

Research Article

The role of attention-deficit/hyperactivity disorder symptoms in the relationship between digital parenting attitudes and internet gaming disorder symptoms

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Abstract

Objective: This study aimed to examine the relationship between digital parenting attitudes and Internet Gaming Disorder (IGD) symptoms among children and adolescents, and to investigate whether Attention-Deficit/Hyperactivity Disorder (ADHD)-related symptoms play a moderating role in this relationship.

Methods: This cross-sectional study included 193 children and adolescents aged 10–17 years and their parents. Digital parenting attitudes were assessed using the Digital Parenting Attitude Scale, ADHD-related symptoms were measured with the Conners Parent Rating Scale–Revised Short Form, and IGD symptoms were evaluated using the Internet Gaming Disorder Scale–Short Form. Group comparisons were performed using independent samples t-tests and one-way ANOVA.

Results: Male children differed significantly from female children in cognitive problems/inattention ($p=0.002$), hyperactivity symptoms ($p<0.001$), ADHD index scores ($p=0.027$), and IGD severity ($p=0.001$). Frequency of technology use was significantly associated with cognitive problems/inattention ($p=0.048$) and IGD severity ($p<0.001$). IGD symptoms were positively correlated with oppositional behavior ($r=0.28$, $p<0.05$), cognitive problems/inattention ($r=0.42$, $p<0.001$), hyperactivity symptoms ($r=0.33$, $p<0.001$), and ADHD index scores ($r=0.49$, $p<0.001$). Digital parenting attitudes were not significantly associated with IGD severity. Moderation analyses showed that ADHD symptoms ($B=3.3$, $p<0.001$) and hyperactivity symptoms ($B=3.6$, $p<0.001$) were significantly associated with IGD severity, whereas the interaction terms were not statistically significant ($p=0.300$; $p=0.568$).

Conclusion: The findings suggest that ADHD-related symptoms were more closely associated with IGD severity than digital parenting attitudes in this sample. Preventive and intervention strategies should prioritize the identification and management of ADHD-related vulnerabilities within a broader family context rather than focusing solely on digital parenting practices.

Keywords: Digital parenting attitudes; internet gaming disorder; ADHD symptoms; hyperactivity; children and adolescents; digital media use

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INTRODUCTION

The rapid expansion of digital technologies has profoundly transformed children's and adolescents' daily lives, particularly in relation to internet use and digital gaming (Paulus et al., 2018; Petrescu et al., 2025). While digital environments offer opportunities for learning, social interaction, and entertainment, excessive or uncontrolled engagement with online games has raised significant mental health concerns. Internet Gaming Disorder (IGD), recognized in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) as a condition warranting further study, is characterized by persistent and recurrent gaming behavior leading to functional impairment or distress (Borges et al., 2021; Moreno et al., 2022). Adolescents appear to be particularly vulnerable to IGD due to developmental factors such as heightened reward sensitivity, immature self-regulation, and increased autonomy in digital media use.

Parental influence plays a central role in shaping children's digital behaviors, especially during adolescence. In this context, the concept of digital parenting has gained increasing attention in the literature (Liu et al., 2023; Piao et al., 2022). Digital parenting attitudes encompass parental strategies, rules, monitoring practices, and guidance related to children's use of digital technologies. Supportive and guidance-oriented digital parenting has been associated with healthier online behaviors, whereas overly controlling, inconsistent, or permissive digital parenting styles may increase the risk of problematic internet and gaming use (Fidan & Olur, 2023; Ren & Zhu, 2022). Despite growing interest in this area, empirical findings remain mixed, suggesting that the impact of digital parenting attitudes on IGD symptoms may depend on individual child-related factors.

One of the most consistently reported individual risk factors for problematic gaming is Attention-Deficit/Hyperactivity Disorder (ADHD) (Berloff et al., 2022). ADHD is characterized by persistent patterns of inattention, hyperactivity,

and impulsivity, which may predispose individuals to excessive gaming through mechanisms such as impaired self-control, reward-seeking behavior, and difficulties in delaying gratification (Antshel & Barkley, 2020). Previous studies have demonstrated strong associations between ADHD symptoms and increased severity of IGD symptoms (Werling et al., 2022). However, less is known about how ADHD symptoms interact with environmental factors, such as parental digital attitudes, in shaping adolescents' gaming behaviors.

