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Perceived parental psychological control and the risk of internet gaming disorder in adolescents: a cross-sectional study

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Abstract
It is stated that parental psychological control (PC), which appears to hinder psychological development in children and adolescents, is associated with internet gaming disorder (IGD). However, parenting styles and practices vary across cultures. For this reason, to determine the risk of IGD in adolescents who are in the process of psychological development and to prevent it at an early stage, there is a need to better understand the effect of PC on the development of IGD. In this context, this study aims to examine the impact of perceived parental psychological control on the risk of Internet gaming disorder in Turkish adolescents. A cross-sectional design was used. The sample group consisted of 4498 students from eight public high schools in Turkey. Participant Information Form, the Psychological Control Scale, and the Internet Gaming Disorder Scale Short Form were used for collecting data. Univariate logistic regression analysis demonstrated that the risk of IGD increased as maternal disrespect-maternal psychological control and father disrespect scores increased. Paternal psychological control score had no significant effect on IGD risk. In the multivariate model, age, father's education level, spending money on games, time spent playing daily games on weekdays and weekends, and father's psychological score were found to be associated with IGD risk. The effects of maternal disrespect and maternal psychological control scores on the IGD risk varied according to the number of siblings and the education level of the mother. As a result, parental PC was determined to affect the risk of IGD in Turkish adolescents significantly.

Keywords Adolescents · Psychological control · Internet gaming disorder · Behavioral addiction · Parental control · Parental control applications

Introduction

Parental control practices have been reported to be necessary due to their effects on children's emotional, cognitive, and social development (Aunola & Nurmi, 2005). Parental control is defined as a parental attitude that adopts attitudes such as punishing, blaming, suppressing, restricting, applying inconsistent control methods, and depriving people of love (Barber, 2002). This concept, which is quite comprehensive and multidimensional, is divided into two: behavioral control and psychological control (Barber, 1996).

Behavioral control (BC) is defined as an attempt to supervise and control the child by observing how they behave and setting regulatory rules (such as keeping track of who, where, and what they are doing, and organizing the activities they take part in). Psychological control (PC) is defined as a highly insidious type of control that potentially inhibits or violates psychological development through manipulation and abuse of the parent-child bond (e.g., love-withdrawal and guilt induction), negative emotional expressions, criticism (e.g., disappointment and shame), and excessive personal control (Barber, 1996).

According to recent studies, such parental practices may be related to parents' stress levels and psychological flexibility skills (Fonseca et al., 2020; Flujas-Contreras et al., 2023). Psychological flexibility, in the context of parenting, is expressed as the capacity of parents to establish a

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good relationship with their children and is stated to have a significant impact on parenting practices and children's development. Accordingly, parents with less psychological flexibility may apply very strict discipline or inconsistent rules (Burke & Moore, 2015; Flujas-Contreras et al., 2023). At the same time, these parents can often evaluate their internal stress experiences negatively. Especially, increasing parental anxiety leads them to apply experiential avoidance, suppression and control strategies, and this increases the child's anxiety level. (Burke & Moore, 2015; Emerson et al., 2019; Fonseca et al., 2020). This can lead to adolescents having low self-esteem and self-confidence, becoming more vulnerable to internalizing problems such as loneliness, and thus to problems arising from unmet psychological needs (Barber & Xia, 2013).

The literature on adolescence and psychological needs demonstrates that Internet games fulfill psychological needs that arise during this period (Przybylski et al., 2010). However, online games that satisfy psychological needs may cause adolescents to become addicted to these games after some time (Zhu et al., 2015). Several empirical studies have demonstrated that adolescents' internet gaming disorder (IGD) and internet addiction are positively associated with parental PC (Song et al., 2014; Zhu et al., 2015; Yang et al., 2020).

