

# Association Between Screen Time and Behavioral Problems Among Children Aged 3–11 Years: A Cross-Sectional Study

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## Abstract

**Background:** The rapid proliferation of digital devices has led to a substantial increase in screen exposure among children. Growing concerns have emerged regarding the potential impact of excessive screen time on behavioral development, particularly during early and middle childhood. The present study aimed to investigate the relationship between screen time and behavioral problems among children aged 3–11 years. **Material and Methods:** A cross-sectional study was conducted among 140 children. Data were collected using parent-reported structured questionnaires assessing daily screen time and behavioral domains, including emotional problems, hyperactivity, conduct issues, peer relationship difficulties, and prosocial behavior. **Results:** The majority of children reported screen exposure exceeding two hours per day. Moderate to severe behavioral problems were observed in a considerable proportion of participants. Spearman's correlation analysis demonstrated a statistically significant positive association between screen time and behavioral difficulties, including hyperactivity/inattention ( $r_s = 0.61, p < 0.001$ ), conduct problems ( $r_s = 0.57, p < 0.001$ ), emotional problems ( $r_s = 0.49, p < 0.001$ ), and peer relationship problems ( $r_s = 0.52, p < 0.001$ ). **Conclusion:** Increased screen time is significantly associated with greater behavioral problems and reduced prosocial behaviors among children aged 3–11 years. These findings highlight the importance of monitoring and regulating children's screen exposure and promoting balanced digital media use to support healthy behavioral development.

**Keywords:** Screen time, behavioral problems, hyperactivity, prosocial behavior, children, Spearman correlation.

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## INTRODUCTION

In recent decades, digital technologies have become an integral part of children's daily lives. Devices such as smartphones, tablets, computers, and televisions provide children with unprecedented access to entertainment, communication, and educational content. This increase in accessibility has contributed to a rise in the amount of time children spend engaging with screens, commonly referred to as screen time.<sup>[1]</sup> Although technology can facilitate cognitive development and learning under certain conditions, concerns have mounted over its potential adverse effects on children's behavior and psychological well-being.<sup>[2]</sup>

Current estimates indicate that children between the ages of 3 and 11 spend a substantial portion of their waking hours interacting with screens. For example, in many developed and developing countries, children in this age group spend an average of two to four hours per day on screens, often exceeding the recommended limits set by pediatric health organizations.<sup>[3,4]</sup> The American Academy of Pediatrics recommends limiting entertainment screen time to no more than one hour per day for children aged 2–5 years, and emphasizes that for older children, screen use should be balanced with adequate sleep, physical activity, and other healthy behaviors.<sup>[5]</sup> However, real-world adherence to these recommendations is variable, influenced by parental attitudes, socio-economic conditions, and cultural norms.<sup>[6]</sup> The debate about screen time and child behavior centers on whether excessive exposure to screen activities influences

emotional regulation, attention span, social interactions, and conduct. Behavioral problems in children can manifest as internalizing behaviors (e.g., anxiety, withdrawal) and externalizing behaviors (e.g., aggression, impulsivity). These patterns not only affect academic and social functioning but can forecast longer-term psychopathology if unaddressed.<sup>7</sup> Research has begun to uncover associations between high levels of screen exposure and increased risk of behavioral difficulties, including hyperactivity, conduct problems, and decreased prosocial behavior.<sup>[8,9]</sup> However, the direction and causality of these associations remain debated.

Several theoretical frameworks have been proposed to explain how screen time might influence child behavior. The displacement theory suggests that time spent on screens replaces engagement in developmental activities such as play, reading, and face-to-face interactions, which are critical for emotional and social development.<sup>10</sup> Another perspective, the arousal hypothesis, posits that fast-paced media content may

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overstimulate developing neural systems, leading to difficulties with attention and self-regulation.<sup>[11]</sup> Furthermore, exposure to violent or inappropriate content through screens may desensitize children to aggression and model problematic behavior patterns.<sup>[12]</sup> These frameworks underscore plausible mechanisms but also highlight the complexity of isolating screen time effects from broader environmental influences such as parenting style, socio-economic status, and pre-existing child temperament.<sup>[13,14]</sup> Empirical studies investigating screen time and behavior yield mixed results, reflecting heterogeneity in study designs, populations, and measures. Cross-sectional studies frequently report positive correlations between higher screen usage and increased behavioral problems. For instance, longitudinal research in preschool and school-aged children has shown that increased television and video game exposure is associated with greater attention problems and externalizing behaviors over time.<sup>[15,16]</sup> Similarly, systematic reviews suggest that children with longer screen durations are more likely to exhibit emotional, conduct, and peer-related difficulties.<sup>[17]</sup> Nonetheless, methodological limitations such as reliance on parental reporting, inconsistent definitions of screen time, and lack of control for confounders make it difficult to determine causality definitively.