Therefore, the present study aims to examine the relationship between digital parenting attitudes and Internet Gaming Disorder symptoms in a clinically referred sample of children and adolescents with suspected ADHD-related symptoms, and to investigate the moderating role of ADHD symptoms in this relationship. A moderation framework was considered relevant because ADHD-related difficulties such as inattention, impulsivity, and hyperactivity may influence how effectively children and adolescents respond to parental guidance, monitoring, and rule-setting in digital environments. In this sense, ADHD-related symptoms may alter the strength of the association between digital parenting attitudes and IGD symptoms, rather than functioning only as an independent correlate. At the same time, alternative conceptualizations are also plausible, and ADHD-related symptoms may be examined as predictors or parenting-related variables may be examined as mediators in future studies. By exploring whether the association between digital parenting and IGD symptoms varies according to the level of ADHD symptoms, this study seeks to contribute to a more nuanced understanding of the interplay between parental and individual factors in problematic gaming behaviors.

METHODS

Study Design

This study employed a quantitative research approach using a correlational research design to examine the moderating role of ADHD symptoms in

the relationship between digital parenting attitudes and IGD symptoms. Correlational research designs aim to determine the strength, direction, and nature of relationships among two or more variables without experimental manipulation and are widely used in behavioral and social sciences research (Creswell & Creswell, 2017). In this framework, digital parenting attitudes were treated as the independent variable, IGD symptoms as the dependent variable, and ADHD symptoms as the moderator variable.

Ethical permission was obtained from the Istanbul Aydın University, Social and Human Sciences Ethics Committee for this study with date 19/12/2024 and number 2024/13, and Helsinki Declaration rules were followed to conduct this study. The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki. Participation was voluntary. Because the study sample consisted of children and adolescents under the age of 18, written informed consent was obtained from their parents or legal guardians prior to participation. Confidentiality and anonymity of participant data were strictly maintained throughout the research process.

Sample

The study sample consisted of children and adolescents aged 10–17 years who were referred to the first author's private practice in psychology in Bursa, Türkiye, with suspected ADHD-related symptoms, and one of their parents. Suspicion of ADHD was determined during the routine clinical referral process at the private practice. The study sample did not include participants with a formally established ADHD diagnosis; rather, inclusion was based on referral due to suspected ADHD-related symptoms and the presence of parent-reported ADHD symptomatology. The study did not rely on a formal diagnostic interview for inclusion; instead, participants were enrolled based on referral for ADHD-related complaints and completion of the study measures. Inclusion criteria were being between 10 and 17 years of age, being referred with

suspected ADHD-related symptoms, and having complete parent-reported questionnaire data. Participants with incomplete data were excluded from the final analyses. A convenience sampling method, a non-probability sampling technique, was used due to its practicality, cost-effectiveness, and ease of access to eligible participants (Suen et al., 2014). Sample size estimation was conducted using G*Power version 3.1.9.2, based on the effect size reported in the study by Berloff et al. (Stefano Berloff et al., 2022). Assuming a moderate effect size ($f = 0.40$), a significance level of $\alpha = 0.05$, and 95% statistical power, the minimum required sample size was calculated as 70 participants. Participation in the study was entirely voluntary. Prior to data collection, all participants were provided with an informed consent form, which clearly stated that the data would be used solely for research purposes and that participants had the right to withdraw from the study at any time without penalty. Ultimately, data from 193 parents and 193 children/adolescents were included in the final analyses.

Data Collection Instruments

Sociodemographic Information Form

This form was developed by the researcher to obtain demographic information about the participants. It included items related to parental gender, age, educational level, marital status, technological competence, as well as the child's age, gender, and frequency of technology use. Technology use frequency was categorized based on parental reports as follows: 'monthly' (use occurring a few times per month or less), 'weekly' (use occurring several times per week), and 'daily/almost daily' (use occurring every day or nearly every day).

Digital Parenting Attitude Scale

Digital parenting attitudes were assessed using the Digital Parenting Attitude Scale, developed and validated in Turkish by Kaya et al. (2018). The scale consists of 12 items rated on a 5-point Likert scale and includes two subscales: (1) Approval of

Effective Use of Digital Media and (2) Protection from Digital Media Risks. Previous studies using the Turkish version of the scale reported Cronbach's alpha values of 0.77 for the first subscale and 0.72 for the second, indicating acceptable reliability. Total scores range from 12 to 60, with higher scores indicating stronger digital parenting attitudes. In the current sample, Cronbach's alpha coefficients were 0.78 for Approval of Effective Use of Digital Media and 0.75 for Protection from Digital Media Risks.

