

# A review on exposure to smart phone and its impact on behavioral and cognitive development of young children

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## ABSTRACT

Children of today's generation are growing up with digital devices, such as mobile phones, iPads, computers, video games, and smart gadgets; therefore, screen time has become ubiquitous in children's daily routines. Smart phone has become an integral part in children's lives, impacting many aspects of development. This study aims to systematically identify the social risk factors and impacts associated with smart phone usage among young children (birth to 6 years). The articles related to the topic were selected based on the inclusion criteria that, studies highlighting behavioral and cognitive outcomes and published in English language using several search engines. The review delineates impact of on behavioral and cognitive outcomes.. Social domain considers relationships, social skills, interaction, competence, self-regulation. The analysis outcome reveals that the social risk factors associated with smart phone addiction among young children. Negative impacts of smart phone usage include externalizing and internalizing behavior problems, withdrawn behavior, conduct problems, hyper activity, inattention and lack of social competence, self-regulation and decreased interaction with social groups, social isolation and on cognitive development such as reduced attention span, sleep time, academic achievement and poor vocabulary. It's essential for parents, caregivers, and educators to monitoring and limiting screen time, ensuring a balance of activities and promoting positive digital habits can contribute to the positive social development of young children.

**Key words:** Smart Phone<sup>1</sup>, Children<sup>2</sup>, Behavio<sup>3</sup>, Cognitive<sup>4</sup>, Development<sup>5</sup>

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## Introduction

Recent years have witnessed a surge in the availability of smart phones and child-oriented applications, presenting young children with unprecedented access to digital content and interactive media. From educational games to video streaming platforms, smart phones offer a myriad of opportunities for entertainment, learning, and engagement. However, alongside the potential benefits of smart phone use among young children, concerns have emerged regarding its impact on socio-emotional development. Research suggests that excessive screen time during early childhood may disrupt critical aspects of social interaction and emotional regulation, posing risks to interpersonal relationships and well-being [9]. The passive nature of screen-based activities may limit opportunities for meaningful face-to-face interactions and physical play, which are essential for developing social skills and empathy [5].

Despite growing recognition of the importance of understanding smart phone use among children, empirical research on this topic remains relatively limited. Existing studies often yield conflicting findings, reflecting the complexity of the relationship between smart phone use and behavioral outcomes. Contextual factors such as parental mediation practices, socioeconomic status and cultural norms may further shape children's experiences with smart phones and their subsequent developmental trajectories [3].

Given the evolving landscape of digital technology and its profound influence on early childhood experiences, there is a critical need for rigorous empirical investigations into the impact of smart phone use on behavior among young children. To address this gap, this review aims to elucidate the nuanced associations between smart phone use patterns, cognitive and behavioral outcomes in young children.

## Methodology

The research articles selected from different sites such as open access journals, peer reviewed journals, science direct, google scholar etc, published in English language between 2018 to 2022. The studies emphasized on smart phone as independent variable and child outcomes in behavioral and cognitive development as dependent variables were selected and also studies which have selected children from birth to 6 years were selected. Nearly 40 research articles were selected, but 8 studies that reported a standardized or quantifiable measure of use of smart phones by children which was use to measures of behavior and cognitive development of young children were selected.

**Table 1:** Overview on association between smart phone use patterns and behavior and cognitive developmental outcomes in young children

Study	Author and Year of the study	Study design	Sample size and Age group	Smartphone measures	Child outcome measures	Results
Screen time and developmental and behavioral outcomes for Preschool children	McArthur <i>et al.</i> , 2022	Longitudinal study	1994 mothers and children of age 24 to 36 months	Maternal report on children’s screen time (h/day)	Internalizing and externalizing behavior was Measured using the Child Behavior Checklist, Developmental screener-parent-report measure used to Evaluate developmental progress in five domains and Communicative Development was used to assess language Acquisition.	Children using screens 2 h or 3 h/day had an increased likelihood of reported behavioral problems delayed achievement of developmental milestones and poorer vocabulary acquisition
Technoference: longitudinal associations between parent technology use, parenting stress, and child behavior problems	McDaniel, B. T., and Radesky, J. S., 2020	Longitudinal study	194 couples with a young child from Birth to 5 years	Technoference was assessed by mother and father self-report Technology Device Interference Scale (TDIS).	Child Behavioral Checklist (CBCL) and Parenting Stress Index (PSI).	Technology interference often predicted greater externalizing behavior. Greater child externalizing behavior predicted greater technology interference and greater parenting stress. Associations between child internalizing behavior and technology interference were relatively weaker, associations were more consistent for child withdrawal behaviors.
Association between mobile technology use and child adjustment in early elementary school age	Hosokawa, R., and Katsura, T., 2018	Longitudinal study	1,642 preschool Children with age range of 5 to 6 years	Children's use of mobile Devices was assessed through average use time on a typical day	Strengths and Difficulties Questionnaire (SDQ) was used to measure of parents' perceptions of their children's prosocial and difficult Behaviors	Frequent mobile device use is likely to increase children's social isolation and hinder opportunities for social interaction with family, friends, that benefits the development of social competence, resulting in emotional or behavioral problems.