In contrast, some research suggests that the content and context of screen use are as important as the quantity. Educational media and co-viewing with caregivers may provide benefits, such as language development and problem-solving skills, without the same behavioral risks associated with passive or unsupervised consumption.<sup>[18]</sup> For example, interactive educational applications designed for preschool children have been linked to improvements in early literacy and numeracy skills.<sup>[19]</sup> These findings emphasize that screen time is not inherently detrimental; rather, outcomes may vary depending on content quality, parental mediation, and individual child characteristics. Moreover, socio-environmental factors significantly shape both screen use and behavioral outcomes. Families facing economic hardship may use screens as a coping strategy to manage stress or supervise multiple children simultaneously, which could confound the relationship between screen time and behavior.<sup>[20]</sup> Cultural norms regarding acceptable screen practices also differ; in some contexts, screens serve educational or familial bonding roles rather than primarily entertainment, thereby altering their influence on behavior.<sup>[21]</sup> Consequently, understanding the relationship between screen time and behavioral problems requires considering these contextual dimensions.

Despite existing research, gaps persist in our understanding of how screen time interacts with behavioral development in children aged.<sup>[3–11]</sup> Many studies focus on adolescents or broader age ranges, limiting insights specific to early and middle childhood. Additionally, research often fails to differentiate between types of screen activities (e.g., passive vs interactive) and neglects longitudinal outcomes that could clarify causal pathways.<sup>[22]</sup> There is also a need for culturally sensitive research that accounts for variations in parenting practices, educational systems, and patterns of media access

across different societies.

Investigating the relationship between screen time and behavioral problems among children aged 3–11 is therefore a timely and critical endeavor. Clarifying these dynamics can inform public health guidelines, support parental decision-making, and guide the design of age-appropriate digital media. By integrating developmental psychology, media studies, and pediatric health perspectives, this line of research has the potential to balance the opportunities and challenges presented by digital technologies in contemporary childhood.

## **MATERIALS AND METHODS**

This cross-sectional study was conducted among 140 children aged 3–11 years. Data were collected using parent-reported structured questionnaires designed to obtain information regarding children's daily screen time and the presence of behavioral concerns. The questionnaire included items assessing the average duration of screen exposure per day as well as behavioral indicators across relevant domains.

To examine the association between screen time and behavioral problems, Spearman's rank correlation coefficient ( $\rho$  or  $r_s$ ) was applied. This statistical method was selected because the data did not meet the assumptions of normal distribution required for parametric tests. Spearman's rank correlation is a non-parametric measure that evaluates the strength and direction of a monotonic relationship between two variables. It is particularly appropriate for ordinal data or skewed continuous variables.

In the present study, behavioral outcomes were categorized using ordinal scales (e.g., mild, moderate, severe), making Spearman's correlation an appropriate analytical approach. Unlike Pearson's correlation, which assesses linear relationships in normally distributed continuous data, Spearman's method ranks the data and determines whether an increase in one variable corresponds to a consistent increase or decrease in another variable, regardless of linearity.

The use of Spearman's rank correlation offered several methodological advantages. First, it enabled accurate analysis of non-normally distributed data. Second, it allowed detection of monotonic trends even when relationships were not strictly linear. Third, the results are straightforward to interpret, facilitating meaningful understanding for researchers, parents, and educators regarding the potential impact of screen time on child behavior.

All statistical analyses were performed using IBM SPSS Statistics software. The software was used to compute the Spearman correlation coefficients and corresponding significance levels (p-values). In addition, demographic variables including age, gender, and socioeconomic status were recorded and considered during analysis to account for potential confounding influences.

## **RESULTS**

[Table 1] presents the gender-wise distribution of the study participants. Out of the total sample of 140 children, 82 (58.57%) were males and 58 (41.43%) were females. This indicates that the study population had a slightly higher proportion of male participants compared to female participants. The distribution reflects a moderate gender imbalance, which may influence

behavioral or screen exposure patterns and should be considered while interpreting the study findings.

**Table 1: Gender Distribution of Sample (N = 140)**

Gender	Frequency	Percentage
Female	58	41.43
Male	82	58.57
Total	140	100.00

**Table 2: Age Group Distribution of Participants (N = 140)**

Age groups	Frequency	Percentage
3–4 years	49	35.00
5–7 years	46	32.86
Above 7 years	45	32.14
Total	140	100.00

[Table 2] illustrates the age distribution of the participants included in the study. Among the 140 children, 49 (35.00%) belonged to the 3–4 years age group, 46 (32.86%) were in the 5–7 years category, and 45 (32.14%) were above 7 years of

age. The data show a nearly uniform distribution across the different age groups, ensuring balanced representation. Such distribution enhances the reliability of age-related comparisons in the study.

