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A Model for Explaining Digital Addiction in Adolescents: The Role of Self-Perception, Social-Emotional Learning, Adolescent-Parent Relationship and Peer Relationships

Ergenlerde Dijital Bağımlılığı Açıklamaya Yönelik Bir Model: Benlik Algısının, Sosyal-Duygusal Öğrenmenin, Ergen-Ebeveyn İlişkisinin ve Arkadaş İlişkilerinin Rolü

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Abstract

Objective: This study was aimed at examining the levels of digital addiction in adolescents with a regression model created with self-perception, adolescent-parent relationships, peer relationships, and social-emotional learning (SEL) skills.
Method: The participants consisted of 504 high school students. The data were obtained through the Personal Information Form, the Digital Addiction Scale, the Adolescent-Parent Relationships Scale, the Friendship Quality Scale, the Self-Perception Scale, and the Social and Emotional Learning Scale.
Results: Self-perception, adolescent-parent relationship, and SEL skills were significant predictors of adolescents' digital addiction levels, while the peer relationships was not. Additionally, the regression model explains approximately 27% of the total variance of digital addiction in adolescents.
Conclusion: The ability of digital platforms to compensate for negative self-perception during adolescence, coupled with inadequate SEL skills, may hinder adolescents from forming satisfying real relationships with themselves and their environment, ultimately increasing their levels of digital addiction. In families without satisfying relationships with parents where there is no positive, warm, supportive, and safe climate, this may cause digital addiction in adolescents.

Keywords: Digital addiction, self-perception, social and emotional learning, adolescent-parent relationship

Öz

Amaç: Bu çalışmada ergenlerde dijital bağımlılık düzeylerinin benlik algısı, ebeveyn ilişkileri, akran ilişkileri ve sosyal-duygusal öğrenme becerileri ile oluşturulan regresyon modeli ile incelenmesi amaçlanmıştır.
Yöntem: Çalışma grubu 504 lise öğrencisinden meydana gelmektedir. Veriler Kişisel Bilgi Formu, Dijital Bağımlılık Ölçeği, Ergen-Ebeveyn İlişkileri Ölçeği, Arkadaşlık Kalitesi Ölçeği, Benlik Algısı Ölçeği ve Sosyal ve Duygusal Öğrenme Ölçeği aracılığıyla elde edilmiştir.
Bulgular: Benlik algısı, ebeveyn ilişkileri ve sosyal duygusal öğrenme becerileri ergenlerin dijital bağımlılık düzeylerinin anlamlı yordayıcıları iken, arkadaşlık kalitesi değişkeni anlamlı bir yordayıcı değildir. Ayrıca regresyon modeli ergenlerde dijital bağımlılığın toplam varyansının yaklaşık %27'sini açıklamaktadır.
Sonuç: Dijital platformların ergenlik dönemindeki olumsuz benlik algısını telafi etme yeteneği, yetersiz sosyal duygusal öğrenme becerileriyle birleşerek, ergenlerin kendileriyle ve çevreleriyle tatmin edici gerçek ilişkiler kurmalarını engelleyebilir ve sonuç olarak dijital bağımlılık düzeylerini artırabilir. Ebeveynlerle tatmin edici ilişkilerin olmadığı, olumlu, sıcak, destekleyici ve güvenli bir iklimin bulunmadığı ailelerde, bu durum ergenlerde dijital bağımlılığa neden olabilir.

Anahtar kelimeler: Dijital bağımlılık, benlik algısı, sosyal ve duygusal öğrenme, ergen-ebeveyn ilişkisi

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Introduction

In the 21st century, digital technologies have become an integral part of everyday life. The rapidly developing and widespread internet and mobile technologies have significantly affected social life (1). However, despite the facilitating effect of technology on social life, its excessive use has also created a problem such as "digital addiction" (2). There are several types of digital addiction, characterized by compulsive, habitual and uncontrolled use of digital devices (3). This addiction includes internet addiction, social networking addiction, e-mail addiction, online gaming addiction and smartphone addiction (4).

