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Understanding Digital Game Addiction among 3-6 year-old children: The Role of Age and Social Spontaneity

3-6 Yaş Arası Çocuklarda Dijital Oyun Bağımlılığının Anlaşılması: Yaş ve Sosyal Spontanlığın Rolü

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ABSTRACT

Objectives: This study aimed to identify the factors that predict among 41-72 month children's tendency towards digital game addiction, with a specific focus on social spontaneity and parental age.

Materials and Methods: This cross-sectional and descriptive study was conducted in June-July in 2024 with 223 volunteer parents of children aged 41-72 month in a province in the middle region of Turkey. Data were collected using the “Descriptive Information Form”, "Preschool Children's Digital Game Addiction Tendency Scale" (DGATS) and the "Children's Playfulness Scale for Children"(CPS).

Results: The average age of the children was 4.79±1.03 years and 53.8% were girls. The average age of the mothers was 34.7±5.7 years. The average total score of the DGATS is 48.6±21.7, and the average score of the CPS is 89.6±17.1. Over half of children, 53.4%, had their own tablet or phone. Significant negative weak correlations were found between the DGATS and the CPS Score (r=-.23; p<.05). Social spontaneity and the mother's age were significant predictors of digital game addiction tendency (F=13.756; p=0.00), accounting for 11.1% of the variance.

Conclusions: Considering the results of this study, the findings suggest that effective intervention strategies should consider both social spontaneity and mother’s age.

Keywords: child, computers, digital health, habits

ÖZET

Amaç: Bu çalışma, 41-72 ay arası çocuklarda dijital oyun bağımlılığı eğilimini yordayan faktörleri, özellikle sosyal spontanlık ve ebeveyn yaşına odaklanarak belirlemeyi amaçlamıştır.

Gereç ve Yöntem: Bu kesitsel ve tanımlayıcı çalışma, Haziran-Temmuz 2024 aylarında Türkiye'nin orta bölgesindeki bir ilde 41-72 ay arası çocuklara sahip 223 gönüllü ebeveynle yürütülmüştür. Veriler, "Tanımlayıcı Bilgi Formu", "Okul Öncesi Çocuklarda Dijital Oyun Bağımlılığı Eğilimi Ölçeği" (DGATS) ve "Çocuklar İçin Oyun Oynama Becerisi Ölçeği" (CPS) kullanılarak toplanmıştır.

Bulgular: Çocukların yaş ortalaması 4,79±1,03 yıl olup, %53,8'i kızdır. Annelerin yaş ortalaması ise 34,7±5,7 yıldır. DGATS'ın ortalama puanı 48,6±21,7, CPS'nin ortalama puanı 89,6±17,1'dir. Çocukların %53,4'ünün kendi tableti veya telefonu vardı. DGATS ve CPS Puanı arasında anlamlı negatif zayıf korelasyonlar bulundu (r=-,23; p<,05). Sosyal spontanlık ve annenin yaşı, dijital oyun bağımlılığı eğiliminin anlamlı yordayıcılarıydı (F=13,756;p=0,00) ve varyansın %11,1'ini açıklıyordu.

Sonuç: Bu çalışmanın sonuçları göz önüne alındığında, bulgular etkili müdahale stratejilerinin hem sosyal spontanlığı hem de annenin yaşını dikkate alması gerektiğini göstermektedir.

Anahtar Kelimeler: çocuk, bilgisayarlar, dijital sağlık, alışkanlıklar

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Introduction

The preschool period, typically encompassing ages three to five, is a crucial developmental stage in a child's life. During this time, children begin to develop essential social, emotional, cognitive, and physical skills that form the foundation for their future learning and development (1). Preschool activities typically focus on play-based learning, social interaction, and early academic skills such as language, mathematics, and fine motor skills. They begin to explore their environment more independently, developing essential skills through play and interaction with peers. Language acquisition flourishes as they expand their vocabulary and start to form complex sentences, enhancing their ability to communicate their thoughts and feelings. Socially, children learn to share, cooperate, and navigate relationships, laying the groundwork for future interpersonal skills (2).

