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The Correlation between Problematic Media Use and Executive Functions in Preschool Children

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Main Points

- There is a negative relationship between EFs and problematic media use.
- As children's TV viewing time increases, their problematic media use increases.
- Problematic media use predicts working memory and inhibitory control skills.

Abstract

The aim of this study is to determine whether or not preschool children's TV watching time and problematic media use are predictors for the working memory and inhibitory control components of executive functions (EFs). The participants, 418 mothers, answered questions about TV watching time, problematic media use, as well as working memory and inhibitory control components of EFs for their children (4-6 years old). The findings of the study revealed that problematic media use had moderately negative significant correlations with working memory and inhibitory control. Furthermore, TV watching time and problematic media use predicted working memory and inhibitory control. Accordingly, the problematic media use of the children accounted for 29% of the total variance in working memory and 27% of the total variance in inhibitory control. These findings shed light on the correlation between problematic media use and EFs in preschool children.

Keywords: Inhibitory control, preschool period, problematic media use, television, working memory

Introduction

Today, digital media plays a significant role in family life (McDaniel & Coyne, 2016). Many children begin interacting with media tools during their infancy (Rideout, 2017). Their screen exposure has increased with the discovery of media tools, particularly television. This leads to questioning the possible effects of media on child development (Drotner, 2013). The studies have revealed that excessive use of digital media tools in preschool period is associated with delays in cognitive, linguistic, social, emotional, and motor development of children (Pagani et al., 2010). Factors causing these results are that screen time of children has increased, they do not watch age-appropriate content, parent-child interaction has decreased, and they excessively use social media (Hinkley et al., 2014). Screen media exposure at early ages and the abovementioned factors negatively affect the executive processes that identify a series of cognitive functions of children (Nathanson et al., 2013). Given the important role of executive functions (EFs) for lifelong adaptation, the current study examined how children's problematic media use and TV watching time were correlated with working memory and inhibitory control components of EFs in a population including mothers with children (48 – 72 months old) in Türkiye.

Literature Review

Executive Functions in Preschool Children

Executive functions are sophisticated, complicated behavioral and metacognitive self-regulation abilities supported by neural networks in the brain,

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such as planning, directing attention, inhibitory control, emotional control, self-monitoring, and response inhibition (Hughes et al., 2009). In other words, EF is an umbrella term used for a set of interrelated cognitive functions that regulate and coordinate other cognitive processes, drive the dynamics of human cognition, and enable people to achieve their aims (Welsh et al., 1991). Three main components of EF are inhibitory control, cognitive flexibility, and working memory (Miyake et al., 2000). Inhibitory control refers to the ability to focus on the main task by inhibiting natural but unnecessary thoughts and/or behaviors that interfere with completing tasks in daily life. Working memory refers to the ability to retain and manipulate information. Cognitive flexibility refers to the ability to flexibly change perspectives, focus of attention, or response maps. Studies have revealed that the most significant changes in the development of the main EF components occur between the ages of three and five (Marcovitch & Zelazo, 2009). Furthermore, it is stated in the literature that EF has an important role in achieving successful social and cognitive functioning and acquiring basic academic abilities (Ponitz et al., 2009). Moreover, the level of motor competence, which includes both physical capacity and cognitive components, is highly associated with the improvement of EF from the preschool period (Malambo et al., 2022). Studies on EF and media use have reported that screen time and television watching are significant predictors of EF in preschoolers and increased screen time results in weaker EF (Nathanson et al., 2014)

Screen Exposure and Problematic Media Use in Preschool Children

As from infancy, the children's rate of media use increases rapidly (Rideout, 2017). During early childhood, children are reported to spend an average of 2 – 3 hours a day in front of a screen (McNeill et al., 2019). These findings suggest that children consume media intensively from an early age. Studies on the effects of screen exposure on child development have indicated that increased screen exposure is associated with poor sleep, inadequate school readiness (Fitzpatrick et al., 2012), increased sedentary behaviors, obesity, attention deficit (Swing et al., 2010), and inadequate social skills during infancy, early childhood, and adolescence (Hisler et al., 2020).

Children's exposure to media that can cause devastating effects on their development is examined as problematic media use (Domoff et al., 2020). Following DSM-5 criteria can be used to identify problems related to problematic media use in the literature; (a) preoccupation with screen media, (b) tolerance (or needing more screen media), (c) escape (i.e., using media to avoid or get rid of negative emotion), (d) loss of interest in other activities, (e) withdrawal (i.e., experience of psychological withdrawal when screens are denied access), (f) lack of control (overuse), (g) use-related psychosocial consequences, (h) cheating (hiding or lying use to access screens), and (i) serious problems from use (APA, 2013). Problematic media use may result in detrimental impacts in the social, behavioral, and/or academic fields. Depending on the problematic media use, the individual may retreat from social life by demonstrating a high tolerance for media tools (Domoff et al., 2019). Another study indicated that preschool children's problematic media use and early-onset screen exposure were correlated with poor EF (Nathanson et al., 2014). Based on studies, it is regarded as essential to investigate the potential correlation between media use and EF in the preschool period.