Although digital addiction is an important risk factor for all developmental groups, children and adolescents are the most at risk among these groups (5). The reports and studies published by national and international organizations support this idea. The "Research on the Use of Digital Technologies in Children," published by the Turkish Statistical Institute (TURKSTAT), reported that the internet usage rate of children in the 6–15 age group was 50.8% in 2013 and 82.7% in 2021 (6). The Program for International Student Assessment (PISA) report published by the Organisation for Economic Co-operation and Development (OECD) mentioned that 91% of the participants in the 15-year-old age group had access to smartphones, 74% had access to portable laptops, and 60% had access to PCs (7).

Increased use of digital technology among children and adolescents has led to many problems. "The State of the World's Children: Children in the Digital World," published by the United Nations Children's Fund (UNICEF), reported that excessive use of digital technology is a potential risk that threatens children's safety, privacy, health, and happiness (8). In this context, to prevent or minimize the negative effects of digital addiction on adolescents, it is important to consider the psychosocial context in which digital addiction occurs. Based on this necessity, individual and environmental factors related to digital addiction in adolescents were examined in this study.

Adolescents with positive self-perception may feel valuable and establish healthy relationships. On the other hand, adolescents with negative self-perception may experience problems such as low self-esteem and worthlessness (9). Individuals with negative self-perception may spend more time in the digital world to feel better about themselves and may develop digital addiction (10). In the digital world, where they can hide their identities, getting positive feedback on their sharing can satisfy their egos. This can lead them to withdraw from their social environment and become more dependent on the digital world (11). Individuals with negative self-perception may constantly seek more followers, likes, or compliments on digital platforms. They may see others' lives, achievements, or appearances, make social comparisons to themselves, and feel worthless (12).

Social and emotional inadequacies such as the inability to express their feelings in real life, loneliness, the inability to socialize, etc. can be effective in turning to virtual environments. Individuals may tend to share their emotions with others in a virtual world due to insufficient social connections (13). Similarly, they may spend more time on social networks when they need to express their emotions, socialize, spend leisure time, escape from negative emotions, etc. (14). On the other hand, digital environments can be a haven for adolescents who cannot establish healthy relationships, cannot produce solutions to the problems they face, lack a sense of empathy, cannot take responsibility for their decisions, and have a negative self-perception. Digital environments, which contain many risks, can seriously harm individuals physiologically and psychologically (15). The problems of technology-addicted individuals are low self-control, an inability to express themselves, an inability to establish healthy relationships with others, and being accepted into peer groups (16).

Parents not spending enough time with their children, not providing emotional support, and not communicating with them can increase the likelihood of their children becoming addicted. The digital world can become an escape for children when they want to fulfill their emotional needs or fill their free time. At this point, parents' coping skills and knowledge about problematic use can play a critical role in keeping their children away from digital addiction (17). Parents set an example for their children with their own

technology use habits; spending too much time in the digital world and communicating less with family members can lead to similar behaviors in their children (18).

During adolescence, individuals spend more time with their peers than with their families, and their social relationships play a greater role in their daily lives (19). However, excessive use of technology during this period may cause adolescents to neglect their real-life relationships. When adolescents feel lonely due to social isolation, the digital world can be seen as a means of escape or solace (20). Adolescents who cannot spend quality time with their peers at school or outside of school may prefer excessive use of technology in order to be liked and adopted. Adolescents who identify themselves differently in the digital world try to join virtual groups. Uncontrolled and excessive use of technology can prevent their socialization and lead them to loneliness (21). Individuals who are addicted to technology may become depressed after a while due to a decrease in friendships and withdrawal from social life. Based on the interaction between technology addiction and depression, overuse of technology may increase symptoms of depression, and an increase in symptoms of depression may lead to overuse of technology (22).

