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Digital Game Addiction and Peer Interaction: The Role of Parents' Education Levels*

Dijital Oyun Bağımlılığı ve Akran Etkileşimi: Ebeveynlerin Eğitim Düzeylerinin Rolü

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ABSTRACT: This study investigates the impact of digital game addiction on peer play behaviors and social skills in early childhood, focusing on parents' education levels. Using a relational screening model, the sample consists of 405 preschool children attending kindergartens in Afyonkarahisar, Türkiye. Data were collected using the Digital Game Addiction Tendency Scale and the Penn Interactive Peer Play Scale (Parent Form). Significant negative correlations were found between the sub-dimensions of disconnection from life and conflict in the Digital Game Addiction Scale and play interaction, indicating that increased digital game addiction tendencies correspond to decreased positive peer play behaviors. No direct correlation was observed between the continuous play and reflection in life dimensions of digital game addiction and peer play interaction. The study emphasizes the importance of balancing digital and peer play experiences for children's social development. Additionally, it explores how parental education levels influence these dynamics, providing insights and recommendations for families, educators, and policymakers to monitor digital game use and promote balanced play activities. This research adds to the growing literature on digital game addiction and its implications for early childhood development, highlighting the critical role of parental education.

Keywords: Digital game addiction, peer play, early childhood, parental education.

ÖZ: Bu çalışma, dijital oyun bağımlılığının erken çocukluk dönemindeki akran oyun davranışları ve sosyal beceriler üzerindeki etkisini, ebeveynlerin eğitim düzeylerine odaklanarak incelemektedir. İlişkisel tarama modeli kullanılarak gerçekleştirilen araştırmanın örneklemini, Afyonkarahisar ilindeki anaokullarına devam eden 405 çocuk oluşturmaktadır. Veri toplama aracı olarak Dijital Oyun Bağımlılığı Eğilimi Ölçeği ve Penn Etkileşimli Akran Oyunu Ölçeği (Ebeveyn Formu) kullanılmıştır. Analizler sonucunda, Dijital Oyun Bağımlılığı Ölçeği'nin hayatla bağlantının kopması ve çatışma alt boyutları ile oyun etkileşimi arasında anlamlı negatif ilişkiler bulunmuştur. Bu durum, artan dijital oyun bağımlılığı eğilimlerinin olumlu akran oyun davranışlarının azalmasıyla ilişkili olduğunu göstermektedir. Dijital oyun bağımlılığının sürekli oyun oynama ve yaşamda yansıma boyutları ile akran oyun etkileşimi arasında doğrudan bir ilişki gözlemlenmemiştir. Çalışma, çocukların sosyal gelişimi için dijital ve akran oyun deneyimlerinin dengelenmesinin önemini vurgulamaktadır. Ayrıca, ebeveyn eğitim düzeylerinin bu dinamikleri nasıl etkilediği araştırılmış ve ailelere, eğitimcilere ve politika yapıcılara dijital oyun kullanımını izleme ve dengeli oyun aktivitelerini teşvik etme konularında öneriler sunulmuştur. Bu araştırma, dijital oyun bağımlılığı ve erken çocukluk gelişimi üzerindeki etkileri konusundaki literatüre katkı sağlamaktadır.

Anahtar kelimeler: Dijital oyun bağımlılığı, akran oyunu, erken çocukluk, ebeveyn eğitimi.

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The early childhood education period is defined as a critical process during which children make rapid progress in all areas of development, acquire the foundations of their personality, are maximally influenced by their socio-cultural environment, and strive to develop their existing potentials to the highest extent possible (Gander-Gardiner, 1981). One aspect that significantly influences children's development during this period is parental education levels, which can shape children's digital game addiction tendencies and peer interactions. One of the most sensitive aspects of a child's development during this period is socialization, and at the core of socialization lies play. When considering the physical, cognitive, linguistic, social, and emotional development of children, play holds a position as important as their basic needs (Koçyiğit et al., 2015). Therefore, play has a significant impact on a child's comprehensive development at the early childhood education level (National Association for the Education of Young Children [NAEYC], 2001). Play occupies an indispensable place in the lives of all children. Through play, children not only complete their developmental processes but also learn about their community, its rules, their own rights, the rights of their friends, sharing, cooperation, empathy, mutual assistance, and the development of creative skills. When we think of play, we often envision activities where children come together in open spaces, enjoying themselves with materials like balls and ropes. However, today, it can be observed that the concept of play has evolved from its traditional meaning, with more emphasis on indoor, individual, screen-based, and often non-interactive activities due to the advancement of technology. Changes in the way individuals acquire knowledge, communicate, shop, and entertain themselves have accompanied technological advancements, and some problems have arisen from the misuse of technology. One of the primary issues is digital game addiction, particularly among children, which can be influenced by the educational levels of both mothers and fathers. Parents with higher education levels might have better awareness and strategies to regulate their children's digital game use. Aslan (2016) pointed out that in our era, the internet, which is indispensable for everyone, captures children's attention from an early age, offering numerous opportunities for activities and catering to all age groups.

