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Research Article

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The Relationship between Smartphone Addiction and Identity Development among Adolescents

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Abstract

Smartphone addiction has negative consequences on adolescents. The main developmental task of adolescence is the formation of ego-identity. Little is awareness of the role of smartphone addiction in ego-identity during adolescence. The study intends to examine the relationship between smartphone addiction and dimensions of identity development. For this purpose, the effects of smartphone addiction on identity dimensions were analysed using path analysis. The sample consisted of 403 high school students aged between 13 and 18 years. The Dimensions of Identity Development Scale and Smartphone Addiction Scale Short Form were used as data gathering instruments. As a result of the analysis, it was determined that smartphone addiction negatively predicted identification commitment, commitment making and exploration breadth from the dimensions of identity development. In addition, it was found that smartphone addiction positively predicted ruminative identity exploration. With the model presented in this study, the connection between smartphone addiction and identity development was determined and it was concluded that adolescents' smartphone addiction plays an important role in identity development. The results obtained were discussed within the framework of the literature. Suggestions were made to researchers and practitioners.

Key Words

Identity development • Adolescence • Smartphone addiction

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With the developments in technology in recent years, smartphones have become an integral part of individuals. Smartphones offer the opportunity to access information and maintain communication at any time. In addition, they can play games through applications downloaded to smartphones, be online on social media, and instantly follow (Körmeni et al., 2016). While 3.8 billion world population actively used smartphones in 2021, this number is expected to increase to 4.5 billion in 2024 (Newzoo, 2021). Although smartphone offer many opportunities, the increase in the duration of use and out of control use has brought many problem areas. One of these problems is smartphone addiction (Wu et al., 2013). Smartphone addiction (SPA) is defined as a behavioural addiction that causes many negative consequences in the individual as because of uncontrolled, excessive and, addictive use of the smartphone (Billieux, 2012). The biopsychosocial model has defined the symptoms of SPA. These symptoms include salience, withdrawal, tolerance, mood modification, conflict, and relapse (Griffiths, 2005).

When the definition and symptoms of SPA are considered, it may be related to many problems. Adolescents, especially in the transition period, are prone to SPA (Yen et al., 2009). In this period, SPA is associated with many problem areas. In adolescence, SPA was positively associated with alexithymia (Ding et al., 2022), anxiety (Güner & Demir, 2022), loneliness (Yıldız-Durak, 2018), poor sleep quality (Yang et al., 2020), depression (Demirbaş- Çelik et al., 2022) and cyberbullying (Gül et al., 2020). SPA, which is associated with many problem areas during adolescence, brings to mind how it will be reflected in ego-identity development, which is the basic developmental task of the individual in this period. According to Erikson's (1968) psychosocial development theory, the basic development of adolescence is to form ego-identity. This suggests how the SPA the adolescent in this period will be related to the identity

The five-dimensional identity model was developed by Luyckx et al. (2008a) within the scope of Erikson's (1968) identity theory and Marcia's (1966) identity statuses model. These dimensions are Identification Commitment (IC), Exploration Breadth (EB), Commitment Making (CM), Ruminative Exploration (RE), and Exploration Depth (ED) (Luyckx et al., 2010). CM is the individual's attachment to the constructs that will form the identity (Luyckx et al., 2008b). IC is the degree to which the individual feels that the identity structures are compatible with them (Luyckx et al., 2010). CM and IC are closely linked to the achievement and foreclosure identity status in Marcia's model of identity statuses (Luyckx et al., 2008a). EB is extensive research on the options that will form ego-identity. In this dimension, the individual explores many ideals, values, and ideological issues (Luyckx et al., 2008b). ED is the re-evaluation of ego identity structures (Luyckx et al., 2010). EB and ED are closely linked to achievement and moratorium identity status (Luyckx et al., 2008a). RE refers to being stuck in the process of the identity formation. RE refers to being stuck in the process of identity (Luyckx et al., 2010). RE is closely linked to moratorium and diffusion identity statuses (Luyckx et al., 2008a).

Many risk factors negatively affect ego-identity development (Luyckx et al., 2008a). One of these risk factors may SPA. According to the biopsychosocial model, SPA is among the risk factors for adolescents. The biopsychosocial model, behavioural addiction includes psychological, sociological, and biological components. This model addresses the definition, types and symptoms of behavioural addictions. Behavioural addiction is an addiction that is unrelated to a substance. These include addiction to smartphones, gaming, eating, exercise, and sex. The

