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Association Between Self-Esteem and Cyber Victimization: The Mediating Roles of Digital Game Playing and Cyberbullying

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ABSTRACT

Background: Today, the intensive use of technology necessitates more research on cyberbullying and victimization among adolescents.
Purpose: The purpose of this study was to evaluate a proposed model of the associations between self-esteem, digital game playing, cyberbullying, and victimization in early adolescents.
Methods: A total of 312 early adolescents participated based on the criterion sampling method. The age range of the adolescents was 10–14 years (Mean = 12.63; SD = 0.60). Two-stage structural equation modeling was used to analyze the data. Bootstrapping analysis was used to test mediation effects.
Results: The findings revealed the serial mediating relations of digital game playing and cyberbullying in the association between early adolescents' self-esteem and cyber victimization.
Discussion: The results emphasize the role of individual differences in adolescents' self-esteem as a significant factor in cyber victimization. This relationship operates through the behavioral pathways of digital game use and cyberbullying.
Translation to Health Education Practice: Based on the research findings, health educators can encourage students in this developmental period to establish healthier relationships in the digital world and develop strategies to protect mental health. In this direction, health educators should aim to develop healthy digital gaming habits in students by considering the negative effects of digital game addiction on cyber victimization. For this purpose, educators can organize awareness-raising educational programs against digital game addiction and guide students in determining balanced play times

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Background

Technological advancements have created a new social interaction space, particularly for adolescents, allowing them to create anonymous identities and say and do things they might not feel comfortable doing in person (Ang & Goh, 2010; Arnaiz et al., 2016). A large proportion of children and adolescents uses social media and cell phones as a means to communicate and maintain interactions with each other (Kiriakidis & Kavoura, 2010). However, conducting communication through online platforms rather than face-to-face contexts can complicate interpersonal relationships (Brochado et al., 2017). For example, children and adolescents may experience bullying and victimization on these platforms. Although traditional bullying remains a significant problem among children and adolescents (Halliday et al., 2021), new forms of aggression based on information and communication technology, such as cyberbullying and online harassment, are on the rise (Nixon, 2014). A significant number of children and adolescents are exposed to cyberbullying (Kowalski & Limber, 2007), which often leads to cyber victimization. Cyber victimization has been linked to suicidal ideation and attempts in children and adolescents, academic problems (e.g., concentration difficulties, academic failure, and absenteeism), online aggression, behavioral disorders, depression, and other psychological problems that hinder their healthy development (Tran et al., 2023; Zhou et al., 2023). In this context, depression and mental health problems are emerging as a chronic and common condition for adolescents. Such cyber victimization during adolescence can contribute to the development of depression as well as anxiety disorders, low self-esteem, and other serious mental health problems (Núñez et al., 2021). Chronic depression can also severely impact adolescents' daily functioning and leave lasting effects on mental health in the long term (Thapar et al., 2012). Examining the factors that lead to cyber victimization can help in both prevention and intervention efforts. This study aimed to identify factors that contribute to the development of cyber victimization in early adolescents, specifically the roles of self-esteem, digital game playing, and cyberbullying.

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Cyberbullying and cyber victimization

Initially emerging in technologically advanced countries, Cyberbullying has become a global concern as children and adolescents worldwide gain increased access to affordable communication devices like the internet and cell phones (Park et al., 2021). Adolescence, being a vulnerable developmental period with significant growth and challenges (Steinberg, 2013), requires a thorough examination of the underlying mechanisms of cyberbullying for effective intervention. Cyberbullying involves repeated aggressive and intentional acts directed at groups or individuals who cannot defend themselves through electronic media (Smith et al., 2008). These acts may include sending harassing messages, posting derogatory comments on social networking sites, sharing humiliating pictures, or electronically threatening someone (Camerini et al., 2020; Hinduja & Patchin, 2007). Although cyberbullying shares similarities with traditional bullying, it also exhibits significant differences. Electronic media offer unique features like easy access for bullies, limitless bystanders, persistence of material and victims, and the use of multimedia tools, such as video and photos (Mehari et al., 2014).

Cyber victimization refers to individuals or groups enduring harm, either economically or psychologically, in the online environment due to harmful behaviors (Smith et al., 2008). Although previously, young individuals felt safe within the confines of their rooms in their homes, the rise of technology means that this space is now vulnerable to cyberbullying (Tara & Brian, 2007). It has become evident that there is often a connection between cyber victimization and cyberbullying, with individuals potentially playing both the roles of the bully and the victim (Spears et al., 2015). Those subjected to cyberbullying are termed cyber victims (Brown et al., 2014). Notably, some individuals can be both perpetrators and recipients of these bullying behaviors, known as bully-victims (Martínez-Monteagudo et al., 2020).Theories such as the general aggression model and ecological system theory suggest that cyberbullies and their victims often share similar social environments (Kowalski et al., 2019). Hence, in bullying others, cyberbullies inadvertently create victims.

Digital game playing and cyberbullying and cyber victimization

One of the major types of games that children and adolescents play in today's world involves digital gaming. Digital games are defined as games played on electronic devices, such as desktop and laptop computers, mobile phones, game consoles, handheld devices, and video games (Whitton, 2013). Digital games have addictive features for children and adolescents. According to (Lemmens et al., 2009) digital game addiction is characterized by "excessive and compulsive use of computers or video games that results in social and/or emotional problems. Despite experiencing these problems, individuals with digital game addiction are unable to control their excessive use of gaming" (p. 78).

