyun bağımlılığı ve akıllı telefon bağımlılığı olmak üzere, dört teknolojik bağımlılık sosyal bağlılığı önemli ölçüde etkilemektedir.

Anahtar kelimeler: Dijital oyun bağımlılığı, internet bağımlılığı, akıllı telefon bağımlılığı, sosyal bağlılık, sosyal medya bağımlılığı

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INTRODUCTION

Computers, the internet and smartphones have become an important part of everyday life. Hence, by 2016, 46% of the world population are users of internet, 31% active social media, and 51% smartphone users (1,2). This situation is also similar in Turkey. According to Turkish Statistical Institute (TUIK) (3) data, 61% of Turkey's population use the internet; and among internet use purposes social media ranks first. In Turkey 96% of the household have mobile phones (3). Besides, 53% of Turkey's population is actively using social media (1). Finally, digital games are commonly played among adolescents (4). These data and research results show that internet, social media, smart phones and digital games are used extensively. The intensive use of technology is together with problematic or pathological consumption. In this context, the question "can technology be an addiction?" is one of the topics frequently discussed in the literature (5,6). In the recent years, research has been conducted to answer the question "whether technological addictions such as internet addiction, social media addiction, digital game addiction and smartphone addiction are myths or are they really behavioral addictions?" Research has emphasized that individuals with internet addiction, social media addiction, digital game addiction, and smartphone addiction exhibit symptoms similar to those with other behavioral or chemical addictions (7-15).

Internet addiction, social media addiction and smartphone addiction are not classified as a disorder in DSM-5. However, in chapter 3 of DSM-5 it is suggested that digital game addiction can be recognized as "internet gaming disorder". In the DSM-5 internet gaming disorder is defined with 9 diagnostic criteria: preoccupation with internet games (internet gaming becomes the dominant activity in daily life), tolerance (the need to spend increasing amounts of time engaged in internet games), withdrawal symptoms (irritability, anxiety, or sadness), continuity/permanence (unsuccessful attempts to control the participation in internet games), replacement (preferring internet games against previous hobbies and entertainment), continued

excessive use of internet games despite knowledge of psychosocial problems, deceiving (deceiving others regarding the amount of internet gaming), escape (use of internet games to escape from a negative mood), conflict/lost (having lost educational or career opportunities). Observation of five or more criteria in the last one year indicates internet gaming disorder. Besides, for the first time the concept of internet addiction took place in DSM-5 (7). It is anticipated that technological addictions will be included in a wider range in later versions of DSM. In the literature, internet addiction, social media addiction and smart phone addiction are considered as behavioral addiction. Griffiths (16), Young (17), Anderson (18) and Shapira et al. (19) have described smartphone addiction as a behavioral addiction; Kuss and Griffiths (20), Griffiths (21), van den Eijnden et al. (14) and Lin et al. (23) have described smartphone addiction as a behavioral addiction.

Internet addiction is the main framework of other internet related addictions. In this context, Griffiths and Szabo (13) emphasize that the internet activities as well as the internet are addictive sources. Therefore, concepts such as social media addiction, digital game addiction and smart phone addiction can be considered as addictions in which the active substance is internet (14,22). Regardless of the type of addictive practice or application, internet addiction is considered as a whole. But the concepts of social media addiction, digital game addiction, smartphone addiction are more specific and more purposeful. internet addiction can be likened to "volatile substances" in this respect. The concept of volatile substances constitutes the basic framework of materials such as adhesives, thinners, cooler sprays and lighter gas. Knowing what type of volatile substance an individual is addicted, facilitates intervention and prevention efforts. Similarly, internet addiction is a general and inclusive concept. It is very critical in terms of preventive and intervention efforts to know which application or activity of the internet is the person addicted. In this context, Kuss and Griffiths (20) consider internet addiction, social media addiction, digital gaming addiction and smart phone

addiction as technological addictions. Therefore, it is possible to judge all these addictions as technological addictions or technology related addictions as technological addictions or technology related addictions.

Examining the literature, a common definition can be given to the concepts of internet addiction, social media addiction, digital game addiction and smartphone addiction. According to this, "the state of excessive use, unsatisfied desire to use, neglect of activities due to excessive use, disrupting social relations due to excessive use, use as an escape tool from negative emotions and life stress, having problems in giving up and reducing the use, becoming nervous and anxious when it is not possible to use, and deceiving others regarding the duration and amount of use" defines internet addiction, social media addiction, digital game addiction and smartphone addiction (7,14,17,22). Since internet addiction is the main component of social media addiction, digital game addiction and smart phone addiction, it is possible to say that internet addiction is highly related to these addictions.