Current Study

Today, children are surrounded by media tools. Increased media possibilities result in increased screen exposure in children. It is stated in the literature that excessive screen exposure is associated with various negative outcomes for children. Based on the current findings, this study aims to determine whether problematic media use and screen exposure predict EF in children aged 48 – 72 months. For this purpose, the research questions are as follows:

- Does problematic media use have any significant correlation with working memory and inhibitory control functions in 48 – 72-month-old children?
- Do problematic media use, working memory, and inhibitory control functions differ in 48 – 72-month-old children based on daily TV watching time?
- Does TV watching time predict working memory and inhibitory control in 48 – 72-month-old children?
- Does problematic media use predict working memory and inhibitory control in 48 – 72-month-old children?

Material and Methods

The cross-sectional study was designed based on the correlational survey model, which is one of the quantitative research methods. The correlational survey model intends to identify the existence and/or degree of covariance between two or more variables (Karasar, 2014). Correlational research, one of the correlational survey methods, is considered important because it enables higher analyses by identifying the level of correlation between the variables. The dependent variables of the study in this context are the "working memory" and "EFs" components of EFs. It was investigated whether or not each of these dependent variables varied according to the study's independent variables (gender, TV watching time, and problematic media use). Furthermore, the variables' presence and/or degree of covariance were investigated using the aforementioned valid and reliable assessment tools.

Participants

The sample group consisted of 440 women who were contacted through face-to-face interviews between May 1, 2022, and July 1, 2022, were residing in Türkiye and had 48 – 72-month-old children. The study was completed with a total of 418 mothers since 22 mothers, who filled out the data collection tools incorrectly, were excluded from the study. The participants were chosen using convenience sampling, one of the non-random sampling methods. The sample size determination table developed by Israel (1992) was used to establish the minimum sample size for the study. According to this table, it was determined that the minimum sample size to be taken from the population provided in the 5% sensitivity and 95% confidence interval must be 390. Table 1 shows the descriptive characteristics of the children and the parents.

Table 1 shows some descriptive characteristics of the children and mothers who participated in the study. As a result, the gender rates of the children were similar to each other. Mothers having 225 (53.8%) girls and 193 (46.2%) boys participated in the study. It can be asserted that the age distribution of the children

Table 1.
Distribution of Descriptive Variables of the Children and the Mothers (n = 418)

Variables		n	%
Gender of the child	Girl	225	53.8
	Boy	193	46.2
Age of the child	4 years	157	37.6
	5 years	138	33.0
	6 years	123	29.4
Educational level of the mother	Primary school	130	31.1
	High school	116	27.8
	university or higher	172	41.1
Employment of the mother	Employed	159	38.0
	unemployed	259	620
Age at which the child starts watching TV	0 – 1 year	73	17.5
	1 – 2 years	144	34.4
	2 – 3 years	97	23.2
	3 – 4 years	73	17.5
	4 – 5 years	18	4.3
	5 – 6 years	13	3.1
Daily TV watching time of the child	Never	50	12.0
	0 – 30 minutes	116	27.8
	31 – 60 minutes	122	29.2
	1 – 2 hours	86	20.6
	3 hours and more	44	10.5
Total		418	100.0

was similar. There were 157 (37.6%) children in the 4-year-old group, 138 (33.0%) in the 5-year-old group, and 123 (29.4%) in the 6-year-old group. When the findings regarding the age at which children started to watch TV were examined, it was determined that the children (34.4%) started watching TV mostly at the age of 1 – 2, followed by the ages of 4 – 5 (4.3%) and 5 – 6 years (3.1%), respectively. According to the information reported by the mothers, it was found that the children's TV watching time was mostly 31 – 60 minutes (29.2%), which was followed by 0 – 30 minutes (27.8%) and 1 – 2 hours (20.6%), and 3 hours and more (10.5%), respectively.

Data Collection Tools

Personal Information Form: The researchers prepared a personal information form to determine the socio-demographic characteristics of the participants. The form was completed by the mother of the child included in the study. It includes questions about the mother's education and employment status, the child's age and gender, the age at which the child began watching television, and the daily TV watching time.