Research supports a strong connection between digital game playing and cyberbullying among children and adolescents, with significant impacts on their psychological well-being and social adjustment (Huang et al., 2019; Leung & McBride Chang, 2013). Several theories, including social learning theory (Bandura, 2001), explain this relationship. According to social learning theory, individuals learn by observing and imitating the behaviors of those around them. In the digital gaming context, individuals may adopt violent behaviors modeled in violent games, potentially leading to the development of cyberbullying behaviors. Learning through observation and imitation often results in individuals who engage in both digital game-playing and cyberbullying. Notably, this issue isn't solely about digital games but rather playing them with individuals who engage in cyberbullying, as these bullies contribute to creating cyber victims through their aggressive actions.

In this study, we examined the connections between digital game playing, cyberbullying, and cyber victimization through the Lifestyle-routine Activities theory (Holt & Bossler, 2009), which suggests that engaging in deviant online activities exposes individuals to potential offenders, increasing their vulnerability to victimization. Additionally, individuals with friends involved in computer deviance face higher risks due to their proximity to potential offenders and reduced social guardianship. Consequently, an individual's online presence elevates the likelihood of victimization, with digital gaming intensifying this risk (Ngo & Paternoster, 2011). Thus, digital games can be viewed as routine activities, particularly when encountering cyberbullies, leading to cyber victimization. Furthermore, in line with Self-control theory (Gottfredson, 1990), addicted individuals often exhibit low self-control, a significant trait. Past research has linked lower self-control to higher rates of cyber victimization. Additionally, intense engagement with digital games is considered a key factor in the development of cyberbullying and cyber victimization (Bossler & Holt, 2010). However, these theories require empirical validation in this context (Şimşek et al., 2019) found that internet addiction increases the likelihood of adolescents becoming both cyber victims and cyberbullies, emphasizing digital

platforms as risk factors. Nonetheless, precise explanations for the relationships among digital game playing, cyberbullying, and victimization remain elusive. Empirical studies suggest that playing digital games alone does not directly elevate the likelihood of adolescents becoming cyber victims (Durmaz & Ateş, 2022; Hidayat et al., 2022). When adolescents engage in digital games alongside cyberbullies, they may learn bullying behaviors, employ them in their interactions, and subsequently become victims of cyberbullying. Various explanations support this notion. For instance, as suggested by Willard (2007), individuals may perceive their virtual bullying actions as part of a character-based game, allowing them to evade responsibility. Digital game environments facilitate cyberbullying behaviors, potentially contributing to an increase in cyberbullying incidents. Consequently, the repercussions of cyberbullying can lead to cyber victimization. Nonetheless, only a limited number of studies have explored these associations in a causal comparative manner.

Self-esteem, cyberbullying, cyber victimization, digital game playing

Self-esteem refers to an individual's attitude toward oneself (Nie et al., 2024). It plays a crucial role during adolescence because adolescence is a critical time in identity development (Steinberg, 2013). High self-esteem leads to feelings of self-worth and success, along with an acceptance of one's mistakes (Nie et al., 2024). Conversely, low self-esteem results in a diminished sense of self-worth, often leading individuals to seek validation from others for success and love (Brausch & Decker, 2014).In the online context, low self-esteem is a significant risk factor for cyberbullying and cyber victimization (Kowalski et al., 2019).

Self-esteem is a critical individual difference factor influencing involvement in cyberbullying (Livingstone & Smith, 2014). On the one hand, lower self-esteem is associated with an elevated risk of cyberbullying victimization, decreased academic performance, and heightened emotional problems (Kim & Leventhal, 2008). Indeed, research indicates that low self-esteem predicts both traditional and cyber victimization (Chang et al., 2013; Kowalski & Limber, 2007). On the other hand, higher self-esteem is found to be protective against cyberbullying victimization in children and adolescents aged 8 to 18 (O'Moore & Kirkham, 2001). Longitudinal studies suggest that adolescents with low self-esteem perceive themselves as unable to defend against bullying, increasing their vulnerability (Egan, 1998; Salmivalli & Isaacs, 2005).

More specifically, the meta-analysis of van Geel et al. (2018) revealed a cyclical relationship between self-esteem and cyberbullying victimization, highlighting that increased self-esteem can contribute to recovery from peer victimization. Higher self-esteem appears to be protect against cyberbullying (Palermiti et al., 2017). However, some studies show self-esteem influences victimization and bullying (Brewer & Kerslake, 2015; Patchin & Hinduja, 2010). High loneliness and low self-worth, social acceptance, and friendship skills make individuals more likely to cyberbully (Schoffstall & Cohen, 2011). Those individuals with low self-esteem, especially children and adolescents, may bully to fit in with peers (Olthof & Goossens, 2008). Antisocial behaviors can stem from the need for belonging and validation from others engaging in such behaviors (Baumeister & Leary, 2017). Some bullies act out of fear of exclusion due to low self-esteem (Owens et al., 2000). Victims with low self-esteem are more vulnerable to bullying (Veenstra et al., 2010). Thus, individuals with low self-esteem and antisocial traits experience an increased likelihood of being targeted whereas bullies with low self-esteem seek approval and anonymity online (Yen et al., 2014).

Individuals with low self-esteem and social anxiety often turn to the internet as an escape (Lee & Stapinski, 2012). Low self-esteem is linked to increased video game usage in children (Jackson et al., 2010) and can lead to online gaming addiction when it interferes with daily responsibilities (Griffiths et al., 2012). Digital game addiction, especially among young people, is a growing concern given its adverse effects on mental health and relationships (Witt et al., 2011). Longitudinal studies confirm that children with low self-esteem are more likely to engage in digital gaming to seek social support and connection (Mun & Lee, 2023; Wartberg et al., 2019). Individuals with psychological issues like low self-esteem find digital environments appealing and can develop addiction with increased use (Yao et al., 2014). This addiction can lead individuals to feel a need to play games, disconnect from real-life situations, and avoid their responsibilities. Thus, we expected that higher levels of self-esteem would be associated with lower levels of adolescents' digital game playing.