The popularization of digital games has led scholars to explore their role and effects in the lives of individuals, particularly children (Aydoğdu-Karaaslan, 2015; Bülbül et al., 2018; Fullerton et al., 2014; Kaya & Karaca, 2023; Mustafaoğlu & Yasacı, 2018). Defined as the use of technological devices like computers, tablets, and phones for gaming across various platforms (Göldağ, 2018; Jones et al., 2014; Marsh et al., 2016; Özhan, 2011), digital games have been shown to positively influence children's development. Enhancements in areas such as visual attention skills, visual intelligence (Küçük & Çakır, 2020; Gentile et al., 2011; Green & Bavelier, 2002), spatial visualization, communication, calculation, empathy, computer literacy (Anderson et al., 2012), cognitive development (Hazar & Hazar, 2017; Irmak & Erdoğan, 2016; Kestane, 2019; Yalçın & Bertiz, 2019), time management, decision-making, problem-solving skills (Mustafaoğlu & Yasacı, 2018), and hand-eye coordination (Bilgin, 2015) have been reported.

Conversely, there are concerns about the negative effects of digital games. Experts warn that while well-designed games can be beneficial, poorly designed ones might adversely impact children's mental, physical, and developmental health (Aydoğdu Karaaslan, 2015; Fullerton et al., 2014; Lautamo & Heikkila, 2011; Lieberman et al.,

2009). A crucial aspect to consider is the duration and content of engagement with digital games, as excessive use can lead to addiction and social or emotional problems (Bülbül et al., 2018; Lemmens et al., 2009). Children with digital game addiction may exhibit symptoms like attention deficit, aggression, depression, musculoskeletal disorders, visual impairments, headaches, sleep problems, epilepsy, obesity, skeletal and circulatory system disorders, decreased social behaviors, and academic achievement (Dursun & Çapan-Eraslan, 2018; Gentile, 2009; Gentile et al., 2012; Hazar et al., 2017; Mustafaoğlu & Yasacı, 2018; Karademir-Coşkun and Filiz, 2019; Talan & Kalınkara, 2020). Furthermore, addiction can impede the acquisition of social skills, as noted by Kestane (2019), who highlighted the risk of social isolation and loneliness. Unfortunately, excessive engagement in digital games can deprive children of valuable experiences like peer interaction and outdoor play (Hayırcı & Sarı, 2020; Hazar et al., 2017). This growing concern about the impact of digital game addiction on the social skills and peer interactions of children aligns with the principles of Bronfenbrenner's ecological systems theory, emphasizing the influence of both mothers' and fathers' education levels. This theory emphasizes the interconnectedness of a child's environment and its profound influence on their development. As we consider the risks associated with excessive digital gaming, it becomes essential to examine how these activities fit within the diverse ecosystems that shape a child's growth and learning.

Bronfenbrenner's (1979) ecological systems theory is based on the principle of mutual interaction, considering the child as a part of this system and explaining it as interconnected and interrelated ecosystems. In the microsystem within the ecological systems model, individuals directly interact with and establish connections with their environments. Therefore, it is asserted that there is ongoing interaction between the ecological system and the child, and peer relationships are one dimension of this interaction, in addition to the child's interactions with other elements. The microsystem encompasses the child's family, peers, school or work environment (Bronfenbrenner, 1979). In this context, it can be said that the child's acquisition of many social skills and friendships plays a significant role in their development (Lautamo & Heikkila, 2011). Peer relationships, which are one of the fundamental components of social life, play an important role in a child's development (Levine & Munsch, 2014). The foundation of peer relationships is laid in play environments during early childhood. Play can be defined as activities that have existed throughout human history and take on different forms at different stages of a person's life (L'abate, 2009). According to Levine and Munsch (2014), playing with peers in childhood provides numerous opportunities for cognitive, physical, and linguistic development and also offers many opportunities for social and emotional development (Cohen & Mendez, 2009; Lautamo & Heikkila, 2011; Tuğrul, 2015). Additionally, positive interactions established during play with peers can help children acquire necessary social skills for their future and reduce some social problems (Coplan et al., 2006), while negative peer relationships can increase problem behaviors (Hodges et al. 1997; Schwartz et al., 2000). To allow children to experience positive or negative peer relationships and develop positive peer relationships, opportunities need to be created. Interactive peer play environments play a significant role in this regard, especially in the early childhood period. In this context, Elkind (2007) emphasizes that children who engage in play from an early age are more likely to become individuals dedicated to lifelong learning, capable of solving problems

and understanding them. Furthermore, Erikson (1959), who places great importance on self-development, argues that positive social experiences acquired through self-development will lead to emotionally healthy individuals in their later lives. This is because during play, a child's social needs are met, allowing them to progress through developmental stages in a healthy manner (Tuğrul, 2015). Therefore, it can be said that interactive play environments play a crucial role in enabling children to become successful, individuals with positive self-concepts, and healthy individuals in their future lives.

Today, instead of engaging in peer play, children are increasingly turning to digital games due to urbanization and the rapid advancement of technology. In recent years, there has been a significant increase in the prevalence of digital game use among young children, raising concerns about its potential impact on their social development and peer interactions (Chaudron et al., 2018; Domoff et al., 2019). The advent of the COVID-19 pandemic has further accelerated this trend, as children have spent more time indoors and have had limited opportunities for face-to-face social interactions, leading to increased reliance on digital media for entertainment and socialization (Nagata et al., 2022; Lemish, 2021). While digital games can offer educational benefits and enhance certain cognitive skills (Granic et al., 2014), excessive use has been associated with negative outcomes such as social withdrawal, decreased physical activity, and the development of addictive behaviors (Kuss & Griffiths, 2017; Paulus et al., 2018).