Childhood Executive Functioning Inventory: Thorell and Nyberg (2008) developed the "Childhood Executive Functioning Inventory (CHEXI)" to assess the EFs of children aged 4 – 12. The original version of the scale consists of two subscales (working memory and inhibitory control) and a total of 24 items. It can be filled out by parents and teachers. The Turkish adaptation of the scale was conducted by Çiftçi et al., (2020). As a result of the validity and reliability study conducted with data obtained from a total of 754 children aged between 48 months 72 months, the two-factor structure of the five-point Likert-type scale with 24 items (1 = not at all, 2 = slightly true, 3 = moderately true, 4 = true, 5 = extremely true) was supported. The reliability coefficients for the subscales of the scale were calculated as 0.95 for the working memory subscale and 0.91 for the inhibitory control subscale. Test-retest reliability coefficients were found to be 0.89 for the working memory subscale and 0.85 for the inhibitory control subscale. High scores signify that the child displays more EF skills. In the current study, the Cronbach's alpha internal consistency coefficient was calculated as $\alpha = 0.933$ for the working memory subscale, $\alpha = 0.926$ for the inhibitory control subscale, and $\alpha = 0.964$ for the overall scale.

Problematic Media Use Measure: Domoff et al. (2019) developed the "Problematic Media Use Measure (PMUM)" to determine problematic media use in 4 – 11-year-old children. The original version of this five-point Likert scale (1 = never …… 5 = always) has a 27-item long form and a 9-item short form. The Turkish adaptation studies of the scale for the long and short forms were conducted by Furuncu and Öztürk (2020). The validity and reliability studies of the scale included 324 parents in the first stage and 213 parents in the second stage. As a result of its validity and reliability study, the reliability coefficients of the 27-item long version and the 9-item short version were calculated as .97 and .92, respectively. High scores indicate problematic use. In the current study, the Cronbach's alpha internal consistency coefficient of the scale was calculated as $\alpha = 0.978$.

Ethical Considerations

Ethical considerations were paid attention to throughout the current study. Permission from the authors who developed or adapted the scales was sought to use them in the study. Before the study, ethical approval (dated 26.10.2022 and numbered 2022/36) was obtained from the Non-Invasive Clinical Trials Ethics Committee of Aydın Adnan Menderes University, Faculty of Health Sciences. Then, mothers who completed the informed consent form within the scope of the study were asked to complete the personal information form, the Problematic Media Use Measure, and the Childhood Executive Functioning Inventory for their children.

Data Analysis

The IBM SPSS 25 (IBM SPSS Corp.; Armonk, NY, USA) program was used to analyze the data. In the first stage, it was checked whether the values of each variable were within their possible ranges and whether there was any missing data. In the second stage, the normal distribution of the variables was checked using descriptive statistics (reviewing the mean and trimmed mean values), and the patterns of the distributions were examined using skewness and kurtosis coefficients, and Histogram, Normal Q-Q Plot, Detrended Normal Q-Q, and box plots. It was determined that the skewness values of the total scores of the scales used in the study ranged between −0.157 and 0.743 and the kurtosis values ranged between −0.146 and −0.503. Since the skewness and kurtosis values of the total scores in the scales were in the range of −1 to +1, it was determined that the scale scores were normally distributed (Hair et al., 2013). For this reason, the analyses were carried out using parametric methods. In this framework, one-way analysis of variance (ANOVA) was used to examine the difference in TV watching time. In cases where there was a significant difference between the groups according to the results

of one-way ANOVA, multiple comparison tests (post-hoc tests) were used to determine between which groups these differences existed. For the hypothesis of determining whether there is a correlation between the variables, the assumptions of linearity and covariance were checked over the scatter plots, and the presence of any correlation between the variables was examined with Pearson's Product Moments correlation coefficient. In addition, whether the variables of problematic media use and TV watching time, as independent variables, have a role in working memory and inhibitory control was tested with simple and multiple linear regression analyses. Prior to the regression analysis, antecedents such as sample size, multicollinearity and uniqueness, extreme values, normality, linearity, covariance, and independence of residuals were checked. As a result of this control, it was determined that the assumptions were met. A significance level of $p < .05$ was applied in all analyses.

Results

The results, showing how children's problematic media use and TV watching time were correlated with working memory and inhibitory control components of EFs in a population of mothers having 48 – 72-month-old children in Türkiye, are presented in tables.

Pearson's correlation analysis was employed to test the correlation between the scales utilized in the study, as shown in Table 2. Accordingly, as a result of the analysis, a statistically significant negative correlation was found between the working memory ($r = -0.541$, $p < .05$) and inhibitory control ($r = -0.523$, $p < .05$) subscales of CHEXI and PMUM. According to these results, high levels of problematic media use are associated with low levels of EF (working memory and inhibitory control).