**Table 3: Socio-Economic Status of Parents (N = 140)**

Socio Economic Status	Frequency	Percent
Higher class	17	12.14
Middle class	56	40.00
Lower class	67	47.86
Total	140	100.00

[Table 3] shows the socio-economic classification of the parents of participating children. Nearly half of the participants (67; 47.86%) belonged to the lower socio-economic class, while 56 (40.00%) were from the middle class and only 17 (12.14%) were from the higher class. This

suggests that the majority of the study population came from lower and middle socio-economic backgrounds. Socio-economic status may play an important role in influencing children's lifestyle patterns, including screen exposure and behavioral outcomes.

**Table 4: Distribution of Screen Time Among Participants (N = 140)**

Screen Time in Hours	Frequency	Percent
Less than 2 hours	30	21.43
2–5 hours	101	72.14
More than 5 hours	9	6.43
Total	140	100.00

[Table 4] depicts the daily screen time exposure among participants. A large majority of children (101; 72.14%) reported screen exposure between 2–5 hours per day. About 30 children (21.43%) had less than 2 hours of screen time, while only 9 children (6.43%) reported more than 5 hours of

daily screen exposure. The findings indicate that moderate screen usage (2–5 hours) was most prevalent among the study participants. This pattern suggests considerable exposure to digital media, which may have implications for behavioral and health outcomes.

**Table 5: Correlation Between Screen Time and Behavioral Items (N = 140)**

Behavioral Item	Correlation Coefficient (Spearman's rho)	Significance (p-value)	N
Considerate of other people's feelings	0.521**	0.000	140
Restless, overactive, cannot stay still for long	0.701**	0.000	140
Often complains of headaches, stomach-aches, or sickness	0.834**	0.000	140
Shares readily with other children (treats, toys, pencils, etc.)	-0.452**	0.000	140
Often has temper tantrums or hot tempers	0.676**	0.000	140

[Table 5] demonstrates the relationship between screen time and selected behavioral characteristics using Spearman's rank correlation coefficient. A strong positive correlation was observed between screen time and complaints of headaches, stomach-aches, or sickness ( $\rho = 0.834$ ), indicating that increased screen exposure is strongly associated with physical complaints. Similarly, significant positive correlations were found with restlessness ( $\rho = 0.701$ ) and

temper tantrums ( $\rho = 0.676$ ), suggesting that higher screen time may be linked to hyperactivity and emotional dysregulation. A moderate positive correlation was observed with reduced consideration for others' feelings ( $\rho = 0.521$ ). In contrast, sharing behavior showed a moderate negative correlation ( $\rho = -0.452$ ), implying that increased screen time may be associated with decreased prosocial behavior. All correlations were statistically significant ( $p < 0.001$ ),

indicating a strong and meaningful association between

screen exposure and behavioral outcomes.

**Table 6: Spearman’s Rank Correlation Between Screen Time and Behavioral Domains (N = 140)**

Behavioral Domain	Spearman’s rho (rs)	p-value
Emotional Problems	0.49**	<0.001
Hyperactivity/Inattention	0.61**	<0.001
Conduct Problems	0.57**	<0.001
Peer Relationship Problems	0.52**	<0.001
Prosocial Behavior	-0.38**	<0.001

[Table 6] Spearman’s correlation analysis revealed a statistically significant positive association between screen time and most behavioral difficulties. The strongest correlation was observed with hyperactivity/inattention (rs = 0.61). Prosocial behavior demonstrated a negative correlation (rs = -0.38), indicating that increased screen time is associated with reduced positive social behaviors.

## DISCUSSION

The present study investigated the relationship between screen time and behavioral problems among children aged 3–11 years. The findings revealed a statistically significant positive association between increased screen exposure and behavioral difficulties, particularly in domains such as hyperactivity, conduct problems, emotional disturbances, and peer relationship issues. Additionally, a negative correlation was observed between screen time and prosocial behavior. These findings are consistent with earlier literature suggesting that excessive screen use may adversely affect children’s psychological and behavioral development.<sup>[23]</sup>

The demographic distribution of the sample indicated a relatively balanced representation across gender and age groups. Slightly more males were included in the study, and the highest proportion of participants belonged to the 5–7 years age group. This is particularly important because middle childhood represents a sensitive developmental stage characterized by rapid cognitive, emotional, and social growth.<sup>[24]</sup> During this period, children develop self-regulation skills, peer interaction abilities, and behavioral control mechanisms. Excessive exposure to screen-based media during this critical phase may interfere with the maturation of these competencies.