symptoms of SPA include salience, withdrawal, tolerance, mood change, conflict, and relapse (Griffiths, 2005). In this context, Côté and Levine (2002) stated that addiction is an obstacle to harmonious ego identity. Marcia (1966) emphasized that substance abuse decreases the tendency towards successful identity status and increases the tendency towards moratorium and diffusion identity statuses. In a longitudinal study by De Moor et al. (2022), IC and ED were negatively related to substance abuse. In addition to substance addiction, recent years, there have been studies examining the effects of internet, social media and smartphone addiction on ego-identity. Internet addiction was negatively related to identity exploration (Israelashvili et al., 2012) and ego-identity (Kim et al., 2010). Internet addiction was found to be inversely related to informative and normative identity styles and positively related to diffuse avoidance style (Monacis et al., 2017). In another study, internet addiction and RE were positively correlated (Morsünbül, 2014). In addition, social media addiction and identity confusion were positively related (Sharif & Khanekharab, 2017). Social media addiction was found to be negatively related to achievement and foreclosure identity statuses and positively related to moratorium and diffusion identity statuses (Mazalin & Moore, 2004). Few studies have addressed the relationship between SPA and ego-identity. In a study by Kaya (2021), a negative relationship was found between SPA and identity functions. In addition, SPA was found to be negatively related to self-identity dimensions (Kim, 2017). Another study found a positive relationship between SPA and identity diffusion (Fallah et al., 2019). As a result, considering and literature the relationship between SPA and identity development dimensions was analysed.

The present study

SPA has become a worldwide phenomenon and its negative influences have been the subject of many studies (Liu et al., 2017). In the literature, although there are studies on the social (Yıldız-Durak, 2018; Tateno et al., 2019), emotional (Ding et al., 2022; Kim et al., 2019), and academic (Samaha & Hawi, 2016; Shen et al., 2021) effects of SPA on adolescents, there are few studies on the link between this addiction and ego-identity. Previous studies have examined the effects of SPA on identity functions (Kaya, 2021) and self-identity (Kim, 2017). However, revealing the relationship between ego-identity, which is the basic developmental task of adolescence, and SPA, which has become a worldwide phenomenon, may contribute to the literature. In addition, the results of this study may contribute to prevention and intervention programmes for SPA. In line with this importance, the objective of this study was to explore the link between SPA and the dimensions of identity development. The research hypothesis (a) SPA positively predicted CM, (b) SPA positively predicted IC, (c) SPA positively predicted EB, (d) SPA positively predicted ED, and (e) SPA negatively predicted RE.

Methods

Participants

The convenience sampling method was used to determine the samples. This method prevents the loss of money and labour and takes into account the accessibility of the participants (Büyüköztürk et al., 2010). The participants are studying in three high schools in Mardin. The participants consisted of 403 students, 241 (59.8%) female and 162 (40.2%) male. Their ages were between 13 and 18 (Mean= 15.74, SD= 1.46). Of these adolescents, 81 (20.3 %) were in 9th grade, 120 (29.8 %) in 10th grade, 125 (31.0 %) in 11th grade, and 76 (18.9 %) in 12th grade.

Procedure

Before starting the research, ethics committee permission was obtained from Çukurova University (Document no: E-95704281-604.02.02-579891). In addition, necessary permissions were obtained from the parents of the students and educational institutions. The information consent form was obtained. Participants are those who voluntarily want to get involved. It took approximately 20 minutes to answer the scales. The scales were administered by the researchers using paper and pencil in the classroom. All processes of the research were conducted according to the Declaration of Helsinki.

Measures

Identity Development Dimensions Scale

The scale was proposed by [Luyckx et al. \(2008a\)](#) and translated into Turkish by [Morsünbül and Çok \(2014\)](#). It consists of twenty-five items and five dimensions. The instrument is 5-point Likert type. The scores that can be obtained for each dimension are between 5 and 25. The model fit value of the scale was found to be acceptable ($\chi^2/df = 2.90$, AGFI = 0.94, GFI = 0.95, CFI = 0.92, SRMR = 0.07 and RMSA = 0.06). Factor loadings were found between 0.49 and 0.80. Cronbach alpha values of the dimensions are between 0.88 and 0.78. Internal consistency values for this study are presented in Table 1.

Smartphone Addiction Scale Short Form

The scale was proposed by [Kwon et al. \(2013\)](#) and translated into Turkish by [Noyan et al. \(2015\)](#). It is a 6-point Likert-type scale 10 items. The scale consists of one dimension. The scores that can be obtained from the scale are between 10 and 60. The factor loads of the scale were found between 0.49 and 0.83. Cronbach alpha values were calculated as 0.87.

Data analysis

In this study, the cross-sectional method was used to reveal the relationship between variables. Path analysis was used to test the prediction of SPA on the dimensions of identity development. Herman's single factor test was analysed to determine the common method bias (CMB) problem. To avoid CMB problem, a single factor structure should explain less than 40% of the variance ([Zhou & Long, 2004](#)). In this study, 23.95% of the variance was explained as a single factor structure. For normal distribution, [Tabachnick and Fidell's \(2001\)](#) criterion that both skewness and kurtosis values should be in the range between +1.5 and -1.5 was taken into consideration. In addition, AVE >0.05, CR >0.07 and CR > AVE criteria should be met for convergent, discriminant validity ([Hair et al., 2014; Fornell & Larcker, 1981](#)). SPSS 25, SmartPLS 3 and AMOS 26 package programmes were used for the analyses in this study.