In the literature, technological addictions are related to biopsychosocial problems. Research have shown that internet addiction, social media addiction, smartphone addiction and digital game addiction are associated with "depression" (24-27), "impulsivity" (7,28-30), "loneliness" (31-34), "sleep quality" (25,27,35,36), "well-being" (25,37-39), "self-esteem" (33,34,40,41) and "academic performance" (24,42-44). On the other hand, according to some researchers, the use of technology strengthens friendship, facilitates interpersonal conversations and communication, and allows establishing new social relations (45-47). Therefore, the problematic use of technology should be regarded as an important criterion. Hence, research emphasize that problematic internet usage is related to psychopathological symptoms (48).

The literature discusses the effects of internet addiction, social media addiction, smartphone addiction and digital gaming addiction on social connectedness. Grieve et al. (49) emphasize that the use of social media provides positive contributions to

the development and maintenance of social connectedness. Similarly, Quinn and Oldmeadow (50) found that adolescents using social media had a higher sense of belonging than adolescents who did not. Additionally, Davis (51) emphasizes that the use of technology strengthens friendship and increases social connectedness. Use of appropriate and effective technology can provide significant contributions to social relationships, but harms social relationships when technology use reaches a problematic level.

In the literature, there is no research on which of the technological addictions such as internet addiction, social media addiction, smart phone addiction and digital game addiction have a higher effect on social connectedness. However, it can be said that internet addiction has a higher effect on social connectedness because internet addiction constitutes the main framework of other addictions related to internet (social media addiction, smart phone addiction and digital game addiction). In the research, the effects of internet addiction, social media addiction, smartphone addiction and digital game addiction on social connectedness have been investigated separately. In this context, researchers emphasize that the use of internet, social media, digital gaming and smartphone at the level of addiction hinders real social relations and consequently social connectedness is reduced (52-54).

Social connectedness is the subjective perception of whether an individual feels himself or herself as a significant part of his/her social and emotional relationships (55). As this subjective perception increases, social connectedness becomes stronger. Moore (56) emphasizes that social connectedness should be regarded as a talent. According to Moore (56), social connectedness is defined as the ability to develop meaningful relationships that will facilitate the individual to view himself/herself as part of his/her relationships. Maslow (57) also considers social connectedness as a basic human need. Technology can be used as an alternative tool to address this need. In this context, it is possible to say that communication technologies in particular have a critical importance in the development and maintenance of social connectedness. Hence, Chayko (58) emphasizes that

the internet and digital technologies connect people living in different regions of the world, which contributes to people get aware of each other and have communication. Therefore, it can be said that internet and digital technologies strengthen social connectedness.

Problematic use of technology is an important criterion in the relationship between technology use and social connectedness. Social connectedness is negatively affected if the use of technology restricts real social relations and leads to isolation and alienation (59). Intense use of technology restricts the individual's true social environment interactions and interpersonal relations which cause the individual to move away from the real social environment. When isolated from the true social environment the individual starts to perceive himself as not being a meaningful part of his relationships (53,54,60). Similarly, McIntyre et al. (61) emphasize that compulsive internet use can directly affect social connectedness as well as through personality traits. According to McIntyre et al. (61), when the internet is used at the compulsive level, it becomes difficult for the individual to develop meaningful and sustainable relations and to feel himself as a meaningful part of his relations.

Adolescence is regarded as a critical period in terms of social connectedness (55,62) and technological addictions such as internet addiction, social media addiction, digital game addiction and smartphone addiction (4,15,22). The use of technologies such as the internet and social media is more common among adolescents. This makes the adolescents more vulnerable to technological addictions (63). In this context, Andreassen (64) emphasizes that the fact that there are no authority figures in virtual environments leads the adolescents to virtual environments. Adolescence is a period when conflicts with the authority figure are experienced. Adolescent frequently prefers virtual environments to avoid this conflict. Hence, Yen et al. (65) indicate that adolescents use virtual environments as an alternative means of coping with psychosocial problems. During adolescence, the individual is in search of a group or individual to whom he or she can associate or feel belonging. This is quite

critical in terms of the development of the adolescent's social connectedness. Social connectedness affects both adolescence and adulthood developmental tasks. It has been emphasized that individuals with low levels of social connectedness tend to be isolated from society, have problems in associating themselves or sense of belonging, have negative perceptions towards themselves and others, and have distrust (55,62,66). In this context, particular attention should be paid to technological addictions and social connectedness in biopsychosocial evaluation of adolescents. Technological addictions cause the adolescent become lonely, get isolated from the society and deteriorate interpersonal relations. This prevents the adolescent from developing social connectedness or reduces the existing level of social connectedness.