Internet gaming disorder and parental control applications

IGD is described in the most recent edition of the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2022). However, IGD is included in the section recommending conditions for further research, along with caffeine use disorder and other conditions. Nine diagnostic criteria for IGD were determined in DSM-5. These are (1) preoccupation with videogames (i.e. preoccupation); (2) experiencing unpleasant symptoms when playing videogames (i.e. withdrawal); (3) the need to spend an increased amount of time involved in video games (i.e. tolerance); (4) failed attempts to control participation in videogames (i.e. lose control); (5) losing interest in past hobbies and entertainment as a result of, and except for, videogames (i.e. surrender from other activities); (6) continue to use videogames despite having knowledge of psychosocial problems (i.e. continuation); (7) deceiving family members, therapists or others regarding the number of videogames (i.e. fraud) (8) using videogames to escape or eliminate negative feelings (i.e. escape) and (9) harm or lose relationships, work, or education or significant career opportunities because of participation with videogames (i.e. negative consequences) (Pontes & Griffiths, 2015).

Studies conducted in the context of IGD have demonstrated that IGD has a high prevalence, especially in adolescents and young adults (De Pasquale et al., 2020; Gao et al., 2022). Studies have also revealed that IGD is associated with male gender, stress, severe depressive symptoms, poor sleep quality, increased time spent gaming, total leisure time spent gaming, poor academic performance, bullying, interpersonal problems, hyperactivity/inattention, anxiety, depression, emotional distress, low self-confidence, and family dysfunction (Severo et al., 2020; Gao et al., 2022). On the other hand, previous studies have pointed out the importance of parental control in IGD development and emphasized that parental control affects the development of Internet addiction. Bleakley et al., 2016; Şhek et al., 2018). In this regard, a very recent study revealed that behavioral control of both parents has a protective function on the development of internet addiction in adolescents, while psychological control has a negative effect (Zhu et al., 2023).

Something researchers have focused on is how adolescents cope with negative emotions, depressive symptoms, distress, and disappointments they experience about parental control; and have reported that coping is related to the tendency to use the Internet (Xin et al., 2018; Zhu et al., 2021). Several researchers have suggested that parental control is effective in the development of Internet addiction (Bleakley et al., 2016; Shek et al., 2018) and specifically that parental PC is an important factor related to individuals' addictive behaviors (Zhang et al. 2022). A 2-year longitudinal study conducted with 908 adolescents recently showed a direct reciprocal relationship between parental psychological control and IGD (Lin et al., 2020). Similarly, Su et al. (2018) and Koning et al. (2018) suggested a bidirectional relationship between IGD and parental behavior in adolescents. A systematic review study examining family factors associated with IGD in adolescents reported four important factors parent-child relationship: parental status (e.g., mental health, socio-economic status), family environment (e.g., number of people living at home), and parental influence on playing (e.g., games) (Schneider et al., 2017).

In the literature, it is seen that in the context of digital addictions in adolescents, parents should be informed about the use of digital technologies and their control over children, and their digital literacy should be improved. For instance, Kurniady et al. (2022) stated in their study that the behavioral control used by parents should be maintained in a friendly and healthy way to reduce the effects of digital technologies on adolescents, and parents should also be more informed about their children'sdigital participation. On the other hand, Nurhayati et al. (2022), emphasized that there is still a lack of understanding and skills among parents, especially in using social media. Therefore, they stated that studies with a digital literacy model are important,

which can help increase parents' knowledge and skills in using social media, as well as improve parental control over children's use of other types of technology.

The present study

IGD is a universal problem with a high prevalence in adolescents and young adults (De Pasquale et al., 2020; Gao et al., 2022). However, parenting styles and practices vary across cultures (Feldman, 2003). For this reason, studies in different cultures are needed to understand more comprehensively the effect of parental PC on IGD risk and to contribute to universal planning to prevent IGD. Hence, in this study, it was aimed to examine the effect of PC on IGD risk in adolescents in Turkey. In this cross-sectional study, the effect of parental PC on IGD risk and differentiation depending on other factors were discussed together. In this context, answers were sought to the following questions:

1. What is the level of PC adolescents perceived from their parents?
2. What is the level of IGD risk among adolescents?
3. Does parental PC affect the IGD risk in adolescents?
4. Does the effect of PC on IGD risk depend on other factors?

Since the study is an exploratory study specific to Turkish culture, there are no assumptions.