When Table 3 was examined, it was observed that the ANOVA test was used to determine whether there is a significant difference in problematic media use, working memory, and inhibitory control based on TV watching time. Analysis results (Table 4) indicated that problematic media use [$(F(4, 413) = 10.34$, $p < .001)$], working memory [$(F(4, 413) = 4.57$, $p = .001)$], and inhibitory control [$(F(4, 413) = 5.27$, $p < .001)$] changed significantly according to TV watching time. According to the results of the Scheffe test, which was conducted to determine between which group's differences in TV watching time were observed, those who did not watch TV ($\bar{x} = 51.78$) and those who watched TV for 0 – 30 minutes ($\bar{x} = 53.85$), 31 – 60 minutes ($\bar{x} = 58.28$), and 1 – 2 hours ($\bar{x} = 59.01$) exhibited less problematic media use than those who spent 3 hours or more ($\bar{x} = 77.64$). When TV watching time and working memory were compared, it was observed that those who did not watch TV ($\bar{x} = 50.72$) and those who watched TV for 0 – 30 minutes ($\bar{x} = 49.75$) had higher working memory scores than those who watched TV for 3 hours or more ($\bar{x} = 43.25$). When inhibitory control was compared in terms of TV watching time, it was determined that those who did not watch TV ($\bar{x} = 41.50$) and those who watched TV for 0 – 30 minutes ($\bar{x} = 40.32$) had higher inhibitory control scores than those who watched TV for 3 hours or more ($\bar{x} = 34.61$).

Table 2.
Pearson's Correlation Analysis Results for the Correlation Between the Scales

Scale and Its Subscales		1	2	3
1. Working memory subscale	*r*	1.000	0.882	−0.541
	p	–	.000*	.000*
2. Inhibitory control subscale	*r*		1.000	−0.523
	p		–	.000*
3. Problematic media use measure	*r*			1.000
	p			–

*$p < .05$.

As a result of the multiple linear regression analysis (Table 4), it was observed that TV watching time significantly predicted working memory ($R^2 = 0.029$, $p < .001$). Preschool children's TV watching time accounted for around 3% of the total variance in working memory. When examining TV watching time, it was observed that watching no television had a positive effect on working memory, whereas watching 3 hours or more had a negative effect. In addition, TV watching time significantly predicted inhibitory control ($R^2 = 0.039$, $p < .001$). The preschoolers' TV watching time accounted for around 4% of the total variance in inhibitory control. When examining TV watching time, it was observed that not watching television had a positive impact on inhibitory control; however, watching television for 1–2 hours and 3 hours or more had a negative effect on inhibitory control.

The simple linear regression analysis indicates that problematic media use significantly predicted working memory ($R^2 = 0.293$, $p < .001$) (Table 5). Problematic media use accounted for 29% of the total variance in working memory. A standard deviation decrease in problematic media use affected a decrease of −0.541 units in working memory. In addition, problematic media use significantly predicted inhibitory control ($R^2 = 0.273$, $p < .001$). Problematic media use accounted for 27% of the total variance in inhibitory control. Accordingly, a standard deviation decrease in problematic media use affected a decrease of −0.523 units in working memory.

Discussion

This study investigated the role of problematic media use and TV watching time on working memory and inhibitory control components of EFs among preschool children. There are various causes for problematic media use and the choice of television as a media tool in the main problem of this study, as well as EFs: (1) EFs predict basic developmental outcomes, (2) EFs are affected by some television content (Lillard et al., 2015), and (3) children spend a long time with television and the media tool they are most exposed to is television (Tozduman Yaralı, 2021). Findings of the present study indicate that problematic media use and TV watching time had a decisive role in preschool children's EFs. The study revealed a significant negative correlation between CHEXI's working memory and inhibitory control subscales and PMUM (Table 2). The findings are compatible with previous study findings that screen exposure is associated with executive functioning (Nathanson et al., 2014). It has been stated that television exposure, especially during infancy, affects EFs (Miyake & Friedman, 2012), which are the developmental processes behind goal-oriented self-regulation behaviors such as attention, planning, and inhibitory control, and may cause problems in cognitive

Table 3.
Analysisi of Variance Results of Problematic Media Use, Working Memory, and Inhibitory Control Based on TV Watching Time

	Time	n	$\bar{x}$	SD	DF	F	p	Significant Difference
Problematic media use	Never	50	51.78	20.28	4/413	10.336	.000	Never – 3 hours 0 – 30 minutes – 3 hours 31 – 60 minutes – 3 hours 1 – 2 hours – 3 hours
	0 – 30 minutes	116	53.85	22.36				
	31 – 60 minutes	122	58.28	21.57				
	1 – 2 hours	86	59.01	20.53				
	3 hours and more	44	77.64	30.13				
Working memory	Never	50	50.72	10.27	4/413	4.573	.001	Never – 3 hours 0-30 minutes – 3 hours
	0 – 30 minutes	116	49.75	10.44				
	31 – 60 minutes	122	48.56	9.09				
	1 – 2 hours	86	47.33	8.96				
	3 hours and more	44	43.25	10.73				
Inhibitory control	Never	50	41.50	8.91	4/413	5.271	.000	Never – 3 hours 0 – 30 minutes – 3 hours
	0 – 30 minutes	116	40.32	8.95				
	31 – 60 minutes	122	38.84	7.83				
	1 – 2 hours	86	38.08	7.40				
	3 hours and more	44	34.61	8.30				