In a nutshell, it is no longer possible to completely stay away from the digital world, but overuse of technology poses a significant risk. According to reports from national and international organizations and research results, the use of digital technologies among adolescents is at a risk level and negatively affects their physical, cognitive, social, and emotional development. However, preventive and intervention approaches aim to promote responsible technology use and prevent or minimize digital addiction. An important factor in the effectiveness of these approaches is the planning and implementation of prevention and intervention studies in the psychosocial context of adolescents. For this purpose, it is necessary to examine the variables that may be related to digital addiction in both individual and environmental dimensions. Therefore, this study was aimed at examining to what extent the variables of self-perception, SEL skills, adolescent-parent relationship, and peer relationships predict digital addiction in adolescents (Figure 1).

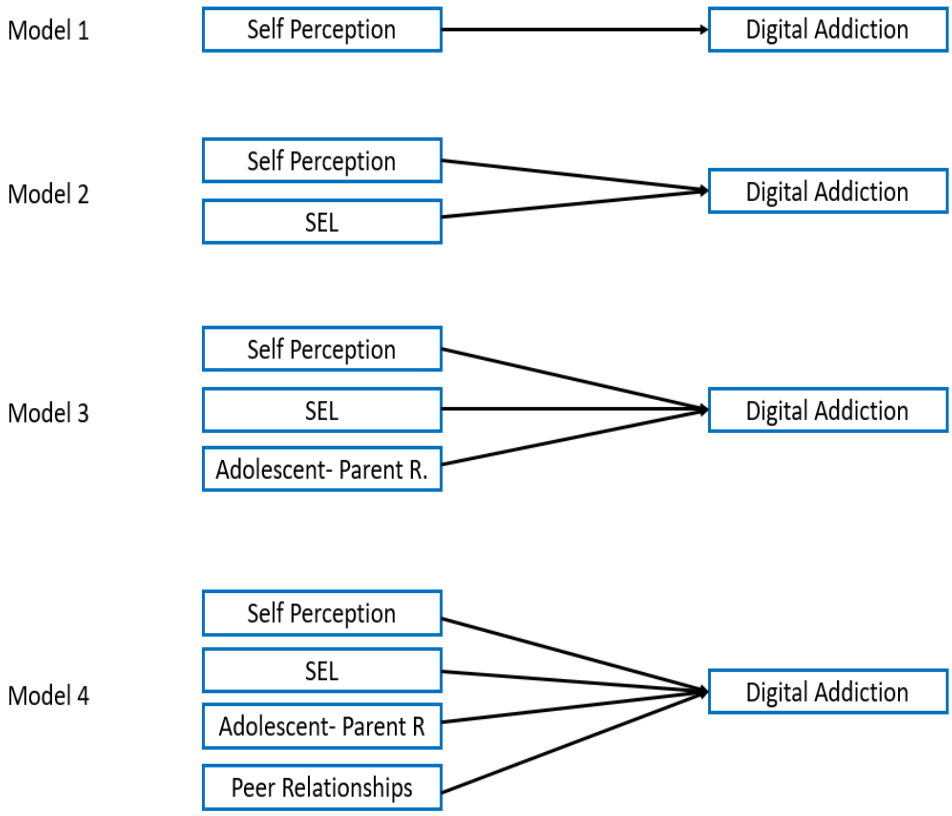

Figure 1. Hierarchical regression model

Method

Participants and Procedure

We selected the participants by random sampling method among the students in four high schools in Erzincan in the 2022–2023 academic year. Written informed consent was obtained from all participants and their parents. When calculating the sample size, power analysis determined that a minimum of 395 participants was sufficient with an error of 0.05, a 95% confidence interval, and 80% power. The study was completed with 504 adolescents who volunteered to participate in it. Socio-demographic information about the participants is presented in Table 1.