Method

Design and participants

This study was performed cross-sectionally between February and April 2022 in Ankara, Türkiye's capital city. Socioeconomic classification was not made between schools, as a central exam is applied throughout the country and students are placed in public high schools according to their scores. Eight high schools were randomly selected from a total of 582 public high schools in 25 districts of Ankara (Ministry of National Education, 2022). The number of 9th, 10th, and 11th grade students studying in these 8 high schools is 5,297. However, students who reported not playing games on the Internet ($n=593$), whose forms were incomplete ($n=85$), refusing to participate in the study ($n=69$), with divorced parents ($n=37$), with one parent deceased ($n=6$), and students who reported to have neuropsychiatric problems ($n=9$) were excluded. The study was completed with 4,498 students (84.9%) whose parents were alive and living together, and who participated in the study voluntarily.

Instruments

Participant information form

The form was prepared by the researchers in line with the relevant literature (Schneider et al., 2017; Yang et al., 2020; Lin et al., 2020; Macur & Pontes, 2021). The questions included were on age, gender, grade, family income, number of siblings, parental education level, student's academic achievement level, unlimited Internet connection status at home, the average number of hours of gaming per day on weekdays (Monday-Friday) and weekends (Saturday-Sunday), money spent on gaming, whether or not parents control gaming time of the participants.

Internet gaming disorder scale-short form (IGDS-SF)

The scale was developed by Pontes and Griffiths (2015) to measure Internet gaming addiction. The items were created based on the IGDS diagnostic criteria established by the American Psychiatric Association (2013) (Pontes & Griffiths, 2015). The unidimensional questionnaire is a 5-point Likert scale and consists of 9 items, including "preoccupation", "deprivation", "tolerance", "loss of control", "abandonment of other activities", "continuation", "cheating", "escape", and "negative consequences". The lowest score that can be obtained on the scale is 9, and the highest score is 45. High scores indicate a high risk of addiction. Students scoring 36 or higher on this scale were classified as at high risk of IGD (Pontes & Griffiths, 2015). In this study, the X adaptation of the scale by Arıcak et al. (2018) was used, and the Cronbach alpha coefficient was reported as 0.908.

Psychological control scale (PCS-YSR)

The scale was developed by Barber (1996) to obtain information about the psychological control that adolescents perceive from both their parents. Later, the scale improved by Sayıl and Kındap (2010) by adding cross-cultural items was adapted to Turkish culture, and its psychometric properties were verified. With this scale, which consists of 16 items and two sub dimensions (Psychological Control (PC) and Mother/Father (PD), it is possible to measure perceived psychological control by parents. The scale items are of the 4-point Likert type and range from 1: "Not at all similar to the characteristics of my mother/father" to 4: "Very similar to the characteristics of my mother/father." Regarding the validity of the scale, as expected, PC and PD were negatively correlated with democratic parenting style and positively correlated with authoritarian style (Sayıl & Kındap, 2010). In this study, Cronbach's alpha coefficient for the

mother and father was calculated to be 0.832 and 0.837 in the PC dimension and 0.862 and 0.802 in the PD dimension, respectively.

Data analysis

The distributions of quantitative variables were examined using normality plots and skewness/kurtosis statistics. The mean ± standard deviation and the median (Interquartile Range, IQR: first quartile – third quartile) were provided for the quantitative variables. The categorical variables were reported by frequency (%).

The low and high IGD risk groups were compared using Mann-Whitney U test, Pearson chi-square test and Fisher's exact test concerning the demographical characteristics and PCS-YSR score. The logistic regression analysis was performed to investigate the potential risk factors for IGD risk in addition to PCS-YSR scores. The multicollinearity between potential quantitative factors was examined by Spearman's correlation coefficients (r_s). All r_s ranged between 0.044 and 0.772, indicating no multicollinearity among the predictors. The candidate covariates and factors for the multivariate model were determined univariately using socio-demographic characteristics, academic achievement, gaming activities (spending money on games and daily time spent gaming on weekdays and weekends), the status of parental control over gaming time, and PCY-YSR scores. Then, the interaction effect of PCS-YSR scores with the education level of parents, number of siblings, as well as PCS-YSR M-D*PCS-YSR F-D, PCS-YSR M-PC*PCS-YSR F-PC, and education level of parents*parental control over game time was included in the multivariate model by the variable selection method of the backward likelihood ratio. The regression coefficients and odds ratios were reported for each term in the final model, with standard error and 95% confidence interval (CI), respectively. For the interaction terms that included PCS-YSR scores, the parameter estimates of PCS-YSR scores were provided to remark the effect of these scores. A p-value < 0.05 was considered statistically significant. All statistical analyses were performed via IBM SPSS Statistics 22.0 (IBM Corp. Released 2013. IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp.).

