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School belongingness, peer relations, and insomnia as predictors of middle school pupils' problematic online gaming

Poczucie przynależności do szkoły, relacje rówieśnicze i bezsenność jako predyktory problemowego grania w gry sieciowe wśród uczniów szkół gimnazjalnych

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Abstract

The focus of this study was to determine the level of problematic online gaming among middle school pupils as related to age, gender, school type, and peer relationships as well as school belongingness and insomnia. A total of 291 middle school pupils constituted the study's samples, 147 of whom were boys and 144 of whom were girls. One of the study's purposeful sampling methods, non-random sample methods, was used. In the study, one of the non-random sampling methods purposeful sampling methods was utilised. The dependent variable was problematic online gaming, while the independent variables included the search for peer relationships, school belongingness, and insomnia. Problematic online gaming is the dependent variable, whereas peer relationships, school belongingness, and insomnia are the variables that are independent. To find out if the independent factors predicted the dependent variable, multiple regression analysis was utilised. The regression study revealed that insomnia, school belongingness, peer relationship, age, type of school, and age factors accounted for 30% of the problematic online gaming variable.

Keywords: problematic online gaming, peer relationship, school belongingness, insomnia

Streszczenie

Celem badania było określenie skali zjawiska problemowego grania w gry sieciowe wśród uczniów gimnazjów w zależności od szeregu czynników obejmujących wiek, płeć, typ szkoły, relacje rówieśnicze, poczucie przynależności do szkoły i bezsenność. Do badania włączono 291 uczniów szkół na poziomie gimnazjalnym. Grupa badana obejmowała 147 chłopców i 144 dziewczęta. W badaniu zastosowano jedną z celowych metod doboru próby – metodę doboru próby nielosowej. Problemowe granie w gry sieciowe było zmienną zależną, natomiast relacje rówieśnicze, poczucie przynależności do szkoły i bezsenność stanowiły zmienne niezależne. Aby ustalić, czy czynniki niezależne mają wartość predykcyjną względem zmiennej zależnej, przeprowadzono analizę regresji wielokrotnej. Wykazano, że bezsenność, poczucie przynależności do szkoły, relacje rówieśnicze, typ szkoły, wiek i czynniki związane z wiekiem odpowiadają za 30% zmiennej problemowego grania w gry sieciowe.

Słowa kluczowe: problemowe granie w gry sieciowe, relacje rówieśnicze, poczucie przynależności do szkoły, bezsenność

INTRODUCTION

As old as the history of humankind, games are considered an important factor in the course of children's development (Koçyiğit et al., 2007). According to Bekir and Yıldırım (2018), while examples of games in the past included with marbles, hide-and-seek, and nine-tiles, it may not be appropriate to give these examples today. In the present day, it is evident that interest in the traditional games has declined (Öncel and Tekin, 2015). In today's world, the word "game" immediately brings to mind smartphone games, Xbox 360, tablet games, and Internet-based games. The distinguishing feature of these Internet-based games is the potential harm they can cause to children, encompassing deleterious academic, relationship, and physical effects (Ko et al., 2020; Mills and Allen, 2020; Purwaningsih and Nurmala, 2021; Young, 1998, 1996).

Different scales have been used in studies on Internet-based games. These scales are routinely referred to in the literature as the Internet gaming disorder, online gaming addiction, digital game addiction, and sometimes problematic online gaming (Arıcak et al., 2018; Kaya, 2013; Şahin and Tuğrul, 2012; Sanders and Williams, 2019). The titles may differ according to the sampling types when analysing the details of these articles: for example, Internet gaming disorder when conducted in clinics, gaming addiction when conducted in addiction centres, and problematic online gaming when conducted in schools. For the purpose of this article, these terms will be referred to as 'problematic online gambling', as the subject group in this article comprises pupils.

This study, conducted among middle school pupils, aims to describe the variables related to problematic online gaming, which is believed to have a negative impact on children's mental health and overall development. Considering the fact that some online games have approximately 20 million players, it is evident that many middle school pupils are at risk. Given the sample size of pupils, the presence of insomnia, and loss of self-control (Teng et al., 2014), problematic online gaming can even lead to fatal consequences, as supported by various articles. Despite the perils of problematic online gaming, only a limited number of studies have been found on the subject. In this context, the present study was conducted to investigate the hypotheses listed below in order to examine the relationship between problematic online gaming levels among middle school pupils and their levels of insomnia, school belongingness, and peer relationships.