Table 1. Sociodemographic information of participants

Variable	f	%
Gender		
Female	323	64.1
Male	181	35.9
Class		
9th grade	196	38.9
10th grade	130	25.8
11th grade	89	17.7
12th grade	89	17.7
Owning a Smartphone		
Yes	450	89.3
No	54	10.7
Owning a PC		
Yes	303	60.1
No	201	39.9
Coexistence Status		
With my mother and father	462	91.7
Either my mother or father	28	5.6
Other	14	2.8
Education Condition of Mother		
Illiterate	4	0.8
Literate	7	1.4
Primary school	116	23.0
Middle school	98	19.4
High school	184	36.5
Undergraduate	95	18.8
Education Condition of Father		
Illiterate	2	0.4
Literate	6	1.2
Primary school	58	11.5
Middle school	67	13.3
High school	178	35.3
Undergraduate	193	38.3
Academic Achievement (mean ± sd)	82.08 ± 9.71	

f: frequency; sd: standard deviation.

We collected the data through personal information forms and scales from 9th, 10th, 11th, and 12th grade students. We first obtained permission from the Human Research Ethics Committee of Erzincan Binali Yıldırım University (04.04.2023-252842) before the data collection. After, we interviewed school administrators and presented information about our study. In addition, we presented information about the study to the students and their parents.

Instruments

Personal Information Form

The from was developed by the researchers to determine the sociodemographic characteristics (gender, class, owning a smartphone, owning a PC, coexistence status, education condition of the mother, education condition of the father, and academic achievement) of the participants.

Digital Addiction Scale

This scale was developed by Arslan et al. (23) to measure the digital addiction levels of high school and university students. The scale, which consists of 29 items in total, has three sub-dimensions: gaming addiction, social media addiction, and impact on daily life. The Cronbach's alpha coefficient for the reliability of the scale is .89, which was calculated as .92 in this study.

Adolescent-Parent Relationship Scale

The scale was developed by Aktaş (24) to measure the quality of adolescents' relationships with their parents. The scale consists of 27 items in total and has four sub-dimensions: support, sharing, intimacy, and monitoring. Cronbach's alpha coefficient for the reliability of the scale is .95 and it was calculated as .95 in this study.

Friendship Quality Scale

This scale was developed by Thien et al. (25) to measure the quality of adolescents' relationships with their friends and was adapted by Akın et al. (26). The scale, which consists of 21 items in total, has 4 sub-dimensions: safety, closeness, acceptance, and help. The Cronbach's alpha coefficient for the reliability of the scale is .91, which was calculated as .91 in this study.

Self-Perception Scale

Self-Perception Scale was developed by Şahin and Ersanlı (27) to measure adolescents' self-perceptions in different dimensions. The scale, which consists of 25 items in total, has 5 sub-dimensions: general self-perception, physical self-perception, academic self-perception, social self-perception, and family self-perception. The Cronbach's alpha coefficient for the reliability of the scale is .91, which was calculated as .92 in this study.

Social-Emotional Learning Scale

The scale was developed by Totan (28) to measure adolescents' social-emotional learning skills. The scale can be used in two different types: long and short. The long form consists of 23 items, and the short form consists of 5 items. It consists of five sub-dimensions: self-awareness, social awareness, self-management, relationship skills, and responsible decision-making. The Cronbach's alpha coefficient for the reliability of the scale is .92, which was calculated as .82 in this study.

Statistical Analysis

Analyses were started by examining the univariate and multivariate outlier, normality, linearity, homogeneity, and multicollinearity assumptions (29) on the data set. For univariate normality, the scores obtained from the measurements were converted into standard z scores, and z scores that were not within ±3 (n=24) were removed from the data set. The Mahalonobis distance value was used for the multivariate normality criterion. The data (n=6) that did not meet the $p<.001$ significance level criterion (30) accepted for multivariate outliers

were removed from the data set. Then, it was observed that the skewness and kurtosis values of the variables were within acceptable ranges (±1.5) (29), the histogram, branch leaf, and Q-Q graphs met the conditions, and the data showed a distribution close to normal.