Purpose

Cyber victimization is a significant threat to adolescent well-being (Nixon, 2014). Our study aimed to contribute to the literature on adolescent cyberbullying by exploring the roles of self-esteem, digital game playing, and cyberbullying in the development of cyber victimization among Turkish adolescents. Specifically, we

assessed a unique chain mediation model in which the link between adolescents' self-esteem and cybervictimization is explained by digital game playing and cyberbullying as mediating behaviors.

We examined cyber victimization in a causal-comparative manner with the following rationale. First, exposure to cyberbullying increases the likelihood of becoming a cyber victim (Kalia, 2017). Cyberbullying and cyber victimization occur through mobile phones or the internet (Olweus, 2013). In this study, we assumed that adolescents addicted to digital games, when exposed to cyberbullying, would experience more cyber victimization based on the Routine Activity theory (Pratt & Turanovic, 2016). This theory suggests that victimization occurs when a motivated offender and a suitable target/victim converge in time and space, within a context lacking effective guardianship. Digital games are such contexts without victims or effective guardians, which can include people or objects (e.g., fences, surveillance cameras, police officers) that deter crime. Effective guardianship can also include individual differences like personality traits that affect engagement in specific activities.

Our comprehensive chain mediation model posited that higher self-esteem in adolescents would be associated with less digital game use, which would, in turn, be linked to reduced cyberbullying behavior, ultimately resulting in a lower likelihood of experiencing cyber victimization. By evaluating this model, we aimed to assess a novel understanding of cyber victimization and provide empirical insights for screening, preventing, or addressing cyber victimization among early adolescents. Identifying specific behavioral processes involved in the development of cyber victimization can help pinpoint key, modifiable targets for intervention. As a result, this study examined the relationship between self-esteem and cyber victimization through the series of digital game playing and cyberbullying.

Methods

Study participants and procedure

The number of possible study participants in this research was 327. However, 15 students dropped out of the study for various reasons during the research process. Accordingly, the response rate of the study was 95%. As a result, a total of 312 early adolescents participated in this study in which the criterion sampling method was used. The age range of the adolescents was 10–14 years (Mean = 12.63; SD = 0.60). Of these students, 163 (52.2%) were female and 149 (47.8%) were male. All of the adolescents were students in a public secondary school. A total of 67 (21.5%) of the adolescents reported low socio-economic status, 203 (65.1%) reported medium socio-economic status, and 52 (16.7%) reported high socio-economic status.

The inclusion criteria for the adolescents were not having any psychiatric diagnosis, being Turkish early adolescents, and volunteering to participate in the study. The reason for the criterion that the adolescents did not have a psychiatric diagnosis was to ensure that the participants included in the study constituted a homogeneous group and to prevent psychiatric factors from affecting the results.

The formula (Number of Participants/Number of Parameters > 10) was used to determine the sample size. Accordingly, there were 12 parameters in the hypothetical model. According to this formula, since (312/12 = 26), the sample size was sufficient for structural equation modeling analysis.

Before the data were collected, the school administration was first informed about the study and the necessary permissions were obtained. A consent form was distributed to the adolescents. In the consent form, information about the content and purpose of the study was given, the participants were informed that their information would be kept confidential and that they were free to stop participating at any stage of the study. Student assent and parent informed consent were obtained via the same consent form.

Within the scope of the study, data were collected from students studying in three different institutions between April and June 2023. During the data collection process, the participants were given the self-report measures to be filled in using paper and pen in the classroom environment. All measures were administered at the same time; the students were given 30 minutes to complete the measures. In order to ensure confidentiality, no names or other personal information were collected from the students and the questionnaires were collected anonymously. The distribution and collection of the questionnaires were carried out under the supervision of the research team and with the help of the classroom teachers.

Data collection

Two-Dimensional Self-Esteem Scale

The Two-Dimensional Self-Esteem Scale was used to measure self-esteem. The scale is a 16-item self-report scale and consists of two sub-dimensions: self-love (e.g., "I'm quite at peace with myself.") and self-efficacy (e.g., "I am sometimes inadequate in coping with difficulties."). Responses were indicated using a 5-point Likert-type scale ranging from 1 (not at all appropriate)

to 5 (completely appropriate). Scale scores were calculated by summing item responses (ranging from 16 to 90), with higher scores indicating higher self-esteem (Doğan, 2011) reported an internal reliability estimate of .83 for the Self-love subscale and .74 for the Self-efficacy subscale in the Turkish sample. The reliability coefficient (alpha) in the current study was .91 for total score.

Digital Game Addiction Scale

The Digital Game Addiction Scale (DGAS-7) identifies problematic digital gaming behaviors in adolescents aged 12–18 (Lemmens et al., 2009). It's a seven-item scale with a five-point Likert-type response format (1 = never, 5 = always) and measures a single factor. Scores range from 7 to 35, with higher scores indicating higher digital game addiction levels. The DGAS-7 was adapted into Turkish by (Yalçın Irmak et al., 2015) with a reliability coefficient of .72 in their study and .80 in ours.

