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PHUBBING, ALIENATION, DIGITAL GAME ADDICTION, INDEPENDENT SELF-CONSTRUAL, AND INTERDEPENDENT SELF-CONSTRUAL AMONG HIGH SCHOOL STUDENTS: A PATH ANALYSIS

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Abstract

In this study, the aim is to analyze the relationships between phubbing, alienation, digital game addiction, independent self-construal, and interdependent self-construal among high school students. The sample of the study consists of 1,932 students studying in different high schools in Turkey who were selected by the stratified random sampling method, considering the grade levels and gender variables. The students completed surveys regarding self-construal, digital game addiction, alienation, and phubbing. The data obtained were analyzed by path analysis, one of the structural equation modeling methods. In the research, nine hypotheses were developed for the proposed model based on theoretical knowledge. As a result of the analysis, eight hypotheses were supported, and one was unsupported. According to the findings, digital game addiction had a significant impact on alienation and phubbing; also, alienation had a considerable impact on phubbing. The model explained 16% of the variance (R^2= .16) of phubbing, directly and indirectly. This means that the exogenous variables have a moderate level of influence on the endogenous variable. Moreover, alienation had a maximum degree of effect on phubbing.

KEY WORDS: *phubbing, self-construal, digital game addiction, alienation, path analysis*.

Resumen

El objetivo de este estudio es analizar las relaciones entre ningufoneo, alienación, adicción a los juegos digitales, autoconstrucción independiente y autoconstrucción interdependiente entre estudiantes de secundaria. La muestra consta de 1.932 estudiantes de diferentes escuelas secundarias de Turquía, que fueron seleccionados por el método de muestreo aleatorio estratificado considerando los niveles de grado y el sexo. Los estudiantes completaron encuestas sobre autoconstrucción, adicción a los juegos digitales, alienación y ningufoneo. Los datos obtenidos se analizaron mediante análisis de trayectoria, uno de los métodos de modelado de ecuaciones estructurales. En la investigación se desarrollaron nueve hipótesis para el modelo propuesto a partir de conocimientos teóricos. Como resultado del análisis se confirmaron ocho hipótesis y una no se

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confirmó. Según los hallazgos, la adicción a los juegos digitales tuvo un impacto significativo en la alienación y el ningufoneo; además, la alienación tuvo un impacto considerable en el ningufoneo. El modelo explicó el 16% de la varianza (R^2= 0,16) de ningufoneo, directa e indirectamente. Esto significa que las variables exógenas tienen un nivel moderado de influencia sobre la variable endógena. Además, la alienación tuvo un grado máximo de efecto sobre el ningufoneo.
PALABRAS CLAVE: *ningufoneo, autoconstrucción, adicción a los juegos digitales, alienación, análisis de ruta.*

Introduction

In modern society, the recent development of smartphones has brought about a groundbreaking change. Smartphones typically have high-speed data access functions over wifi and mobile broadband, web browsers that can access and display standard web pages, and high-resolution touch screens (Kwon et al., 2013). Thanks to these functions, nowadays, smartphones have replaced mobile phones and, to a certain extent, personal computers, and many other devices (Samaha & Hawi, 2016). Smartphones have become an integral part of people's lives of all ages across the world. People feel that they cannot become inseparable from their smartphones (Lepp et al., 2015). Almost all adolescents (98%) have a mobile phone, most of which (97%) are smartphones (Haug et al., 2015), and 45% state that they are almost always online. People look at their smartphones first thing in the morning and last thing before going to sleep (Anderson & Jiang 2018; Gökçearslan et al., 2018).

The reason for this unexpected popularity of smartphones is that it makes people's lives easier. It offers many possibilities to its users, anytime and anywhere, such as messaging, making calls, taking videos/photos, accessing social networks, surfing the internet, and playing games (Lepp et al., 2015). In addition to these achievements, the overuse of smartphones has brought along many negative conditions as a significant social issue (Li et al., 2014). Today, addiction refers not only to drug or substance abuse, but also to games, the internet, and even smartphones. These fall into the category of behavioral addiction. Smartphone addiction, which is classified as "an addiction disorder not related to substances" by American Psychiatric Association (APA), is also referred to in the literature as "problematic smartphone use" (Panova & Carbonell, 2018). Overuse of smartphones has been reported to cause anxiety, obsession, obsession with looking at the phone, and addiction (King, et al., 2014). Furthermore, smartphone addiction impacts face-to-face interaction. Smartphones have social and psychological effects that change behavior, habits, social cognition, personality, and relationships, on people, groups, and societies (King et al., 2014). Some of these are the weakening of face-to-face communication, more individualization of individuals, information pollution, addictive practices, and the psychological problems that they bring (Yıldırım & Kişioğlu, 2018).

In correlation to smartphone addiction, the phenomenon called phubbing is emerging currently, which can also be considered as a form of technological

addiction. The word "phubbing" is derived from two words: "phone" and "snubbing" (Karadağ et al., 2016). "Phubbing", the act of looking at the smartphone while meeting others face-to-face, is a concept with many possible dynamics, such as disrespect for another person or people, and preference for virtual environments over real-life ones (Nazir, 2017). According to previous studies, smartphone addiction and phubbing have similar symptoms, including unpleasant moods, lack of impulse control, having problems due to heavy use of online activities, and sending too many SMS (Choliz, 2010). In addition, smartphones negatively effect on interpersonal relations, with phubbers having inadequate communication skills. They have difficulty in eye contact with the other person while dealing with their smartphones, and some of them are completely closed to what is happening around them (Karadağ et al., 2016). Chotpitayasunondh and Douglas (2016) claimed that 44% of people report phubbing, and 55% report that they are phubbed several times per day. Another study showed that 90% of the participants used their smartphones during their social activities, and remembered that 86% of the others were also interested in their phones during the social interaction (Ranie & Zickuhr, 2015). Results are similar in studies with adolescents. In the study conducted by Davey et al (2018), it was found that approximately half of teenagers and adolescents (49.3%) showed phubbing behavior, even increasing to 65.9% in the home environment (Davey et al., 2018). It is understood from these studies that phubbing behavior is quite common among both adults and adolescents and creates many negative effects. However, little is known about which factors influence phubbing behavior, and what causes its behavior. In this context, it is necessary to determine the potential roles of variables that lead to the structuring of phubbing behavior.