and social functions in later periods. When performing EFs and watching television, people employ the same information processing resources. Therefore, when information processing resources are used during TV watching, it becomes difficult to use them during executive activities. When children are overstimulated by the content broadcast on television or encounter new and challenging content, their information processing process impairs (Lillard et al., 2015). In a study, it was determined that even watching a fast-paced television show (cartoon) for just 9 minutes can have negative effects on the EF of a 4-year-old (Lillard & Peterson, 2011). These findings in the literature and in the present study are regarded as quite beneficial in terms of development.

Another interesting finding of the study was that working memory and inhibitory control differed significantly depending on television-watching time. It was determined that individuals who did not watch television throughout the day, those who watched TV for 0 – 30 minutes, 31 – 60 minutes, and 1 – 2 hours had less

Table 4.
Results of Multiple Linear Regression Analysis on the Effect of TV Watching Time on Executive Functions

Dependent Variable(s)	Independent Variable	Unstandardized Values		Standardized Values		
		B	Std_b	β	*t*-test	*p*
Working memory	Constant	50.720	1.382	–	96.577	.000*
	0 – 30 minutes	−.970	1.654	−0.044	−0.587	.558
	31 – 60 minutes	−2.163	1.641	−0.099	−1.317	.188
	1 – 2 hours	−3.394	1.738	−0.138	−1.953	.052
	3 hours and more	−7.470	2.021	−0.231	−3.697	.000*
	$R = 0.206$ $F_{(4,413)} = 4.573$	$R^2 = 0.029$ $p = .000$*				
Inhibitory control	Constant	41.500	1.167	–	35.559	.000*
	0 – 30 minutes	−1.181	1.396	−.063	−.846	.398
	31 – 60 minutes	−2.656	1.386	−.144	−1.916	.056
	1 – 2 hours	−3.419	1.468	−.164	−2.329	.020*
	3 hours and more	−6.886	1.709	−.251	−4.037	.000*
	$R = 0.220$ $F_{(4,413)} = 5.271$	$R^2 = 0.039$ $p = .000$*				

Table 5.
Results of Simple Linear Regression Analysis on the Effect of Problematic Media Use on Executive Functions

Dependent Variable(s)	Independent Variable	Unstandardized Values		Standardized Values		
		B	Std_b	β	*t*-test	*p*
Working memory	Constant	61.729	1.100	–	56.105	.000*
	Problematic media use	−0.229	.017	−0.541	−13.116	.000*
	R = 0.541 $F_{(1,416)}$ = 172.020	R^2 = 0.293 *p* = .000*				
Inhibitory control	Constant	49.930	.945	-	52.864	.000*
	Problematic media use	−0.187	.015	−0.523	−12.504	.000*
	R = 0.523 $F_{(1,416)}$ = 156.339	R^2 = 0.273 *p* = .000*				

problematic media use than those who watched TV for 3 hours or more. When TV watching duration was correlated with working memory and inhibitory control, people who did not watch television or watched for 0 – 30 minutes had better working memory and inhibitory-control scores than those who watched TV for 3 hours or more (Table 3). This finding suggests that increased TV watching time throughout the preschool years may be a risk factor for developmental problems. Studies have reported that excessive use of digital media tools in the preschool period has also been associated with delays in cognitive, linguistic, social, emotional, and motor development areas in children (Pagani et al., 2010), which supports this idea. In their study, McNeil et al. (2019) investigated the correlation of media use in preschool period with EFs and psychosocial development and reported that higher levels of media exposure at the ages of 3 – 5 years resulted in an increase in externalization and behavioral problems and negative psychological development. In addition to this finding, it was reported that a low level of media exposure did not cause significant changes in EFs, and high media exposure (≥30 minutes/day) was detrimental to EFs. Furthermore, the results of several studies conducted after the 2000s have shown that watching television is associated with decreased attention abilities both concurrently and/or in the long term (Swing et al., 2010). In their study, Nathanson et al (2014) reported that children who cumulatively watched more television had lower EF. Contrary to popular belief, the effect of television on children's EF is not limited to just watching. In their study, Schmidt et al. (2008) determined that children's focused attention span was three-quarters of the time the television was turned on, which indicates that television was more than just background noise.