In today's rapidly advancing technological world, technology significantly impacts various aspects of children's lives, including one of their fundamental needs play (3). Digital technologies cover a wide spectrum of electronic tools and systems that enable the generation, storage, analysis, and sharing of data. This includes hardware such as computers, smartphones, and tablets, as well as software applications and platforms that facilitate communication, information sharing, and data analysis. The rise of digital technologies has transformed various sectors, including education, healthcare, business, and entertainment, enabling greater efficiency, connectivity, and innovation (4). With the rise of technology and the accessibility of gaming platforms, many children find themselves spending excessive amounts of time engaged in video games (5).

Digital games have not only positively influenced children's lives but also brought about several negative consequences. One of these adverse effects is digital game addiction (6). With the widespread use of digital devices, the usage of digital games among children has increased, leading to numerous studies on the positive and negative aspects of these games (7-9). In our country, there is no national study regarding the use of digital devices during early childhood. However, according to the "Statistical Children" report published by the Turkish Statistical Institute (2021), the internet usage and frequency among children aged 6-10 increased from 36.9% to 78.1% between 2013 and 2021. While 53.9% of children aged 6-10 use smartphones, 70.5% use their smartphones for playing online/offline games. Additionally, 45.5% of children own a desktop computer, laptop, or tablet (7,10). Digital game addiction is one of the most significant negative attributes of digital games, and by its definition, it leads to adverse outcomes (11). Preschool children are particularly vulnerable to digital game addiction because they have a limited ability to regulate their own screen time and are more susceptible to the addictive nature of video games. Symptoms of addiction can include withdrawal from real-life activities, neglect of responsibilities, and irritability when not playing. This compulsive behavior can lead to a range of negative outcomes, such as poor sleep patterns, decreased physical activity, and difficulties in forming healthy relationships (12-14). Pazarcıkcı's study (2024) on technology addiction revealed that factors such as low digital parenting awareness, high parental stress, male caregivers, low household income, and the use of digital tools in single-parent families increase the likelihood of technology addiction among young children (2-5 years old) (15).

Playing games in preschool children is not only fun, but also important for their development. Games help children learn important skills such as taking turns, following rules, problem-solving, and working together with others, develop their fine and gross motor skills, as well as cognitive skills such as memory and concentration (16). Social spontaneity, a key finding of our article, is a fundamental social skill that refers to a child's capacity to initiate, adapt, and interact reciprocally with peers. In early childhood, this skill develops largely through free play, face-to-face interactions, and shared social contexts. Increased use of digital games may indirectly affect the development of social spontaneity by partially limiting the time and contexts in which children engage in direct

social interaction with their peers. In particular, the replacement of social play and reciprocal interaction-based activities with screen-based activities may reduce children's opportunities for spontaneous social initiatives. From a developmental perspective, this displacement of socially rich play environments provides a theoretical basis for expecting an inverse relationship between digital game use and social spontaneity in early childhood. However, a child who spends too much time on the digital platform faces many negative factors such as developmental and mental skills deficiency, insomnia, learning difficulties, and various degrees of behavioral disorders (17,18). Parents and caregivers play a crucial role in shaping young children's digital media use and in supporting a healthy balance between screen-based activities and developmentally appropriate play experiences. Establishing consistent boundaries, promoting physical and outdoor play, and providing alternative forms of engagement are widely emphasized in the literature as key protective strategies. Building on this framework, the present study aimed to identify the factors predicting digital game addiction tendencies among children aged 41–72 months.

Drawing on existing literature on early childhood play behavior and digital media use, it is expected that digital game addiction tendency will be associated with children's playfulness levels. Additionally, digital game addiction tendency is expected to vary according to children's and parents' sociodemographic characteristics. Finally, playfulness dimensions together with selected sociodemographic variables are expected to predict digital game addiction tendency among children aged 41–72 months.

Methods

Participants and Sampling

This descriptive and cross-sectional study was conducted to among 41-72 month old children's tendency towards digital game addiction in June-July 2024. The population of the research consists of parents of pre-school children month 41-72 who attend kindergartens within the official primary schools affiliated with the Ministry of National Education in a provincial center in Middle Turkiye. The minimum age of the sample included in our study is 3.79 years (approximately 45 months), which falls entirely within the 41-72 month age range for which the Turkish adaptation of the CPS is valid. However, to specify a clear age range, especially for the preschool period, we indicated the age range as 41-72 month in both the title and the Methods section. To estimate the required sample size, we used G*Power to conduct a statistical analysis with α=0.05 and power=0.95 (19). Previous studies have found the effect size to be small (r=.23-.24) (7,20). Accordingly, in our study, an average value of r=.20 was used for the power analysis. For the linear multiple regression, these input values resulted in a projected sample size of n=117. Consequently, at the end of our study, 224 children aged 41-72 month were reached. After outliers and erroneous data were removed, analyses were performed on the data of 223 children month 41-72.