To fill this gap, this research aimed to reveal the perceptions of high school students about phubbing, alienation, digital game addiction, independent self-construal, and interdependent self-construal, which are explained in detail in the theoretical background, by path analysis. These results can provide a detailed understanding of how self-construal, digital game addiction, and alienation affect phubbing behavior. Firstly, the literature on the variables used for the study and the relationship of these variables is given below.

Phubbing means using a smartphone in a social environment of two or more people, and interacting with the smartphone instead of the person or people (Chotpitayasunondh & Douglas, 2016). In other words, it involves looking at a person's mobile phone while in real conversation with someone else (Karadağ et al., 2016). Phubbing is a multi-factor phenomenon such as smartphone addiction, social media addiction, internet addiction and digital game addiction. (Nazir, 2017). In other words, there are many individual and social factors that affect the phubbing behavior of individuals. One of these factors is digital game addiction. Digital game addiction prevalence rates may vary according to cultures. For example, 90% of American teens play digital games, and 15% of them are estimated to be game addicts (Tanner, 2007). Some studies found a digital game addiction rate, 5.6% in China (Dong et al., 2013), 11.9% in Germany (Grüsser et al., 2007) of 8.0% in Australia (Porter et al., 2010), and 28.8% (Irmak & Erdoğan, 2019) in Turkey. Roberts & David (2016) began to consider some of the consequences of problematic

smartphone use, such as phubbing and negative results for relationship satisfaction. Moreover, almost half of the adult respondents were phubbed. However, the potential roles of variables that lead to the structuring of phubbing are still not fully known.

The self is a central element that forms the identity of the person. *Self-construal* is defined as the sum of thoughts, feelings, and actions related to one's relationships with others and their different self. Self-construal is the thoughts, judgments, and inferences that individuals have reached about themselves as a result of their relationships with people in their social life (Singelis, 1994).

Digital game addiction has been described as an impulse control disorder with symptoms such as "inability to control the playing time", "loss of interest in other activities", "continuing to play despite its negative consequences", and "feeling psychological deprivation when unable to play" (Irmak & Erdoğan, 2019).

Markus and Kitayama (2003) differentiate independent self-construal and interdependent self-construal by conceptualizing the way individuals perceive and interpret the world around them and their cultural differences. The independent self-construal is that the individuals do not wait for the support of their social environment to realize their characteristics. In independent self-construal, individuals focus on themselves, not needing positive opinions and approval from others. In interdependent self-construals, individuals shape themselves according to the social environment and the society they live in, where individuals need to be accepted and approved by others. The individuals act as society expects of them (Singelis, 1994). Independent self-construal is labeled as individualistic, idiocentric, self-contained, and egocentric. In opposition to this, interdependent self-construal is conceptualized as part of various interpersonal relationships (Markus & Kitayama, 2003). Independent self-construal involves positioning the self separately from others, whereas the interdependent self-construal consists in positioning the self-concerning others (Doğan, 2019). While the interdependent self-construal explains the interdependence aspect of the ego in relation to the culture of commitment, the independence dimension and differentiation of the self are explained with the concept of independent self-construal (Kağıtçıbaşı, 2010).

The individualism dimension, where the individual makes his own decisions, makes his own choices, and is supported to express his thoughts directly, differs from the dimension of collectivism, where interpersonal relations are seen as more important, the group's expectations and intra-group harmony are emphasized, and it is not welcome to disrupt this harmony (Duman, 2018). Therefore, individuals with interdependent self-construals are more interested in what others do whereas individuals who are independent self-construals are labelled as individualistic, egocentric and detached, which is also the characteristics of adolescent high school students (15-18 years old). During this period, students prefer to stay away from society and act independently (Flannery, 2006). A feeling of being independent of parents and peers is experienced in both emotional and relational dimensions during adolescence. This independence includes attitudinal independence, emotional independence, functional independence, conflictual independence and social independence (Noom et al., 2001). Digital game play is also very common among adolescents (Kwon et al. 2013). While studies conducted with adolescents have a

negative relationship with variables such as secure attachment (Savcı & Aysan, 2016) and social support (Esen & Siyez, 2011); there is a positive relationship with variables such as loneliness (Esen & Siyez, 2011), social isolation and social inadequacy (Akkaş, 2020).

There are studies showing that social support acts as a mediator in the relationship between interdependent self-construal and depression (Kateri & Karademas, 2018), interdependent self-construal and loneliness are related (Özdemir & İlhan 2012), and interdependence is important in explaining social support and loneliness (Taniguchi & Kaufman, 2019). However, since the sense of social connectedness is likely to be related to both social relationships and perceptions of loneliness, it makes sense to focus on self-construal, that is, how individuals define themselves to others (Taniguchi & Kaufman, 2019). As far as we know, there has been no study that handles digital game addiction and self-construal together among adolescents. However, in the light of the current studies mentioned above, in this study, it is assumed that there is a positive relationship between digital game addiction and independent self-construal, including social isolation and loneliness. In addition, it is assumed that there is a negative relationship between digital game addiction and interdependent self-construal including secure attachment, social support, social adaptation, and social approval. Based on these references, the following hypotheses are proposed:

H1. Interdependent self-construal is negatively linked to digital game addiction.

H2. Independent self-construal is positively linked to digital game addiction.

Alienation are emotions and behaviors such as not being deeply or sincerely attached to something, feeling alienated, not being able to integrate, disconnection in a desired or expected relationship, indifference, withdrawal, powerlessness, meaninglessness, normlessness, self-estrangement, and social isolation caused by institutional or interpersonal problems on the individual (Sidorkin, 2004; Seeman, 1991). The alienated individuals become insensitive to their surroundings by isolating themselves from the social environments and withdrawing to their own shell. For this reason, alienation is shown as a contemporary problem and even as the source of many other problems (Eryılmaz & Burgaz, 2011). Alienation is negatively related to self-esteem and psychological resilience, academic success, social support, and social connectedness (Johnson, 2007).