Conners Parent Rating Scale–Revised Short Form (CPRS-R:S)

ADHD symptoms were measured using the Conners Parent Rating Scale–Revised Short Form, designed to assess behavioral problems in children and adolescents aged 3–17 years. The scale consists of 27 items rated on a 4-point Likert scale and includes the following subscales: Oppositional Behavior, Cognitive Problems/Inattention, Hyperactivity, and ADHD Index. Scores range from 0 to 81, with higher scores indicating greater symptom severity. Turkish validity and reliability studies reported Cronbach's alpha values ranging between 0.73 and 0.86 (Kaner et al., 2013). In the current sample, Cronbach's alpha coefficients were 0.80 for Oppositional Behavior, 0.84 for Cognitive Problems/Inattention, 0.82 for Hyperactivity, and 0.88 for the ADHD Index.

Internet Gaming Disorder Scale–Short Form (IGDS9-SF)

IGD symptoms were assessed using the Internet Gaming Disorder Scale–Short Form, developed by Pontes and Griffiths (2015) based on DSM-5 diagnostic criteria (Pontes et al., 2017). The scale includes 9 items rated on a 5-point Likert scale, covering symptoms such as preoccupation, withdrawal, tolerance, loss of control, and continued use despite negative consequences. Scores range from 9 to 45, with higher scores indicating greater IGD severity. The Turkish adaptation demonstrated good reliability (Cronbach's alpha = 0.75) and test-retest reliability (0.78) (Arıcak et al., 2018). In the current sample, the Cronbach's alpha coefficient for the IGDS9-SF was 0.83.

All measurement instruments in this study were completed by the parents of the children and adolescents (parent-report format), and no self-report measures were administered to the children.

Statistical Analysis

All statistical analyses were performed using IBM SPSS Statistics for Windows, Version 27.0 (IBM Corp., Chicago, IL, USA). Prior to the main analysis, data were screened for missing values and outliers. Descriptive statistics were calculated for all study variables and are presented as mean $\pm$ standard deviation. The assumption of normality was assessed using the Kolmogorov–Smirnov test, as well as by examining skewness and kurtosis values. Skewness and kurtosis values within the range of ± 2 were considered indicative of an approximately normal distribution. As the data met the assumptions of normality, parametric statistical tests were applied in subsequent analyses. Group comparisons between two independent groups (e.g., child gender and parental marital status) were conducted using independent samples *t*-tests. Comparisons involving more than two groups (e.g., frequency of children's technology use and child age groups) were performed using one-way analysis of variance (ANOVA). When applicable, statistically significant results were interpreted based on overall *p* values, as post hoc comparisons were not the primary focus of the study. Associations among digital parenting attitudes, ADHD-related symptom dimensions, and IGD symptoms were examined using Pearson product-moment correlation analysis. Correlation coefficients (*r*) were interpreted according to conventional effect size guidelines. To examine the moderating role of ADHD-related symptoms in the relationship between digital parenting attitudes and IGD symptoms, moderation analyses were conducted using PROCESS Macro version 4.2 (Model 1). Prior to the moderation analyses, preliminary regression assumptions, including normality, linearity, and the absence of extreme outliers, were evaluated. In addition, main effects of digital parenting attitudes and ADHD-related symptoms on IGD symptom

severity were examined before testing interaction terms. Moderation analyses were then conducted using PROCESS Macro (Model 1), in line with standard regression-based moderation procedures. The same digital parenting variable was used across the moderation models, and the difference between Table 5 and Table 6 in the previous version reflected a labeling inconsistency rather than a difference in model specification. Unstandardized regression coefficients (B), standard errors (SE), *t* values, and *p* values were reported. Model fit was evaluated using the coefficient of determination (R^2) and overall model significance (*F* statistic). No formal correction for multiple comparisons was applied; therefore, the findings from subgroup and correlation analyses should be interpreted as exploratory. Effect sizes were calculated for group comparisons (Cohen's *d* for *t*-tests and eta-squared for ANOVA) to aid in the interpretation of the magnitude of the observed differences.