Table 1 Sociodemographic characteristics of adolescents considering the IGD risk

Characteristics	High IGD Risk ($n=290$)	Low IGD Risk ($n=4208$)	p-value
Age, years[a]	15.43 ± 0.98 16.26 (14.86–16.69)	15.41 ± 0.77 15.38 (14.67–15.93)	**< 0.001**
Sex (Male)	130 (44.8)	1797 (42.7)	0.480
Number of siblings			0.965
None or one	152 (52.4)	2200 (52.3)	
More than one	138 (47.6)	2008 (47.7)	
Mother's education			0.331
High school or less	95 (32.8)	1540 (36.6)	
University	137 (47.2)	1812 (43.1)	
Graduate	58 (20.0)	856 (20.3)	
Father's education			**< 0.001**
High school or less	155 (53.5)	1694 (40.3)	
University	88 (30.3)	1540 (36.6)	
Graduate	47 (16.2)	947 (23.1)	
Academic achievement	3.74 ± 0.68 4.00 (3.00–4.00)	3.96 ± 0.69 4.00 (3.29-4.00)	**< 0.001**
Monthly family income			0.561
≤ 15,000 TL	173 (59.7)	2437 (57.9)	
> 15,000 TL	117 (40.3)	1771 (42.1)	
Internet access at home	283 (97.6)	4187 (99.5)	**0.002**
Spending money on games	114 (39.3)	615 (14.6)	**< 0.001**
Daily time spent gaming on weekdays			**< 0.001**
< 2 h	60 (20.7)	2913 (69.2)	
+ 2 h	230 (79.3)	1295 (30.8)	
Daily time spent gaming at weekends			**< 0.001**
1–2 h	34 (11.7)	2053 (48.8)	
3–4 h	39 (13.4)	1173 (27.9)	
+ 5 h	217 (74.9)	982 (23.3)	
Parental control over game time	87 (30.0)	1042 (24.8)	**0.047**

Mean ± SD and median (IQR) are reported for age and academic achievement, as frequency (%) is provided for qualitative variables

[a]One value is missing

Results

The mean age of all students was 15.43 ± 0.79 (range: 13.60–17.20), and 42.8% ($n=1927$) were male. IGD risk was considered high in 6.4% ($n=290$) of participants. Compared to students with low IGD risk, the age of these students was statistically significantly higher, and their academic performance was lower ($p<0.001$). The ratio of those who spend money on games, who play at least 2 h per day, and whose gaming time is controlled by their parents was significantly higher in the high IGD risk group ($p<0.05$). There was a statistically significant difference between the two groups regarding the father's education level and weekend play time for each category ($p<0.001$). The groups were similar in terms of gender, the number of siblings, the mother's educational level, and family income ($p>0.05$) (Table 1).

The high IGD risk group was found to have higher disrespect scores on the PCS-YSR scale for both parents and higher PC scores for only the mother compared to the low IGD risk ($p\leq0.001$, Table 2). There was no significant difference between groups for the father's PC score ($p=0.164$).