Independent self-construal is defined as individualism, egocentrism and detached, whereas, *interdependent self-construal* is defined as collectivism and the interdependence between people. Individuals with interdependent self-construal need the support of the people around them and care about their support (Markus & Kitayama, 2003). According to Hofstede (2001), individualism means being emotionally independent of the group, organization and other communities; collectivism, on the other hand, refers to the dependence on family, relatives, the group of which they are a member, and increasingly to the social system. Individuals in individualistic communities prioritize individual goals over group goals and are concerned with the provision of personal needs and rights. Conversely, individuals in collectivist cultures prioritize group goals over individual goals and are particularly concerned with relationships. Independent self-construal refers to self-specificity and self-expression, acting with inner beliefs and feelings that it thinks to be true,

self-reliance, and glorifying one's own goals and difference from others. Interdependent self-construal is to act according to group norms and roles, to show a sense of belonging, to show compliant behavior, to be indirect, the absence of conflict and disagreement, and the glorification of group goals and group harmony (Hofstede, 2001). According to Goldston et al. (2008), collectivism or interdependence among people, that is, interdependent self-construal provides a sense of belonging that reduces the risk for suicidal behavior and alienation.

Adolescence is a period in which loneliness and individualism are the most intense and common in development periods. Many researchers argue that loneliness is experienced more intensely and widely in adolescence compared to other developmental periods (Kılınç & Sevim, 2005). In this context, self-perception of adolescent high school students is an important factor in determining the state of alienation from their environment, so it is very important to reduce their alienation by ensuring positive self-perceptions in adolescents (Coşkun & Altay, 2009). Özdemir & İlhan (2012) found in their study that as individuals' autonomy levels increased, they felt lonelier, whereas as their interdependent self-construal levels increased, they felt less lonely. Briefly, in this study, it is assumed that the self-construal of independence, which is at the forefront of individualism, positively affects alienation, and it is assumed that the interdependent self-construal, in which collectivism is at the forefront, negatively affects alienation. In light of the current studies, the following hypotheses are proposed:

H3. Interdependent self-construal is negatively linked to alienation.

H4. Independent self-construal is positively linked to alienation.

Digital game addiction defines one's use of a computer or video game as excessive and compulsive, although they cause social or emotional problems (Lemmens et al., 2009). The issue of the negative effects of digital games on students has been researched for a long time and continues to be investigated. Digital games are used as a popular and common entertainment tool, especially among young people and adolescents. For example, it is reported that an average of 9.5 hours a day is spent in a virtual environment (Kneer et al., 2014). Digital game addiction brings with it many problems, such as decreasing in positive social behaviors and displaying social-behavioral disorders, social, psychological development problems, and aggressive behaviors (Lemmens et al., 2009). The American Psychiatric Association also states that more research and experience is needed regarding this problem (APA, 2013).

Alienated individuals lack social skills and therefore develop the need for online social interaction as opposed to real face-to-face interaction (Caplan, 2003). Individuals who move away from the real world become isolated from society by engaging in unreal activities in the virtual world and become addicted to computer games and the internet (Kuloğlu, 2001). When the literature is examined, it has not been fully revealed whether alienation causes game addiction or game addiction causes alienation. It is stated that social alienation causes computer game addiction, and computer game addiction causes alienation by moving away from real life. Individuals with a high level of computer game addiction also have a high level of alienation (Erboy & Vural, 2010). 40.5% of adolescents cannot spend time with their friends due to computer games and they become alienated from the social

environment (Koçak & Köse, 2014). However, Kim & Kim (2015) in a study examining internet game addiction and parental relationships in adolescents determined that there is a significant difference between family alienation scores of adolescents with and without game addiction. Digital game addiction differs according to daily game playing time (Kanat, 2019). Therefore, while examining digital game habits, the playing time of these games is also important (Aleksić & Ivanović, 2017). When the literature on digital game addiction or digital game habits is examined, it is seen that the duration or frequency of digital game playing is considered as an independent variable (Hazar et al., 2017; Kneer et al., 2014; Esposito et al., 2020; Koçak & Köse, 2014). Therefore, it is predicted that the effect of digital game addiction on both alienation and phubbing may vary according to daily digital game playing times. Thus, the following hypotheses are suggested:

H5. Digital game addiction is positively linked to alienation.

H6. The effect of digital game addiction on alienation varies according to daily digital game play hours.

Among the factors affecting phubbing, digital game addiction, which is used as a means of mental relaxation and to avoid problems in people who lack time management skills, is a critical addiction type (Wood, 2008). Existing research on phubbing has also highlighted factors such as smartphone addiction, SMS addiction, social media addiction, internet addiction, and digital game addiction, which can cause smartphone usage while having a face-to-face conversation with others (Al-Saggaf et al., 2019). A previous study showed phubbing was associated with a mobile phone, internet, and digital game addictions (Karadağ et al., 2015). Considering the relationship between digital game addiction and phubbing, it is assumed that as the daily digital game playing time increases, the relationship between digital game addiction and phubbing behavior will increase. In this context, the following hypotheses are proposed:

H7. Digital game addiction is positively linked to phubbing.

H8. The effect of digital game play addiction on phubbing varies according to daily digital game play hours.

Another factor that affects individuals' phubbing behavior is alienation (Ling et al., 2020). Individuals' inability to connect with the outside world, to isolate themselves, to stay away from society, and to feel powerless are signs of alienation. The first thing people do in environments where they feel alienated is to look at their smartphones. Ironically, the technology designed to bring people together has isolated us from the same people (David & Roberts, 2017). Thus, the following hypothesis is suggested:

H9. Alienation is positively linked to phubbing.

By these hypotheses, Appendix illustrates the proposed path diagram model.

To summarize, in light of the studies in the literature, the hypotheses of this research can be expressed as follows: H1: Interdependent self-construal is negatively linked to digital game addiction. H2: Independent self-construal is positively linked to digital game addiction. H3: Interdependent self-construal is negatively linked to alienation. H4: Independent self-construal is positively linked to alienation. H5: Digital game addiction is positively linked to alienation. H6: The effect of digital game addiction on alienation varies according to daily digital game play hours. H7:

Digital game addiction is positively linked to phubbing. H8: The effect of digital game play addiction on phubbing varies according to daily digital game play hours. H9: Alienation is positively linked to phubbing.