Despite the growing body of research on digital game addiction in adolescents and adults, there is a paucity of studies focusing on early childhood—a critical period for social and emotional development (Hinkley et al., 2018; Njoroge et al., 2013). Early childhood is a formative stage where children acquire foundational social skills through interactive play with peers (Bo Stjerne & Parker, 2021). Excessive engagement with digital games during this period may interfere with children's opportunities to engage in essential peer play experiences, potentially impacting their social competence and peer relationships (Gottschalk, 2019; Madigan et al., 2020).

Furthermore, parental education levels play a crucial role in shaping children's media use behaviors and can influence the extent to which children are exposed to and engage with digital games (Lauricella et al., 2015; Wu et al., 2017). Parents with higher education levels may be more aware of the potential risks associated with excessive digital game use and may implement strategies to moderate their children's screen time (Nikken & Opree, 2018). Conversely, lower parental education levels have been linked to less monitoring of children's media use and higher rates of digital game addiction among children (Nikken & Jansz, 2006). However, there is a lack of research examining how parental education levels may moderate the relationship between children's digital game addiction tendencies and their peer play behaviors in early childhood. This gap in the literature underscores the need for studies that explore the intersection of digital game addiction, peer interactions, and parental influence during early childhood. Understanding these dynamics is particularly important in the current digital era, where children's media environments are rapidly evolving (Livingstone et al., 2017). By investigating how digital game addiction tendencies relate to peer play behaviors and considering the role of parental education levels, this study aims to contribute valuable

insights that can inform interventions and guide parents, educators, and policymakers in supporting children's healthy development."

In line with this goal, the research questions for this study are as follows:

- Is there a relationship between children's digital game addiction tendencies and peer play behaviors in early childhood?
- Is there a relationship between the sub-dimensions of children's digital game addiction tendencies and the sub-dimensions of their peer play behaviors in early childhood?
- Is there a significant difference between the sub-dimensions of digital game addiction tendencies and the sub-dimensions of peer play behaviors in children in early childhood based on parental education level?

In this study, the relationship between the digital game addiction tendencies of children in early childhood and their interactive peer play behaviors was examined, taking into account parental education levels.

Method

Research Design

This study employs a correlational research design to examine the relationship between children's digital game addiction tendencies and their peer play behaviors, considering the influence of parental education levels. A correlational design is appropriate for this research because it allows for the investigation of the extent to which two or more variables are related without manipulating any variables (Creswell, 2014; Fraenkel et al., 2012). This design is commonly used in educational research to identify patterns and relationships among variables in natural settings (Gall et al., 2007).

Study Sample

The population of the research consists of children in preschool institutions affiliated with the Afyonkarahisar Provincial Directorate of National Education - Türkiye. The sample of the study was determined using the convenient sampling method, which is one of the non-random sampling methods, for the 2022-2023 academic year. The convenient sampling method aims to reach the group that provides the closest, most appropriate, and easiest access to the required sample for the research (Büyüköztürk et al., 2011; Cohen & Manion, 1998). Accordingly, 405 preschool children attending nine preschool education institutions affiliated with the National Education Directorate in Afyonkarahisar city center for the 2022-2023 academic year were included in the research through convenient sampling. The participants' ages ranged from 58 to 70 months, with a mean age of 64 months.

Table 1

Demographic Information of Children and Parents Included in the Study

Characteristics	N	%
Child Gender		
Boy	197	48.6
Girl	208	51.4
Mother's age		
29 years and below	123	30.5
30-39 years	238	58.8
40 years and above	44	10.9
Father's age		
29 years and below	37	9.1
30-39 years	280	69.1
40 years and above	88	21.7
Mother's Education		
Primary or Middle School	127	31.4
High School	135	33.3
University	143	35.3
Father's Education		
Primary or Middle School	69	17
High School	159	39.3
University	177	43.7
Child's birth order		
First child	185	45.7
Middle child or one of the middles	116	28.6
Last child	104	25.7
Number of children in the family		
1 child	78	19.3
More than 1 child	327	80.7
Child's previous attendance to preschool education		
Attended	121	29.9
Not attended	284	70.1

Table 1 presents a detailed demographic breakdown of the study's participants. The gender distribution of the children involved in the study is fairly balanced, with boys comprising 48.6% (n=197) and girls 51.4% (n=208). Regarding parental age, mothers were predominantly in the 30-39 age bracket, accounting for 58.8% (n=238) of the sample, while the majority of fathers fell into the same age category, representing 69.1% (n=280). In terms of educational attainment, a slightly higher percentage of

fathers (43.7%, n=177) than mothers (35.3%, n=143) had received university education. Mothers with primary or middle school education constituted 31.4% (n=127) of the sample, whereas this educational level was reported for 17% (n=69) of fathers. The distribution of children according to birth order revealed that 45.7% (n=185) were first-borns, 28.6% (n=116) were middle children, and 25.7% (n=104) were the youngest in their family. In terms of family size, the majority of families had more than one child (80.7%, n=327). Lastly, previous attendance to preschool education was reported for 29.9% (n=121) of the children, while a significant majority (70.1%, n=284) had not attended preschool education.

