

Screen Time, Executive Functions, and Behavioral Problems in Children

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Abstract

This study explored how screen exposure relates to children's executive functioning and behavioural difficulties in the 3–10-year age range in the Coimbatore region. A sample of 50 children participated, and data were collected using three instruments: a self-developed 15-item Screen Time Exposure Scale, the Child Executive Functioning Inventory (CHEXI), and the Problem Behaviour Questionnaire (PBQ). The study followed a correlational design to explore associations among the variables, along with gender comparisons using independent t-tests. Results showed that most children reported moderate to a considerable proportion of children showed extensive screen use alongside notable behavioural challenges. Correlation results indicated that greater screen exposure was linked with reduced executive functioning, while a strong positive association was found between screen time and behavioural difficulties. Additionally, executive functioning was significantly negatively correlated with the behavioural difficulties. Gender analysis showed that girls performed better on executive functions measures, while boys exhibited higher behavioural problem scores, although screen time levels did not differ significantly between genders. Overall, the study underscores the significance balanced screen use and its implications for healthy cognitive and behavioural growth in children behavioural development. The findings emphasize the necessity of ensuring parental monitoring and awareness regarding technology use in early childhood.

Keywords: Screen time, Executive functioning, Problem behaviour, Children, Digital exposure

1. Introduction

In the current era, digital technologies play a major role in children daily routine, screens are now increasingly viewed as a normal part of childhood, especially for children aged 3 to 10. Smartphones, tablets, and televisions are now common companions during meals, car rides, playtime, and even bedtime. While these devices can offer educational opportunities and moments of convenience for busy families, the growing the extensive hours that many young children spend with digital media spend on screens has prompted increasing worries regarding its potential effects on children's thinking skills and behavioural growth. Parents and teachers are becoming more aware that too much screen exposure, or the

lack of proper guidance in its use, can affect children's attention, impulse regulation, emotional control, and their capacity to interact positively with others.

Early childhood represents an essential stage of growth during which abilities like attention, working memory, cognitive flexibility, and self-control begin to take shape.”. These abilities grow through real-life experiences, hands-on play, communication with others, and opportunities to solve problems. However, when a large portion of a child's day is spent on fast-paced videos, games, or constantly stimulating digital content, these natural learning moments may be reduced. Many children become used to high levels of instant gratification, making it harder for them to persist through slower, less stimulating tasks like reading, completing schoolwork, or following daily routines. Behavioural challenges are also becoming more common. Parents often report tantrums when screens are taken away, difficulty transitioning between activities, irritability, restlessness, or dependence on devices for emotional soothing. These patterns may develop when screens replace key experiences that help children learn patience, coping strategies, and social communication. Although technology is not inherently harmful, its impact depends on how much children use it, what they are watching or playing, and whether adults are present to guide them. As screen time continues to rise—especially after the increase in digital reliance during the COVID-19 pandemic it has become essential to understand how early and frequent exposure affects children's developing minds. Exploring the connection between screen use, executive functioning, and behavioural health can help families create more balanced routines and support children in growing up with technology in healthy, developmentally appropriate ways.

Need for the study

There is an urgent requirement to investigate the impact of digital media exposure on executive function and the behavioural problems in children because increase in digital media exposure has been linked to potential delays in cognitive growth, especially in domains that play a vital role in the learning process, self-regulation, and emotional adjustment. Recent research highlights that excessive or poorly managed screen use may displace interactive, exploratory, and social experiences vital for developing abilities including working memory, impulse regulation, and flexible thinking all foundational for school readiness and healthy social behaviour. As children's digital habits form early and can have enduring consequences, it is essential to investigate how different types and contexts of screen interactions shape executive functioning and behaviour, providing evidence to guide parents, educators, and policymakers in supporting optimal child development.

Methodology

Aim:

To investigate how screen exposure relates to executive functioning and behavioural difficulties among children aged 3–10 years in Coimbatore

Objectives

This study aims to explore

- To identify how commonly different levels of screen use, executive functioning, and behavioural challenges occur among children aged 3–10 years
- To analyse how screen exposure relates to executive functioning abilities and behavioural outcomes in children aged 3–10 years.
- To determine whether boys and girls differ in their levels of screen use, executive functioning, and behavioural concerns within the 3–10-year age group

Hypothesis

- Prevalence of screen time usage, executive functioning and the behavioural problems among children aged 3–10 years.
- There exists a meaningful association between children's screen exposure, executive functions, and behavioural problems among children aged 3–10 years.
- There is a significant variation in screen-use patterns between boys and girls, executive functions, and behavioural problems among children aged 3–10 years.

Research Design

The current investigation adopted a correlational approach to examine the relation between screen usage, executive functions, and behavioural problems in children. The design is appropriate because this study aims to understand the relationships between variables without manipulating or controlling any conditions. Additionally, a comparative design was used to assess gender differences across the three variables using independent sample t-tests. The study followed a numerical, cross-sectional method, with data collected at a single point in time from parents using standardized questionnaires.