Method

Participants

The study was conducted with 1,990 high school students who were determined by the stratified random sampling method, where the grade levels and genders of the students studying in different Anatolian high schools in Ankara, Turkey were considered. A total of 58 data points were removed from the dataset, including 51 data that were left blank or sequentially marked in the scales and 7 data calculated as outlier values. As a result, the final number of participants in the analysis was 1,932 and path analysis was performed on the remaining data. The characteristics of the participants are given in Table 1.

Table 1
Characteristics of the participants

Variables	*n*	%
Gender		
Female	1028	53.2
Male	904	46.8
Grade		
1st year	493	25.5
2nd year	491	25.4
3rd year	467	24.2
4th year	481	24.9
Daily digital game play hours		
Never play	546	28.3
Less than 30 minutes	440	22.8
> 30 minutes and ≤ 2 hours	366	18.9
> 2 hours and ≤ 4 hours	336	17.4
More than 4 hours	244	12.6

According to Table 1, 1,028 participants (53.2%) were female, and 904 (46.8%) were male. When looking at year levels, 493 participants (25.5%) were in their first year, 491 (25.4%) in their second year, 467 (24.2%) in their third year, and 481 (24.9%) in their fourth year. Lastly, according to the daily digital game hours, the participants stated that 546 (28.3%) never played, 440 (22.8%) played less than 30 minutes, 366 (18.9%) played between 30 minutes and 2 hours, 336 (17.4%) played between 2 and 4 hours, and 244 (12.6%) played more than 4 hours. The study was conducted with the approval of the Gazi University Ethics Board (Ethics committee approval date-number: 23.07.2020 - E.78128).

Instruments

a) *Phubbing Scale* (Karadağ et al., 2016). The scale consists of 10 items and has a 5-point Likert-type (1= "never", 5= "always") scale. The following 2 sub-factors (communication disturbances and phone obsession) are found: (i) Factor 1 (5 items; α= .87) and (ii) Factor 2 (5 items; α= .85). The lowest score that can be obtained from the scale is 10 and the highest score is 50. In the study sample (*n*=b1932), Cronbach's alpha internal consistency coefficient was calculated as .802 for the first factor, .762 for the second factor, and .852 for the total scale.
b) *Self-Construal Scale* (Singelis, 1994), Turkish adapted version by Wasti and Eser-Erdil (2007). The adapted version consists of 22 items, a 7-point Likert-type (1= "strongly disagree", 7= "strongly agree") scale and the following 2 sub-factors (independent self-construal and interdependent self-construal) are found: (i) Factor 1 (8 items; α= .68), and (ii) Factor 2 (14 items; α= .75). The lowest score that can be obtained from the scale is 22, and the highest score is 154. In the present study, Cronbach's alpha internal consistency coefficient was calculated as .68 for the first factor, .706 for the second factor, and .729 for the total scale.
c) *Digital Game Addiction Scale* (Hazar & Hazar, 2017). The scale consists of 24 items, a 5-point Likert-type (1= "strongly disagree", 5= "strongly agree") scale and the following 4 sub-factors are found: (i) Factor 1 (7 items; α= .78), (ii) Factor 2 (7 items; α= .81), (iii) Factor 3 (6 items; α= .76), and (iv) Factor 4 (4 items; α= .67). The lowest score that can be obtained from the scale is 24 and the highest score is 120. In the present study, Cronbach's alpha internal consistency coefficient was calculated as .904 for the first factor, .881 for the second factor, .891 for the third factor, .764 for the fourth factor, and .961 for the total scale. The Digital Game Addiction Scale was conducted by Hazar and Hazar (2017) on a sample of middle school students aged 10-14. The sample group in this study is high school students and the age range is 14-18. In this context, confirmatory factor analysis was used to check whether the structure revealed by exploratory factor analysis works in different sample groups. as a result of the analysis, it was concluded that the standardized factor loads of the scale ranged between .614 and .954 and all factors contributed significantly. However, it was seen that the scale consisting of a total of 24 items explained 62.87% of the total variance. When the fit indices of the scale were examined, it was concluded that the values obtained were within acceptable limits (χ^2/sd= 2.377; GFI= .957; AGFI= .881; NFI= .969; RFI= .954; RMSEA= .056; CFI=.97).
d) *Alienation Scale* (Dean, 1961), Turkish adapted version by Güğerçin and Aksay (2017). The adapted version consists of 20 items, a 5-point Likert-type (1= "never", 5= "always") scale and the following 3 sub-factors (powerlessness, social isolation, and normlessness) are found: (i) factor 1 (9 items; α= .86), (ii) factor 2 (6 items; α= .88), and factor 3 (5 items; α= .84). The lowest score that can be obtained from the scale is 20 and the highest score is 100. The total Alienation scale has a reported reliability of .88. In the present study, Cronbach's alpha internal consistency coefficient was calculated as .704 for the total scale.

Procedure

Data were collected through an online questionnaire distributed through email from 1,990 high school students. Students participated in the study on a voluntary basis. Participants were sent a link together with a text that explained the aim of the research. The survey's first screen displayed information, including a research permit, and instructions. On average, the survey takes 15 minutes to complete. IBM SPSS Statistics 25 for descriptive statistics and IBM SPSS AMOS 22 software was used for path analysis.

Data analysis

The structural equation model was used in the study. The model is a comprehensive statistical approach that can test causal relationships between measured (observed) and latent (non-observed) variables in a single model (Byrne, 2010). In the structural equation model, the variables are named differently in the regression analysis. The exogenous variable represents the independent variable, the endogenous variable represents the dependent variable, and the moderating variable represents the variable that mediates the effect of the independent variable on the dependent variable. In the study, the endogenous variable represents phubbing, the exogenous variables represent alienation, digital game addiction, independent self-construal, and interdependent self-construal, and the moderator variable represents daily digital game play hours. The structural equation model has four different methods: a) confirmatory factor analysis, b) path analysis, c) structural regression models, and d) latent change models. Path analysis is the process in which the direction, size, and the indirect or direct effect of linear relationships between variables can be tested simultaneously. In path analysis, a path diagram is created for linear relationships (Raykov & Marcoulides, 2012). In this study, the investigation of direct and indirect links between phubbing, self-construal, digital game addiction, and alienation required the method to be determined as path analysis.