H1. There is a relationship between problematic online gaming, peer relationships, insomnia, and school belongingness.

H2. Peer relationships, school belongingness, insomnia, gender, school type, and age predict online game addiction in regression analysis.

Problematic online gaming and peer relationships

Although there were no previous studies on the negative impact of social games on peer relationships, numerous studies have shown that problematic online gaming harms children's relationships with their peers (Ayas and Horzum, 2013; Ayas et al., 2011; Horzum, 2011; Şahin and Tuğrul, 2012). According to Horzum et al. (2008), problematic online gaming can cause aggressive behaviour, symptoms of violence, decreased emotions, learning disorders, psychomotor disorders, and anti-social behaviours, ultimately damaging peer and interpersonal relationships. According to a descriptive study by Totan and Yöndem (2007), the quality of parent–children relationships affects peer relationships, and disturbances in parent–children relationships may increase the possibility of bullying. Therefore, problematic online gaming may indirectly contribute to an increase in bullying behaviour and result in difficulties in peer relationships.

Additionally, while there is a substantial amount of research on the link between the quality of parent–children relationships and Internet addiction (van den Eijnden et al., 2010; Liu et al., 2015, 2013; Milani et al., 2009; Wang et al., 2011; Young and Case, 2004), there is limited research investigating the association between peer relationships and problematic online gaming (Lin and Tsai, 1999). Given the positive link between peer relationships and parental relationships (Totan and Yöndem, 2007), problematic online gaming may predict the course of peer relationships. Furthermore, variables related to Internet addiction (such as child–parent relationships, loneliness, and bullying behaviour) may also be related to problematic online gaming (van den Eijnden et al., 2010; Hazar and Ekici, 2021).

Therefore, there may be an increase in bullying behaviour indirectly, which may lead to problems in peer relationships. Furthermore, even though there is substantial research on the parent–children relationship and Internet addiction (van den Eijnden et al., 2010; Liu et al., 2015, 2013), there is limited research investigating the link between peer relationships and problematic online gaming (Lin and Tsai, 1999). However, parents have an important role to play in the prevention and psychoeducation studies because collaboration and communication with parents are known to be essential for monitoring psychoeducation (González-Bueso et al., 2018; Zajac et al., 2020). In addition, one can observe a negative association between child–parent relationship and Internet addiction (Milani et al., 2009; Wang et al., 2011; Young and Case, 2004). As there is a positive link between peer relationships and parental relationships (Totan and Yöndem, 2007), problematic online gaming may predict the course of peer relationships. Additionally, considering that access to the Internet is necessary for problematic online gaming to develop, variables related to Internet addiction (such as child–parent relationship, loneliness, and bullying behaviour) may also be related to problematic online gaming (Hazar and Ekici, 2021).

Problematic online gaming and insomnia

Sleep is defined as a state of unconsciousness during which an active regeneration period is re-preparing the whole body towards external stimuli (Özgüvenç, 2016). Considering the age of middle school pupils, sleep is one of the periods during which the growth and development rates are the fastest (Koç, 2004). In this context, sleep problems that middle school pupils experience may induce both physiological (Larwin and Larwin, 2008) and psychological discomfort (Yeşilyaprak, 1985). According to study findings, middle school pupils may experience sleep problems due to prolonged exposure to computer screens (Flisher, 2010) and may even give up eating and sleep just to spend more time in the virtual world (Internet-based games) (Denizci Nazlıgül et al., 2018). These children may have a range of health problems such as back pain, eye fatigue, and physical and eating disorders (Lee et al., 2017). In addition, according to the American Psychiatric Association (Amerikan Psikiyatri Birliği, 2013), among the diagnoses of problematic online gaming, such as breaking daily routine, withdrawal symptoms, regarding it as a path to escape, and preferring games over other activities can be mentioned. Given the situation, it is possible to say that the idea that the child or adolescent might prefer playing games over sleeping can be backed in line with these findings. When the related literature on the subject is examined, there is a positive relationship between problematic online gaming and insomnia (Achab et al., 2011; Lam, 2014; Smyth, 2007; Younes et al., 2016). According to these studies, problematic online gaming can be predictive for the variable of insomnia.