Data Collection Instruments

As instruments for data collection, the study utilized the "General Information Form," which contains personal details of preschool children, and two specialized scales. The "Digital Game Addiction Tendency Scale," developed by Budak and Işıkoğlu (2022), and the "Penn Interactive Peer Play Scale (Parent Form)," developed by Ahmetoğlu et al. (2016), were employed. Both scales are parent-reported measures.

General Information Form: This form, devised by the researcher, includes questions determining the child's gender, parents' age and educational status, birth order of the child, and whether the child has attended preschool education. The inclusion of parental education levels helps to understand how education may influence parenting styles, supervision, and management of children's digital game use.

Digital Game Addiction Tendency Scale: To measure the levels of children's tendencies towards digital game addiction, the study used the "Digital Game Addiction Tendency Scale," developed and validated for reliability by Budak and Işıkoğlu (2022). The scale, consisting of 20 items rated on a 5-point scale (5: Always, 4: Often, 3: Sometimes, 2: Rarely, 1: Never), allows for a minimum score of 20 and a maximum of 100. It's important to note that there are no negatively scored items. Higher total scores indicate an increased tendency towards digital game addiction. The scale can be analyzed either by evaluating each item individually or by considering the total score. It includes four subscales: disconnection from life (7 items), conflict (5 items), continuous Play (5 items), and reflection in life (3 items). The subscales measure, respectively, social withdrawal during game play, reactions to being prevented from playing, the tendency to spend prolonged periods in digital gaming, and the probable symptomatic behaviors and life impacts resulting from gaming. The Cronbach's Alpha coefficients for the subscales are as follows: disconnection from life = .88, conflict = .90, continuous play = .82, and reflection in life = .70. The overall reliability coefficient of the scale is .93, indicating its reliability. The Digital Game Addiction Tendency Scale showed high internal consistency in this study (α = .91), confirming the scale's reliability for assessing digital game addiction tendencies in young children. The subscales exhibited strong reliability, with Cronbach's Alpha values of .86 for disconnection from life, .88 for conflict, .83 for continuous play, and .72 for reflection in life, indicating robust measurement across the various dimensions of digital game addiction.

***Penn Interactive Peer Play Scale (PIPPS) - Parent Form*:** This scale, originally developed by Fantuzzo, Mendez, and Tighe (1998) and adapted to Turkish by

Ahmetoğlu, Acar, and Aral (2016), is used to determine the play behaviors of preschool children aged 60-72 months during free play with their peers. The Penn Interactive Peer Play Scale consists of 28 items and encompasses three subscales: play interaction, play disruption, and play disconnection. The play interaction subscale highlights positive aspects such as comforting other children, helping, displaying creative behaviors in play, and encouraging others to join in (e.g., sharing toys with others). Play disruption defines aggressive and antisocial behaviors that disrupt ongoing peer interaction (e.g., ruining others' games), while play disconnection represents non-participation and withdrawn behaviors in peer play (e.g., refusing to join when invited). Scores are expected to be inversely related between the play interaction and the other two subscales (play disruption and play disconnection). Each item on the scale is rated on a four-point Likert scale. The internal reliability coefficients for the Turkish adaptation are play interaction (α=.72), play disruption (α=.75), and play disconnection (α=.68). For the study sample, the Penn Interactive Peer Play Scale (Parent Form) demonstrated satisfactory internal consistency, making it a suitable tool for measuring peer play behaviors in early childhood. The subscales also demonstrated acceptable reliability, with Cronbach's Alpha values of .74 for play interaction, .77 for play disruption, and .68 for play disconnection, suggesting reliable measurement across different dimensions of peer play behaviors.

Data Collection Process

In this study, examining the relationship between digital game addiction tendencies and peer play behaviors among early childhood children and the variable of parental educational status, initial efforts were focused on determining the study group. Necessary permissions were obtained from the Afyonkarahisar Directorate of National Education to identify the study group. Prior to data collection, parents were informed about the study's objectives, data collection tools, and privacy policies. A parental consent form was also utilized to ensure ethical compliance. The measurement tools, which were parent reported, were completed by the parents of the 405 children from nine preschool centers included in the sample group. During this process, meetings were initially held with the parents of the children involved in the study, where they were asked to assess their children's digital game addiction tendencies and peer play behaviors. Information about the scales was provided to the parents during these meetings. The measurement tools were distributed to the interested parents and collected by the researchers at the end of the meeting. This process facilitated the efficient gathering of data necessary for the study within the designated time frame.

Data Analysis

The analysis of the data derived from the "Digital Game Addiction Tendency Scale" and the "Penn Interactive Peer Play Scale (Parent Form)" commenced with an evaluation of the distribution of scores. This preliminary assessment utilized the Kolmogorov-Smirnov (K-S) Test, a robust method for determining the conformity of data distribution to normality. The results of this test indicated that the p-values were below the threshold of .05 (Büyüköztürk, 2007), thus confirming a deviation from a normal distribution.