In addition to internet addiction, social media addiction, digital game addiction and smart phone addiction, TV addiction (67), phubbing (68), online pornography addiction (69), online shopping addiction (70), and online sex addiction (71) are considered within the scope of technological addictions in the literature. However, in this study, the concept of technological addiction is limited to internet addiction, social media addiction, digital game addiction and smart phone addiction. In this study, the predictive effect of technological addictions on social connectedness in adolescents was examined. There are many studies in the literature that examine the relation of technological addiction to social connectedness. However, no research has been found on which technological addiction is more risky in terms of social connectedness. No studies investigating the effects of multiple technological addictions on social connectedness have been available. It is conceivable that this research can reach important conclusions about how social connectedness is affected by technological addictions. Determining the extent to which social connectedness is affected by technological addictions and which technological addiction has more effect on social connectedness will provide a significant contribution to the protection of social connectedness against technological addictions. Since social connectedness

is an evolving construct, it is critical to determine the risk factors regarding social connectedness. Accordingly, the identification of risk factors may contribute to the development and protection of social connectedness.

METHOD

Study Design

This is a descriptive study examining the predictive effect of internet addiction, social media addiction, digital game addiction and smartphone addiction on social connectedness in adolescents.

Study Group

The study was carried out with the students attending four high schools (Anatolian High School, Science High School, Vocational and Technical High School and Religious Vocational High School) affiliated to Elazig Provincial Directorate of National Education in 2015-2016 academic year. The Convenience Sampling method was used in the study. The study has been conducted on adolescents who have been using the internet, playing digital games, and using social media and having at least one social media account and a smartphone over the past year. It has been found that 21 adolescents who met these criteria did not want to participate in the study. Upon administration, data was collected from 209 adolescents. Data of the 8 subjects were not included in the analyzes because they were incomplete, sloppy and incorrect. Consequently, 201 volunteers who met the criteria were included in the study. Of the adolescents, 101 (50.2%) were female and 100 (48.8%) were male. The adolescents ranged 14-18 years old.

Measures

In this study, Young's Internet Addiction Test Short Form (YIAT-SF), Smart Phone Addiction Scale Short Form (SAS-SF), Digital Game Addiction Scale (DGAS-7), Social Media Disorder Scale (SMDS), Social Connectedness Scale (SCS) and Personal Information Form were used as data collection tools.

Young's Internet Addiction Test Short Form (YIAT-SF): YIAT-SF, developed by Young (17) and transformed into a short form by Pawlikowski et al. (72), is a 5-point Likert type measure consisting of 12 items. The Turkish version of YIAT-SF was conducted by Kutlu et al. (73) on both adolescents and university students. As a result of the Exploratory Factor Analysis (EFA), it was seen that it was a one-factor scale in both university students and adolescents. One-factor structure of the scale was tested with Confirmatory Factor Analysis (CFA). The fit index values for CFA showed good fit both in university students (χ^2=144.930, sd=52, RMSEA=0.072, RMR=0.70, GFI=0.93, AGFI=0.90, CFI=0.95 and IFI=0.91) and in adolescents (χ^2=141,934, sd=51, RMSEA=0.080, GFI=0.90, CFI=0.90 ve IFI=0.90). The Cronbach alpha reliability coefficient of the scale was 0.91 in university students and 0.86 in adolescents. The test-retest reliability of the YIAT-SF was 0.93 in the university students and 0.86 in the adolescents. There are no reversed scored items and the high scores indicate increased risk of internet addiction.