Data on the total number of kindergartens (n=24) in the city where the research was conducted were obtained from the Provincial Directorate of National Education. Taking into account the number of students and potential participant attrition, six schools were planned to be included in the study. Each school was assigned a number, and six were randomly selected using a random number table.

Participants were eligible for inclusion if they were children aged between 41 and 72 months, whose parents provided informed consent, had adequate Turkish reading and writing skills, and whose children were attending the selected kindergarten. Children were excluded if they had a diagnosed neurodevelopmental disorder affecting play behavior, a severe chronic medical condition that could influence daily functioning, or if the questionnaire responses were incomplete or inconsistent.

Data collection

Data were collected from the children's parents through face-to-face interviews. Parents were contacted through the school administration and informed about the study. Participant files, including an information note about the study, a digital game addiction tendency scale, a children's playfulness

Table 1. Descriptive features of children and parents

Characteristics	Frequency (n=223)	Percentage (%)
Gender		
Male	103	46.2
Female	120	53.8
Mother's education level		
Primary and school	44	13.5
Middle school	14	6.3
High school	69	30.9
Undergraduate and postgraduate	110	49.3
Mother working status		
Working	90	40.4
Not working	133	59.6
Father's education level		
Primary and school	13	5.8
Middle school	13	5.8
High school	47	21.1
Undergraduate and postgraduate	150	67.3
Father working status		
Working	213	95.5
Not working	10	4.5
Family type		
Nuclear family	193	86.5
Extended family	30	13.5
Income status		
Income less than expenses	27	12.1
Income equal to expenses	145	65.0
Income more than expenses	51	22.9
Having a desktop computer that you use frequently at home		
Yes	122	54.7
No	101	45.3
Having a phone/tablet belonging to your child(ren) at home		
Yes	119	53.4
No	104	46.6
Having a game console that you use at home		
Yes	51	22.9
No	172	77.1
	(M±SD)	
Child Age	4.79±1.03	
Mother age	34.70±5.79	
Father age	37.41±5.51	
Number of siblings	1.59±1.16	

Note. *SD: Standard Deviation

scale, descriptive information form and a consent form were distributed to parents who volunteered to participate in the study. The forms returned to the school administration were collected by the researcher.

Measures

The survey consisted of three domains assessing study participants' sociodemographic characteristics, game addiction level, and children's playfulness level.

Descriptive Information Form: The form prepared by the researcher includes questions about demographic characteristics as well as having a digital device. Detailed information regarding daily screen time duration, type of digital content, and parental co-use was not collected in this study.

Table 2. Average scores of children from total digital game addiction tendency scale, children's playfulness scale for children and subscales

Scale	M±SD	Min-Max
Digital Game Addiction Tendency Scale (DGATS)	48.66±21.78	20-100
Detachment from life	16.27±8.04	7-35
Conflict	12.56±5.68	5-25
Continuous playing	12.26±6.13	5-26
Projection to life	7.56±3.50	3-15
Children's Playfulness Scale (CPS)	89.68±17.15	31-115
Physical spontaneity	16.34±3.73	4-20
Social spontaneity	20.34±4.77	5-25
Cognitive spontaneity	13.88±2.96	7-20
Expression of pleasure	19.70±3.26	9-25
Sense of humor	19.42±4.99	5-25

*SD: Standard Deviation

Preschool Children's Digital Game Addiction Tendency Scale (DGATS): This scale was developed by Budak & Işıkoğlu (2022). The scale consists of four subscales and 20 items: detachment from life (7 items), conflict (5 items), constant playing (5 items) and reflection on life (3 items). The scale is prepared in a 5-point Likert type and the questions can be answered as "5:Always, 4:Often, 3:Sometimes, 2:Rarely, 1:Never". The lowest score that can be obtained from the scale is "20" and the highest score is "100". As the total score from the scale increases, children's addiction tendencies towards digital games increase. In this study, the Cronbach alpha was found to be 0.94 for total score.