The data were analyzed using path analysis, one of the structural equation modeling methods. To perform path analysis, assumptions that must be met are: (a) sufficient sample size, (b) absence of missing data, (c) absence of outlier values in data, (d) normal distribution of data, (e) absence of multicollinearity between exogenous variables, and (f) goodness-of-fit indices (Raykov & Marcoulides, 2012). The following steps were applied to test the assumptions of the path analysis:

a) There is no doubt that sample size plays an important role in almost every statistical technique applied in practice. Samples must not only be representative but must be of sufficient size to produce reliable factors. There have been various claims made concerning the ratio of subjects to variables running from as large as 10:1 as the necessary minimum down to 2:1 (Raykov & Marcoulides, 2012; Kline, 2015). Jackson (2003) has reported that working with a sampling that is as large as 20:1 of variables produced reliable results. Accordingly, it can be said that a sufficient sampling size is provided for path analysis since this study was conducted with a sampling size of approximately 25.5 fold of the

variables [self-construal= 22, digital game addiction=24, alienation= 20, and phubbing=10].

b) In the study, five records with missing data were corrected by taking the mean of the series.

c) The Mahalanobis distance values can be used to analyze outlier values. For this, the probability of distance scores in the chi-square (χ^2) distribution is examined, and records above the level of .001 significance are accepted as extreme values (Büyüköztürk, 2018). In the study, the Mahalanobis distance values were calculated for the multivariable outlier values, and the records of 7 students above the level of a significance of .001 in the probability of these distance scores in the chi-square distribution were removed from the data file.

d) The assumption of normality in the study was tested with skewness and kurtosis coefficients. As seen in Table 2, as a result of the normality analysis, the skewness coefficients were calculated between -.333 and 1.38, and the kurtosis coefficients were calculated between -.347 and 1.04. It is stated that the normal distortion condition is provided in case of skewness and kurtosis values in the range of -2 to +2 (George & Mallery, 2010). Based on this reference, it was seen that the data of all variables were normally distributed.

e) For the assumption that there is no multicollinearity problem among the exogenous variables of the study, Variance Inflation Factor (VIF) and Tolerance values are examined. If the VIF value is lower than 4, there is no multicollinearity problem, which is the desired value. However, it is stated that the threshold of this value is 10. If VIF is below the threshold value (10), it is acceptable. A VIF value is calculated as 1 / Tolerance value. In other words, a low tolerance and high VIF value indicates that there is a multicollinearity problem among the exogenous variables (Hair et al., 2014). It was seen in the dataset that VIF values were lower than 1.065 and all of the Tolerance values were higher than .939. Therefore, there was no multicollinearity problem in this study. In addition, in analyzing the multicollinearity problem, the correlation matrix was examined. If the variables are very highly correlated (the correlation values are higher than .70, and the p-value is lower than 0.05), there is multicollinearity (Tabachnick & Fidell, 2013). As seen in Table 3, the correlation values were determined to be lower than .70 in the study. These results show that there was no multicollinearity problem among variables.

f) Evaluation of model (theoretical) fit is typically carried out based on many goodness-of-fit indexes (χ^2/df, GFI, AGFI, NFI, RFI, CFI, RMSEA). How well the model describes the data obtained is determined by the fit indexes. Among the goodness-of-fit indices, χ^2/df is used primarily. An χ^2/df rate less than 3 is considered as a good fit indicator between the data set and model (Kline, 2015). When other goodness of fit indices are examined, if GFI, NFI, RFI, and CFI values are greater than 0.95 (Bentler & Bonett, 1980; Baumgartner and Homburg, 1996), and the AGFI value is greater than 0.90 (Schermelleh-Engel et al., 2003), it is indicated that the model has goodness-of-fit. For the RMSEA, Browne & Cudeck (1992) stated that values of 0.05 or less would indicate a ''close fit'', a value of 0.08 or less would indicate a ''reasonable fit'', and values greater than 0.10 would indicate ''unacceptable fit''. The fact that the goodness-of-fit

indexes of the tested model have "close fit'' values show that this assumption is met.

As a result, it has been determined that all assumptions are provided to perform the path analysis.

Results

In the findings, firstly, measurement results regarding whether the data meet the assumptions for path analysis are presented. The normal distributions of the data were controlled with skewness and kurtosis values. The multicollinearity problem was controlled with VIF and tolerance values and correlation coefficients among the exogenous variables. Table 2 shows the descriptive statistics (means, standard deviations, tolerance, VIF, skewness, and kurtosis).

Table 2
Descriptive statistics of variables

Variables	*M*	*SD*	Tolerance	VIF	Skewness	Kurtosis
Phubbing	2.76	.828	Endogenous variable		.003	-.347
Independent self-construal	5.40	.853	.939	1.065	-.333	-.324
Interdependent self-construal	4.77	.790	.939	1.065	-.104	-.164
Digital game addiction	1.70	.490	.965	1.036	1.380	1.040
Alienation	3.01	.426	.967	1.035	-.027	-.006

According to the findings obtained as a result of the study, the midpoint scores of the students from the phubbing, independent self-construal, interdependent self-construal, digital game addiction, and alienation scales were found as 2.76, 5.40, 4.77, 1.70, and 3.01, respectively. The phubbing, digital game addiction, and alienation scales are 5-point Likert types, and the self-construal scale is a 7-point Likert type. Considering that the midpoint score that can be obtained from the scales is 3.5 in the self-construal scale and 2.5 in the other scales, it is seen that the students obtained above midpoint scores, except for the digital game addiction scale. It should be noted that there is no multicollinearity among the exogenous variables in path analysis. When Table 2 is examined, the VIF values are lower than 10, and tolerance values are greater than .01, indicating that there is no multicollinearity. Also, it can be seen that findings of skewness and kurtosis values are within the range of -2 to +2, that is, within acceptable limits (George & Mallery, 2010). Additionally, in controlling the assumption that there is no multicollinearity problem, there should also be no high relationship among the exogenous variables. Correlation coefficients between variables are shown in Table 3.