Problematic online gaming and school belongingness

School belongingness can be defined as the individual's subjective state of emotion towards the extent to which he/she is individually accepted, respected, and supported by other pupils and/or teachers at school (Goodenow and Grady, 1993). The literature shows that academic success can be associated with the variables of school belongingness (Adelabu, 2007; Booker, 2004, 2006; Isakson and Jarvis, 1999), relationships with teachers and friends (Goodenow, 1993a, 1993b), happiness, experiencing positive emotions, exclusion, depression, and jealousy (Osterman, 2000). Pupils may also suffer from sleep problems due to mental issues that they may experience (Achab et al., 2011; Lam, 2014; Smyth, 2007) and may have difficulty focusing on the lessons, as they cannot regularly attend school. Factors such as depression, anxiety, insomnia, stress (Younes et al., 2016) and peer bullying (Sezen and Murat, 2018) were also found to be associated with the relationship between problematic online gaming and school belongingness. In addition, the fact that school provides a protective factor by reducing the likelihood of negative experiences such as depression, inclination to crime, and substance abuse plays an important role in reducing these harmful situations (Jackson and Warren, 2000). According to Bargeron and Hormes (2017), problematic online gaming may have serious consequences that disrupt peer relationships and affect emotional life, and may also lead to quitting school or job (Zhu et al., 2015). For this reason, problematic online gaming can predict school belongingness.

METHOD

Sampling

The study focused on middle school pupils who actively engage in online gaming and who live in Turkey. The method of purposeful sampling, a non-random sample technique, was used in the study. The subjects were selected based upon a minimum of one-year experience in online game playing. A total of 291 pupils, 147 boys and 144 girls, participated in the study. With a mean age of 11.70, the participants' ages ranged from 10 to 13 years. Overall, 175 of the study subjects attended public schools, whereas 116 were in private schools.

Data collection tools

Internet Game Disorder Scale-9 (IGDS9-SF-TR): Internet Game Disorder Scale developed by Pontes and Griffiths (2015) and adapted to Turkish by Arıcak et al. (2018), consists of 9 items and has a single factor structure. Cronbach's alpha reliability coefficient was 0.82 and the Guttman split-half reliability coefficient was 0.74. The lowest score that can be obtained in the scale is 9, and the highest is 45.
Bergen Insomnia Scale (BIS): The Bergen Insomnia Scale, developed by Pallesen et al. (2008) and adapted to Turkish by Bay and Ergun (2018), consists of 6 items and two sub-dimensions. Within the scope of reliability analyses, Cronbach's alpha reliability coefficient of the scale was 0.79 in daytime symptoms, 0.63 in night-time symptoms and 0.72 for total BIS. The lowest score that can be obtained from the BIS is 0, and the highest score is 42.
Friendship Qualities Scale (FQS): Developed by Bukowski et al. (1994) and adapted to Turkish by Atik et al. (2014), the Friendship Qualities Scale consists of 22 items and five sub-dimensions. Cronbach's alpha internal consistency coefficients were 0.66 for the coexistence sub-dimension, 0.66 for the conflict sub-dimension, 0.86 for the help sub-dimension, 0.71 for the protection sub-dimension, 0.83 for the proximity sub-dimension, and 0.85 for internal consistency coefficient for the whole scale.
School Belongingness Scale (SBSS): The scale, developed by Arslan and Duru (2017), consists of 10 items that can measure the level of school belongingness among middle school pupils. Cronbach's alpha internal consistency coefficients for the whole scale were calculated as 0.85.

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Variable	Men		Women	
	Mean	*SD*	**Mean**	*SD*
Problematic online gaming	21.0	7.1	15.0	5.4
Peer relationship	76.1	15.	76.4	16.8
School belongingness	26.8	4.8	26.3	5.5
Insomnia	17.0	8.7	15.3	8.0
SD – standard deviation.				

Tab. 1. Means and standard deviations (gender differences)

Variables	Skewness	Kurtosis	VIF	CI
Problematic online gaming	0.73	0.01		1.00
Insomnia	0.19	−0.52	1.04	4.59
School belongingness	−0.33	−0.33	1.19	12.15
Peer relationship	−0.21	−0.46	1.17	15.32
VIF – variance inflation factor; **CI** – confidence interval.				