Social Media Disorder Scale (SMDS): SMDS is a Likert-type measure consisting of 9 items and one dimension that was developed by van den Eijnden et al. (22) and adapted to Turkish by Savci, Ercengiz and Aysan (74). As a result of the EFA, it was seen that it has a one-factor structure which accounts for 47.88% of total variance. This one-factor structure was tested with CFA in two separate samples. As a result of the analysis, it was found that the social media disorder model had good fit values in both samples [(χ^2=39.237, sd=27, χ^2/sd=1.453, RMSEA=0.055, GFI=0.95, AGFI=0.91, CFI=0.97, IFI=0.97 ve TLI (NNFI)=0.96, (χ^2=50.725, sd=26, χ^2/sd=1.951, RMSEA=0.072, GFI=0.94, AGFI=0.90, CFI=0.94, IFI=0.94 ve TLI (NNFI)=0.92]. The factor loadings of SMDS for EFA range from 0.58 to 0.77 and for CFA range from 0.44 to 0.75. According to the results of criterion-related validity analysis of SMDS is positively

related with the duration of social media usage, number of social media accounts, negative emotions and impulsivity, but negatively related with self-esteem, social connectedness, and positive emotions. The reliability of SMDS was examined with test-retest method and Cronbach's α internal consistency reliability coefficient in three different samples. Cronbach's alpha coefficient was 0.83, 0.86 and 0.86; and a three-week test-retest correlation was 0.805. There are no reverse-scored items, and high scores indicate an increased risk of social media disorder/ addiction.

Digital Game Addiction Scale (DGAS-7): DGAS-7 is a Likert-type scale consisting of 7 items and one dimension developed by Lemmens et al. (4) and adapted to Turkish by Yalcin-Irmak and Erdogan (75). In EFA results it was seen that DGAS-7 has a one-factor structure that accounts for 56.96% of the total variance. This one-factor structure was tested with CFA. As a result of the analysis, it was found that the digital game addiction model had acceptable fit index values (χ^2=14.22, p=0.37, sd=14, RMSEA=0.012, AGFI=0.92, CFI=0.99, GFI=0.96 ve SRMR=0.06). The factor loadings of the DGAS-7 ranged from 0.52 to 0.77 and the item total score correlation coefficients ranged from 0.52 to 0.76. The Cronbach alpha coefficient of the DGAS-7 was 0.72 and the three-week test-retest correlation was 0.80. There are no reverse-scored items, and high scores indicate increased risk of digital game addiction.

Smartphone Addiction Scale Short Version (SAS-SV): SAS-SV is a Likert-type scale consisting of 10 items and one dimension that was developed by Kwon et al. (14) and adapted to Turkish by Noyan et al. (76). The one-dimensional structure of SAS-SF accounts for 46.3% of the total variance. The factor loadings of SAS-SF range from 0.49 to 0.83. The criterion validity of SAS-SF was examined with internet addiction. As a result of the analysis, it was seen that SAS-SF is related to internet addiction in expected direction and level. The reliability of SAS-SF was examined by Chronbach

alpha coefficient and test-retest reliability coefficient. As a result of the analysis, Chronbach alpha coefficient of SAS-SF was 0.87 and test-retest reliability coefficient was 0.93. There are no reverse-scored items, and high scores indicate increased risk for smartphone addiction.

Social Connectedness Scale (SCS): The SCS which was developed by Lee and Robbins (62) and adopted to Turkish by Duru (77), is a one-dimensional measure with 8 negative items. The SCS is assessed over 6 points. As a result of EFA, it was seen that Turkish version of SCS had one dimension. Criterion validity of the SCS was assessed by UCLA Loneliness Scale, Life Satisfaction Scale and Social Provisions Scale. As a result of the criterion-related validity analysis, it was seen that the SCS was associated with these scales in the expected direction and level. Cronbach's alpha internal consistency reliability coefficient of the SCS was 0.90 and test-retest reliability coefficient was 0.90. There are no reverse-scored items, and high scores indicate high level of social connectedness.