Another important result of the study was that TV watching time predicted working memory and inhibitory control. Television is the most studied media tool and the most discussed effect on children in the literature (Tozduman Yaralı, 2021). While television causes children to be constantly exposed to stimuli that are not normally of interest to them, it also prevents them from making related thoughts. This is thought to be an indication that television watched in the early period is associated with attention problems in 7-year-old children. Given these impacts of television, the American Academy of Paediatrics recommends that children under the age of 24 months should not be exposed to technological products that provide one-way communication, but it emphasizes that this duration should be 2 hours on average for preschool children (AAP, 2011). While there are several remarks for restricting screen usage of children throughout the preschool period, the most crucial factor here is parents. In their study, Yang et al. (2017) determined that TV watching time and educational programs for children were associated with EF. Furthermore, television content fully mediated the effect of TV watching time on EF, and parent-restrictive approach strategies moderated the effect of TV watching time on EF (Yang et al., 2017).

Another study finding was that problematic media use significantly predicted working memory and inhibitory control, and thus accounted for 29% of the total variance in working memory and 27% of the total variance in inhibitory control. Problematic media use refers to children's exposure to media at a level that may adversely affect their development (Domoff et al., 2020). In this context, the increase in screen exposure of children due to electronic games as well as watching TV or video includes problematic media use (Domoff et al., 2019). In this regard, Yang et al. (2020) examined the correlation between electronic games and executive functions in their study conducted with Chinese children aged 3 – 6 and revealed that time spent on electronic games was associated with EF when factors such as children's age, gender, and socioeconomic status were controlled.

Finally, as a result of the study, it can be asserted that problematic media use is correlated with executive functions in preschool children. For this purpose, some researchers have stated that television may cause attention disorders, as well as children with attention disorders may prefer to watch television selectively in the early periods. Acevedo-Polakovich (2007) stated that children with ADHD watched television more than other children, and they enjoyed television more. Likewise, it was found that children with Autism Spectrum Disorder watched television earlier and more often than children with typical development (Chonchaiya et al., 2011). These results show that in addition to the effect of screen exposure on executive functions, children with problems in executive functions may be more interested in the screen.

Limitations and Directions/Suggestions for Future Research

Parents are ultimately responsible for how much time their children spend watching television and what they learn from it. When parents regulate the use of media tools, watch the programs with their children, and interpret together what the children see, they can both benefit from the positive aspects of television for the child and protect the child from violent programs. Limiting the

amount of time children spend in front of screens and allocating time for other activities such as exercise, face-to-face interaction, and time spent outside can be beneficial for their development. It is deemed important to guide families in managing the time their children spend in front of a screen. Although this study reveals important results for current studies in terms of the critical role of problematic media use on working memory and inhibitory control, the study has certain limitations. The study had a cross-sectional design. In the study, correlational results were obtained, but causality was restricted. Furthermore, all information was received via the mothers, and self-reports were not received from the children. The data obtained only from mothers caused concerns that they could be prejudiced against their children. Despite these limitations, the study is thought to shed light on the correlation between problematic media use and executive functions in children and to serve as a reference for future research on the issue.

Data Sharing and Declaration: The datasets generated and/or analyzed in the study are not publicly released but are available from the corresponding author upon reasonable request.

Ethics Committee Approval: Ethical committee approval was received from the Ethics Committee of Aydın Adnan Menderes University, Faculty of Health Sciences. (Approval No: 2022/36 Date: 26.10.2022).

Informed Consent: Written informed consent was obtained from the parents of the participants who agreed to take part in the study.

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Genişletilmiş Özet

Okul Öncesi Dönemdeki Çocuklarda Problemli Medya Kullanımı ile Yürütücü İşlevler Arasındaki İlişki

Giriş

Günümüzde dijital medya, aile hayatında oldukça önemli bir konumdadır. Birçok çocuk, medya araçlarıyla bebeklik döneminde tanışmaya başlamaktadır. Başta televizyon olmak üzere medya araçlarının ortaya çıkışı ve yaygınlaşması ile birlikte ekran maruziyetinin arttığı gözlemlenmektedir. Bu durum, medyanın çocuk gelişimi üzerindeki potansiyel etkilerinin sorgulanmasına neden olmaktadır. Yapılan çalışmalar, okul öncesi döneminde dijital medya araçlarının fazla kullanımının çocuklarda bilişsel, dil, sosyal, duygusal ve motor gelişim alanlarında gecikmeler ile ilişki olduğunu ortaya koymaktadır. Bu sonuçların ortaya çıkışındaki etkenlerin, artan erkan süresi, çocukların yaşına uygun içerikleri izlememesi, ebeveyn-çocuk etkileşimindeki azalma ve aşırı sosyal medya kullanımı olduğu ileri sürülmektedir. Medya araçları ile erken yaşlarda tanışılmış olunması ve bir önceki cümlede ifade edilen etkenlere maruz kalınmasının çocukların bir bizi bilişsel işlevi tanımlayan yürütücü işlevlerini olumsuz yönde etkilediği saptanmıştır. Yaşam boyu uyum için yürütücü işlevlerin önemli rolü göz önüne alındığında mevcut çalışmada Türkiye'deki 48-72 ay çocuğa sahip annelerin oluşturduğu bir popülasyonda çocukların problemli medya kullanımı ve TV karşısında geçirdikleri süre ile yürütücü işlevleri içeren çalışma belleği ve ketleyici kontrol bileşenleri arasındaki ilişki araştırılmıştır.