Children's Playfulness Scale (CPS): It was conducted by Barnett (1990) to measure the individual play of children aged 29-61.5 months, based on Lieberman's pioneering research (22). Adapted into Turkish by Sadiye Keleş and Özlem Yurt (2017). The study group is children aged 41-72 months (23). The CPS was administered within the validated age range of its Turkish adaptation (41–72 months).The scale is a 5-point Likert type (1="Exactly like a child", 5="Not at all like a child") and each item has a score between 1-5. The total score that can be obtained from the scale is between 23 and 115. In the CPS, higher total and subscale scores reflect a child's greater tendency toward spontaneous, flexible, and socially engaged play behaviors, while lower scores indicate more restricted playfulness and limited social initiative. This 23-item form has five sub-dimensions: physical spontaneity, social spontaneity, cognitive spontaneity, expression of pleasure and sense of humor. In this study, the Cronbach alpha was found to be 0.92 for total score.

Statistical analysis

The study data were analyzed using SPSS 24.0. Numbers, percentages, and mean values were used in the statistical analysis of the demographic information of children and parents. The normality of the data was assessed by examining skewness and kurtosis values. Outliers were identified using Z-scores. For values that met the assumptions, Pearson's correlation analysis was used to determine the relationships between the CPS Score, DGATS Score, its subscales, and other independent variables. We specified a linear multiple regression model with digital game addiction tendency as the outcome and mother's age, playing tendency, physical spontaneity, social spontaneity, cognitive spontaneity, expression of pleasure, and sense of humor as predictors. The backward method was used to determine which independent variables had the

Table 3. Pearson Correlation between the Digital Game Addiction Tendency Scale (DGATS) and its subscales with the Children's Playfulness Scale (CPS) and its subscales, age, and number of siblings

Variable		DGATS Score	Detachment From Life Score	Conflict Score	Continuous Playing Score	Projection to Life Score
CPS Score	r	-.23	-.20	-.30	-.24	-.08
	p	**.000**	**.002**	**.000**	**.000**	.190
Physical Spontaneity Score	r	-.19	-.18	-.24	-.20	-.00
	p	**.004**	**.006**	**.000**	**.002**	.932
Social Spontaneity Score	r	-.28	-.23	-.23	-.29	-.19
	p	**.000**	**.001**	**.000**	**.000**	**.003**
Cognitive Spontaneity Score	r	-.15	-.09	-.24	-.17	-.00
	p	**.025**	.149	**.000**	**.007**	.931
Expression of Pleasure Score	r	-.21	-.21	-.24	-.19	-.11
	p	**.001**	**.001**	**.000**	**.004**	.067
Sense of Humor Score	r	-.17	-.13	-.24	-.18	-.03
	p	**.011**	**.041**	**.000**	**.006**	.658
Child age	r	-.09	-.14	-.06	-.09	-.01
	p	.144	**.03**1	.343	.169	.850
Mother age	r	-.15	-.11	-.13	-.16	-.18
	p	**.021**	.083	.041	**.015**	**.006**
Father age	r	-.07	-.06	-.05	-.05	-.11
	p	.299	.355	.411	.445	.094
Number of siblings	r	-.06	-.07	-.04	-.07	-.05
	p	.326	.294	.537	.275	.43

Note. DGATS= Digital Game Addiction Tendency Scale; CPS=Children's Playfulness Scale

most significant effect on the dependent variable. The significance level of the statistical tests was set at $p < 0.05$ (24,25).

Ethical considerations

This study was approved by the Ethics Board of the University (ethical approval number 14.42-22.05.2024). Participants provided both verbal and written informed consent, and were assured of their right to withdraw from the interview at any time. All the information obtained was treated with confidentiality.

Results

The demographic characteristics of the participants, including children and parents, are shown in Table 1. The average age of the children is 4.79±1.03 years, and 53% of them are girls. The average age of the mothers is 34.7±5.7 years, with about half having a university degree or higher education, and 59% are not working. The average age of the fathers is also 37.41±5.51 years, with more than half having a university degree or higher education, and nearly all are working. Most of the families participating in the study live in nuclear families, and their income is equal to their expenses. More than half of the families have a desktop computer and a phone/tablet at home, and 22.9% have a game console. 53.4% percent of children have their own tablet or phone. The average number of siblings, excluding the child who participated in the study, is 1.59±1.16 (Table 1).