As seen in Table 3, the correlation values were determined to be lower than .70 in the study. These findings show that there was no multicollinearity problem.

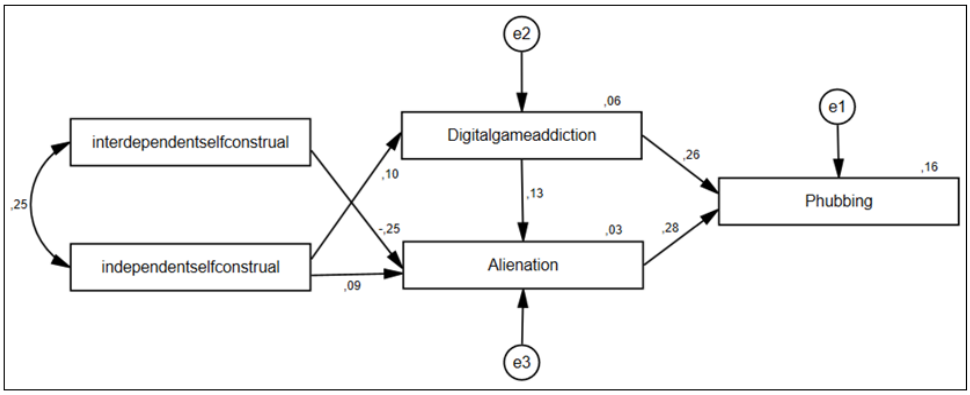
Table 3
Correlations matrix among variables

Variables	1	2	3	4	5
1. Phubbing	1.00				
2. Independent self-construal	.068**	1.00			
3. Interdependent self-construal	-.006	.247**	1.00		
4. Digital game addiction	.290**	.123**	-.023	1.00	
5. Alienation	.308**	.079**	-.252**	.106**	1.00

Note: **p< .01.

The goodness-of-fit indexes were obtained as a result of path analysis; χ^2/df=2.992; GFI=.999; AGFI=.991; NFI=.991; RFI=.956; CFI=.994; RMSEA=.032. If the χ^2/df value is in the range of $2 \leq \chi^2/df \leq 3$ indicates "reasonable fit"; If the GFI, NFI, RFI, CFI values are ≥ .95 indicates "close fit"; If AGFI value is ≥ .90 indicates "close fit"; and If RMSEA value is ≤ .05 indicates "close fit". According to the findings, the goodness-of-fit indexes of the model tested are quite high (Kline, 2015; Bentler & Bonett, 1980; Baumgartner & Homburg, 1996; Schermelleh-Engel et al., 2003; Browne & Cudeck, 1992). These results show that the default model is compatible with the data and the model is fit for path analysis. Path analysis results are given in Figure 2.

Figure 2
The path diagram model



The path analysis was performed to examine the effects of the variables. In the model tested in Figure 2, the total effects and path coefficients of alienation, digital game addiction, independent self-construal, and interdependent self-construal variables on the phubbing variable. Measurement values of the path model are given in Table 4.

Table 4
Measurement values of the path model

Hypotheses and structural paths	Estimate β	Standardized indirect effects	SE	*t*	*p*	Results
H1. Interdependent self-construal → Digital game addiction	.043	.000	.024	1.840	.066	unsupported
H2. Independent self-construal → Digital game addiction	.105	.005	.012	4.535	.000	supported
H3. Interdependent self-construal → Alienation	-.252	.000	.021	-11.445	.000	supported
H4. Independent self-construal → Alienation	.086	-.034	.012	3.627	.000	supported
H5. Digital game addiction → Alienation	.131	.000	.012	5.652	.000	supported
H7. Digital game addiction → Phubbing	.260	.037	.021	12.407	.000	supported
H9. Alienation → Phubbing	.280	.000	.041	13.372	.000	supported

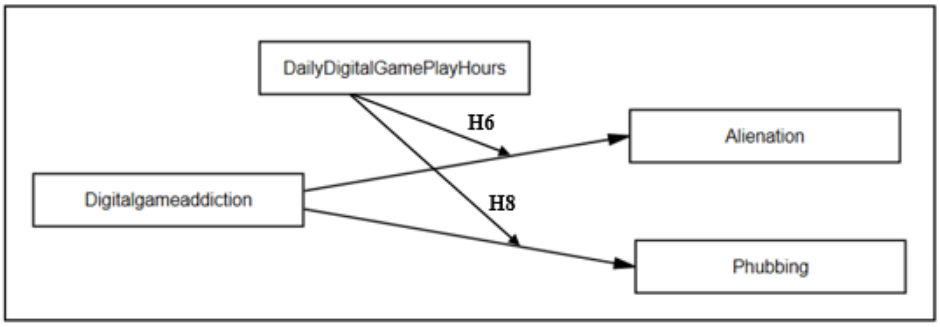
The perception of interdependent self-construal and digital game addiction was not found to be significant (r= .04; p= .066) and H1 (interdependent self-construal is negatively linked to digital game addiction) was unsupported. Therefore, H1 was removed from the model. H2 (the positive effect of independent self-construal on digital game addiction) was also significant (r=.10, p< .05). H3 (the negative effect of interdependent self-construal on alienation) was significant (r= -.25, p< .05), but only a small percentage (3%) of the perception of alienation could be explained. H4 (the positive effect of independent self-construal on alienation) was also significant (r=.09, p< .05). In addition, H5 (the positive effect of digital game addiction on alienation), H7 (the positively effect of digital game addiction on phubbing), and H9 (the positive effect of alienation on phubbing) were also significant (r= .13, p< .05; r= .26, p< .05; r= .28, p< .05). Moreover, it was observed that alienation was the variable with a maximum degree of effect on phubbing among the variables (r=.28, p< .05).

According to the findings in Figure 2, interdependent self-construal, independent self-construal, digital game addiction, and alienation variables explained 16% of the variance (R^2=.16) of phubbing. In path analysis, the t value gives information about whether each variable is a significant predictor, and path coefficient (β) gives information about the degree of impact. Also, the β coefficient shows standardized direct effects and standardized regression weights. The R^2 (effect size) value shows a small effect level if $0.02 \leq R^2 < 0.13$, medium effect level if $0.13 \leq R^2 < 0.26$, and large effect level if $0.26 \leq R^2$ (Cohen, 1988). When this value is analyzed, it is determined that alienation, digital game addiction, independent self-construal, and interdependent self-construal variables have a medium effect level on the phubbing variable.