Data Collection Phase

This study was conducted within the scope of the first author's doctoral dissertation that was executed under the supervision of the second author. Therefore, the data of the research has been collected within the permission granted to the doctoral dissertation. The research data were collected in classrooms of the adolescents. Administration took place at four high schools affiliated to Elazig Provincial Directorate of National Education in 2015-2016 academic year. The researcher explained the purpose of the research, the administration method and the principles of privacy and volunteering, and read the informed consent form. Since the sample group was large, the Informed Volunteer Consent Form was read by the researcher in order that the administration did not interfere with the lectures and that it could be completed in one lecture hour. Consents were not obtained from the participants' families. However, the administration was

carried out by the researcher within the implicit knowledge and approval of the school management and under the supervision of the teachers. Volunteer adolescents who have been using the internet, playing digital games, and using social media, and having at least one social media account and a smartphone in the past year have been included in the study. Adolescents who did not meet these criteria or met the criteria but did not volunteer, were not included in the study. It was observed that the administration lasted 25-30 minutes. At the end of the administration, 8 subjects with incomplete, sloppy or incorrect data were excluded and analyses were carried out on the remaining data. The researchers declare that this study was carried out in accordance with the Helsinki Declaration.

Statistical Analysis

Statistical analyzes were performed considering loss and extreme values, single and multivariable normality, linearity, and multicolinearity problems. In this context, firstly data set was examined in terms of loss and extreme values. Missing data was replaced with series mean. Then extreme values were examined and no extreme data which could adversely affect the analysis were detected. The research data were examined in terms of single and multivariable normality and it was found that the skewness (-0.36 to 0.58) and the kurtosis coefficients (-0.69 to 0.47) for the research variables were within acceptable values. In addition, the Scattering Diagram Matrix was examined and it was seen that there are elliptical distributions. These findings indicate that the research data meet the assumptions of linearity and single and multivariable normality (78). The correlations between variables and VIF and tolerance values were examined to evaluate whether or not the research data caused multicolinearity problems. The multicolinearity problem occurs when the correlation between variables is greater than 0.90, VIF values are greater than 10, and tolerance values are less than 0.10 (78). Binary correlations between the independent variables of the study do not cause a multicolinearity problem (r<0.90 for all binary correlations). In addition, the VIF (all VIF values of independent variables are less than 10) and the tolerance values (all tolerance values of independent variables are greater than 0.10) of independent variables do not cause a multicolinearity problem. Taking into account these statistical analyzes, the data of the research was analyzed by parametric statistical methods.

RESULTS

Descriptive Statistics and Correlation Values

Descriptive statistics and correlation values for dependent variables and independent variables are presented in Table 1.

The skewness coefficients of the variables in the study ranged from -0.36 to 0.58, the kurtosis coefficients ranged from -0.69 to 0.47, and the Cronbach alpha internal consistency reliability coefficients ranged from 0.77 to 0.93. Social connectedness was negatively and moderately related with internet addiction (r=-0.34, p<0.01) and social

Table 1: Descriptive statistics and correlation values of variables

	Descriptive Statistics					Correlation Values	
	Mean	SD	Skewness	Kurtosis	Cronbach's Alpha		Social connectedness
Social connectedness	35.38	9.57	-0.36	-0.69	0.91	Internet addiction	-0.34*
Internet addiction	30.90	8.29	0.57	0.47	0.84	Social media addiction	-0.33*
Social media addiction	21.54	5.83	0.32	-0.53	0.78	Digital game addiction	-0.28*
Digital game addiction	16.79	4.64	0.15	-0.44	0.77	Smartphone addiction	-0.22*
Smartphone addiction	21.64	8.87	0.58	-0.58	0.93		

*p<0.01, SD: Standard deviation

media addiction (r=-0.33, p<0.01); and it was negatively and mildly related with digital game addiction (r=-0.28, p<0.01) and smart phone addiction (r=-0.22, p<0.01).

The Predictive Effect of Technological Addictions on Social Connectedness

The results of multiple regression analysis regarding the predictive effect of technological addictions on social connectedness are presented in Table 2.

According to the results of multiple regression analysis given in Table 2, internet addiction, social media addiction, digital game addiction and smartphone addiction predicted 25% (R^2=0.25 p<0.001) of social connectedness significantly (F[4,196]=16.438, p<0.001). When t-test results regarding the significance of the regression coefficients are examined, the greatest contribution to the prediction of social connectedness is from internet addiction, followed by social media addiction, digital game addiction and smartphone addiction.

Internet addiction is the main framework of social media addiction, digital game addiction, and smartphone addiction. This fact can cause a concern that social connectedness is predominantly predicted by internet addiction. For that reason, internet addiction has been removed from the model and the predictive effect of social media addiction, digital game addiction, and smartphone addiction on social connectedness has been examined. The results of multiple regression analysis are presented in Table 3.