The Average scores of children from total DGATS, subscales and CPS, subscales are shown in Table 2. The average total score of the DGATS is 48.6±21.7, and the average total score of the CPS is 89.6±17.1 (Table 2).

Table 4. Predictors of digital game addiction tendency (N=223)

Model/Variables	DGATS				
	Unstandardized coefficient		Standardized coefficient	t	*p*
	B	SE	β		
Model 1					
(Constant)	96.715	11.84		8.164	.00
Mother age	-.639	.602	.970	.513	.60
Children's Playfulness Scale	1.233	2.401	.549	.297	.60
Physical Spontaneity	-1.262	2.463	-.217	-.512	.72
Social Spontaneity	-3.627	2.559	-.794	-1.417	.15
Cognitive Spontaneity	-.841	2.530	-.115	-.332	.74
Expression of Pleasure	-1.335	2.498	-.200	-.534	.59
Sense of humor	-.208	2.414	-.048	-.086	.93
Model summary	R=.362	R^2=.131	Adjusted R^2=103	F=4.630	**.000****
Model 2					
(Constant)	95.826	11.457		8.364	.00
Mother age	-.626	.248	-.166	-2.525	.01
Children's Playfulness Scale	.539	.277	.424	1.942	.053
Social Spontaneity	-2.796	.844	-.612	-3.312	.001
Expression of Pleasure	-.855	.687	-.128	-1.245	.214
Model summary	R=.355	R2=.126	Adjusted R2=.110	F=7.881	**.000****
Model 3					
(Constant)	99.201	10.652		9.313	.000
Mother age	-.663	.240	-.176	-2.766	.006
Social Spontaneity	-1.353	.291	-.296	-4.649	.000
Model summary	R=.333	R^2=.111	Adjusted R^2=103	F=13.756	**.000****

Note. *p< .05, **p> .01. DW: 1.523 SE= Standard Error DGATS=Digital Game Addiction Tendency Scale

Significant negative weak correlations were found between the DGATS Score and the CPS Score (r=-.23; p<.05), physical spontaneity subscale score (r=-.19; p<.05), social spontaneity subscale score (r=-.28; p<.05), cognitive spontaneity subscale score (r=-.15; p<.05), expression of pleasure subscale score (r=-.21; p<.05), sense of humor subscale score (r=-.17; p<.05), and mother's age (r=-.15; p<.05). Significant negative weak correlations were found between the detachment from life subscale score and the CPS Score (r=-.20; p<.05), physical spontaneity subscale score (r=-.18; p<.05), social spontaneity subscale score (r=-.23; p<.05), expression of pleasure subscale score (r=-.21; p<.05), sense of humor subscale score (r=-.13; p<.05), and child's age (r=-.14; p<.05). Significant negative weak correlations were found between the conflict subscale score and the CPS Score (r=-.30; p<.05), physical spontaneity subscale score (r=-.24; p<.05), social spontaneity subscale score (r=-.23; p<.05), cognitive spontaneity subscale score (r=-.24; p<.05), expression of pleasure subscale score (r=-.24; p<.05), sense of humor subscale score (r=-.24; p<.05). Significant negative weak correlations were found between the continuous playing subscale score and the CPS Score (r=-.24; p<.05), physical spontaneity subscale score (r=-.20; p<.05), social spontaneity subscale score (r=-.29; p<.05), cognitive spontaneity subscale score (r=-.17; p<.05), expression of pleasure subscale score (r=-.19; p<.05), sense of humor subscale score (r=-.18; p<.05), and mother's age (r=-.16; p<.05). Significant negative weak correlations were found between the projection to life subscale

score and the social spontaneity subscale score (r=-.19; p<.05) and mother's age (r=-.18; p<.05) (Table 3).

Social spontaneity and mother's age significantly predicted DGAT (p=0.00). These factors explained 11.1% of the variance in DGAT (Table 4).