The effects of mobile phone / tablet use on preschool children	Sanela Nesimovic, 2021	Descriptive design	139 educators who shared their experiences in working with children of 3 to 6 years who exposed to mobile phone use	Children observed in different natural situations and artificial circumstances.	Children's behavior	Use of mobile phones in preschool has negative effects on Children and causes antisocial behavior in children.
The association between parent-child technology interference and cognitive and social-emotional development in preschool children	Carson, V., and Kuzik, N., 2021	Cross sectional design	100 parents and their preschool-aged child of 3 to 6 years	Parent-child relationship technology interference was measured with parental reported using an adapted version of the Technology Device Interference Scale	Cognitive development was objectively measured using three iPad-based tasks from the Early Years Toolbox to capture executive functions (i.e., working memory and response inhibition) and language development (i.e., expressive vocabulary). Social-emotional development was parental reported using the Child Self-regulation and Social Behavior Questionnaire.	Electronic devices in particular the cell phone/smart phone, may interrupt parents' conversations and activities with their child multiple times per day. This parent-child technology interference was found to be associated with lower response inhibition and emotional self-regulation as well as higher externalizing and internalizing.
Impact of Technology Use on Behavior and Sleep Scores in Preschool Children in Saudi Arabia	Almuaigel <i>et al.</i> , 2021	Cross-sectional study	288 children from 3 to 5 years	Questions related to the use of technology by a child focused on the duration, type of device, supervision, and content.	The Sleep Disturbance Scale for Children (SDSC) and The Children's Behavior Questionnaire (CBQ)	Technology use is associated with a negative impact on children sleep and behavior. Owning a digital device, using tablets, screen viewing for more than 3-5 h, and watching movies were significantly associated with negative child's behavior and sleep.
Reciprocal Associations between Electronic Media Use and Behavioral	Poulain <i>et al.</i> , 2018	Longitudinal study	527 children of 2 to 6 years	Children's use of different electronic media was assessed by population-based	Behavioral difficulties of children were assessed using the parent version of the Strengths and Difficulties Questionnaire (SDQ),	Usage of computer /Internet in early period predicted more emotional and conduct problems at later life, and usage of mobile phones was associated with more conduct problems and hyperactivity or inattention. The

Difficulties in Preschoolers				nationwide survey		preschoolers' use of electronic media, especially newer media such as computer/Internet and mobile phones, and their behavioral difficulties are mutually related over time.
Longitudinal Associations Between Early Childhood Externalizing Behavior, Parenting Stress, and Child Media Use	McDaniel, B. T., and Radesky, J. S., 2020	Longitudinal study	Mothers and fathers from 183 heterosexual couples with their child with age range of 1 to 5 years	Frequency of child media use was assessed at baseline and 6 months through parent report across eight items (e.g., television [TV], smart phone, tablet use)	Child externalizing behavior was assessed through the Child Behavioral Checklist, and parent stress through the Parenting Stress Index	Child behavior problems associated with media use and increases in externalizing behavior.

**Table 2 :** Behavioral developmental outcomes of children using smart phone

Social developmental outcomes	Frequency (f)	Percentage (%)
Externalizing behavior	91	50
Internalizing behavior	90	49.7
Depressing symptoms	93	51
Behavioral problems (risk group)	89	17
Conduct problems	95	19
Hyperactivity/inattention	106	20
Peer relationship problems	42	8
Antisocial behaviors	112	81.3

The results presented in table 1 and 2 reveals that, the children who used smart phones had negative behavioral and cognitive developmental outcomes. Both longitudinal and cross sectional research studies explained that use or exposure to smart phones and other electric gadgets in early life influences negatively during four to six years. The children who were exposed to screen time more than 3 hours/day were identified with greater externalizing and internalizing behavior problems, withdrawn behavior, conduct problems, hyperactivity, inattention, lack of social competence, self-regulation, less social interaction, social isolation reduced sleep time, delayed achievement of developmental milestones, poor vocabulary and impact parents such as increase in parental stress intern negative influence on parent and child relationship.

### Conclusion

A small attempt to review the potential negative effects of smart phone usage on the behavioral and cognitive developmental outcome on young children, including social competence, social interaction and behavioral problems revealed negative developmental outcomes. Hence it is essential for parents, caregivers, and educators to stay informed about the latest research in this field and make informed decisions based on individual circumstances. Monitoring and limiting screen time, ensuring a balance of physical activities and promoting positive digital habits can contribute to the positive social development of young children. However, the positive side of the technology use cannot be neglected, there is need to study the same. The type of media, type of gadgets, impact on health, parental stress, management strategies are few areas may be focused through future studies.

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