According to the results of multiple regression analysis given in Table 3, social media addiction, digital game addiction and smartphone addiction predicted 20% (R^2=0.20 p<0.001) of social connectedness significantly (F[3,197]=16.072, p<0.001). When the results of the t-test on the significance of the regression coefficients are examined, it has been found that social media disorder, digital game addiction and smartphone addiction, respectively, contribute significantly to the prediction of social connectedness.

DISCUSSION

In this study, the predictive effect of internet addiction, social media addiction, digital game addiction, and smartphone addiction on social connectedness has been investigated. As a result of the study, it is seen that these technological addictions predict the social connectedness negatively and

Table 2: Results of multiple regression analysis regarding predictive effect of ınternet addiction, social media addiction, digital game addiction, and smartphone addiction on social connectedness

Predicted Variable	Predictors	B	Standard Error	Beta	t	p
Social Connectedness	Constant	62.940	3.461		18.185	<0.001
	Internet addiction	-0.283	0.075	-0.245	-3.780	<0.001
	Social media disorder	-0.376	0.107	-0.229	-3.531	<0.001
	Digital game addiction	-0.398	0.131	-0.193	-3.041	<0.001
	Smartphone addiction	-0.186	0.068	-0.172	-2.749	<0.001

R=0.50 R^2=0.25, Adj R^2=0.24, F (4,196)=16.438, p<0.001

Table 3: Results of multiple regression analysis regarding predictive effect of social media addiction, digital game addiction and smartphone addiction on social connectedness

Predicted Variable	Predictors	B	Standard Error	Beta	t	p
Social Connectedness	Constant	57.396	3.239		17.721	<0.001
	Social media disorder	-0.489	0.106	-0.298	-4.628	<0.001
	Digital game addiction	-0.440	0.135	-0.213	-3.266	<0.001
	Smartphone addiction	-0.189	0.070	-0.175	-2.705	<0.001

R=0.44 R^2=0.20, Adj R^2=0.18, F (3,197)=16.438, p<0.001

significantly. It has been seen that the greatest contribution to the prediction of social connectedness is from internet addiction. Social media addiction, digital game addiction and smartphone addiction, respectively, provide significant contributions to the prediction of social connectedness.

The effects of internet addiction, social media addiction, digital game addiction, and smart phone addiction on social connectedness can be explained by real social environments, loneliness, peer groups and friendship, communication skills and socialization tendencies, intimate relationship and personality traits. Theoretical explanations and research results regarding these factors are presented below.

Technology is used as an alternative to real social environments in the development and maintenance of social connectedness. With technological advances, individuals in different continents of the world have the opportunity to communicate and interact at the speed of light. This provides crucial contributions to the establishment and maintenance of interpersonal relationships and to the participation in the society (58). However, technology can be overused to disrupt functioning in some individuals. Such use can cause the individual move away from the true social environment (31,33,52). In this context, it can be said that the pathological or problematic use of technology negatively affects social connectedness. Lee and Robbins (55) emphasize that social connectedness develops through interpersonal relationships established in the real social world. Therefore, it is possible to say that individuals who spend a considerable part of their time in virtual environments and play games are at risk in terms of social connectedness.

Bargh and McKenna (79) emphasize that using the internet in a non-functional way causes young people to get trapped in pornography and become addicted to the internet. According to Bargh and McKenna (79), these individuals spend limited time with their family and friends and become lonely. As a consequence, social ties weaken and social connectedness decreases. In addition, van den Eijnden et al. (22) emphasize that social media addiction, Bian and Leung (31) smartphone addiction, and van Rooij et al. (34) game

addiction cause young people to be isolated from the real social environment. In this context, it can be said that the individuals with technological addictions become lonely, and social connectedness decreases in the individuals who become lonely. As a matter of fact, Lee and Robbins (55) emphasize that loneliness is a risk factor in terms of social connectedness.

During adolescence, peer groups and friendships gain importance. Adolescents meet the need of belonging by joining peer groups and developing friendships. During adolescence, peer groups and friendships become more meaningful than all other relationships that adolescents have (80,81). This shows that peer groups and friendship relations have a critical importance in adolescent social connectedness. In addition, the family is also considered as an important factor in the development of adolescent social connectedness (82). Social connectedness weakens if peer, friendship, and family relations of the adolescent is restricted. In other words, the quality of the relationship that the adolescent has developed with his peers and family affects social connectedness. Therefore, it is possible to say that factors that restrict or block these relationships of adolescents negatively affect social connectedness (55,56,62). It is emphasized in the literature that technological addictions restrict and hinder the development of these relations (7,17,22). In sum, technological addictions adversely affect the quality of relationship of adolescents with their peers, friends and family. This prevents the adolescent from seeing himself as a meaningful part of his relationships. Therefore, level of social connectedness of adolescents with technological addictions decreases or the development of social connectedness is hampered.