Another condition of multiple linear regression analysis is the absence of a high correlation coefficient between predictor variables. For this condition, we examined the pairwise correlation coefficients between predictor variables, tolerance value, VIF (variance inflation factor), and CI (condition index) values. According to the analyses, there is no correlation value above .80 which can be defined as multicollinearity among the predictor variables (Table 2). CI (5.831-27.364), VIF (1.003-1.933), and Tolerance values (0.527-0.997) are within the appropriate reference ranges. Finally, whether there is autocorrelation (multicollinearity) in the regression model was tested with the Durbin-Watson method. It was (1.779) within the appropriate reference range. After the a priori analyses, a data set of 504 participants was found to meet the assumptions. The data were analyzed with hierarchical regression analysis.

Results

Pearson product-moment correlation, minimum and maximum, standard deviation, skewness and kurtosis, and Cronbach's alpha coefficient values are presented in Table 2.

Table 2. Descriptive statistics of variables

Variables	1	2	3	4	5
1. Digital Addiction	—				
2. SEL	-0.38**	—			
3. Self Perception	-0.45**	0.47**	—		
4. Adolescent-Parent Relationship	-0.42**	0.37**	0.63**	—	
5. Peer Relationships	-0.09*	0.18**	0.29**	0.16**	—
Mean (x̄)	69,12	84,44	90,00	98,20	86,28
Minimum - Maximum	28–140	51-112	25-125	28-130	21-126
Standard Deviation	21.42	11.27	16.97	21.23	19.66
Skewness	0.50	-0.14	-0.58	-0.83	-0.55
Kurtosis	0.30	-0.18	0.38	0.33	0.30
Cronbach Alpha	0.92	0.82	0.92	0.95	0.91

* p < .05, ** p < .01

There are statistically significant relationships between all variables in the study (Table 2). There are negative correlations between Digital Addiction and SEL Skills [r= -.38, p<.01], Self-Perception [r= -.45, p<.01], Adolescent-Parent Relationships [r= -.42, p<.01] and Peer Relationships [r= -.09, p<.01]. There are positive correlations between SEL Skills and Self-Perception [r= .47, p<.01], Adolescent-Parent Relationships [r= .37, p<.01] and Peer Relationships [r= .18, p<.01]. There are positive correlations between Self-Perception and Adolescent-Parent Relationships [r=.63, p<.01] and Peer Relationships [r= .29, p<.01]. There is a positive correlation between Adolescent-Parent Relationships and Peer Relationships [r= .16, p<.01].

Hierarchical regression analysis was used to examine whether self-perception, SEL skills, adolescent-parent relationship, and peer relationships were statistically significant predictors of adolescents' digital addiction levels (Table 3). We started the hierarchical regression analysis by adding self-perception to the model. The beta coefficient of the self-perception was -0.57, and the t-test result was statistically significant (tself-perception= -11.31; p>.01). In addition, Model 1 explains approximately 20% of the digital addiction level of adolescents (R2 =.203; F1-503= 127.99; p<.01).

In the second step, we added SEL skills to the model in addition to self-perception. When the variables in the model were constant, the beta coefficient of the self-perception was -0.44, and the SEL skills was -

0.39. The t-test results were significant for the self-perception (tself_perception= -7.95; p<.01) and the SEL (tsocial_and_emotional_learning= -4.67; p<.01). Model 2 explains approximately 24% of the digital addiction level of adolescents (R2 =.236; F2-502= 77.47; p<.01).