In light of the non-normal distribution of the data, the Spearman Correlation Coefficient was judiciously selected as the most appropriate statistical tool for examining the relationships between the scores on the Digital Game Addiction Tendency Scale and the Penn Interactive Peer Play Scale (Parent Form). This non-parametric measure was employed due to its suitability for analyzing ordinal data or data not adhering to a normal distribution, providing a robust evaluation of the monotonic relationships between the variables under study.

Furthermore, to analyze the impact of the variable of parental educational status on the aforementioned scales, the Kruskal Wallis H Test was utilized. This non-parametric test, optimal for comparing more than two independent groups, was instrumental in discerning any statistically significant differences in scores across varying levels of parental education. The implementation of these rigorous statistical methodologies underscores the comprehensive and meticulous approach adopted in the analysis phase of this research, ensuring the validity and reliability of the findings.

Results

The findings related to the influence of maternal education levels on the tendencies toward digital game addiction and the sub-dimensions of peer play behaviors among early childhood children are presented in Tables 2 and 3.

Table 2

Kruskal Wallis H Analysis of the Relationship between Digital Game Addiction Tendencies and Sub-Dimensions of Peer Play Behaviors in Early Childhood, In Relation to Mothers' Education Levels.

Scales	Sub-dimensions	Mother's Education	N	Mean Rank	Kruskal-Wallis H		
					χ^2	P	Sig.
Digital Game Addiction Tendency Scale	Disconnection from life	Primary or Middle School	127	218.484	4.990	0.082	
		High School	135	186.411			
		University	143	204.909			
	Conflict	Primary or Middle School	127	227.961	8.451	0.015	1-2
		High School	135	191.889			1-3
		University	143	191.322			
	Continuous Play	Primary or Middle School	127	228.965	10.393	0.006	1-2
		High School	135	199.141			1-3
		University	143	183.584			
	Reflection in life	Primary or Middle School	127	198.559	0.290	0.865	

Penn Interactive Peer Play Scale (PIPPS) - Parent Form	Play interaction	High School	135	203.981	5.722	0.057	
		University	143	206.017			
		Primary or Middle School	127	182.461			
	Play disruption	High School	135	212.307	6.302	0.043	1-2 1-3
		University	143	212.455			
		Primary or Middle School	127	224.220			
	Play disconnection	High School	135	190.519	4.905	0.086	
		University	143	195.937			
		Primary or Middle School	127	221.547			
		High School	135	191.093			
		University	143	197.769			

Upon examination of Table 2, it is evident that no significant relationship was found between the mothers' education levels and the sub-dimensions of the Digital Game Addiction Tendency Scale, namely disconnection from life ($\chi^2 = 4.990$, $p = .082$, $p > .05$) and reflection in life ($\chi^2 = 0.290$, $p = .865$, $p > .05$). However, significant statistical differences were identified in the conflict ($\chi^2 = 8.451$, $p = .015$, $p < .05$) and continuous play ($\chi^2 = 10.393$, $p = .006$, $p < .05$) sub-dimensions based on the mother's education level. Further pairwise comparisons to ascertain where these significant differences lay revealed that lower maternal education levels were significantly associated with higher scores in the conflict and continuous play sub-dimensions.

Regarding the sub-dimensions of the Penn Interactive Peer Play Scale, no significant relationship was observed between the mothers' education levels and the play interaction ($\chi^2 = 5.722$, $p = .057$, $p > .05$) and play disconnection ($\chi^2 = 4.905$, $p = .086$, $p > .05$) sub-dimensions. However, a significant statistical difference was noted in the play disruption sub-dimension ($\chi^2 = 6.302$, $p = .043$, $p < .05$) relative to the mothers' education level. Subsequent pairwise comparisons indicated a significant difference favoring children of mothers with lower education levels in the play disruption sub-dimension scores.

This finding suggests that maternal education levels are associated with certain behaviors in children, particularly in the realms of digital game addiction and peer play. Specifically, lower maternal educational levels are linked with increased tendencies in children towards conflict and continuous play in digital game addiction, and more disruptive behaviors in peer interactions. This highlights the influence of maternal educational background on specific child behavioral outcomes, underscoring the need for attention to parental education in understanding and addressing children's digital engagement and social behaviors.

Table 3

Kruskal Wallis H Analysis of the Relationship between Digital Game Addiction Tendencies and Sub-Dimensions of Peer Play Behaviors in Early Childhood, in Relation to Fathers' Education Levels

Scales	Sub-dimensions	Father's Education	N	Mean Rank	Kruskal-Wallis H		
					X^2	P	Sig.
Digital Game Addiction Tendency Scale	Disconnection from life	Primary or Middle School	69	206.580	1.276	0.528	
		High School	159	209.626			
		University	177	195.653			
	Conflict	Primary or Middle School	69	212.783	8.404	0.015	2-3
		High School	159	219.792			
		University	177	184.102			
	Continuous Play	Primary or Middle School	69	222.812	13.207	0.001	1-3 2-3
		High School	159	221.016			
		University	177	179.093			
Penn Interactive Peer Play Scale (PIPPS) - Parent Form	Reflection in life	Primary or Middle School	69	213.543	2.335	0.311	
		High School	159	209.453			
		University	177	193.093			
	Play interaction	Primary or Middle School	69	187.609	2.322	0.313	
		High School	159	199.862			
		University	177	211.819			
	Play disruption	Primary or Middle School	69	217.761	6.724	0.035	1-3 2-3
		High School	159	215.516			
		University	177	186.003			
	Play disconnection	Primary or Middle	69	220.355	1.882	0.390	