Technological addiction negatively affects the person's interpersonal communication skills and tendency to socialize (7,15). Individuals with technological addictions spend a noteworthy amount of their daily life in virtual environments. This leads to weakening of the features used in the real social environment. Therefore, the skills and tendencies required by the actual social environments are distorted. Indeed, virtual environments lack in clues

to true social communication and do not reflect the spirit of real social environments (83). In this context Ogel (84) emphasizes that virtual environments are the loss of social life which is called reality. According to Ogel (84), virtual environments cause deformation of real socialization. In the literature, communication skills and tendency to socialization are considered to be positive contributors to social connectedness (62,85). In this context, the effect of technological addictions on social connectedness can be explained by communication skills and the tendency to socialize. Therefore, it can be said that tendency to socialize and communication skills of the individuals with technological addictions decrease, and as a result, their social connectedness weakens.

Technological addiction causes the deterioration of intimate relations of the individual. Hence, in the two items of Young's eight-item list proposed for the diagnosis of internet addiction, refers to the interpersonal relations (17). Young (17) suggests "excessive internet use causes problems with family, school, work and friend" and "false statements about internet usage" as two criteria for diagnosing internet addiction. Similarly, two of the nine criteria for DSM-5 internet gaming disorders are related to interpersonal relationships (7). In DSM 5, the two criteria: "has deceived family members, therapists, or others regarding the amount of internet gaming" and "has jeopardized or lost a significant relationship, job, or educational or career opportunity because of participation in internet games" are used to diagnose internet gaming disorder (7). In addition, three of the nine criteria proposed by van den Eijnden and colleagues (22) to measure social media disorder/ addiction are about interpersonal relationships. According to this, "regularly had arguments with others because of social media use", " regularly lied to parents or friends about the amount of time spent on social media" and "had serious conflict with parent(s) and sibling(s) because of social media use" are considered as criteria of social media disorder/addiction. Finally, in the scale developed to measure smartphone addiction by Kwon et al. (14) it is emphasized that the use of smartphones negatively affects interpersonal

relationships. In the diagnoses of internet addiction, social media addiction, digital game addiction and smartphone addiction, it is emphasized that intensive use negatively affects interpersonal relationships and causes deceptive behaviors in interpersonal relationships. Individual's feeling himself or herself as a meaningful part of his/her relationships is considered as a critical indicator of social connectedness (55). However, technological addictions cause the individual to have arguments and conflicts in interpersonal relations and to get deceptive behaviors in interpersonal relations. For this reason, it is possible to say that the social connectedness is negatively affected in the individuals with technological addictions.

It is possible to explain the effect of technological addictions on social connectedness with personality traits. According to McIntyre et al. (61), internet addiction causes progression of individual's introverted personality traits. Introverted personality traits cause the individual to move away from the real social environment. This negatively affects social connectedness. Indeed, Lee et al. (85) emphasize that extroverted personality trait is a factor strengthening social connectedness. Extroverted adolescents prefer face-to-face interaction rather than interacting with the virtual world. However, introverted adolescents avoid interaction with other people because they are shy. This leads to a more intense use of the virtual world in maintaining communications and relationships (86). However, Savci and Aysan (87) found that the internet contributed to the coalescence of adolescents with their friends and that adolescents with high internet addiction experienced a higher level of peer association. Therefore, the question arises: "Does internet use have different consequences for individuals with different personality traits?" The negative consequences of the internet use are susceptible to personality traits (61). internet use can weaken extroverted personality traits, trigger introverted personality traits, or can cause progression of extroverted personality traits. The internet and social media can contribute to the development and maintenance of social relations of individuals with extroverted personality traits (20). Hence, the motivation of extrovert individuals to use

social media is different from the introverted individuals. However, Rothschild (88) emphasizes that social media use positively affects social connectedness in individuals with low levels of social skills and affects negatively in individuals with high social skills.