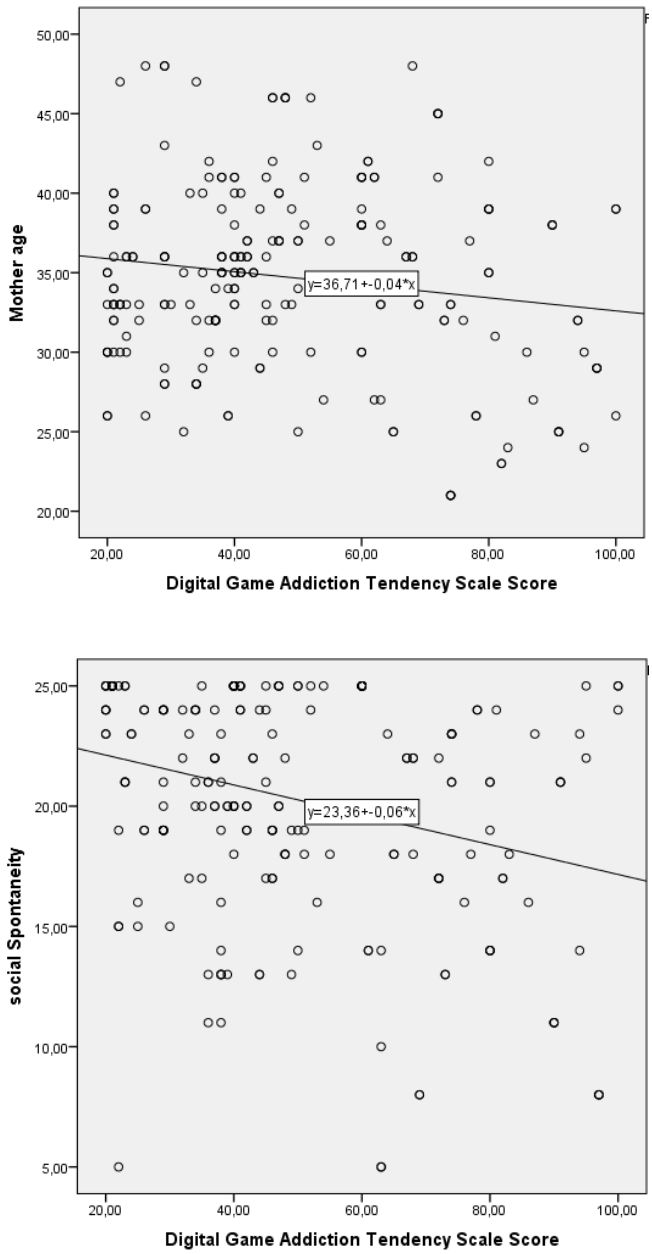


Figure 1. Scatter plot of the relationship between digital game addiction tendency with mother age and social spontaneity

Backward regression analysis was conducted to refine the predictive model for DGAT. Initially, the model included mother's age, total score on the CPS, physical spontaneity, social spontaneity, cognitive spontaneity, expression of pleasure, and sense of humor as potential predictors. The final model, which included only mother's age and social spontaneity, demonstrated predictive ability for DGAT (Figure 1). The results indicated that this final model was statistically significant in predicting DGAT (F=13.756, p=.000). The standardized coefficients were: mother's age β=-.176, p=.000, and social spontaneity β=-.296, p=.000.

Discussion

This study examined the relationship between digital game addiction tendency, playfulness dimensions, and selected sociodemographic variables in preschool children aged 41–72 months. The findings indicated that social spontaneity and maternal age were significant predictors of digital game addiction tendency, although the overall explanatory power of the model was modest (11.1%). Additionally, weak negative associations were found between digital game addiction tendency and overall playfulness. No significant associations were observed for number of siblings or father's age.

One of the central findings of this study was the negative association between digital game addiction tendency and social spontaneity. Social spontaneity reflects a child's ability to initiate interaction, cooperate with peers, share materials, and engage naturally in social play. From a developmental perspective, early childhood is characterized by learning through reciprocal social interaction and play-based engagement. Increased screen exposure may displace opportunities for face-to-face interaction, potentially limiting spontaneous peer engagement. This finding is consistent with previous research suggesting that greater digital game engagement is associated with lower levels of social interaction and playfulness (12, 26, 27). Although the relationship observed in the present study was weak, it supports the notion that screen-based activities may coexist with reduced spontaneous social behaviors in early childhood.