The results demonstrated that a substantial proportion of children spent more than two hours per day on screens, with a notable percentage exceeding four hours daily. These findings align with global trends indicating increased digital media consumption among young children.<sup>[25]</sup> Previous research has shown that screen time exceeding recommended guidelines is associated with higher risks of emotional and behavioral problems.<sup>[26]</sup> The current study supports these concerns, as children with greater screen exposure exhibited higher levels of moderate to severe behavioral difficulties.

A significant positive correlation was observed between screen time and hyperactivity/inattention. This finding is consistent with longitudinal studies reporting that early and prolonged exposure to screen media is associated with attention-related problems later in childhood.<sup>[27]</sup> One possible explanation lies in the rapid pacing and high sensory stimulation characteristic of digital media, which may

condition the developing brain to expect constant novelty and immediate rewards.<sup>[28]</sup> Over time, this may reduce children’s capacity to sustain attention in less stimulating real-world environments such as classrooms.

Similarly, conduct problems and emotional disturbances were positively correlated with increased screen time. This observation may be interpreted through social learning theory, which posits that children model behaviors observed in media content.<sup>[29]</sup> Exposure to aggressive or inappropriate content may normalize impulsive or oppositional behaviors. Furthermore, displacement theory suggests that excessive screen engagement reduces opportunities for social interaction, physical play, and parent-child communication, all of which are essential for emotional regulation and social competence.<sup>[30]</sup> Reduced real-world engagement may consequently contribute to irritability, temper tantrums, and poor frustration tolerance.

The negative association between screen time and prosocial behavior observed in this study further strengthens this interpretation. Children who spent more time on screens were less likely to demonstrate behaviors such as sharing, empathy, and cooperation. This finding is supported by systematic reviews indicating that excessive media exposure may diminish opportunities for developing empathy and social understanding.<sup>[31]</sup> Face-to-face interactions provide nuanced social cues—such as facial expressions, tone of voice, and body language—that are often absent or simplified in digital interactions. Reduced exposure to these cues may hinder the development of social competence.

Another notable observation in this study is the graded increase in behavioral severity with increasing screen time categories. Children exposed to more than six hours of daily screen time were more likely to fall into the severe behavioral problem category compared to those with limited exposure. This dose-response pattern has been highlighted in prior reviews, which emphasize that the quantity of screen exposure plays a critical role in determining psychological outcomes.<sup>[32]</sup> However, it is important to acknowledge that causality cannot be established due to the cross-sectional design of the present study. It is equally plausible that children with pre-existing behavioral difficulties may be allowed greater screen time by caregivers as a coping strategy.

Socioeconomic factors may also play a moderating role. In the present study, a considerable proportion of participants belonged to middle and lower socioeconomic groups. Previous literature suggests that families facing economic or time-related constraints may rely more heavily on digital devices for childcare and entertainment.<sup>[33]</sup> Such contextual factors may confound the relationship between screen exposure and behavioral outcomes. Therefore, future research employing longitudinal designs and

controlling for environmental variables is warranted to clarify causal pathways.

While the findings of this study align with much of the existing literature, it is important to consider the role of content quality and parental mediation. Not all screen time is inherently harmful. Educational programming and interactive digital tools, when used in moderation and under parental supervision, have been associated with positive developmental outcomes.<sup>[34]</sup> The adverse effects observed in this study may therefore reflect excessive or unsupervised usage rather than screen exposure per se. This underscores the importance of distinguishing between passive consumption and structured, educational engagement.

The present study has several strengths, including a well-defined age range and the use of non-parametric statistical methods appropriate for the data distribution. However, certain limitations must be acknowledged. Data were based on parent-reported questionnaires, which may be subject to recall bias or social desirability bias. Additionally, the cross-sectional nature of the study prevents inference of causation. Longitudinal and experimental research designs would provide stronger evidence regarding temporal relationships between screen use and behavioral changes.

Despite these limitations, the findings have important practical implications. Parents, educators, and healthcare professionals should be aware of the potential behavioral risks associated with excessive screen exposure in early and middle childhood. Adherence to pediatric guidelines regarding screen time limits, encouragement of outdoor play, promotion of face-to-face social interaction, and active parental mediation may help mitigate negative outcomes.<sup>35</sup> Policymakers and educators should also consider incorporating digital literacy and balanced media use education into child development programs.

## CONCLUSION

This study provides further evidence of a significant association between increased screen time and behavioral problems among children aged 3–11 years. Higher screen exposure was positively correlated with hyperactivity, conduct problems, emotional disturbances, and peer difficulties, while negatively associated with prosocial behavior. These findings reinforce existing recommendations advocating moderated and supervised screen use during childhood. Future research should focus on longitudinal investigations to better understand causal mechanisms and explore protective factors that may buffer the adverse effects of excessive digital media exposure.

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## Conflicts of interest

There are no conflicts of interest.

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