Table 2 PCS-YSR scale scores of adolescents considering the IGD risk

Scores	High IGD Risk ($n=290$)	Low IGD Risk ($n=4208$)	p-value
PCS-YSR Mother			
Disrespect	20.87 ± 4.85 21 (19–24)	18.19 ± 5.37 19 (14–22)	**< 0.001**
Psychological control	25.14 ± 3.82 26 (23–28)	22.61 ± 5.34 23 (19–27)	**< 0.001**
PCS-YSR Father			
Disrespect	17.24 ± 4.80 18 (14–21)	16.36 ± 4.49 16 (13–20)	**0.001**
Psychological control	20.77 ± 5.17 21 (16–25)	20.37 ± 5.34 21 (16–24)	0.164

Mean ± SD and median (IQR) are reported

PCS-YSR, Psychological control scale-Youth self-report

The results of the univariate logistic regression analysis showed that the risk for IGD increased with the increase in PCS-YSR M-D, M- PC, and F-D scores ($p \leq 0.001$, Table 3). PCS-YSR F- PC score had no significant effect on IGD risk ($p = 0.215$). In addition, age, academic performance, father's educational level, student's spending on games, time spent playing games during the week and on weekends, and parental control over game time had a statistically significant effect on IGD risk (< 0.05).

In the multivariate model, age, father's education level, playing games, daily gaming time on weekdays and weekends, and PCS-YSR F- PC score was associated with IGD risk. IGD risk increased 1.820-fold (95% CI: 1.549–2.138) with a one-year increase in age ($p < 0.001$) and it was lower in those whose fathers had bachelor's degrees or master's degree than in those whose fathers had a lower educational level. In students who spent money on games compared to those who did not spend money on games, the risk was found to be 1.739 times higher (95% CI: 1.272–2.377) ($p = 0.001$), and the risk increased with the increase in time spent playing games during the week or weekend, and the risk decreased with the increase in PCS-YSR F- PC score (Table 4).

The effects of PCS-YSR M-D and M-PC scores on IGD risk differed according to the number of siblings and the mother's educational level. When the PCS-YSR M-D score increased by one unit, the IGD risk increased 1.279-fold (95% CI: 1.155–1.417) in adolescents without or with one sibling ($p < 0.001$) and a 1.150-fold (95% CI: 1.049–1.261) increase was observed in adolescents with more than one sibling ($p = 0.003$). The risk for IGD in adolescent children of mothers with high school or lower-level education increased 1.279-fold (95% CI: 1.155–1.417) with a one-unit increase in PCS-YSR M-D score ($p < 0.001$) while this score was not associated with IGD risk in the adolescent children of mothers with a higher level of education. A one-unit increase in PCS-YSR M- PC score decreased the risk of IGD in adolescents with or without siblings and 15.1% (95% CI: 4.1-24.9%; OR: 0.849, 95% CI) in adolescent children of mothers with high or low school education (0.751–0.959) ($p = 0.008$). This score had no significant effect on IGD risk among adolescents with more than one sibling and adolescent children of mothers with higher education levels ($p > 0.05$) (Table 4).

Table 3 Univariate effects of PCS-YSR scores on IGD

	Univariate Model		
Covariates/Factors	$\widehat{\beta} \pm SE$	OR (95% CI)	p-value
Age	0.675 ± 0.076	1.964 (1.692–2.279)	**< 0.001**
Sex[a]	0.086 ± 0.122	1.090 (0.858–1.385)	0.480
Academic achievement	-0.459 ± 0.090	0.632 (0.530–0.754)	**< 0.001**
Mother's education level[a]			
University	0.203 ± 0.138	1.226 (0.935–1.606)	0.140
Graduate	0.094 ± 0.172	1.098 (0.784–1.539)	0.585
Father's education level[a]			
University	-0.471 ± 0.138	0.625 (0.476–0.819)	**0.001**
Graduate	-0.640 ± 0.171	0.527 (0.377–0.738)	**< 0.001**
Family income[a]	-0.072 ± 0.124	0.931 (0.730–1.186)	0.561
Number of siblings[a]			
One	0.237 ± 0.280	1.267 (0.732–2.192)	0.398
More than one	0.205 ± 0.280	1.228 (0.710–2.124)	0.463
Spending money on games[a]	1.331 ± 0.128	3.784 (2.295–4.862)	**< 0.001**
Daily time spent gaming on weekdays[a]	2.154 ± 0.149	8.623 (6.442–11.542)	**< 0.001**
Daily time spent gaming at weekends[a]			
3–4 h	0.697 ± 0.237	2.008 (1.260–3.198)	**0.003**
+ 5 h	2.591 ± 0.188	13.343 (9.222–19.306)	**< 0.001**
Parental control over game time[a]	0.264 ± 0.133	1.302 (1.003–1.690)	**0.047**
PCS-YSR M-D	0.099 ± 0.012	1.104 (1.078–1.131)	**< 0.001**
PCS-YSR M-PC	0.106 ± 0.014	1.111 (1.082–1.142)	**< 0.001**
PCS-YSR F-D	0.043 ± 0.013	1.044 (1.017–1.071)	**0.001**
PCS-YSR F-PC	0.014 ± 0.011	1.014 (0.992–1.037)	0.215