RESULTS

A total of 193 children and adolescents and their parents were included in the study. Of the children/adolescents, 78 (40.4%) were female and 115 (59.6%) were male. The mean age of the children/adolescents was 12.1 ± 1.8 years.

Male children demonstrated significantly lower scores in approval of effective digital media use compared to female children ($p=0.006$). In contrast, male children exhibited significantly higher levels of cognitive problems/inattention ($p=0.002$), hyperactivity symptoms ($p<0.001$), and ADHD index scores ($p=0.027$). Furthermore, IGD symptom severity was significantly higher among male children compared to females ($p=0.001$). No significant gender differences were found for protection from digital media risks or oppositional behavior ($p>0.05$). The observed differences were of small-to-moderate magnitude based on effect size estimates. (Table 1).

Table 1. Gender-Based Differences in Digital Parenting Attitudes, ADHD-Related Symptoms, and Internet Gaming Disorder Severity Among Children

	Female (n=78)	Male (n=115)	p value
Digital Parenting Attitudes	24.1±3.8	22.6±3.7	0.006
Digital Parenting – Protection from Digital Media Risks	25.8±3.5	25.7±2.8	0.886
Oppositional Behavior (CPRS-R:S)	4.7±2.9	5.1±4.0	0.420
Cognitive Problems / Inattention (CPRS-R:S)	3.2±2.7	5.0±4.5	0.002
Hyperactivity (CPRS-R:S)	1.7±2.1	3.8±4.2	<0.001
ADHD Index (CPRS-R:S)	9.2±5.6	11.5±7.9	0.027
IGD symptoms	16.5±6.2	20.3±8.1	0.001

Values are presented as mean±standard deviation. Abbreviations: CPRS-R:S, Conners Parent Rating Scale–Revised Short Form; ADHD, Attention-Deficit/Hyperactivity Disorder; IGD, Internet Gaming Disorder. $p<0.05$ was considered statistically significant.

Children who used technological devices daily or almost daily showed significantly higher levels of cognitive problems/inattention than those who used them weekly, according to post hoc comparisons ($p=0.048$). Moreover, IGD symptom severity differed significantly across technology use frequency

groups, and post hoc analyses indicated that children in the daily/almost daily use group had significantly higher IGD scores than those in the monthly use group ($p<0.001$). No significant differences were detected across groups in digital parenting attitudes, hyperactivity symptoms, or ADHD index scores ($p>0.05$) (Table 2).

Table 2. Differences in Digital Parenting Attitudes, ADHD-Related Symptoms, and Internet Gaming Disorder Severity According to Children's Frequency of Technology Use

Variable	Monthly (n=20)	Weekly (n=51)	Daily / Almost daily (n=122)	p value
Digital Parenting – Approval of Effective Digital Media Use	21.8±3.4	23.6±3.2	23.2±4.1	0.185
Digital Parenting – Protection from Digital Media Risks	26.7±2.4	25.9±2.4	25.5±3.4	0.234
Oppositional Behavior (CPRS-R:S)	4.4±4.8	4.3±2.7	5.3±3.6	0.213
Cognitive Problems / Inattention (CPRS-R:S)	4.0±4.6	3.3±2.7	4.8±4.2	0.048
Hyperactivity (CPRS-R:S)	2.9±4.7	2.7±2.8	3.0±3.8	0.898
ADHD Index (CPRS-R:S)	9.2±7.8	9.7±6.1	11.2±7.4	0.291
IGD symptoms	14.8±6.2	16.5±5.1	20.4±8.2	<0.001

Values are presented as mean±standard deviation. Abbreviations: CPRS-R:S, Conners Parent Rating Scale–Revised Short Form; ADHD, Attention-Deficit/Hyperactivity Disorder; IGD, Internet Gaming Disorder. $p < 0.05$ was considered statistically significant.

IGD symptom severity was positively correlated with oppositional behavior ($r = 0.28$, $p < 0.05$), cognitive problems/inattention ($r = 0.42$, $p < 0.001$), hyperactivity symptoms ($r = 0.33$, $p < 0.001$), and ADHD index scores ($r = 0.49$, $p < 0.001$). In addition, protection from digital media

risks was positively correlated with oppositional behavior, cognitive problems/inattention, hyperactivity symptoms, and ADHD index scores (all $p < 0.05$). No significant correlation was found between approval of effective digital media use and IGD symptoms ($r = 0.03$, $p > 0.05$) (Table 3).