Sample and Population

The population of this study consist of children who are aged from 3 to 10 currently residing in the Coimbatore region. A sample of 50 children was selected using a convenient sampling method. The sample included both boys and girls, representing different age groups, family types, and socioeconomic backgrounds. Parents served as the primary respondents for reporting screen time, executive functioning behaviour, and child behaviour problems. The sample size was adequate for conducting correlational analysis and the independent sample t-tests.

Tools Used

Three standardized tools were used in the study:

- Screen Time Questionnaire
- Executive Function Questionnaire (EF Scale)
- Problem Behaviour Questionnaire (PBQ or Behaviour Checklist)

Each tool are assessed with one of the major study variables and was scored and categorized according to predefined scoring systems.

Description of the Tools

1. Screen Time Exposure Scale (Self-Developed)

Screen use was measured using a self-developed Screen Time Exposure Scale consisting of 15 items. The scale assesses multiple aspects of children digital media usage, including daily screen time duration, type of content accessed, device usage patterns, and the extent of parental supervision. Each item is rated on a 5-point Likert scale with options: *Never*, *Rarely*, *Sometimes*, *Often*, and *Always*. Greater scores indicate greater levels of screen exposure and lower score indicate lower level of screen exposure. This tool was specifically designed for the present study to capture the contextual and behavioural aspects of screen time in young children.

2. Child Executive Functioning Inventory (CHEXI)

Executive functioning was measured using the CHEXI developed by Thorell et al. (2009). This standardized instrument assesses children's everyday executive functioning across two main domains:

- Working Memory
- Inhibition

The CHEXI is widely used for children aged 4–12 years and is based on behavioural observations made by parents or teachers. Items reflect the child's ability to stay focused, remember instructions, control impulses, and regulate emotions. Higher scores indicate stronger executive functioning abilities.

3. Problem Behaviour Questionnaire (PBQ)

Problem behaviours were assessed using the Problem Behaviour Questionnaire (PBQ) developed by Lewis, Scott, and Sugai (1994). It is a 15-item functional behavioural assessment tool that evaluates the frequency, context, and potential triggers of problem behaviours such as aggression, tantrums, non-compliance, and the disruptive actions. Problem Behaviour Questionnaire helps to identify the functions behind the behaviour (e.g., attention-seeking, escape, sensory stimulation). Greater scores indicate greater behavioural concerns, and lower scores indicate lower behavioural concern

RESULTS

Table 1: Shows Descriptive Statistics of Screen Time, Executive Functioning, and Problem Behaviour (N = 50)

Study Variable	Levels	Frequency (f)	Percentage (%)
Screen Time	Low	13	26%
	Moderate	20	40%
	High	17	34%
	Total	50	100%
Executive Functioning	Low	17	34%
	Moderate	23	46%
	High	10	20%
	Total	50	100%
Problem Behaviour	Low	5	10%
	Moderate	21	42%
	High	24	48%
	Total	50	100%

Table 1 presents the distribution of screen time, executive functionings, and problem behaviour levels among 50 children. For screen time, the majority of children (40%) fall in the moderate range, followed by 34% in the high category, indicating that substantial screen exposure is common in the sample. Executive function levels show that nearly half of the children (46%) fall in the moderate range, while only 20% exhibit high executive functioning, suggesting average cognitive control abilities for most participants. For problem behaviour, the highest proportion of children (48%) scored in the high category, indicating that behavioural difficulties are relatively common within the group. Overall, the descriptive results suggest that many children have moderate to high screen exposure, moderate executive functioning skills, and elevated the behavioural problems.

Table 2: Shows the relationship between variables (N=50)

Variables	Screen Time	Executive Functions	Problem Behavior
Screen Time	1.00	-0.48*	0.72**
Executive Functioning	-0.48*	1.00	-0.56**
Problem Behaviour	0.72**	-0.56**	1.00

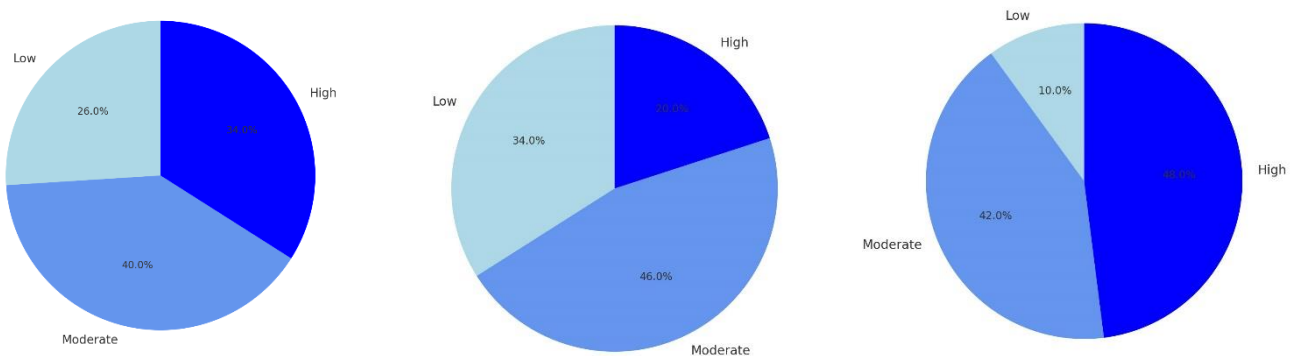
Table 2 shows the Pearson correlation coefficients for the three variables. A moderate negative correlation was found between screen time and executive functions ($r = -0.48$, $p < .05$), indicates that higher screen time is associated with lower executive function abilities. A strong positive correlation was found between screen time and problem behaviour ($r = 0.72$, $p < .01$), meaning that children with higher screen exposure tend to show more behavioral difficulties. Additionally, executive functions and problem behaviour demonstrated a moderate negative relationship ($r = -0.56$, $p < .01$), suggesting that children with stronger executive functions exhibit fewer behavioral problems. Overall, the results show meaningful and statistically significant relationships among the three variables.