Revised Cyberbullying Inventory-II

Revised Cyberbullying Inventory-II was developed by (Topçu, 2014). This scale comprises 10 items that participants assess from two perspectives, "I did it" and "It was done to me," using a 4-point Likert scale (Never, Once, Two or three times, More than three times). Scores on this scale range from 10 to 40, with higher scores indicating more frequent cyberbullying and cyber victimization. The internal consistency coefficients (alpha) were .69 for the Cyberbullying subscale and .72 for the Cyber Victimization subscale. In our study, the reliability (alpha) coefficient for the Cyberbullying subscale was .79, and for the Cyber Victimization subscale, it was .77.

Ethics

To collect the data, permissions were obtained from the relevant researchers for the measures to be used in the study, and ethical committee approval was also obtained from [Omitted] University Social and Human Sciences Ethical Committee (Meeting No: 20230402020). All stages of the study were conducted according to Helsinki Declaration.

Data analysis

We conducted preliminary analyses, including tests for normality and multicollinearity. The data were then assessed using two-stage structural equation modeling. We used several fit indices to evaluate the model, including $\chi 2/df$, RMSEA, NFI, CFI, GFI, and AGFI. We employed the Maximum Likelihood estimation technique. Our main goal was to test the serial mediator role of digital game addiction and cyberbullying in the relationship between self-esteem and cyber victimization. We assessed the significance of these mediator roles through bootstrapping analysis with 1000 resamples, accompanied by the determination of lower and upper confidence intervals.

Additionally, the scales for digital game playing, cyber victimization, and cyberbullying displayed one-dimensional structures. To address this, we utilized parceling based on item-total correlations, creating two virtual factors for each: digital game playing, cyber victimization, and cyberbullying. This parceling technique reduced the number of observed variables, improved data distribution normality, and enhanced measurement reliability.

Results

Preliminary analysis

Kurtosis and skewness were examined, with kurtosis values for observed variables ranging from −.42 to .92. Only parcel 2 of the cyberbullying measure had a value exceeding the normal range (i.e., 7.92). Skewness values for all variables were within the normal range, ranging from −.68 to 2.45. Regarding the multicollinearity assumption, VIF values ranged between 1.13 and 1.21, tolerance ranged from .82 to .88, and conditional index ranged from 1.00 to 16.82. Additionally, as seen in Table 1, correlation coefficients between latent variables varied between (r = −.36 and r = .61). Based on these findings, we concluded that there were no issues with multicollinearity.

Two-stage structural equation modeling

Stage 1: Measurement model

This model consisted of four latent variables (Self-Esteem, Digital Game Playing, Cyberbullying and Cyber Victimization) represented by eight observed variables (Self-Liking, Self-Competence, Parcel 1 and 2 of Digital Game Playing, Parcel 1 and 2 of Cyberbullying, Parcel 1 and 2 of Cyber Victimization). When this measurement model was tested, good fit

Table 1. Correlations of latent variables.

Variables	1	2	3	4
1. Self-Esteem	1			
2. Digital Game Playing	−.364**	1		
3. Cyberbullying	−.268**	.294**	1	
4. Cyber Victimization	−.341**	.318**	.617**	1

**$p < .01$.

indices were observed (χ^2/df (23.483/14) = 1.67, NFI = .97, CFI = .99, AGFI = .95, GFI = .98 and RMSEA = .04 (90%) CI for RMSEA = [.00, .07]) It was also observed that the standardized factor loading of this measurement model ranged from .70 to .93, and the *t* values of all these factor loadings were statistically significant.These findings supported the measurement model. The structural model was evaluated in the next step.

Stage 2: Hypothetical structural model

The overarching aim of this study was to test the serial mediator roles of digital game playing and cyberbullying in the relation between self-esteem and cyber victimization. For this purpose, the hypothetical structural model was tested first. The hypothesized structural model displayed good fit indices of (χ^2/df (23.483/14) = 1.67, NFI = .97, CFI = .99, AGFI = .95, GFI = .98 and RMSEA = .04 (90% CI for RMSEA = [.00, .07]). In addition, the standardized path coefficients and explained variances of the hypothesized structural model are shown in Figure 1. The non-standardized path coefficients, standard errors, and *t* values are shown in Table 2.

Final structural model

Although fit indices of the hypothetical structural model were good, the standardized path coefficient (β = .10) from digital game playing to cyber victimization was found to be non-significant ($p > .05$) (see Figure 1 and Table 2). This path was thus removed from the model, and it was reanalyzed (see Figure 2 and Table 3).