As can be seen in Table 4, digital game addiction (t= 12.407, p< .05) and alienation (t= 13.372, p< .05) are significant predictors of the phubbing variable. Also, independent self-construal (t= 3.627, p< .05), interdependent self-construal (t= -11.445, p< .05), and digital game addiction (t= 5.652, p< .05) are predictors of the alienation variable. For phubbing, the order of the effects of exogenous variables is alienation (β= .280), and then digital game addiction (β= .26). The study findings supported the hypotheses H2, H3, H4, H5, H7, and H9. To sum up, most of these correlations have confirmed our predictions.

The study also tested whether daily digital game playing time has a moderator role between digital game play addiction and phubbing, and between digital game play addiction and alienation (H6 and H8). Path analysis of H6 and H8 hypotheses are given in Figure 3.

Figure 3
The path diagram model of the moderator variable



Measurement values of the path model are given in Table 5. In the model, daily digital game play hours are categorical variables. For categorical variables, the model is drawn, subgroups are defined, and the values of the groups are compared. For this reason, in the analysis of whether the effect of digital game addiction on alienation changes according to daily digital game play hours (H6), subgroups were defined, and the values of the groups were compared. In the model, daily digital game play hours were tested separately (Table 5). The path coefficient (β) shows the degree of influence between the variables. For those who never played β= .041 (t= .961, p> .05) or played for less than 30 minutes β= .155 (t= 3.277, p> .05), were not significant. However, for those who played for between 30 minutes and 2 hours β= .211 (t= 4.126, p< .05), between 2 and 4 hours β= .209 (t= 3.903, p< .05), and for more than 4 hours β= .111 (t= 1.739, p< .05), it was seen that there were significant differences. It has been observed that, as daily digital game play hours increase, so does alienation.

Table 5
Measurement values of the path model of H6 and H8 hypotheses

Hypotheses and structural paths	Daily digital game play hours	Estimate β	SE	*t*	*p*	Results
H6. Digital game play hours ⊥ Digital game addiction and alienation	Never play	.041	.024	.961	.336	unsupported
	Less than 30 min.	.155	.027	3.277	.082	unsupported
	> 30 min. & ≤2 h	.211	.030	4.126	.000	supported
	>2 h & ≤ 4 h	.209	.033	3.903	.000	supported
	More than 4 h	.111	.028	1.739	.042	supported
H8. Digital game play hours ⊥ Digital game addiction and phubbing	Never play	.202	.049	4.803	.000	supported
	Less than 30 min.	.258	.052	5.591	.000	supported
	> 30 min. & ≤ 2 h	.361	.055	7.403	.000	supported
	>2 h & ≤ 4 h	.377	.057	7.440	.000	supported
	More than 4 h	.442	.048	7.684	.000	Supported

When examining whether the effect of digital game addiction on phubbing changes according to digital game playing times (H8), it was found that for those who never played β= .202 (*t*= 4.803, *p*< .05), less than 30 minutes β= .258 (*t*= 5.591, *p*< .05), between 30 minutes and 2 hours β= .361 (*t*= 7.403, *p*< .05), between 2 and 4 hours β= .377 (*t*= 7.440, *p*< .05) and for more than 4 hours β= .442 (*t*= 7.684, *p*< .05), were significant. According to these results, as the daily digital game playing times increase, digital game play addiction affects phubbing more. Therefore, the H8 hypothesis, which argues that the daily digital game playing time variable affects the relationship between phubbing and digital game play addiction as a moderator, was supported.

Discussion

The effect of various factors on phubbing behavior, such as social media addiction, smartphone addiction, and loneliness, has started to gain empirical support (David & Roberts, 2017; Ling et al., 2020; Nazir, 2017). However, questions remain mostly unanswered concerning the potential roles of factors that could be involved in structuring phubbing behaviors. This research was performed by way of path analysis to understand better the relationships between phubbing behavior, alienation, digital game addiction, independent self-construal, and interdependent self-construal. The results indicated that alienation and digital game addiction have significant effects on phubbing behavior. In this direction, a model based on the relevant literature was built, and nine hypotheses were tested.

According to the results of the path analysis, there is no clear evidence in this dataset alone on whether interdependent self-construal has an effect on digital game addiction (Hypothesis 1). In interdependent self-construals, approval of the social environment is essential for individuals, these individuals are shaped according to the society, and their social interactions are high (Singelis, 1994). Therefore,

people with interdependent self-construals are more interested in what others are doing (Doğan, 2019). On the other hand, unlike face-to-face interaction, individuals can meet their social interaction needs with online social interaction (Caplan, 2003). Many digital games are played online in groups. Since individuals can meet their social interaction needs online, there may not be a meaningful relationship between interdependent self-construal and digital game addiction. According to the study findings, independent self-construal positively affected digital game addiction and alienation (Hypothesis 2 and Hypothesis 4). There is no direct study investigating the relationship between self-construal and digital game addiction or alienation. It is reported that adolescents isolate themselves from the social environment where they meet their socialization needs in the online environment and play digital games too much (Kuloğlu, 2001). On the other hand, self-development of high school students coincides with being individualistic, egocentric, and self-contained. Moreover, these features are the most prominent features of the 15 to 18 age group, and they prefer to be alienated from society (Flannery, 2006). In light of this perspective, these findings obtained from the research can be interpreted as being consistent with the results of previous studies in the literature. The current study showed that interdependent self-construal negatively affected alienation (Hypothesis 3). Similarly, Özyazıcı (2019) reports that interdependent self-construal scores show negative correlations with preferring to be alone. Individuals with interdependent self-construals are motivated to find ways to adapt to other people, fulfill obligations, and generally be a part of various interpersonal relationships. They consider the needs of the group before themselves, make sense of themselves in society, and are intertwined within society (Markus & Kitayama, 2003). In this context, individuals with this self-construal are more likely to value connectedness, and do not alienate from society (Triandis & Gelfand, 2012) whereby, it is consistent with the outcome that these individuals need to connect with others. The results of the current research demonstrated that digital game addiction is positively linked to alienation (Hypothesis 5). When studies on digital game addiction are examined, it is reported that digital game addiction leads to alienation by moving away from real life (Duman & Özkara, 2019). It is emphasized that individuals who move away from the real world tend to be internet addicts and addicted to digital games, and there is a positive relationship between digital game addiction and alienation (Baran & Kuloğlu, 2001).