Table 3. Pearson Correlation Matrix of Digital Parenting Attitudes, ADHD-Related Symptom Dimensions, and Internet Gaming Disorder Symptoms

Variable	1	2	3	4	5	6
Digital Parenting – Protection from Digital Media Risks	-0.27*	—				
Oppositional Behavior (CPRS-R:S)	-0.03	0.20*	—			
Cognitive Problems / Inattention (CPRS-R:S)	-0.19*	0.20*	0.57***	—		
Hyperactivity (CPRS-R:S)	-0.14*	0.18*	0.64***	0.58***	—	
ADHD Index (CPRS-R:S)	-0.03	0.23*	0.62***	0.83***	0.62***	—
IGD symptoms	0.03	0.10	0.28*	0.42***	0.33***	0.49***

Values represent Pearson correlation coefficients (r). Abbreviations: CPRS-R:S, Conners Parent Rating Scale–Revised Short Form; ADHD, Attention-Deficit/Hyperactivity Disorder; IGD, Internet Gaming Disorder. 1: Approval of Effective Use of Digital Media; 2: Protection from Digital Media Risks; 3: Oppositional Behavior; 4: Cognitive Problems/Inattention; 5: Hyperactivity; 6: ADHD Index; 7: Internet Gaming Disorder symptoms. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Scores for protection from digital media risks were significantly lower in the ≥ 13 years age group compared to younger age groups ($p < 0.001$). No

significant age-related differences were observed for digital media approval, ADHD-related symptoms, or IGD symptom severity ($p > 0.05$) (Table 4).

Table 4. Comparisons of Digital Parenting Attitudes, ADHD-Related Symptoms, and Internet Gaming Disorder Severity Across Child Age Groups

Variable	Age 10 (n=58)	Age 11–12 (n=67)	Age ≥13 (n=68)	p value
Digital Parenting – Approval of Effective Digital Media Use	22.8±5.1	22.7±2.9	24.0±3.2	0.107
Digital Parenting – Protection from Digital Media Risks	26.6±2.8	26.4±2.9	24.4±3.1	<0.001
Oppositional Behavior (CPRS-R:S)	4.4±2.7	5.5±4.2	4.9±3.6	0.210
Cognitive Problems / Inattention (CPRS-R:S)	4.2±3.6	4.3±4.3	4.3±3.5	0.986
Hyperactivity (CPRS-R:S)	2.5±3.6	3.2±4.1	3.0±3.7	0.595
ADHD Index (CPRS-R:S)	9.9±5.8	11.5±6.9	10.3±6.8	0.422
IGD symptoms	19.2±9.8	22.4±16.8	20.3±14.3	0.602

Values are presented as mean±standard deviation. Group comparisons were conducted using one-way analysis of variance (ANOVA). Abbreviations: CPRS-R:S, Conners Parent Rating Scale–Revised Short Form; ADHD, Attention-Deficit/Hyperactivity Disorder; IGD, Internet Gaming Disorder.

$p < 0.05$ was considered statistically significant.

ADHD symptoms were significantly associated with IGD symptom severity ($B=3.3$, $p < 0.001$). However, the interaction term between digital parenting attitudes and ADHD symptoms was not

statistically significant ($p=0.300$), indicating no significant moderating effect. The overall model explained 21% of the variance in IGD symptoms ($R^2=0.21$, $p < 0.001$) (Table 5).

Table 5. Moderation Analysis Examining the Role of ADHD Symptoms in the Relationship Between Digital Parenting Attitudes and Internet Gaming Disorder Symptoms

Predictor	B	SE	t	p
Constant	18.7	0.5	38.2	<0.001
Digital Parenting Attitudes	0.4	0.5	0.9	0.370
ADHD Symptoms	3.3	0.5	6.7	<0.001
Digital Parenting × ADHD	0.5	0.5	1.0	0.300

Model summary: $R^2 = 0.21$, $F = 17.14$, $p < 0.001$. Unstandardized regression coefficients are reported. Moderation analysis was conducted using PROCESS Macro (Model 1). Abbreviations: ADHD, Attention-Deficit/Hyperactivity Disorder; IGD, Internet Gaming Disorder.