Table 3: Shows the Gender Differences on Screen Time, Executive Functioning, and Problem Behaviour(N=50)

Variable	Gender	Mean	SD	t-value	df	p-value
Screen Time	Girls	43.23	12.55	-1.02	48	0.311
	Boys	47.25	15.15			
Executive Functioning	Girls	40.54	10.37	3.17	48	0.003
	Boys	32.13	8.15			
Problem Behaviour	Girls	41.81	13.37	-4.01	48	0.0002
	Boys	57.63	14.52			

Table 3 presents the results of independent samples t-tests comparing boys and girls. For screen time, no significant gender difference was observed between girls ($M = 43.23$) and boys ($M = 47.25$), $t(48) = -1.02$, $p = .311$, indicates that both genders use screens at similar levels. In contrast, a significant gender difference emerged in executive functions, with girls ($M = 40.54$) scoring higher than boys ($M = 32.13$), $t(48) = 3.17$, $p = .003$, suggesting that girls show stronger cognitive controlling abilities. For problem behaviour, boys ($M = 57.63$) scored significantly higher than girls ($M = 41.81$), $t(48) = -4.01$, $p = .0002$, indicates that boys exhibit more behavioural problems. These findings highlight that while screen time does not differ by gender, girls tend to have better executive functions, and boys show higher levels of behavior problems.

FIGURE 1 : Screen Time, Executive Functioning And Problem Behaviour



DISCUSSION

The present study examined the connections among children's screen exposure, executive functioning skills, and behavioural difficulties among children aged 3 to 10 years in the Coimbatore region. The findings revealed a moderate negative association between screen exposure and executive functioning, suggesting that children with greater screen involvement tend to show poor cognitive control, attention regulation, and planning skills. These results are consistent with Christakis et al. (2018), who found that prolonged exposure to digital devices during early childhood is associated with reduced executive functioning, particularly difficulties in sustained attention and inhibitory control. Similarly, Wu et al. (2020) reported that children with higher screen exposure exhibit weaker working memory and cognitive flexibility, further supporting the current findings.

The study also demonstrated a strong positive link between children's screen exposure and behavioural difficulties. Children with higher digital screen usage showed increased behavioural difficulties, including impulsivity, irritability, and emotional dysregulation. These results align with the findings of Radesky and Dunlap (2019), who noted that excessive screen media exposure is linked to higher rates of externalizing behaviors such as aggression and hyperactivity. Furthermore, Tamana et al. (2019) indicated that children with screen usage exceeding recommended limits have a higher tendency to demonstrate behavioural challenges and had lower psychosocial well-being.

The observed negative correlation between executive functioning and the behavioural problems reinforces the previous research suggesting that deficits in cognitive control contribute to the behaviour dysregulation. Eisenberg et al. (2019) highlighted that children with weaker executive functioning are more prone to emotional outbursts, impulsive reactions, and difficulty following rules, which is consistent with the present results.

Gender differences identified in the current study showed that girls had significantly higher executive functioning scores, while boys demonstrated higher problem behavior levels. These findings reflect broader developmental research indicating that girls typically acquire self-regulation abilities sooner than boys do, whereas boys tend to exhibit more externalizing behaviours. Overall, the results of this study are consistent with previous research and highlight the need to regulate children's screen use to promote healthier cognitive and behavioural growth.

Conclusion

This study examined the connection between children's screen exposure executive functioning, and behavioural difficulties experienced by children aged 3 to 10 years. The findings indicates that increased screen exposure is linked with the reduced executive functioning and increase in behaviour difficulties. Gender differences were also observed, with girls showing stronger executive functions and boys exhibiting more behavioural problems. Although screen time did not differ significantly between genders, the developmental outcomes varied. Overall, the research emphasizes the value of balanced screen usage and early guidance from parents and educators to promote positive cognitive growth and behavioural well-being in young children.

Limitations

- This study used a small, region-specific sample, making it difficult to apply these results to broader groups.
- Cross-sectional design prevents determining causal relationships between the variables.
- Parent-reported measures may contain bias, affecting the accuracy of screen exposure and behaviour data.

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