SE, Standard error of regression coefficient; *OR*, Odds ratio; *CI*, Confidence interval; *PCS-YSR,* Psychological Control Scale-Youth Self-Report, *M-/F-D,* Mother/Father disrespect; *M-/F-PC,* Mother/Father Psychological Control

[a]Reference category is 'female' for sex, 'high school or less' for education level, '<15 000' for income level, 'none' for number of siblings, 'no' for both spending money on games and parental control over game time, '<2 h' for daily time spent gaming on weekdays and '1–2 h' for daily time spent gaming at weekends

Table 4 Adjusted effects of PCS-YSR scores on IGD

Covariates/Factors/Interactions		Multivariate Model		
		$\widehat{\beta} \pm SE$	OR (95% CI)	*p*-value
Age		0.599 ± 0.082	1.820 (1.549–2.138)	**< 0.001**
Father's education level[a]				
University		-0.352 ± 0.169	0.704 (0.506–0.979)	**0.037**
Graduate		-0.564 ± 0.216	0.569 (0.372–0.868)	**0.009**
Spending money on games[a]		0.553 ± 0.159	1.739 (1.272–2.377)	**0.001**
Daily time spent gaming on weekdays[a]		0.757 ± 0.212	2.132 (1.408–3.227)	**< 0.001**
Daily time spent gaming at weekends				
3–4 h		0.144 ± 0.260	1.155 (0.694–1.921)	0.579
+ 5 h		1.533 ± 0.258	4.634 (2.794–7.686)	**< 0.001**
PCS-YSR F-D		0.016 ± 0.024	1.016 (0.969–1.065)	0.517
PCS-YSR F-PC		-0.043 ± 0.020	0.958 (0.922–0.995)	**0.027**
Number of siblings				
0 or 1	PCS-YSR M-D	0.246 ± 0.052	1.279 (1.155–1.417)	**< 0.001**
	PCS-YSR M-PC	-0.164 ± 0.062	0.849 (0.751–0.959)	**0.008**
> 1	PCS-YSR M-D	0.140 ± 0.047	1.150 (1.049–1.261)	**0.003**
	PCS-YSR M-PC	-0.017 ± 0.054	0.983 (0.884–1.093)	0.749
Mother's education level				
High school or less	PCS-YSR M-D	0.246 ± 0.052	1.279 (1.155–1.417)	**< 0.001**
	PCS-YSR M-PC	-0.164 ± 0.062	0.849 (0.751–0.959)	**0.008**
	Parental control over game time[a]	-0.789 ± 0.426	0.454 (0.197–1.048)	0.064
University	PCS-YSR M-D	0.025 ± 0.034	1.025 (0.960–1.095)	0.464
	PCS-YSR M-PC	0.030 ± 0.036	1.031 (0.961–1.106)	0.399
	Parental control over game time[a]	0.493 ± 0.220	1.637 (1.063–2.521)	**0.025**
Graduate	PCS-YSR M-D	0.081 ± 0.045	1.084 (0.993–1.184)	0.072
	PCS-YSR M-PC	-0.083 ± 0.056	0.920 (0.825–1.026)	0.134
	Parental control over game time[a]	0.679 ± 0.319	1.971 (1.056–3.681)	**0.033**