It has been seen in the literature that there are conflicting explanations and research results regarding the relationship between introverted and extroverted personality traits and the use of the internet, social media and smartphones. When the internet, social media, and smartphone are used functionally, they can have positive results in extroverted and introverted individuals. However, using the internet at the level of addiction leads to increased introverted personality traits and decreased extroverted personality traits. It has also been found that digital game addicts have low extroverted personality traits (89). Lee et al. (85) emphasize that extroverted personality trait is an important source in the development of social connectedness. Therefore, when the effects of technological addictions on social connectedness are examined, it is necessary to take personality traits into account. Hence, it has been found in research that technological addictions are closely related to personality traits (90-94).

The strongest predictive effect on social connectedness is from internet addiction and the weakest effect from smart phone addiction. This is due to the specific characteristics of technological addictions (internet addiction, social media addiction, digital game addiction and smartphone addiction). It is not anticipated that an addiction to a smartphone without the internet, mobile applications (especially social media applications) and games will develop. The development of smartphone addiction is due to the smartphone's internet access, the use of social media applications and the ability to play games. The adolescents involved in the research may have been using the internet, social media and digital games on different devices. Smart phone addiction is significant with internet, social media and gaming. Having a smart phone alone is not addictive, it is necessary to use these features. For this reason, smartphone addiction may be a weaker predictor than other independent variables. The reason for internet addiction's being the strongest predictor of social connectedness is due to the fact that the internet is the center point of other technological addictions (social media, digital gaming and smartphones).

In this study, it was determined that internet addiction, social media addiction, digital game addiction and smart phone addiction are important predictors of social connectedness in adolescents. Therefore, these addictions should be taken into consideration in social connectedness work and studies. Real social environments are considered to be an effective factor in the development of social connectedness (55) and in the prevention and treatment of technological addictions (87,95). For this reason, adolescents should be directed to real social environments by their parents and their school teachers. Also the relationships established by the adolescents in the real social environment should be supported. Parents should have an encouraging and permissive attitude towards adolescent to spend time with the peers. Finally, the internet and its associates can be used to contribute positively to social connectedness. In other words, the internet and its associates can help the adolescent to develop new social relationships and maintain existing relationships. This requires conscious and functional use. In this context, especially education of adolescents on the effective and functional use of internet and its associates should be increased. In addition, activities to prevent technological addictions and to promote social connectedness should be implemented within the counseling activities at schools.

Digital gaming addiction can be avoided with real social games. This can both associate the adolescent to the real social environment and prevent from developing digital games addiction. Therefore, games based on true social interactions should be foregrounded at home and at school. Smartphones are heavily used by adolescents because they are user friendly and widespread tools that combine numerous possibilities such as online communication-interaction, entertainment and shopping. When the use reaches to a level enough to hamper daily functioning, it can lead to a wide range of harmful results from preventing the adolescent from

having eye contact in communication to weakening of social connectedness. Hence, smartphone usage habits of adolescents should be followed carefully by parents. Parents should stop or limit the adolescent's smartphone use if the use negatively affects the academic success of the adolescent or the relationships and interactions, and leads to the adolescent become lonely and socially isolated.

This research has included adolescents who have been using the internet, playing digital games, using social media, and having at least one social media account and a smartphone for the past year. However, this is a non-clinical sample. Therefore, the effect of technological addiction on social connectedness can be examined in a clinical sample in future studies. The scales used in this research are self-report measures. Future research may use measures based on parent, teacher, or peer feedback. Such scales are not currently available in the literature. However, the development of these scales and the repetition of this research will provide critical contributions to the study findings. In addition, the impact of technological addiction on social connectedness should be supported by longitudinal, empirical and qualitative studies. In this

study, social connectedness was measured on a one-dimensional scale. Future studies should also consider family connectedness, school connectedness, peer connectedness, and belonging. In this research, internet addiction, social media addiction, digital game addiction and smartphone addiction were evaluated in the context of technological addictions. TV addiction, phubbing, online pornography addiction, online shopping addiction and online sex addiction should also be taken into account in later research.

Contributions category	Authors name
Development of study idea	M.S., F.A.
Methodological design of the study	M.S., F.A.
Data acquisition and process	M.S., F.A.
Data analysis and interpretation	M.S., F.A.
Literature review	M.S., F.A.
Manuscript writing	M.S., F.A.
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