	School		
	High School	159	198.079
	University	177	200.655

Upon reviewing Table 3, it is discernible that no significant relationship exists between fathers' educational levels and the sub-dimensions of the Digital Game Addiction Tendency Scale, specifically disconnection from life ($\chi^2 = 1.276$, $p = .528$, $p > .05$) and reflection in life ($\chi^2 = 2.335$, $p = .311$, $p > .05$). However, significant statistical differences were identified in the conflict ($\chi^2 = 8.404$, $p = .015$, $p < .05$) and continuous play ($\chi^2 = 13.207$, $p = .001$, $p < .05$) sub-dimensions in relation to paternal education level. Further pairwise comparisons to determine the nature of these differences revealed that children of fathers with lower educational levels exhibited significantly higher scores in the conflict and continuous Play sub-dimensions.

In terms of the Penn Interactive Peer Play Scale sub-dimensions, no significant relationship was observed between fathers' education levels and play interaction ($\chi^2 = 2.322$, $p = .313$, $p > .05$) or play disconnection ($\chi^2 = 1.882$, $p = .390$, $p > .05$). However, a notable statistical difference was found in the play disruption sub-dimension ($\chi^2 = 6.724$, $p = .035$, $p < .05$) based on paternal education level. Subsequent pairwise comparisons indicated a significant difference favoring children of fathers with lower education levels in the play disruption sub-dimension scores.

This finding implies that paternal educational levels have a significant impact on certain aspects of children's behaviors related to digital game addiction and peer interaction. Specifically, children of fathers with lower educational levels are more likely to exhibit higher tendencies towards conflict and continuous play in the realm of digital game addiction, as well as increased disruptive behaviors in peer interactions. This suggests a potential link between paternal education and specific behavioral patterns in children, highlighting the importance of considering parental educational backgrounds in understanding children's digital and social behaviors.

The findings regarding the relationship between the sub-dimensions of digital game addiction tendencies and peer play behaviors among early childhood children are presented in Table 4.

Table 4

Spearman Correlation Analysis of the Scores on the Sub-Dimensions of the Digital Game Addiction Scale and the Penn Interactive Peer Play Scale - Parent Form among the Study Group Included in the Research

Digital Game Addiction Tendency Scale	Penn Interactive Peer Play Scale (PIPPS) - Parent Form	N	r	p
Disconnection from life	Play interaction	405	-.119	.016*
Conflict		405	-.099	.047*
Continuous play		405	-.059	.237
Reflection in life		405	-.032	.518
Disconnection from life	Play disruption	405	.215	.000**
Conflict		405	.222	.000**
Continuous play		405	.164	.001**
Reflection in life		405	.180	.000**
Disconnection from life	Play disconnection	405	.263	.000**
Conflict		405	.191	.000**
Continuous play		405	.162	.001**
Reflection in life		405	.115	.021*

$p < .05$*, $p < .01$**

In a sample of 405 participants, the Spearman Correlation Analysis revealed diverse relationships between the sub-dimensions of the Digital Game Addiction Tendency Scale and the Penn Interactive Peer Play Scale (PIPPS) - Parent Form. Notably, negative correlations were found between disconnection from life and play interaction ($r = -.119$, $p = .016$) and conflict and play interaction ($r = -.099$, $p = .047$), suggesting that higher disconnection or conflict due to digital game addiction is associated with less positive peer interaction. The correlations for continuous play and reflection in life with play interaction were negative but not statistically significant. Conversely, all sub-dimensions of the Digital Game Addiction Scale showed positive, statistically significant correlations with play disruption and play disconnection, with disconnection from life ($r = .263$, $p = .000$) and conflict ($r = .191$, $p = .000$) showing particularly strong associations. These positive correlations indicate that higher digital game addiction tendencies are linked with more disruptive and disconnected peer play behaviors. The significance levels, denoted by asterisks, highlight the varying degrees of these relationships, underscoring the nuanced interplay between digital game addiction tendencies and peer play behaviors in early childhood. This finding implies that digital game addiction in early childhood is intricately linked with various aspects of peer play behaviors. Higher tendencies towards digital game addiction, particularly in dimensions like disconnection from life and conflict, are associated with more negative peer interactions and an increase in disruptive and disconnected behaviors. This highlights the complex and significant impact of digital game engagement on the social development and interaction skills of children in their early years.