Maternal age also emerged as a significant predictor of digital game addiction tendency. Children of younger mothers demonstrated higher levels of digital game addiction tendency, although the strength of this association was limited. Previous studies indicate

that parents, particularly mothers, often use digital devices to occupy or calm children while managing daily responsibilities (28–30). Younger mothers may face greater challenges in establishing consistent screen-time boundaries or may rely more frequently on digital media as a behavioral management strategy. However, given the modest effect size, maternal age should be interpreted as a contextual rather than deterministic factor.

The negative correlation between digital game addiction tendency and overall playfulness (CPS total score) further supports the idea that higher engagement with digital games may be associated with reduced engagement in diverse forms of play. Although direct research on digital game addiction in preschool populations remains limited, broader screen-time literature suggests that excessive screen use in early childhood may be linked to reduced socialization opportunities and communication challenges (31). Notably, more than half of the children in this study owned a personal tablet or smartphone, a finding consistent with national data indicating high device ownership among preschool-aged children (28, 32). This widespread access may facilitate increased digital engagement, potentially influencing play patterns.

Our study also found that as children's age decreases, detachment from life tends to increase. Although the correlation is weak, several studies indicate that younger children face issues such as delaying physical needs or experiencing attention deficits. Younger children, who may struggle to differentiate between reality and fantasy, are particularly prone to detachment from life, which makes this finding noteworthy (33,34). This tendency underscores the importance of considering the complexity of screen use and its effects on preschool children's cognitive and behavioral development. Additionally, Guellai et al. (2022) suggest that the effects of screen viewing on infants' cognition can vary depending on the context, with potential positive, neutral, or negative impacts (35). This highlights the complexity of factors influencing young children's cognitive and behavioral development, emphasizing the need for a context understanding of their interactions with digital media. Nurses play a crucial role in educating parents and caregivers about age-appropriate screen use and its potential consequences. Given that screens are increasingly integrated into daily life, understanding their impact on children's development is essential for fostering healthy habits. Nurses can provide valuable guidance on how to set limits on screen time, recommend age-appropriate content, and emphasize the importance of balancing screen use with physical activity and face-to-face interactions. They can also discuss the potential effects of excessive screen exposure, including issues related to sleep disturbances, attention span, and social skills. By equipping parents and caregivers with knowledge and practical strategies, nurses help promote a healthier relationship between children and technology, ultimately supporting overall well-being and development.

Our study found that the number of siblings does not significantly impact digital game addiction. This finding is consistent with studies that found no association between sibling count and digital game addiction (6,36). However, some research suggests that sibling count may influence digital game tendencies (37). These conflicting findings indicate the need for further studies examining the role of sibling dynamics in digital gaming behavior.

Conclusion

This study provides valuable insights into factors associated with digital game addiction tendencies in preschool children. Given the cross-sectional design and the relatively low proportion of explained variance, the findings should be interpreted within an associative rather than causal framework. The results indicate that social spontaneity and maternal age are meaningfully associated with digital game addiction tendency, together accounting for a modest proportion of the variance. The observed negative association between digital game addiction tendency and social spontaneity suggests that higher levels of digital engagement may coexist with reduced opportunities for spontaneous social interaction during early childhood. In addition, differences

related to maternal age and employment status point to the potential relevance of broader familial and socioeconomic contexts in shaping children's digital media experiences. Accordingly, interventions aimed at supporting developmentally appropriate play environments and enhancing parental awareness may be beneficial, although such implications should be considered cautiously. Due to the cross-sectional nature of the study, temporal sequencing and causal relationships cannot be inferred. Future longitudinal studies with larger and more diverse samples are warranted to clarify developmental pathways and to strengthen the generalizability of these findings.

Study limitation

The study has several limitations that should be considered. First, the use of a convenience sample drawn from a limited number of preschools within a single provincial center restricts the generalizability of the findings. Second, the cross-sectional design and reliance on parent-reported data preclude causal interpretations and limit conclusions to associative relationships only. Third, although social spontaneity and maternal age were identified as significant factors, the regression model explained only a modest proportion of the variance in digital game addiction tendency. This indicates that a substantial portion of variance remains unexplained and suggests the presence of other unmeasured mediating or moderating variables. Factors such as socioeconomic conditions, parental mediation strategies, home digital environment, parental stress, and child temperament were not assessed in the current study and may play an important role in shaping digital game addiction tendencies in early childhood. Future research employing longitudinal designs and more comprehensive analytical approaches, such as structural equation modeling, is recommended to better capture these complex relationships.

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