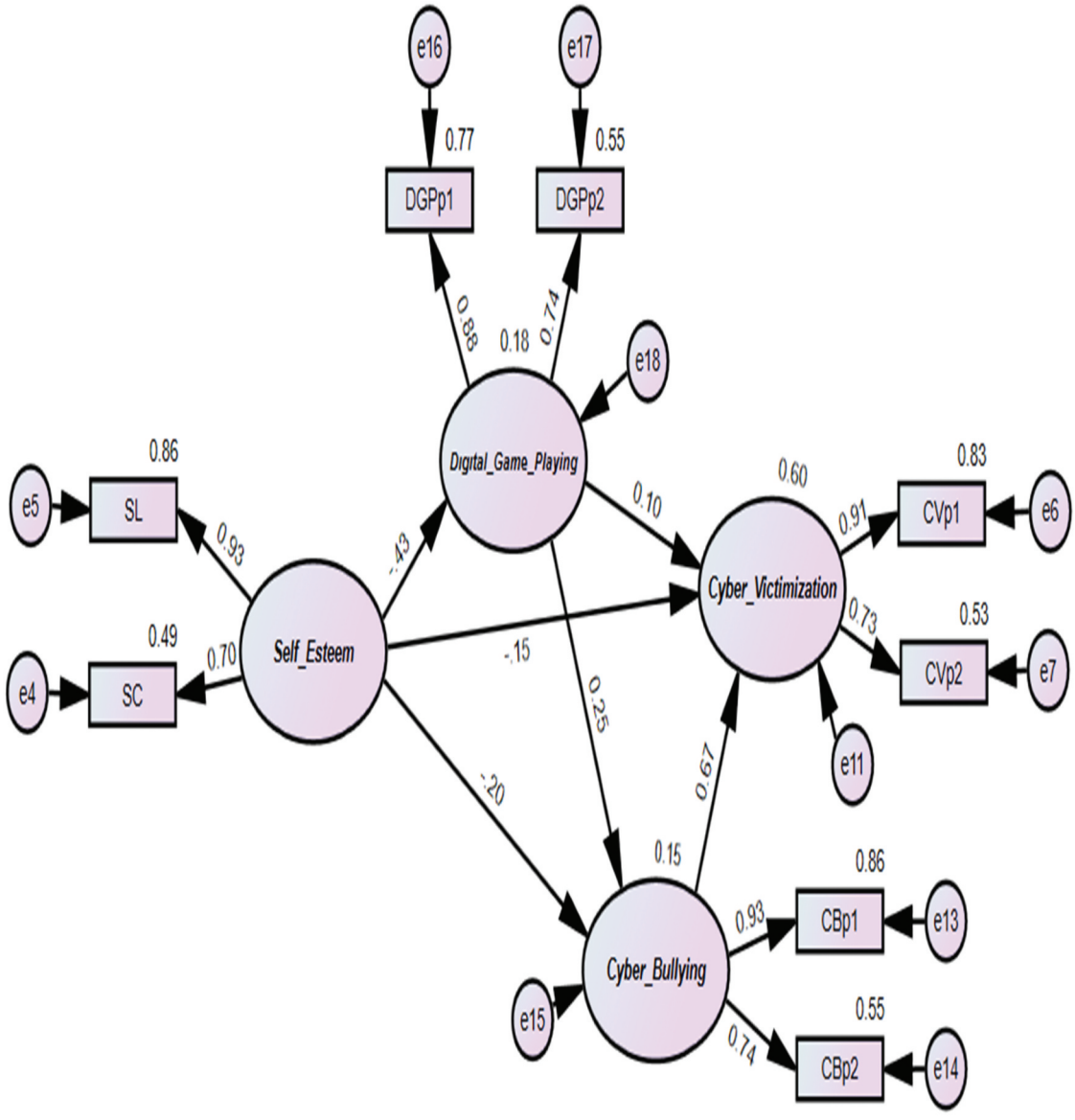

Figure 1. Path diagram of hypothetical structural model. SL= Self-Liking, SC: Self-Competence, DGPp1, DGPp2= Parcels of Digital Game Playing, CBp1, CBp2= Parcels of Cyberbullying, CVp1, CVp2= Parcels of Cyber Victimization.

Table 2. Results of the hypothetical structural model.

Predicted Variable		Predictor Variable	Estimate	S.E.	C.R.	p
Digital Game Playing	<—	Self Esteem	−.327	.053	−6.191	***
Cyberbullying	<—	Digital Game Playing	.201	.061	3.295	***
Cyberbullying	<—	Self Esteem	−.124	.043	−2.865	.004**
Cyber Victimization	<—	Cyberbullying	.714	.072	9.851	***
Cyber Victimization	**<—**	**Digital Game Playing**	**.087**	**.052**	**1.672**	**.095**
Cyber Victimization	<—	Self Esteem	−.100	.038	−2.664	.008**
SL	<—	Self Esteem	1.655	.219	7.561	***
CVp1	<—	Cyber Victimization	1.000			
CVp2	<—	Cyber Victimization	.664	.054	12.405	***
CBp1	<—	Cyberbullying	1.000			
CBp2	<—	Cyberbullying	.621	.050	12.332	***
DGPp1	<—	Digital Game Playing	1.000			
DGPp2	<—	Digital Game Playing	.569	.072	7.900	***
SC	<—	Self Esteem	1.000			

***$p < .001$, **$p < .01$, SL= Self-Liking, SC: Self-Competence, DGPp1, DGPp2= Parcels of Digital Game Playing, CBp1, CBp2= Parcels of Cyberbullying, CVp1, CVp2= Parcels of Cyber Victimization.

As can be seen in Figure 2, a one-unit increase in self-esteem related to a 0.43 decrease in digital game playing by 0.43 ($t = -6.234$; $p < .001$), 0.20 decrease in cyberbullying by 0.20 ($t = -2.751$; $p < .01$), and 0.19 decrease in cyber victimization by 0.19 ($t = -3.496$; $p < .001$). In addition, a one-unit increase in digital game playing was related to a 0.27 increase in cyberbullying ($t = 3.480$; $p < .001$). Finally, a one-unit increase in cyberbullying was related to a 0.70 increase in cyber victimization ($t = 10.596$; $p < .001$).

Considering the explained variances (R^2) described in Figure 2, self-esteem explained s about 19% of the variance in digital game playing. In addition, self-esteem and digital game playing explained about 16% of the variance in cyberbullying. Finally, self-esteem, digital game playing, and cyberbullying together explained about 61% of the variance in cyber victimization.

Bootstrapping analysis of final structural model

The serial serial mediator roles of digital game playing and cyberbullying in the relation between self-esteem and cyber victimization were assessed. Bootstrapping analysis was used to test whether these mediator roles were statistically significant. For this analysis, 1000 resamples were employed and lower and upper confidence intervals were established.