The interaction between digital parenting attitudes and hyperactivity symptoms was not significant ($p=0.568$), suggesting that hyperactivity did not moderate the relationship between digital parenting attitudes and IGD symptoms. The model accounted for a significant proportion of variance in IGD symptom severity ($R^2=0.21$, $p < 0.001$) (Table 6).

Children of divorced parents exhibited significantly higher scores in approval of effective digital media use ($p=0.003$) but significantly lower scores in protection from digital media risks ($p < 0.001$) compared to children of married parents. In addition, IGD symptom severity was significantly lower among children of divorced parents ($p=0.002$). No significant differences were found for ADHD-related symptom dimensions ($p > 0.05$) (Table 7).

Table 6. Moderation Analysis Examining the Role of Hyperactivity Symptoms in the Relationship Between Digital Parenting Attitudes and Internet Gaming Disorder Symptoms

Predictor	B	SE	t	p
Constant	18.8	0.5	38.1	<0.001
Digital Parenting – Approval of Effective Digital Media Use	0.5	0.5	1.1	0.276
Hyperactivity Symptoms (CPRS-R:S)	3.6	0.5	7.1	<0.001
Digital Parenting × Hyperactivity	0.4	0.7	0.6	0.568

Model summary: $R^2 = 0.21$, $F=16.75$, $p < 0.001$. Unstandardized regression coefficients are reported. Moderation analysis was conducted using PROCESS Macro (Model 1). Abbreviations: CPRS-R:S, Conners Parent Rating Scale–Revised Short Form; IGD, Internet Gaming Disorder.

Table 7. Differences in Digital Parenting Attitudes, ADHD-Related Symptoms, and Internet Gaming Disorder Severity According to Parental Marital Status

Variable	Married (n=159)	Divorced (n=34)	p value
Digital Parenting – Approval of Effective Digital Media Use	22.8±3.8	24.9±3.3	0.003
Digital Parenting – Protection from Digital Media Risks	26.1±3.1	23.9±2.5	<0.001
Oppositional Behavior (CPRS-R:S)	4.8±3.8	5.5±2.5	0.286
Cognitive Problems / Inattention (CPRS-R:S)	4.1±4.0	5.0±3.3	0.221
Hyperactivity (CPRS-R:S)	3.0±3.7	2.7±3.6	0.666
ADHD Index (CPRS-R:S)	10.5±7.4	10.9±5.6	0.749
IGD symptoms	19.3±8.1	16.4±3.8	0.002

Values are presented as mean±standard deviation. $p < 0.05$ was considered statistically significant. Abbreviations: CPRS-R:S, Conners Parent Rating Scale–Revised Short Form; ADHD, Attention-Deficit/Hyperactivity Disorder; IGD, Internet Gaming Disorder. $p < 0.05$ was considered statistically significant.

DISCUSSION

A prominent finding of the present study is the strong association between ADHD-related symptoms — particularly hyperactivity— and the severity of IGD symptoms. This result is highly consistent with clinical and population-based research emphasizing neurodevelopmental vulnerability as a core determinant of problematic gaming. In a clinical sample of children and adolescents diagnosed with ADHD, Berloff et al. evaluated 102 participants using structured psychiatric interviews alongside DSM-5–based IGD criteria and reported significantly elevated impulsivity and hyperactivity scores among individuals meeting IGD

thresholds (Berloff et al., 2022). Their findings highlighted deficits in inhibitory control and reward processing as key mechanisms underlying excessive gaming in ADHD populations. Similarly, Chung et al. examined 318 adolescents using standardized parenting questionnaires, validated attention problem scales, and the IGD-Short Form, demonstrating that attentional dysregulation exerted a strong direct effect on IGD severity, whereas parenting variables showed comparatively weaker associations (Chung et al., 2023). Importantly, their path analyses indicated that attention-related symptoms explained a substantial proportion of variance in gaming outcomes. Longitudinal

evidence further strengthens this interpretation. In their systematic review of 28 longitudinal studies involving more than 60,000 children and adolescents, Thorell et al. concluded that ADHD symptoms consistently predicted later problematic digital media use, particularly gaming, even after controlling for baseline media exposure (Thorell et al., 2024). The present study is consistent with these findings in showing that hyperactivity symptoms and ADHD-related symptom severity were significantly associated with IGD severity. These findings suggest that individual neurodevelopmental characteristics may be more closely related to IGD symptoms than digital parenting attitudes in this sample.