Tab. 2. Results of regression analysis

Data analysis

The data in the study were analysed using a one-way analysis of variance, Pearson's correlation, multiple regression analysis, and a *t*-test according to the study's assumptions. Regression analysis was used to determine if the independent variables (those associated with the dependent variable) significantly predicted the dependent variable. The *t*-test for independent samples was used in this instance to find out whether problematic Internet gaming varied by gender and type of school. Middle school students' problematic online gaming was examined using one-way analysis of variance to see if there was a statistically significant difference across pupil ages. In this analysis, one-way analysis of variance was used for homogeneous variances, and the Welch's test was used for non-homogeneous variances. Levene's test was used to determine the homogeneity status of the variances.

RESULTS

Descriptive statistics and correlations

Independent sample *t*-tests were conducted to test for gender, school type and age differences in the mean levels of the variables in the present study. The results showed that there were significant gender differences in problematic online gaming (Tab. 1). However, no difference was found for the variables of school type and age.

The research data were evaluated according to the principles of data set regression analysis before regression analysis. The obtained outcomes are presented in Tab. 2. The suitability of the data for regression analysis was assessed using Mahalanobis distance values, kurtosis and skewness values, and the normal distribution graph. Firstly, Mahalanobis distance values were computed to check whether there were multivariate extremities in the dataset. Then, the values

were assessed based on the significance level of $p < 0.001$, and it was established that there was no data that violates the assumptions of normality and linearity in the dataset. Subsequently, the normal distribution indicators (kurtosis, skewness) were examined to evaluate the suitability of the dataset for regression analysis.

The study revealed a significant association between the variables of problematic online gaming and school belongingness as well as insomnia (Tab. 3). However, no relationship was found between the levels of problematic online gaming and peer relationships among middle school pupils. The findings indicated a negative relationship between the levels of problematic online gaming and school belongingness ($r = -0.13$), whereas a positive relationship was observed with the insomnia variable ($r = 0.37$). Based on these findings, the researchers conducted a multiple regression analysis to determine whether problematic online gaming could be statistically predicted by insomnia, peer relationships, and school belongingness. Tab. 3 shows the means, *SD*s, and Pearson correlation coefficients determined for the variables.

Regression analysis

The regression analysis showed that the model predicting problematic online gaming was statistically significant (Tab. 4). Problematic online gaming was predicted by school belongingness ($\beta = 0.07$), while peer relationships ($\beta = 0.07$) did not significantly predict problematic online gaming. However, insomnia ($\beta = 0.37$), age ($\beta = 0.06$), school types ($\beta = -0.08$), and gender ($\beta = -0.40$) were found to be predictors of problematic online gaming, as indicated in the table. Based on these findings, it can be inferred that the regression model, which includes insomnia, school belongingness, peer relationship, gender, school types, and age, accounts for 30% of the variability in problematic online gaming.

	Problematic online gaming	Peer relationship	School belongingness	Insomnia
Problematic online gaming	1			
Peer relationship	−0.01	1		
School belongingness	**−0.13***	**0.36****	1	
Insomnia	**0.37****	0.06	**−0.15****	1
$\bar{X}$	18.04	76.32	26.58	16.17
SD	7.0	16.1	5.1	8.4
* $p < 0.05$, ** $p < 0.01$. $\bar{X}$ – the sample mean is an average value found in a sample. **SD** – standard deviation.				

Tab. 3. *Correlation analysis result of the links between the insomnia, peer relationship and school belongingness and the level of problematic online gaming among middle school pupils*

Dependent variable	Predictor variable	B	Standard error	β	t	p	Correlation Partial	Correlation Semi-partial
	(Constant)	16.259	2.502		6.49	**0.00**		
	Insomnia	−0.097	0.08	0.36	6.48	**0.00**	0.35	0.35
Problematic online gaming	School belongingness	0.303	0.04	−0.07	−1.19	**0.23**	−0.07	−0.06
	Peer relationships	−0.007	0.02	−0.01	−0.27	0.78	−0.01	−0.01
	Age	0.038	0.31	0.00	0.12	0.90	0.01	0.01
	School types	−1.264	0.72	−0.08	−1.75	**0.08**	−0.10	−0.08
	Gender	−5.725	0.70	−0.40	−8.14	**0.00**	−0.43	−0.40
$F_{(6, 284)} = 692.655, p < 0.00$. $R = 0.556; R^2 = 0.30$.								

Tab. 4. *Results of multiple regression analysis*

DISCUSSION

The study was carried out to determine the links between problematic online gaming of middle school pupils and their peer relationship, insomnia, and school belongingness. The results show that there is a correlation between insomnia, school belongingness, and online game addiction, which is consistent with previously reported research results (Achab et al., 2011; Lam, 2014; Smyth, 2007; Younes et al., 2016; Zhu et al., 2015).