The indirect effect of digital game playing between self-esteem and cyberbullying was significant (β = −.11, SE = .04 [95% CI =-.21, −.04]. In addition, the indirect effects of digital game playing and cyberbullying on the association between self-esteem and cyber victimization was significant (β =. −21, SE = .05 [95% CI =-.32, −.12]. Finally, the indirect effect of cyberbullying on the relation between digital game playing and cyber victimization was found to be significant (β = .18, SE = .06 [95% CI = .05, .33]. All these findings supported the serial mediation roles of digital game playing and cyberbullying in the relation between self-esteem and cyber victimization.

Alternative model

In this study, an alternative model was created to validate the main structural model. An alternative model is used to determine its equivalence or superiority to the main structural model. In the alternative model, self-esteem was considered the exogenous variable, with cyber victimization and digital game addiction as mediator variables, and cyberbullying as the endogenous variable. Testing the alternative model revealed acceptable goodness of fit indices (χ2/df (23.483/14) = 1.67, NFI = .97, CFI = .99, AGFI = .95, GFI = .98, and RMSEA = .04 (90% CI for RMSEA = [.00, .07])). However, the explained variance of the main structural model (R^2: 0.61) was higher than that of the alternative model (R^2: 0.56), leading us to prefer the main structural model. In this research, gender was included as a dummy variable, with Female (0) and Male (1) coding. The analysis results indicated that gender had no significant effect on self-esteem (β = 0.05, $p > .05$), digital game addiction (β = −0.01, $p > .05$), cyberbullying (β = −0.06, $p > .05$), or cyber victimization (β = −0.03, $p > .05$).

Discussion

Research highlights the widespread issue of cyber victimization and its detrimental impact on victims, including mental health problems such as social avoidance anxiety and depression (Grigore & Maftei, 2020). Adolescents involved in cyberbullying have also been found to suffer from similar mental health issues (Chu et al., 2018; Kowalski et al., 2019). Cyber victimization and cyberbullying are significant challenges for many children and adolescents (El Asam & Samara, 2016).

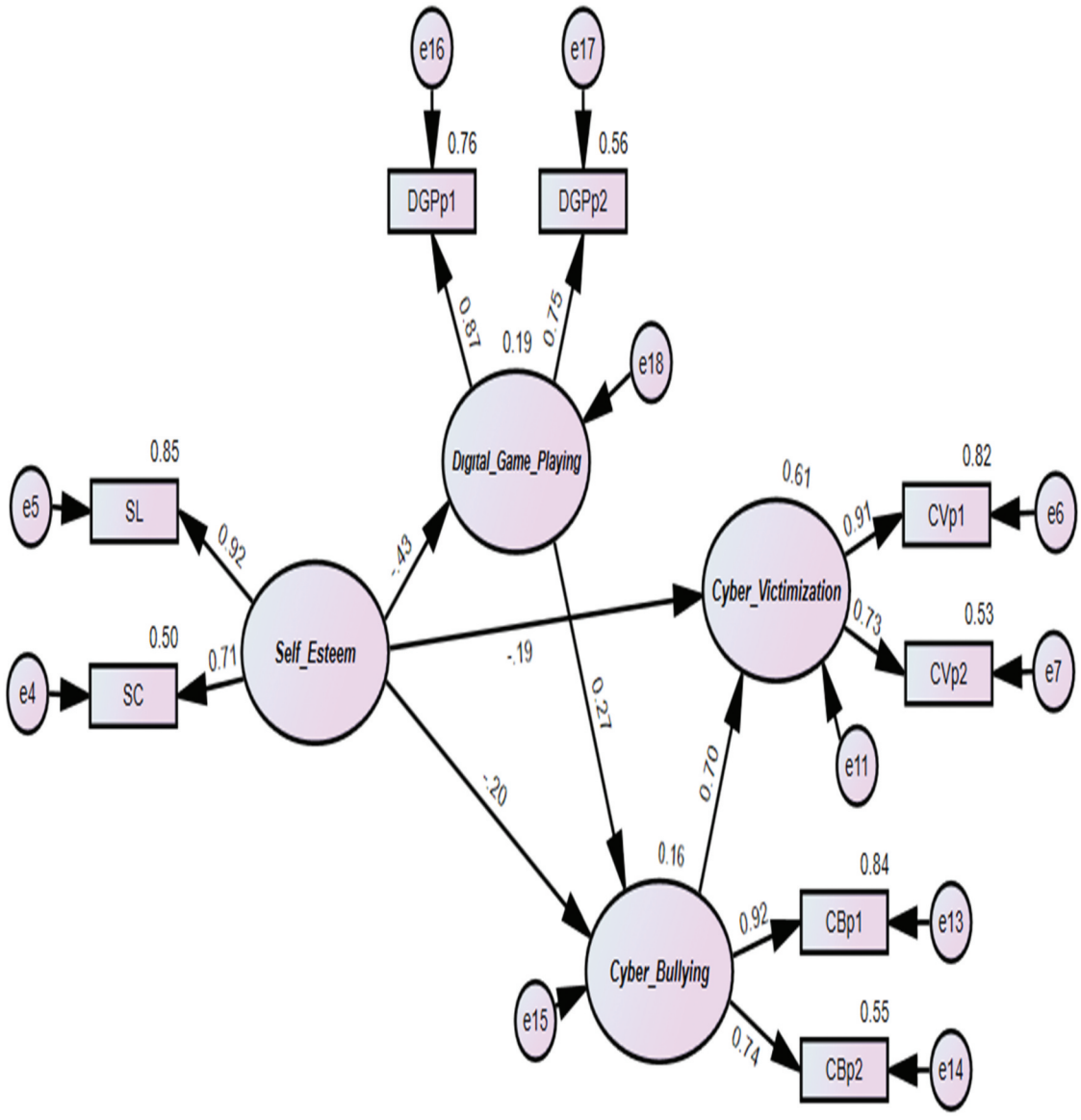

Figure 2. Path diagram of final structural model. SL= Self-Liking, SC: Self-Competence, DGPp1, DGPp2= Parcels of Digital Game Playing, CBp1, CBp2= Parcels of Cyberbullying, CVp1, CVp2= Parcels of Cyber Victimization.