In contrast to initial expectations, digital parenting attitudes were not significantly associated with IGD symptom severity in the present study. This finding aligns with a growing body of empirical literature suggesting that media-specific parenting practices may have limited direct impact on problematic gaming behaviors. Kabadayı and Eyimaya investigated digital parenting attitudes and digital game addiction among middle school students using a validated Digital Parenting Attitude Scale and a digital game addiction inventory (Kabadayı & Eyimaya, 2025). Despite identifying a high prevalence of risky and addictive gaming behaviors, their regression analyses revealed no significant direct association between digital parenting attitudes and addiction severity. A broader synthesis is provided by Lukavská et al., who conducted a meta-analysis of 40 studies encompassing over 90,000 participants and found that media-specific parenting strategies, such as restrictive and active mediation, were weakly or inconsistently related to problematic internet use and gaming disorder (Lukavská et al., 2022). Their results suggested that the influence of media-specific parenting diminishes with age and may be overshadowed by individual-level risk factors. Similarly, Li et al. analyzed data from more than 2,400 adolescents and reported that general parenting warmth and behavioral control showed only modest associations with gaming outcomes once psychological variables were

included in the models (Li et al., 2022). Consistent with these findings, the present study suggests that digital parenting attitudes alone may not be closely associated with IGD severity, particularly in samples characterized by elevated ADHD symptomatology.

Although ADHD and hyperactivity symptoms were robustly associated with IGD severity, they did not moderate the relationship between digital parenting attitudes and IGD symptoms. This pattern is consistent with prior research suggesting that ADHD-related characteristics may be more strongly associated with IGD symptoms than as conditional moderators of parenting-related effects. In their moderation and mediation analyses, Chung et al. demonstrated that attention problems exerted strong direct effects on IGD severity but did not significantly alter the strength of parenting-related associations (Chung et al., 2023). Their findings suggest that attentional dysregulation may be more strongly related to IGD symptoms, potentially leaving limited variance for interaction effects. Moreover, Thorell et al. emphasized that ADHD symptoms represent relatively stable vulnerabilities across developmental contexts, with consistent effects on problematic digital media use regardless of environmental conditions (Thorell et al., 2024). From this perspective, the absence of a moderating effect in the present study may reflect a ceiling phenomenon, whereby the influence of ADHD-related dysregulation on gaming behavior is sufficiently strong to overshadow variations in digital parenting attitudes. Thus, rather than amplifying or buffering parental effects, ADHD symptoms may show a relatively consistent association with IGD symptoms across different parenting contexts.

Several additional findings also merit brief consideration. Male participants showed higher levels of cognitive problems/inattention, hyperactivity symptoms, ADHD index scores, and IGD severity than female participants, which is broadly consistent with previous literature suggesting that boys may be more vulnerable to both ADHD-related symptom expression and problematic gaming behaviors. In addition, more frequent technology

use was associated with higher cognitive problems/inattention and greater IGD severity, supporting the view that more intensive engagement with digital devices may co-occur with greater attentional difficulties and gaming-related problems. Another noteworthy finding was that protection from digital media risks was lower in the older age group, which may reflect reduced parental monitoring or increasing adolescent autonomy with age. Finally, the positive correlations between protection from digital media risks and ADHD-related symptom dimensions may indicate that parents perceive a greater need for protective digital parenting practices when children show more behavioral and attentional difficulties.

Beyond digital parenting attitudes, the broader family environment may be more closely related to IGD symptoms. Gan et al. examined cumulative family risk in a sample of 600 adolescents using validated measures of family structure, conflict, and emotional climate, and demonstrated that cumulative family risk was positively associated with IGD symptoms (Gan et al., 2022). Their mediation analyses further indicated that individual psychological factors partially explained this association. Similarly, Li et al. employed structural equation modeling in a sample of 315 adolescents to investigate parental interpersonal conflict, emotional disengagement, and related behaviors, finding that these parental factors indirectly contributed to internet gaming addiction through adolescent emotional and behavioral pathways (Li et al., 2025). In line with these findings, the present study identified significant differences in IGD severity according to parental marital status, suggesting that family structure and relational dynamics may be more influential than digital parenting attitudes alone. Taken together, these results underscore the importance of considering IGD within a broader family systems framework, where individual vulnerabilities and family-level risk factors interact to shape gaming-related outcomes.