Table 3. Hierarchical regression analysis

Model	B	Sd	β	t	Bin.r.	Part.r	R^2	F
1.(Constant)	120.31	4.60		26.15**			.203	127.99**
Self Perception	-0.57	0.50	-0.45	-11.31**	-.450	-.449		
2.(Constant)	142.32	6.53		21.79**			.236	77.47**
Self Perception	-0.44	0.06	-0.35	-7.95**	-.334	-.310		
SEL	-0.39	0.08	-0.21	-4.67**	-.204	-.182		
3.(Constant)	145.73	6.49		22.43**			.260	58.32**
Self Perception	-0.30	0.06	-0.24	-4.58**	-.200	-.176		
SEL	-0.36	0.08	-0.18	-4.26**	-.187	-.164		
Adoles.-Parent R.	-0.19	0.05	-0.19	-3.94**	-.173	-.151		
4.(Constant)	143.17	6.87		20.84**			.266	44.09**
Self Perception	-0.32	0.07	-0.25	-4.72**	-.206	-.181		
SEL	-0.36	0.08	-0.19	-4.35**	-.189	-.166		
Adoles.-Parent R.	-0.19	0.05	-0.19	-3.88**	-.172	-.150		
Peer Relation.	0.05	0.04	0.05	1.14	.051	.044		

**p<.01; Adoles.-Parent R: adolescent-parent relationship; Peer Relation.: peer relationships; B: unstandardized beta; Sd: standard deviation; β: standardized beta; Bin.r.: binary correlations; Part.r.: partial correlations.

In the third step, we added the adolescent-parent relationship to the model in addition to self-perception and SEL skills. When the variables in the model were constant, the beta coefficient of the self-perception was -0.30, the SEL skills was -0.36, and the adolescent-parent relationship was -0.19. The t-test results were significant for the self-perception (tself_perception= -4.58; p<.01), the SEL (tsocial_and_emotional_learning= -4.26; p<.01), and the adolescent-parent relationship (tadolescent_parent_relationship= -3.94; p<.01). Model 3 explains approximately 24% of the digital addiction level of adolescents (R2 =.260; F3-501= 58.32; p<.01).

In the fourth step, we added the peer relationships to the model in addition to self-perception, SEL skills, and adolescent-parent relationship. When the other variables in the model were constant, the beta coefficient of the self-perception was .-0.32, the SEL skills was -0.36, the adolescent-parent relationship was -0.19, and the peer relationships was 0.05. The t-test results were significant for the self-perception (tself_perception= -4.72; p<.01), the SEL (tsocial_and_emotional_learning= -4.35; p<.01), and the adolescent-parent relationship (tadolescent_parent_relationship= -3.88; p<.01), but not significant for the peer relationships (tpeer_relationships= 1.14; p>.01). Model 4 explains approximately 27% of the digital addiction level of adolescents (R2 =.266; F4-500= 44.09; p<.01).

Discussion

According to the hierarchical regression analysis, self-perception, adolescent parent relationships, and SEL skills were significant predictors of adolescents' digital addiction levels, but peer relationships was not. Self-perception is a significant predictor of digital addiction in adolescents (β: -0.32). This result may be due to the fact that self-perception becomes more important during adolescence, a period in which individuals discover and develop their identities, and that digital platforms compensate for negative self-perception. Self, which includes thoughts, perceptions, and evaluations about oneself, can be positive or negative (31). The smaller the difference between what is desired to be and what actually exists, the more positive the self-perception is (32). Especially adolescence is a period in which the individual's self-perception develops and social relations gain importance. When adolescents feel less worthless or unsuccessful, digital

platforms, social media and online games can make them feel better. However, the dijital world may make the adolescent more addicted by offering temporary satisfaction and positive feedback through factors such as likes, number of followers, or social approval (33).

Individuals with negative self-perception may consider the high number of likes and followers on social networks as success and may increase their social network use to the point of addiction (34). Through social media platforms, people often follow the lives of others and compare their lives with their own. This comparison includes the supposedly perfect lives of others as well as idealized standards. In this case, individuals may evaluate their own lives and appearance according to idealized norms and develop low self-perception (35,36). In addition, individuals with a negative self-perception may consider the high number of likes and followers on social networks as success and increase their social network use to the point of addiction (34).