Table 3. Results of the final structural model.

Predicted Variable		Predictor Variable	Estimate	S.E.	C.R.	p
Digital Game Playing	<—	Self Esteem	−.329	.053	−6.234	***
Cyberbullying	<—	Digital Game Playing	.214	.062	3.480	***
Cyberbullying	<—	Self Esteem	−.119	.043	−2.751	.006**
Cyber Victimization	<—	Cyberbullying	.752	.071	10.596	***
Cyber Victimization	<—	Self Esteem	−.124	.035	−3.496	***
SL	<—	Self Esteem	1.628	.206	7.887	***
CVp1	<—	Cyber Victimization	1.000			
CVp2	<—	Cyber Victimization	.670	.054	12.392	***
CBp1	<—	Cyber Bullying	1.000			
CBp2	<—	Cyber Bullying	.633	.050	12.642	***
DGPp1	<—	Digital Game Playing	1.000			
DGPp2	<—	Digital Game Playing	.576	.074	7.814	***
SC	<—	Self Esteem	1.000			

***$p < .001$, **$p < .01$, SL= Self-Liking, SC: Self-Competence, DGPp1, DGPp2= Parcels of Digital Game Playing, CBp1, CBp2= Parcels of Cyberbullying, CVp1, CVp2= Parcels of Cyber Victimization.

This study aimed to enhance understanding of cyber victimization development among adolescents. It explored a novel model suggesting that self-esteem is associated with cyber victimization through specific behavioral mechanisms; that is, digital game use and cyberbullying. Overall, the results supported the proposed chain mediation model.

The findings align with the General Strain Theory (GST), which suggests that individuals develop negative emotions to cope with various stressors (Agnew, 2017). Digital game-playing can act as a stressor, leading to strain due to factors like competition, the desire for social acceptance, and unmet expectations (Yildiz Durak & Saritepeci, 2020). This strain can trigger negative emotions such as disappointment and anger, potentially driving individuals to engage in cyberbullying behaviors. Similarly, experiencing cyberbullying can also create strain. Victims of cyberbullying may feel emotions like shame, fear, worry, or anger (Paez, 2018). In summary, the strain resulting from digital game playing can lead to cyberbullying, and exposure to cyberbullying can turn individuals into victims due to the emotional distress it causes.

The findings are also consistent with the General Aggression and General Learning Models (Gentile et al., 2009), which propose that behavior is influenced by a series of decisions, attributions, and psychological processes shaped by both situational and individual difference factors, including personality traits. Self-esteem, which is a key individual difference component related to cyber-victimization (Chang et al., 2013; Kowalski & Limber, 2007), was examined in our study. In these models, behaviors that receive positive reinforcement create associations between the behavior and stimuli, leading to more positive attitudes toward previously neutral or negative behaviors (Barlett et al., 2017). The digital games investigated here often involve violence and aggression, with winning often contingent on employing these patterns (Kneer et al., 2016). Winning in such games can serve as significant reinforcement for cyberbullying behaviors, potentially prompting digitally addicted youth to engage in cyberbullying. Social cognitive learning theory can also explain the relationships among self-esteem, cyberbullying, cyber victimization, and digital game playing in our model, which considers interactions between individual, environmental, and behavioral factors in shaping responses (Bandura, 2001). In this study, self-esteem represented the individual factor, digital games represented the environmental factor, and cyberbullying and cyber victimization represented the behavioral factors.

The results of our study emphasize a key aspect of social cognitive learning theory, highlighting the significance of human-human interactions (Bandura, 2001). Here, digital games symbolize interactions between humans and objects. Interestingly, excessive gaming did not directly correlate with cyber victimization among early adolescents. However, although excessive digital game playing did not directly lead to cyber victimization, it did show a connection to cyberbullying, which in turn, was associated with cyber victimization. This link suggests that children and adolescents who excessively engage in digital games can become cyber victims through their involvement in cyberbullying behavior. These findings stress the importance of considering human-human interactions when addressing digital game playing, cyberbullying, and victimization.

The results were consistent with Routine Activity Theory (Pratt & Turanovic, 2016).

Notably, our study revealed that self-esteem displayed statistically significant and meaningful relationships with digital game use, cyberbullying, and cyber victimization. These results thus extended the scope of Routine Activity Theory, which posits that victimization requires the convergence of an offender with motivation in time and space, a suitable target/victim, and a context lacking effective guardianship. Digital games, in this context, represent environments without victims or effective guardians.

Traditionally, guardians are perceived as external entities like fences, surveillance cameras, or police officers that can deter crime. However, our study extended beyond prior explanations by demonstrating that adolescents' self-esteem serves as an internal protective factor that can prevent cyber victimization from occurring.