The findings of the present study should be interpreted in light of several limitations. The cross-sectional design limits the ability to draw causal

inferences regarding the relationships between digital parenting attitudes, ADHD-related symptoms, and IGD. Although strong associations were observed—particularly for ADHD and hyperactivity symptoms—the temporal direction of these relationships cannot be determined, and reciprocal effects are likely. The reliance on parent-reported measures may have introduced reporting bias and shared method variance, as parents' perceptions of both their children's behaviors and their own digital parenting practices may be influenced by subjective factors. In addition, because multiple key variables were derived from the same informant, the possibility of common method bias cannot be ruled out, and this may have contributed to inflated associations among the study variables. In addition, digital parenting attitudes were assessed using a general framework that may not fully capture specific parenting practices directly related to gaming behaviors, such as active mediation, rule enforcement, or real-time monitoring. The use of convenience sampling within a single sociocultural context may further restrict the generalizability of the findings to other populations with different family structures or cultural norms. Although the study did not include a comparison group without ADHD-related symptoms, the use of a relatively homogeneous sample with elevated ADHD-related characteristics allowed for a more focused examination of the relationships of interest within a clinically relevant group. However, this design limits the ability to determine whether the observed associations are specific to individuals with ADHD-related symptoms. Finally, the analytical models focused primarily on ADHD-related symptoms, while other relevant individual and contextual factors—such as emotional regulation, peer influences, and broader family functioning—were not examined and should be considered in future research. In addition, age was analyzed using categorical groupings rather than as a continuous variable, which may have reduced the sensitivity of the analysis and led to some loss of information. Sociodemographic subgroup analyses were conducted on an exploratory basis using variables considered

clinically and contextually relevant in the present sample. However, age, sex, frequency of technology use, and family structure were not included as covariates in the regression and moderation models. Therefore, potential confounding effects cannot be ruled out, and the reported associations should be interpreted with caution. In addition, because multiple statistical tests were conducted without formal correction for multiple comparisons, the possibility of Type I error should be considered when interpreting the findings.

In conclusion, this study highlights, in a clinically referred sample of children and adolescents with suspected ADHD-related symptoms, the strong association between ADHD-related symptoms—particularly hyperactivity—and IGD severity, while suggesting that digital parenting attitudes alone were not significantly associated with problematic gaming behaviors in this sample. The findings indicate that individual neurodevelopmental vulnerabilities may be more closely associated with IGD symptoms than contextual digital parenting practices, and that ADHD symptoms did not significantly moderate the relationship between digital parenting attitudes and IGD severity. Moreover, differences observed according to family-related characteristics, such as parental marital status, suggest that broader family context and relational dynamics may also be associated with IGD symptoms. Taken together, these results underscore the importance of adopting a multidimensional perspective that integrates individual psychological vulnerabilities and family-level factors when understanding and addressing IGD. Interventions aimed at preventing or reducing problematic gaming behaviors may benefit from prioritizing the assessment and management of ADHD-related symptoms while situating digital parenting practices within a broader family systems framework. Although the present study focused on moderation, alternative models may also be relevant. In particular, future studies may examine whether parenting-related variables function as mediating mechanisms in the association between ADHD-related symptoms and IGD symptoms. The absence

of a formal diagnostic assessment for ADHD should be considered when interpreting the findings, as the results reflect ADHD-related symptomatology rather than clinically confirmed ADHD.

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Ethical Declaration

Ethical permission was obtained from the Istanbul Aydın University, Social and Human Sciences Ethics Committee for this study with date 19/12/2024 and number 2024/13, and Helsinki Declaration rules were followed to conduct this study.

Authorship Contributions

Concept: Ü.F.K.; Design: Ü.F.K.; Supervision: Ç.C.D.J.; Financing and equipment: -; Data collection and entry: Ü.F.K.; Analysis and interpretation: Ü.F.K., Ç.C.D.J.; Literature search: Ü.F.K.; Writing: Ü.F.K.; Critical review: Ç.C.D.J.

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