SE, Standard error of regression coefficient; *OR,* Odds ratio; *CI,* Confidence interval; *PCS-YSR*, Psychologic Control Scale-Youth Self-Report; *M-/F-D,* Mother/Father Disrespect; *M-/F-PC,* Mother/Father Psychologic Control

[a]Reference category is 'high school or less' for education level, 'none' for number of siblings, 'no' for both spending money on games and parental control over game time, '<2 h' for daily time spent gaming on weekdays and '1–2 h' for daily time spent gaming at weekends

Discussion

In the literature, it was reported that there is a positive relationship between parental PC and adolescent IGD, which appears to hinder psychological development in children and adolescents (Lin et al., 2020; Yang et al., 2020). However, since parenting styles and practices vary across cultures (Feldman, 2003), there is a need to better understand the effect of parental PC on IGD development to determine IGD risk in adolescents in the psychological development process and to prevent it at an early stage. Accordingly, this cross-sectional design study examined the effect of parental PC on IGD risk in Turkish adolescents and their differentiation depending on other factors.

The result of the univariate logistic regression analysis carried out in the current study demonstrated that IGD risk increases as the maternal disrespect-maternal PC and paternal disrespect scores increase. Studies conducted in different cultures have stated that parent-adolescent relationships and parenting styles contribute to the development of IGD in adolescents. For instance, as a result of the study conducted with 1095 Slovenian adolescents, it was reported that adolescents who expressed that they get along well with their parents had a lower risk of IGD (Macur & Pontes, 2021), while in the study conducted with Korean adolescents, it was emphasized that father-child communication, in particular, reduces the risk of IGD and that fathers' development of open and positive communication skills with their children may help reduce IGD (Kim et al., 2018).

In some empirical studies on IGD in adolescents, parental rejection was pointed out. The results of the study showed that adolescents who perceived higher levels of parental rejection had higher IGD rates (Throuvala et al., 2019; Zhu & Chen, 2021). It was also emphasized that there is a positive relationship between both parents' rejection and overprotection and IGD, as well as both mother's and father's emotional warmth are negatively associated with IGD, and that positive parenting styles (such as emotional warmth) are beneficial in supporting self-efficacy, self-control, and autonomy, which are important protective factors for IGD (Chen et al., 2020). In this respect, it can be said that the findings obtained in the study are parallel to the findings of other studies conducted in different cultures in the context of adolescent-parent and IGD. Adolescents perceived parental control (both psychological and disrespect) may hinder the increased need for autonomy demanded by adolescents,

cause parent-adolescent conflicts, and thus trigger maladaptive coping such as IGD.

In the univariate logistic regression analysis of the study, it was found that paternal psychological control had no effect on IGD, but in the multivariate model, IGD risk decreased as the paternal psychological control score increased. In previous studies examining the relationship between father-child relationship and IGD, it was indicated that the father-child relationship may play a vital role in preventing IGD in adolescents (Su et al., 2018), that fathers' open and positive communication with their children is effective in reducing IGD (Kim et al., 2018), and that adolescents who feel alienated from their fathers may be more prone to feeling rejected and may have an increased tendency to play video games (Liu et al., 2013). Therefore, it is a surprising finding in this study that the risk of IGD decreases as paternal psychological control, which the individuality of adolescents, increases. This is thought to be related to differences in culture-specific parental roles. In Turkish culture, while the mother plays a role in communication, care, and meeting emotional needs, the father can act as an authority figure who meets economic needs, has the final say in decisions and is listened to. Thus, adolescents may misinterpret and internalize the PC they perceive from their fathers, thinking of it as a necessary attitude.

Age, father's education level, spending money on games, and time spent playing daily games on weekdays and weekends were found to be associated with IGD risk in multivariate logistic regression results. IGD risk was found to increase with age, father's education level, increased time spent on gaming, and spending money on gaming. Similarly, it was stated that increased gaming time (Bağcı & Albayrak Özer, 2021; Liu et al., 2021; Macur & Pontes, 2021; Yavuz & Erden Çınar, 2022), and spending money Hawi et al., 2018) increase the risk of IGD and that IGD and age are related (Lin et al., 2020; Xie et al., 2021).