Yöntem

Kesitsel desendeki araştırma, nicel araştırma yöntemlerinden ilişkisel tarama modeline göre tasarlanmıştır. İlişkisel tarama modeli, iki veya ikiden çok sayıdaki değişkenler arasında birlikte değişim varlığını ve/veya derecesini belirlemeyi amaçlamaktadır.

Örneklem

Araştırmanın çalışma grubunu 1 Mayıs 2022- 1 Temmuz 2022 tarihleri arasında yüz yüze ulaşılan 48- 72 ay aralığında çocuğu olan Türkiye'de yaşayan 440 anne oluşturmuştur. 22 anne veri toplama araçlarını eksik doldurduğu için çalışmaya dahil edilmemiş ve toplamda 418 anne ile çalışma tamamlanmıştır. Katılımcıların belirlenmesinde, seçkisiz olmayan örnekleme yöntemlerinden uygun örnekleme kullanılmıştır. Çalışmaya 225 (%53.8) kız, 193 (%46.2) erkek çocuğu olan anne katılmıştır. Çocukların yaşları dağılımlarının birbirine yakın olduğu söylenebilir. 4 yaş grubunda 157 (%37.6), 5 yaş grubunda 138 (%33.0) ve 6 yaş grubunda ise 123 (%29.4) çocuk yer almaktadır.

İşlem

Çalışmaya Gönüllü Onam Formunu dolduran anneler dâhil edilmiştir. Çalışma kapsamında annelerden, Kişisel Bilgi Formu, Problemli Medya Kullanım Ölçeğini ve Çocukluk Dönemi Yürütücü İşlevler Envanteri doldurtulmuştur.

Analiz

Çalışma kapsamın yapılan analizler, parametrik yöntemlerden faydalanılarak gerçekleştirilmiştir. Bu çerçevede TV izleme süresine özgü farklılığın incelenmesinde Tek Yönlü Varyans Analizi kullanılmıştır. Tek yönlü varyans analizi sonuçlarına göre gruplar arasında anlamlı bir fark bulunduğu durumlarda, bu farkın ya da farklılıkların hangi gruplar arasında olduğunun tespit edilebilmesi için çoklu karşılaştırma testlerinden (post-hoc test) yararlanılmıştır. Değişkenler arasında ilişki olup olmadığı Pearson Momentler Çarpımı korelasyon katsayısı ile incelenmiştir. Ayrıca, araştırmanın bağımsız değişkenleri olarak problemli medya kullanımı ve TV izleme süresi değişkenlerinin yürütücü işlevlerin çalışan bellek ile ketleyici kontrol üzerinde rolü olup olmadığı, basit ve çoklu doğrusal regresyon analizi ile test edilmiştir.

Bulgular

Araştırmada kullanılan ölçekler arasındaki ilişkiyi test etmek için Pearson korelasyon analizi uygulanmıştır. Buna göre analiz sonucunda yürütücü işlevler envanterinin çalışma belleği alt boyutu ($r = -.541$, $p < .05$) ve ketleyici kontrol alt boyutu ($r = -.523$, $p < .05$) ile problemli medya kullanım ölçeği arasında istatistiksel olarak negatif yönlü anlamlı bir ilişki olduğu bulunmuştur. Ayrıca problemli medya kullanımı, çalışma belleği ve ketleyici kontrol işlevlerinin TV karşısında geçirilen süreye göre anlamlı bir farklılık gösterip göstermediğini test etmek için Anova testi uygulanmıştır. Analiz sonucu, problemli medya kullanımının [($F(4,413) = 10.34$, $p = .000$)], çalışma belleğinin [($F(4,413) = 4.57$, $p = .001$)] ve ketleyici kontrolün [($F(4,413) = 5.27$, $p = .000$)] TV karşısında geçirilen süreye göre anlamlı olarak değiştiğini göstermektedir

Yapılan çoklu doğrusal regresyon analizi sonucunda TV izleme süresinin çalışma belleğini anlamlı olarak yordadığı ($R^2 = 0.029$, $p = .000$) ve yapılan basit doğrusal regresyon analizi sonucunda ise problemli medya kullanımının çalışma belleğini anlamlı olarak yordadığı sonucuna ulaşılmıştır ($R^2 = 0.293$, $p = .000$).