In the context of these results, it is notable that peer relationships were not found to have a significant effect on problematic online gaming. According to the literature, the fact that children develop social relationships through the games they play with their friends, as well as communication and language skills, self-expression, and the habit of sharing, is important in the sociocultural and psychological aspects (Horzum, 2011), but no study has been found related to whether internet games improve or inhibit these features. In some of the Internet games, other players can be contacted (Bekir and Çelik, 2019; Koç, 2017) and the players even have options for earning gains as a result of communication (Tahiroglu et al., 2010). According to this study, pupils can cope with their lack by playing these games. It is also claimed that pupils with poor peer relationships in social environments can play these games as a means of avoidance (Bekir, 2018). In view of the fact that there are many

types of Internet games (games with communication, games without any direct communication), and that pupils with poor peer relationships need to establish some sort of relationship can be met through these games, there might not be a significant association between problematic online gaming and peer relationships.

A positive high-level correlation was found between problematic online gaming and insomnia. It is a hypothesis that pupils with high levels of Internet gaming exposure should experience sleep problems. In this context, the related literature also provides similar results (Achab et al., 2011; Flisher, 2010; Lam, 2014; Lee et al., 2017; Smyth, 2007; Younes et al., 2016). Pupils may experience sleep problems due to the fact that their bodies are affected by spending long hours playing with technological devices and not noticing the time they spend. According to the American Psychiatric Association (Amerikan Psikiyatri Birliği, 2013), the diagnoses of problematic online gaming include breaking the daily routine, withdrawal symptoms, and preferring games over other activities. When the situation is evaluated, it is thought that children or adolescents might prefer playing online games over sleeping. In this context, the result being positive can be considered normal.

Furthermore, there is a negative relationship between problematic online gaming and school belongingness. The relationships between depression, anxiety, insomnia, stress (Younes et al., 2016) and peer bullying (Sezen and Murat,

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2018) are also linked to school belongingness. When the literature was reviewed, we found no studies investigating the relationship between the two variables. According to the American Psychiatric Association (Amerikan Psikiyatri Birliği, 2013), the preference for games over other activities is counted among the diagnoses of problematic online gaming. Considering that games are very functional, they may sound more fun than school education and, therefore, the level of problematic online gaming may tend to increase, thus decreasing school belongingness. In another study, the success variable was taken as a sub-factor in the scale developed by Kaya (2013). Supporting this idea, Anand (2007) found a prominent relationship between problematic online gaming and academic achievement in school. Academic achievement may be declining as a result of online games (Anand, 2007), and school engagement could be decreasing as academic success declines. Also, when the success and competence to be gained in these virtual games are consolidated, children or adolescents may start to play the game more often and thus, their relations and school belongingness may be damaged, as the performance will be channelled to the games. This result may indicate a negative relationship.

PRACTICAL IMPLICATIONS

When the findings of the study are examined as a whole, the conclusion is that problematic online gaming, school belongingness, peer relationships, and insomnia might be related and predictive variables. When the relationship and predictive levels between them are examined, it can be said that the problems that occur in schools are at a level that can affect the success of the pupil and thus his/her future career. When one considers today's technology and Internet-based games, it is almost impossible to escape or ignore the phenomenon. Instead of directly condemning technological progress and games, it is essential to learn how to use them functionally. Therefore, recognising these variables is vital and has an important place in terms of using them. In the light of the findings obtained in this study, a psychoeducation program can be prepared for adolescents in future studies and the advantages and disadvantages of gaming can be indicated there. Schemas can be prepared according to the levels of problematic online gaming and which schemes are associated with them can be seen. A similar study targeted at university pupils can also be performed and to make a contribution to preventive studies.

LIMITATIONS

In spite of getting basic findings of variances of middle school pupil of problematic online gaming, the study had a range of limitations. The working group was limited to 291 pupils, it was not possible to land up with casual results because of the correlational survey model (Büyüköztürk et al., 2008), the data are just getting from an assessment instrument based on self-reporting, and the study group was restricted to middle school pupils. Moreover, the study encompassed only selected provinces of Turkey.

Conflict of interest

The authors do not report any financial or personal connections with other persons or organisations that could adversely affect the content of the publication or claim the right to this publication.

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