In previous studies, contrary to the findings of the study in the context of IGD and age, it was stated that the risk of IGD decreases as the grade level, that is, age, increases (Hawi et al., 2018), while in some studies, it was reported that there is no relationship between different grade levels and age and IGD risk (Maftei & Enea, 2020; Chen et al., 2020; Macur & Pontes, 2021; Bağcı & Albayrak Özer, 2021). The findings may be the result of the fathers' digital literacy level and their indifference to their children. Because it is reported that the children of uninvolved fathers have a high tendency to exhibit addictive characteristics (Xin et al., 2022), and parents' digital literacy is important in terms of monitoring whether their children's activities on technological devices are appropriate or inappropriate for their age and encouraging them to benefit from technological developments in a healthy way (Nurhayati et al., 2022). Therefore, although the father's education level is high, his indifference to protecting his child against behavioral addictions may affect the child.

Multivariate regression results in the study also demonstrated that the effect of maternal disrespect, and maternal PC scores on IGD risk differed according to the number of siblings and the education level of the mother. It was determined that IGD risk increases with the increase in the maternal disrespect score in adolescents whose mothers have a low education level, have no siblings or have a sibling, the increase in the maternal PC score reduces the risk of IGD in adolescents who do not have siblings or have a sibling, and the increase in the maternal PC score of adolescents with low education level reduces IGD risk. In some empirical studies, it was reported that there is no relationship between the number of siblings and IGD (Çevik et al., 2021; Alfaifi et al., 2022), but the happiness level of students with a high number of siblings is lower, and IGD is higher in students with a lower level of happiness (Çevik et al., 2021). It is thought that the findings obtained in the current study may be related to the mother's capacity to establish a good relationship with her children, that is, her level of psychological flexibility. It is stated that psychological flexibility is important in the mother-child relationship (Fonseca et al., 2020), and parents with lower psychological flexibility in parenting use unpleasant internal experiences related to parenting stress and inconsistent and maladaptive parenting practices (Sairanenet al., 2018). Therefore, although mothers have a low level of education, the healthy relationships they develop with their children may contribute to the reduction of IGD risk.

Limitations

It should be noted that the results of this study have some limitations. First, information obtained from self-reports of adolescents may have reduced the accuracy of the results. This is because although children's perceptions of parenting were noted to change in response to their positive development with increased support and decreased psychological control (Kaniušonyte et al., 2021), parents are not accurate reporters of the adolescent's internal states, such as internalizing symptoms (Angold et al., 1987). Therefore, the risk of IGD in adolescents and parental psychological control can be examined with more detailed tests, and/or more in-depth information can be revealed with mixed methods. In addition, it is stated that internal validity increases as the number of variables increases and the data collection methods used in the research diversify (Lin, 1976). However, the data collection tool was limited in the study as it was thought that it might reduce the possibility of filling out the data form

correctly. Therefore, it may be appropriate to determine the factors affecting the risk of IGD with a more comprehensive data collection tool and various data collection methods. Finally, the sample group of the study consisted of adolescents studying in eight high schools in Turkey. Thus, the study has limited population validity, and it is not possible to generalize the results to all adolescents.

Conclusion

Since parental PC is among the factors affecting the development of IGD, which is a universal problem in adolescents, parental psychological control practices in adolescents are crucial. The evaluation conducted on a total of 4,498 Turkish adolescents revealed that parental PC is a factor that increases the risk of IGD in adolescents. In this regard, parent-teacher association studies can be conducted, and training can be organized on parental control practices. At the same time, workshops can be planned to inform parents about the appropriate or inappropriate use of technology and its control over children and to improve their digital literacy.

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Data availability The datasets generated during this study are available from the corresponding author upon reasonable request.

Declarations

Ethical approval This study complies with the 1964 Declaration of Helsinki and its later addenda. Approval was obtained from the Ethics Committee of X University (number: E-81182178-605.99-20820, date: 29.11.2021) and the Directorate of National Education in X (number: E-14588481-605.99-40008789, date: 28.12. 2021). Written informed assents were obtained from all participants before the study, and written informed consents were obtained from their parents.

Competing interests The authors declare no competing interests.

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