Tartışma

Mevcut araştırmanın sonuçları okul öncesi dönemindeki çocukların yürütücü işlevleri üzerinde problemli medya kullanımının ve televizyon izleme süresinin belirleyici bir rolü olduğunu göstermektedir. Araştırma sonucunda yürütücü işlevler envanterinin çalışma belleği ve ketleyici kontrol bileşenleri ile problemli medya kullanım ölçeği arasında negatif yönlü anlamlı bir ilişki olduğu bulunmuştur. Elde edilen bulgular ekran maruziyetinin yürütücü işlevlerle ilişkili olduğu araştırma sonuçlarıyla paralellik göstermiştir. Gelişimsel açıdan dikkat, planlama ve ketleyici kontrol gibi hedefe yönelik öz düzenleme davranışlarının altında yatan süreçleri oluşturan yürütücü işlevlerin, özellikle bebeklik döneminde maruz kalınan televizyondan etkilendiği, sonraki dönemlerde bilişsel ve sosyal fonksiyonlarda problemlere neden olabileceği belirtilmiştir. Bireyler, yürütücü işlevlerin görevlerini yerine getirirken ve televizyon izlerken aynı bilgi işleme kaynaklarını kullanmaktadır. Dolayısıyla bilgi işleme kaynakları televizyon izlerken kullanıldığından yürütme işlevleri sırasında kullanmak güçleşmektedir. Çocuklar televizyondaki içerik tarafından fazla uyarıldığında ya da yeni ve zor içeriklerle karşılaştığında bilgiyi işleme süreçleri de zarar görmektedir.

Araştırma kapsamında, dikkat çeken bir diğer bulgu ise çalışma belleğinin ve ketleyici kontrolün televizyon izleme süresine göre anlamlı olarak farklılaşmasıdır. Bu bulgu, okul öncesi dönemde artan TV izleme süresinin gelişimsel açıdan risk faktörü olabileceğini düşündürmektedir. Yapılan çalışmalar da, okul öncesi döneminde dijital medya araçlarının fazla kullanımının çocuklarda bilişsel, dil, sosyal, duygusal ve motor gelişim alanlarında gecikmeler ile ilişki olduğunu ortaya koyarak) bu düşünceyi desteklemektedir.

Araştırmanın bir diğer önemli bulgusu ise TV izleme süresinin çalışma belleğini ve ketleyici kontrolü anlamlı olarak yordamasıdır. Okul öncesi dönemde çocukların ekran sürelerini sınırlandırmaya yönelik çeşitli açıklamalar mevcutken, buradaki en önemli faktörün ebeveynler olduğunu vurgulamak gerekmektedir. Yapılan araştırmalarının sonucunda televizyon izleme süresi ve çocuklara yönelik eğitim programlarının yürütücü işlevler ile ilişkili olduğu bulunmuştur.

Son olarak, yapılan araştırma sonucunda okul öncesi dönemindeki çocuklarda problemli medya kullanımı ile yürütücü işlevler arasında ilişki olduğu söylenebilir. Buna yönelik olarak bazı araştırmacılar televizyonun dikkat bozukluğuna sebep olabileceğinin yanı sıra dikkat bozukluğu olan çocukların da erken dönemlerde seçici olarak televizyon izlemeyi tercih edebileceklerini belirtmişlerdir. Yapılan çalışmalarda Otizm Spekturum Bozukluğu olan çocukların tipik gelişim gösteren çocuklara göre daha erken ve daha çok televizyon izledikleri bulunmuştur Bu sonuçlar ekran maruziyetinin yürütücü işlevlere etki etmesinin yanı sıra yürütücü işlevleri problemi yaşayan çocuların ekrana daha fazla ilgi duyabileceklerini göstermektedir.

Görüleceği üzere mevcut araştırmanın sonuçları, problemli medya kullanımının çalışma belleği ve ketleyici kontrol üzerindeki kritik rolü açısından güncel araştırmalar için önemli tespitler içerse de araştırmanın birtakım sınırlılıkları bulunmaktadır. Çalışma, kesitsel bir tasarıma sahiptir. Araştırmada ilişkisel bulgular elde edilmiş olup nedensellik sınırlandırılmıştır. Ayrıca, tüm bilgiler anneler aracılığıyla elde edilmiş, çocuklardan öz bildirimler alınamamıştır. Sadece annelerden toplanan veriler çocukları üzerinde yanlı olabilecekleri endişesini yaratmıştır. Bu sınırlılıklara rağmen, çalışmanın çocuklardaki problemli medya kullanımı ile yürütücü işlevler arasındaki bağlantıya ışık tutacağı ve konuya yönelik araştırmalar için referans oluşturacağı düşünülmektedir.