Results

Preliminary analyses

Firstly, mean, kurtosis, skewness, reliability values, convergent and discriminant validity values were analysed.

Table 1

Convergent, Discriminant Validity and Descriptive Statistics of the Variables

Variable	Mean	SD	Skewness	Kurtosis	Cronbach	McDonald	rho_A	CR	AVE
					α	ω			
SPA	26.60	11.74	0.48	-0.38	0.88	0.90	0.89	0.90	0.54
CM	17.21	4.63	-0.38	0.10	0.88	0.88	0.94	0.91	0.66
EB	18.42	4.22	-0.52	0.19	0.83	0.83	0.84	0.87	0.57
RE	15.75	5.08	-0.17	-0.65	0.82	0.83	0.84	0.87	0.58
IC	17.37	4.80	-0.43	-0.19	0.84	0.85	0.89	0.88	0.62
ED	17.65	4.11	-0.53	0.31	0.71	0.72	0.53	0.74	0.39

As show in Table 1, the mean value of the SPA variable was 26.60, skewness value was 0.48, kurtosis value was -0.38, Cronbach (α) value was 0.88, McDonald omega (ω) value was 0.90, rho_A value was 0.83, CR value was 0.90 and AVE value was 0.54. CM dimension mean value was 17.21, skewness value was -0.38, kurtosis value was 0.10, Cronbach (α) value was 0.88, McDonald omega (ω) value was 0.88, rho_A value was 0.94, CR value was 0.91 and AVE value was 0.66. EB dimension mean value was 18.42, skewness value was -0.52, kurtosis value was 0.19, Cronbach (α) value was 0.83, McDonald omega (ω) value was 0.83, rho_A value was 0.84, CR value was 0.87 and AVE value was 0.57. RE dimension mean value was 15.75, skewness value was -0.17, kurtosis value was -0.65, Cronbach (α) value was 0.82, McDonald omega (ω) value was 0.83, rho_A value was 0.84, CR value was 0.87 and AVE value was 0.58. IC dimension mean value was 17.37, skewness value was -0.43, kurtosis value was -0.19, Cronbach (α) value was 0.84, McDonald omega (ω) value was 0.85, rho_A value was 0.89, CR value was 0.88 and AVE value was 0.62. ED dimension mean value was 17.65, skewness value was -0.53, kurtosis value was 0.31, Cronbach (α) value was 0.71, McDonald omega (ω) value was 0.72, rho_A value was 0.53, CR value was 0.74 and AVE value was 0.39

As show in Table 1, the dimensions included in the study fulfilled the criteria of normal distribution, convergent, discriminant validity and reliability. However, the ED dimension was excluded from the analysis because it did not meet the specified criteria, as rho_A was 0.53 and AVE was 0.39. In the analysis made in this context, presented in Table 1.

Table 2

Correlation Values of the Variables

Variable	1	2	3	4	5
1. SPA	1.00				
2. CM	-0.22**	1.00			
3. EB	-0.13**	0.53**	1.00		
4. RE	0.21**	-0.32**	-0.14**	1.00	
5. IC	-0.13**	0.73**	0.46**	-0.28**	1.00

** $p < 0.01$

Table 2, show a negative relationship between SPA and CM ($r = -0.22, p < 0.01$), EB ($r = -0.13, p < 0.01$), and IC ($r = -0.13, p < 0.01$). A positive relationship SPA and RE ($r = 0.21, p < 0.01$). In addition, CM was positively associated with IC ($r = 0.73, p < 0.01$), and negatively associated with RE ($r = -0.32, p < 0.01$). Also, RE was negatively associated with IC ($r = -0.28, p < 0.01$).

Path Analysis

Table 3

Findings of the Path Analysis

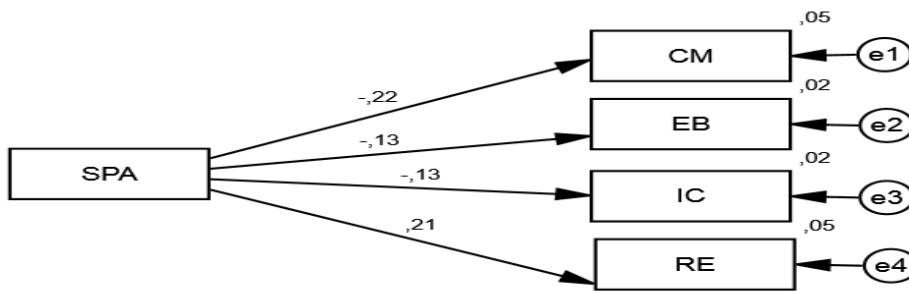
Pathway	B	S.E.	Coefficient	p
SPA → CM	-0.18	0.03	-0.22**	0.00
SPA → EB	-0.09	0.04	-0.13**	0.00
SPA → RE	0.18	0.04	0.21**	0.00
SPA → IC	-0.11	0.04	-0.13**	0.00