Discussion

Games, acknowledged as a vital component of culture since the dawn of human history, hold particular significance during early childhood. Children in this phase can spend most of their time playing (Schwartzman, 2012), with play environments enabling them to overcome a myriad of emotions and relax, thus underscoring the therapeutic aspect of play. However, contemporary trends have shifted children's play environments and materials, increasingly favoring digital games over traditional play (Biricik & Atik, 2021). Technological advancements and the digital era have inevitably altered the nature of play, compounded by factors such as urbanization, parental safety concerns, and pandemics, leading children to play through screens and virtual platforms (Biricik & Atik, 2021). A critical point of concern is the introduction of digital games at younger ages, unpredictable content, increased screen time, and the emerging concept of addiction. Mustafaoğlu and Yasacı (2018) argue that digital game addiction in individuals can lead to undesirable outcomes such as behavioral and health problems. Therefore, it is imperative for parents to understand the contributions of peer play environments to their children's healthy development, provide such opportunities, and exercise control over digital game content and duration. Contemporary education systems also demand the cultivation of 21st-century skills in individuals, emphasizing the need for interactive play environments to acquire skills like communication, collaboration, and social and intercultural competencies. This study aimed to investigate the relationship between digital game addiction tendencies and peer play behaviors in early childhood, exploring the reasons behind the associations between their sub-dimensions.

The study initially established significant negative correlations between the sub-dimensions of disconnection from life and conflict in the Digital Game Addiction Tendency Scale and the play interaction sub-dimension in the Penn Interactive Peer Play Scale Parent Form. The disconnection from life sub-dimension indicates behaviors where children detach from social life and postpone or delay biological needs during digital gameplay. Conflict refers to negative behaviors and reactions when children are not allowed to play digital games. Play interaction highlights children's strengths in comforting and assisting others during play. The study found that as children's digital game addiction tendencies in disconnection from life and conflict increased, their play interaction scores decreased. The significance of peer relationships in children's developmental domains is highlighted, given that children initially bond with their parents and later expand their network to include peers. Digital games can negatively affect children's peer interaction during play, as evidenced by the reduction in play interaction scores and the increase in disconnection from life and conflict scores with increased digital gameplay. Current trends suggest a decline in physical play and outdoor play habits (Aarsand, 2011), with a shift towards digital games, limiting children's socialization and interaction with peers in favor of virtual gaming environments. It has been noted that the increasing number of gamers leading to more game development, with children playing with electronic analogs of traditional play materials in virtual worlds (Elkind, 2007; Frost et al., 2012). Concerns about screen-based play environments isolating children from real life, increasing obesity due to inactivity, and exposing them to physical and psychological issues have been raised (Aarsand, 2011). The findings of this research corroborate these concerns, indicating a

decrease in play interaction scores and an increase in disconnection from life and conflict scores with higher digital game addiction tendencies. Budak (2020) also noted a decrease in social competence and the emergence of social behavioral problems with increased digital game addiction. Hazar et al. (2016) observed that digital games individualize children, detaching them from family and society. Griffiths (2010) highlighted that children addicted to digital games experience an increased desire to play, leading to conflicts with parents when restricted. This study's findings align with these observations, indicating a decrease in play interaction and an increase in conflict scores, reflecting the adverse effects of digital game addiction on peer play behaviors.

The findings of this research highlight that the tendencies toward continuous play" and reflection in life" in digital game addiction do not have a direct effect on the children's interactions with their peers in play settings. This result suggests that the impact of digital games on children's social skills might be limited and can be explained by several factors within the context of early childhood education. Firstly, there's a distinct difference between digital games and peer-interactive play; the former focuses on individual skills and screen engagement, while the latter enhances communication and social abilities (Vygotsky, 1978). While digital games require individual skill and concentration, peer play facilitates the development of a child's communicative and social skills. Children, inherently social beings (Bronfenbrenner, 1979), do not entirely replace their need for social interaction through digital games, and this need can be fulfilled outside digital gameplay. Furthermore, there is a distinction in the development of cognitive and emotional skills between digital and peer play. Digital games often cater to cognitive skills like problem-solving and decision-making, whereas peer interactive play nurtures empathy, cooperation, and social skills (Piaget, 1962). This indicates that skills developed through individual games do not directly correlate with those developed in peer interactive settings. Lastly, due to the structural nature of digital games, their focus on individual achievement and progression offers a somewhat independent experience from peer interactions. While this may suggest a diminishing effect on peer interactions (Ferguson, 2015; Gentile et al., 2011), it does not completely inhibit them, hence the lack of a direct correlation in the scales. These findings underscore the complexity and importance of individual and environmental factors in the examination of digital game addiction and peer interactions. Each child’s individual characteristics and their environmental context play a significant role in the dynamics of these interactions. Considering these varied factors and potential interplays is critical for researchers evaluating the impact of digital games on children (Przybylski & Weinstein, 2017).

In the study, positive significant correlations were found between the sub-dimensions of disconnection from life, conflict, continuous play, and reflection in life in the Digital Game Addiction Tendency Scale and the play disruption and play disconnection sub-dimensions in the Penn Interactive Peer Play Scale Parent Form. Continuous play signifies that children spend more and longer durations playing digital games daily, and reflection in life shows that children imitate characters from the games and express a desire to purchase related items. Play disruption in peer play behaviors indicates aggressive and antisocial behaviors disrupting ongoing peer interactions, and play disconnection represents non-participation and introverted behavior. The research findings indicate that as the scores in disconnection from life, conflict, continuous play,