Besides, in hypothesis 6, it was found that the duration of daily digital game play was a moderator for those who played for 30 minutes to 2 hours, 2-4 hours, and for 4 hours or more. However, it was determined that there was no moderator role in those who never played and played less than 30 minutes. According to these results, the difference in daily digital game playing times depends on whether the individuals play games for more than 30 minutes. It is possible to say that individuals with a daily digital game playing time of 2 hours or more are addicted to digital games or are on the way to addiction. Therefore, this difference can be thought to be related to the digital game playing addiction levels of individuals. Moreover, 40.5% of the adolescents stated that computer games prevent them from spending time with their friends. This is important data for anti-socialization and alienation from the environment. Peer relationships, which are very important in adolescence,

are negatively affected by computer games (Koçak & Köse, 2014). The study findings showed that digital game addiction (Hypothesis 7) had a positive effect on phubbing. Digital games, which are seen as a means of mental relaxation and to escape from problems, are among the factors that affect phubbing (Karadağ et al., 2015). Additionally, in hypothesis 8, it was examined whether daily digital game playing time has a moderator role between digital game play addiction and phubbing. In this study, it was found that as adolescents' daily digital game playing time increases; digital game play addiction affects phubbing more. Considering that phubbing increases as the level of digital game addiction increases, this result is expected. Given that games can be played on smartphones, it is considered that this situation arises from the fact that a significant part of phubbing behavior is spent with digital games. Therefore, the measures to be taken for digital game addiction; It is thought that it may at least be effective in reducing phubbing behavior. Finally, the study found that alienation has a positive effect on phubbing (Hypothesis 9), and this finding supports this situation. Ling et al. (2020) stated that individuals with high phubbing levels also have higher levels of alienation. Phubbers are using smartphones to relieve their loneliness. In this respect, smartphones provide some emotional needs (Humphreys, 2003).

Although individuals describe phubbing behaviors as attitudes that make them feel disrespected and worthless, they continue phubbing behavior while communicating with other people. It is seen that addiction types such as social media addiction, internet addiction, digital game addiction, and phubbing have started to surround individuals (Nazir, 2017). Unlike other addictions, phubbing is not limited to the individual; it is now able to manifest in every aspect, in social environments, and every minute of one's real-life (Karadağ et al., 2016). Therefore, phubbing carries with it much more insidious, widespread, and dangerous consequences than many smartphone addictions types before it (Al-Saggaf et al., 2019). For this reason, the factors affecting phubbing should be examined in detail and necessary precautions should be taken.

The theoretical model resulting from this research may be useful in addressing the effects of technology use such as digital gaming addiction and phubbing in a clinical setting. Given that smartphones are the first thing smartphone users look at in the morning and the last thing they look at before going to sleep, it is important for clinicians to address how the majority of clients are affected by smartphones. Although phubbing behavior is quite common, the potential roles of variables that may be involved in structuring this behavior are unknown. Thus, the results of this study can be beneficial when evaluating the possible outcomes, both positive and negative, that therapists associate with their clients' smartphone use. In addition, therapists need to educate their clients about the outcomes associated with smartphone use, including excessive and problematic use of smartphones and use in social settings. This means that therapists need to be familiar with research focusing on smartphone use.

This research is subject to some limitations. First, the data of the research was obtained from students, which was determined by the stratified random sampling method, because of the time constraint and the difficulty of accessing the sampling. For this reason, the generalizability and external validity of the research results are

limited. Owing to the cross-sectional nature of this causality, the causal inference was not drawn in this study. In the future, the model should be examined using a longitudinal design. Secondly, the research was conducted only on students from high school, and other educational levels were not included in the research scope. Another limitation of the research is that we operationalized phubbing behavior, alienation, digital game addiction, independent self-construal, and interdependent self-construal based on scale items. However, it may be better in terms of ecological validity to measure phubbing behavior, alienation, digital game addiction, independent self-construal, and interdependent self-construal by qualitative analysis, although it is very hard. Accordingly, it is thought that future research to be carried out using the qualitative analysis approach on the subject will make significant contributions to the literature.

This study only focused on alienation, digital game addiction, independent self-construal, interdependent self-construal and phubbing, while other psychological variables, such as resilience, depression, internet addiction, stress, and perceived social support, were not included in the analyses. For this reason, phubbing behavior is explained as specific to the variables in the model. Future studies should take these variables into account. It may also be suggested to investigate other factors affecting phubbing behavior to help reveal to what extent these factors explain the total variance, to make a comparison between these factors, and to be conducted at different educational levels, such as primary school, middle school and university.

Despite these limitations, the current research has important strengths. The present study seems to be the first study to examine the relationships between phubbing behavior, alienation, digital game addiction, independent self-construal, and interdependent self-construal. Therefore, as current findings provide fresh insight into the relationships between phubbing behavior, alienation, digital game addiction, independent self-construal, and interdependent self-construal, and explore more information about explanatory factors, it also is valuable. Finally, another strength of the current study is the use of a reasonably large sample of students from Turkey, providing more evidence of phubbing behavior in a non-western society.

In conclusion, digital game addiction and alienation have been shown to affect phubbing behavior. Digital game addiction has a low effect on alienation, interdependent self-construal has a negative and low effect on alienation, and independent self-construal affects digital game addiction and alienation. The proposed modeling explanation rate for phubbing behavior was found to be 16%. Considering that phubbing behavior is affected by many factors, it can be stated that a variance explanation rate is an important result. We think that educators and psychologists can benefit from the results of this path analysis in guiding activities for families and students who have problems in this regard. It is possible to assess unexplained parts by similarly adding new variables to the model. In particular, conducting studies involving different psychometric variables may guide educators and psychologists in understanding the depth of the subject.

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Appendix

The proposed path diagram model