Limitations

This study demonstrated some noteworthy limitations. The sample consisted only of Turkish adolescents, and cultural differences may lead to different outcomes. Studies with adolescents from other cultures are needed to address the generalizability of our findings. Additionally, relying solely on self-report scales could introduce response bias. Future research might benefit from mixed methods and reports from knowledgeable individuals (e.g., parents). Furthermore, this study employed a cross-sectional design, limiting causal conclusions. Future research should also consider longitudinal or experimental designs to strengthen inferences of causality. Nevertheless, this study introduced a novel cyber victimization model, used sophisticated statistical techniques (SEM), and examined both risk factors (digital game playing, cyberbullying, and cyber victimization) and protective factors (self-esteem). By focusing

on prevention and amelioration, it distinguished itself from most cyber victimization research underscoring the importance of exploring other protective factors and mediators. Finally, the rule of thumb in behavioral science research is to have 10 study participants for each psychometric scale item. Because there were 33 items in the study, our sample size fell short of this criterion by 18 students, reflecting another limitation.

Implications

The study improved our understanding of self-esteem's link to cyber victimization through the specific behavioral mechanisms of digital game use and cyberbullying mediation. This more nuanced model yielded practical implications. To address cyber victimization among adolescents most effectively, school and community professionals should implement comprehensive programs addressing digital game use, cyberbullying, and self-esteem simultaneously. Involving parents in these efforts is likely crucial. Raising awareness and educating parents and others about the links among all of these components (i.e., adolescent self-esteem, bullying, technology use, and digital gaming) should be daunting, but it appears essential.

Conclusion

The results emphasize the role of individual differences in adolescents' self-esteem as a significant factor in cyber victimization. This relationship operates through the behavioral pathways of digital game use and cyberbullying. Low self-esteem can lead to increased digital gaming, which can, in turn, foster cyberbullying in digital environments. Cyberbullying subsequently increases the likelihood of victimization. Effective intervention programs for adolescent cyber victimization should comprehensively address digital game use, cyberbullying, and low self-esteem.

Translation to Health Education Practice

The findings of this study may provide important contributions to health education practices by revealing the serial mediating role of digital game addiction and cyber victimization in the relationship between self-esteem and cyber victimization. Based on the research findings, Certified Health Education Specialists (CHES) can encourage students in this period to establish healthier relationships in the digital world and develop strategies to protect mental health. In this direction, Certified Health Education Specialists (CHES) should aim to develop healthy digital gaming habits in students by considering the negative effects of digital game addiction on cyber victimization. For this purpose, educators can organize awareness-raising educational programs against digital game addiction and guide students in determining balanced play times. In addition, providing students with information about the potential risks of digital games can help them make informed decisions about limiting play time and developing healthy digital habits.

Educators and Certified Health Education Specialists (CHES) working in community mental health centers in Turkey should develop preventive strategies against cyberbullying to minimize its negative effects on students. These strategies may include informing students about cyberbullying, teaching them what to do in case of cyberbullying, and providing resources to support students who are cyberbullied. Educators and Certified Health Education Specialists (CHES) can organize awareness-raising campaigns against cyberbullying and empower students to combat cyberbullying. However, given the protective role of self-esteem on cyber victimization, health educators should organize programs to increase students' self-esteem. These programs should include activities that make students feel more valuable and competent and provide educational materials that support self-confidence. Students with high self-esteem may be more resilient to cyber victimization and develop healthier coping mechanisms.

Existing literature (Wang et al., 2019) also shows that digital game addiction and cyber victimization are associated with depression and other chronic mental health problems. Certified Health Education Specialists (CHES) can contribute to the prevention of these problems by creating early intervention and support systems. Family physicians in the first stage of the health system in Turkey can also provide a preventive service for chronic mental health problems by referring risky children and adolescents to community mental health centers. Regular screening programs should be organized to detect students' mental health problems at an early stage and they should be provided with professional help when necessary. Psychological counseling services should be strengthened in schools so that students can receive individual or group counseling services where they can receive emotional and psychological support. In addition, Certified Health Education Specialists (CHES) can organize educational programs to raise awareness about depression and chronic mental health problems. These programs should aim to help students recognize such problems, recognize their symptoms, and encourage help-seeking behaviors. In addition, training programs can also be organized for teachers and parents so that they can

recognize early signs of mental health problems in children and adolescents.

In light of these findings, Certified Health Education Specialists (CHES) can develop comprehensive and effective programs to mitigate the effects of digital gaming addiction and cyber victimization on students and improve their overall mental health. Thus, students can be supported to lead healthier and safer lives in both digital and face-to-face environments.

Role of the Health Education Specialist

The design and management of this study took into account the responsibilities set out by the National Commission for Health Education Credentialing Inc. (National Commission for Health Education Credentialing, Inc., 2019). In this context, an approach was adopted in line with the core responsibilities for Certified Health Education Specialists (CHES).

(1) **Needs Assessment and Capacity Analysis**: In this study, a comprehensive needs assessment was conducted to examine the effects of digital game addiction and cyber victimization on self-esteem. The research was conducted using questionnaires and scales to determine the student population's levels of exposure to digital game addiction and cyber victimization. This process enabled the planning of appropriate interventions by understanding the needs and current capacity of the target group.
(2) **Planning**: In the planning phase of the research, the desired outcomes were determined in line with the needs assessment data obtained and justifications for future interventions were created.
(3) **Evaluation and Research**: Data were collected and analyzed in order to carry out the study. In this context, quantitative evaluation methods were used. Study design, data collection, analysis and article development were carried out.

These responsibilities, and the approaches adopted during the design and management of the study, aim to improve the effectiveness of health education practices and provide more robust solutions to the challenges students face in the digital world.

Competencies and sub-competencies that were applied in this study include:

(1) Assessment of needs and capacity for health education (1.1., 1.2., 1.4)
(2) Planning for health education (2.1., 2.2.)
(3) Research and evaluation for health education (3.1., 3.2., 3.3., 3.4., 3.5)

Disclosure statement

No potential conflict of interest was reported by the author(s).

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