and reflection in life increase due to digital game addiction tendencies, the scores in play disruption and play disconnection also rise. Hence, it can be said that increased digital game addiction tendencies negatively impact peer play behaviors. Given the nature of digital games, children play individually, distancing themselves from social play environments, thus adversely affecting their social-emotional gains from peer play settings. Literature review indicates that children now prefer playing digital games indoors instead of traditional street games (Balcı & Ahi, 2017; Koçyiğit & Başara-Baydilek, 2015; Tuğrul, 2015). Studies also show that as children's scores in digital game addiction tendencies increase, their inclination towards social play decreases (Baysan, 2022; Gözüm & Kandır, 2020), and parents believe that digital gameplay negatively impacts children's social relationships (Mustafaoğlu & Yasacı, 2018) and academic performance (Cerniglia et al., 2020). Aggressive and hostile behaviors have been observed in children with digital game addiction tendencies (Allahverdipour et al., 2010; Avcı & Er, 2019), along with a tendency to identify with and become attached to game characters, which can lead to fatal consequences (Horzum, 2011), and discordance with the social environment (Gholamitooranposhti et al., 2012). Our study aligns with these findings, suggesting that children with digital game addiction tendencies develop negative peer play behaviors, particularly in the sub-dimensions of play disruption and play disconnection. Especially in contemporary times, when children are provided with peer play environments, they often struggle to decide what to play, create, or find games. Even when together, they prefer playing digital games, indicating an inclination towards digital game addiction, reduced interest in different play materials and environments, and difficulties in initiating and sustaining play. Our study's findings corroborate these observations.

Our findings indicate that parental education levels significantly influence children's behaviors related to digital game addiction and peer interactions. Specifically, children of parents with lower educational levels exhibited higher tendencies towards digital game addiction and more problematic peer interactions. This aligns with the literature suggesting that parental education levels are crucial in shaping children's digital engagement and social development (Bardak, 2023). Higher education levels in parents often correlate with better awareness and strategies for managing children's digital game use, thereby fostering healthier play behaviors and social skills (Mustafaoğlu & Yasacı, 2018). Research indicates that parents with higher educational attainment tend to provide more structured environments and engage in more effective monitoring of their children's activities, which helps in reducing the risks associated with digital game addiction (Işıkoğlu-Erdoğan et al., 2019). In contrast, lower educational levels in parents can be associated with less awareness and fewer resources to manage and mitigate the negative impacts of digital game usage (Bağçeli-Kahraman & Başal, 2011).

Additionally, our findings contribute to the existing body of research by highlighting the importance of parental education in understanding and mitigating the negative effects of digital game addiction on children. Previous studies have shown that parental involvement and the quality of parent-child interactions are critical in shaping children's behavioral outcomes. For instance, the quality and quantity of play interactions between parents and children significantly impact children's social and emotional development (Case-Smith & Kuhaneck, 2008; Fogle & Mendez, 2006).

Parents with higher education levels often engage more effectively in these interactions, providing richer and more diverse play experiences that promote better social and cognitive skills in children (Wood et al., 2002).

Conclusion and Suggestions

This study reveals that there is no direct relationship between the continuous play" and reflection in life" dimensions of digital game addiction tendency and children's interactions in peer play. According to the research results, intensive use of digital games has not created the anticipated negative impact on children's social skills and peer interactions. This situation is supported by literature findings that digital games and peer play develop different skill sets, and children's social needs can also be met through activities outside digital gameplay. Our study's results expand our understanding of the impact of digital game use on children's peer relationships and social development, adding a new perspective to research in this field. Furthermore, the significant influence of parental education levels on children's digital game addiction tendencies and peer play behaviors highlights the critical role of parental involvement in managing children's digital engagement.

Given these findings, it is essential to provide practical implications and recommendations for parents, educators, and policymakers. Parents should be educated on the importance of monitoring and regulating their children's digital game use, ensuring that screen time is balanced with opportunities for peer interaction and outdoor play. Parent training programs can offer strategies to create structured and supportive environments that promote healthy play behaviors. Educators should integrate play-based learning into the curriculum, emphasizing activities that enhance social and communication skills. Schools can also support parents by providing resources and guidance on managing children's digital game use. Policymakers should develop and implement policies that support these efforts, such as establishing guidelines on screen time and funding initiatives that encourage play-based learning and parent education.

This study, while providing valuable insights into the relationship between digital game addiction and peer interaction in early childhood, has certain limitations. Firstly, the cross-sectional nature of the research design limits the ability to establish causation. Longitudinal studies are recommended for future research to better understand the temporal dynamics of this relationship. Additionally, the sample was geographically and culturally specific, which may affect the generalizability of the findings. Future research should consider diverse populations to enhance the applicability of the results. Lastly, the reliance on parent-reported measures might introduce bias; incorporating direct observations or children's perspectives could provide a more holistic understanding. Future research should explore these areas to provide a more comprehensive understanding of the impact of digital game addiction on children's social development. In conclusion, addressing these factors can better support children's overall development in the digital age, paving the way for healthier and more balanced growth.

Statement of Responsibility

Nezahat Hamiden Karaca: Conceptualization, methodology, validation, formal analysis, writing original draft. Neriman Aral: Writing-review & editing, supervision, resources. Ümit Ünsal Kaya: Writing-review, translation, proofreading.

Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this article. All authors have contributed to the work and have approved the final manuscript. There are no financial, personal, or professional relationships that could be perceived to influence the work reported in this paper.

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