SEL skills is a significant predictor of digital addiction in adolescents (β: -0.36). This result may be because adolescents cannot establish real, satisfying, and healthy relationships with themselves and their environment due to the insufficient development of SEL skills. Studies show that there are negative relationships between Facebook addiction and communication skills, problem-solving skills, and coping skills (37); there is a negative correlation between SEL skills and internet abuse, and SEL skills predict internet abuse at a statistically significant level (38).

Individuals with insufficient SEL skills may have difficulty in real-world social interactions (39-41); they may spend more time in the digital world to cope with their stress, anxiety, and negative emotions (42). While the digital world can provide instant emotional satisfaction, in the long run, it can lead to addiction and weaken the relationship with the real world. Supporting this situation, studies show that individuals with insufficient SEL skills, high levels of emotional problems, and low self-esteem have high levels of social media addiction (43,44).

Adolescent-parent relationship is a significant predictor of digital addiction in adolescents (β: -0.19). This result may be due to the fact that in families where there is no positive, warm, supportive, and safe climate, healthy relationships that cannot be established with parents are tried to be satisfied in the digital world.

Spending more time in the digital world leads to social isolation, individualizes family activities, and reduces communication and social interaction within the family (45). When most of the time spent together in the family is focused on phones, computers, or other electronic devices, parents' inability to communicate with their children and respond to their emotional needs increases children's tendency towards technology (46). When parents do not control or limit their children's use of technology, children may be more likely to become addicted to it (47). Similarly, studies show that problematic internet use increases when parental support is low (48), while internet (49), and social media (50) addiction decrease when parental acceptance, closeness, and support increase.

Peer relationships is not a statistically significant predictor of digital addiction in adolescents. This result may be due to the bidirectional relationship between peer relationships and digital addiction. Peer relationships that cannot be established in real life may be compensated in the digital world, or peer relationships established in the digital world may increase addiction (51). Today, making friends on the internet has become popular among adolescents, and social networks such as Facebook, Instagram, and Twitter offer the opportunity to make friends faster and to be in constant communication (52). Through social media platforms, instant messengers, or other digital applications, people can connect with others and make friends. However, friendships made through social networks can lead to overuse of technology (33). This can lead to addiction and negatively affect real-life social relationships (53).

This study has several limitations. First, the findings were based on self-reported data from adolescents and did not include observational data on participants. This may cause participants to fall into personal bias when scoring the scales. Therefore, future studies could support self-reported data with observations of participants' digital technology use. Another limitation was the sample of the study. Our participants consisted only of adolescents in Turkey, which suggests that the findings could be generalized to countries

with similar economic conditions, access to technology, technology usage rates, digital divide, etc. Another limitation was that our findings were limited to cross-sectional data. Therefore, future studies can increase the reliability of their results by collecting longitudinal data.

According to our study, self-perception, parental relationships, and SEL skills were significant predictors of adolescents' digital addiction levels, while peer relationships was not. Educators and researchers can benefit from the findings of this study. The findings of this study may provide a research basis for interventions to prevent digital addiction. When planning programs or interventions to prevent digital addiction in adolescents, educators and researchers can take into account the findings of this study. They can design interventions taking into account personal factors (self-perception, SEL) and environmental factors (adolescent-parent relationships and peer relationships).

Psychological counselors, teachers, and school administrators can inform students and families about the conscious and safe use of technology. Family-participatory interventions can be planned to prevent risks. Seminars can be organized for parents and children to solve communication problems within the family, which is one of the important causes of technology addiction. Parents can be informed about the characteristics of adolescence and the impact of digital addiction during this period. Individual or group psychological counseling can be done for adolescents with insufficient SEL skills, problematic parental relationships, and negative self-perception. To prevent digital addiction, parents can set limits for their children at an early age and set clear rules about technology use. Parents can be role models for their children by following these rules themselves.

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