** $p < 0.01$

As seen in Table 3, SPA predicted CM ($\beta = -0.22, p < 0.01$), EB ($\beta = -0.13, p < 0.01$), IC ($\beta = -0.13, p < 0.01$) negatively and RE ($\beta = 0.21, p < 0.01$) positively. All coefficient values were significant. Figure 1 shows the path analysis.

Figure 1

Standardized Effects of Smartphone Addiction on Identity Developments (Path Analysis)



In the path analysis shown in Figure 1, it was found that smartphone predicted the dimensions of identity development significantly. SPA predicted CM ($\beta = -0.22, p < 0.01$), EB ($\beta = -0.13, p < 0.01$), IC ($\beta = -0.13, p < 0.01$) negatively and RE ($\beta = 0.21, p < 0.01$) positively. All coefficient values were significant.

Discussion

The results of this study showed, that SPA predicted the identity development dimensions CM, EB, IC negatively, and RE positively. In this context, [Kuss and Griffiths \(2014\)](#) emphasised in their book Internet Addiction in Psychotherapy that smartphone addiction has a negative impact on ego-identity formation and ego-identity development. Previous studies have found that internet addiction negatively predicts identity exploration

(Israelashvili et al., 2012) and ego-identity (Kim et al., 2010). The link between internet addiction and RE, one of the dimensions of identity development, was also examined. In the study by Morsünbül (2014), in line with the results of this study, it was found that internet addiction positively predicted RE. The main developmental task of adolescence is to form ego-identity (Erikson, 1968). During this period, SPA negatively affects the process of searching for a compatible identity. Therefore, this may prevent the adolescents from forming a coherent ego-identity.

SPA is a form of internet addiction (Billieux, 2012). Kaya (2021) proposed a model to explain the relationship between SPA and ego-identity. In this model, it was reported that SPA negatively predicted identity functions. Recent studies have found that SPA negatively predicts self-identity (Kim, 2017) and positively predicts identity diffusion (Fallah et al., 2019). The proposed model and previous studies have shown that SPA is negatively related to identity development. In addition, according to Marcia's (1966) model of identity statuses, addiction negatively affects ego-identity. In the five-dimensional identity development model, CM, EB, and IC are explained as dimensions to which positive characteristics are attributed. RE, on the other hand, was defined as a dimension attributing negative characteristics, i.e., obsession and stuckness in identity development (Luyckx et al., 2008a; Luyckx et al., 2010). As a result, it can be stated that CM, EB, and IC predicted negatively and RE predicted positively as indicators of the negative reflection of this addiction on ego identity. Adolescents who are addicted to smartphones cannot do enough expansion research on the options that will form the ego identity and cannot adequately evaluate the options that will form the identity structure. Adolescents may also become stuck in the process of identity formation.

Limitations and Recommendations for Further Research

The study group consisted of adolescents. Therefore, generalisation to different developmental periods may be problem. Based on this limitation, that researchers conduct similar studies in emerging adulthood. Recently, it has been reported that the process of identity formation continues into emerging adulthood (Luyckx et al., 2010). The study was designed cross-sectionally. Therefore, it is a limitation that causality and longitudinally cannot be mentioned. An experimental and longitudinal study examining the effect of smartphone addiction on identity development can be conducted. This study examined the direct effect of SPA on identity dimensions. This also constitutes a limitation. Variables that may play a mediating and moderating role in this relationship can be tested. In the relationship between these two variables, alexithymia, social exclusion, executive function, and emotion regulation difficulty may have a mediating role. In this study, self-report scales were used. This may cause participants to respond with some biases and prejudices. To reduce this limitation, qualitative research designs that address adolescents' views on SPA identity development can be created. This study is important in terms of revealing the relationship between SPA and identity development dimensions. Considering this result, preventive and intervention programmes can be created for SPA to reduce its negative effects on adolescents' identity development. A programme that contributes to the ego-identity formation process for adolescents can be developed. Applications can be created to explore identity options. An intervention programme can be created to reduce adolescents' SPA and contribute to the formation of identity.

Ethic

We declare that the research was conducted in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Author Contributions

This article was written with the joint contributions of two authors.

Conflict of Interest

The authors declare that they have no conflict of interest.

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