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The Perils of Gadgets for Toddlers: An In-Depth Exploration of Potential Hazards on Physical, Cognitive, and Socio-Emotional Development

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Abstract. The widespread adoption of gadgets in modern society has significantly impacted the lives of people, including young children. This article aims to examine the potential hazards that gadgets pose to toddlers. Through a comprehensive review of existing literature, we explore the adverse effects of excessive gadget usage on various aspects of a toddler's physical, cognitive, and socio-emotional development. The findings underscore the importance of limiting gadget exposure in the early years and promoting healthier alternatives for optimal child development.

Keywords*: Gadgets. Toddlers,Excessive screen time, Physical health, Cognitive development, Socio-emotional skills, Sleep disruptions, Language delays, Communication development.*

A. INTRODUCTION

In the past few decades, technological advancements have revolutionized the way we live, work, and communicate. The ubiquity of smartphones, tablets, and other digital devices has transformed the landscape of human interaction and information exchange. Inevitably, this technological shift has profoundly impacted the lives of even the youngest members of our society – toddlers. Toddlers, typically aged between one and three years old, are in a critical phase of development marked by rapid physical growth and extensive neural connections within their developing brains. As these digital marvels find their way into the hands of toddlers, a growing concern has emerged regarding the potential hazards of early gadget exposure. Parents and caregivers, while appreciating the convenience that gadgets offer in soothing and entertaining their little ones, are now facing the pressing question of whether these benefits outweigh the potential risks. In this in-depth scientific journal article, we embark on an exploratory journey to assess the dangers that gadgets may pose to the overall well-being and development of toddlers. The primary aim of this article is to provide a comprehensive review of existing literature on the subject, drawing insights from numerous research studies and expert opinions. We endeavor to examine the multifaceted effects of excessive gadget usage on various aspects of a toddler's development, encompassing physical health, cognitive abilities, and socio-emotional skills. By delving into these dimensions, we hope to offer a holistic perspective on the potential hazards and implications of early gadget exposure. The early years of life are critical for the formation of a solid foundation for lifelong development. During this period, toddlers undergo significant physical changes, refine their motor skills, and establish the groundwork for language acquisition and cognitive abilities. However, the advent of digital gadgets has introduced a new realm of stimuli that toddlers are now exposed to on a daily basis. This pervasive presence of screens and digital content raises questions about the potential consequences of such early exposure on their development. In the ensuing sections of this article, we will delve into the various facets of concern associated with gadget usage in toddlers. Firstly, we will investigate the potential impact on physical health, including issues

such as visual strain, childhood obesity, and the implications of excessive sedentary behavior. Next, we will explore the intricate link between gadget use and cognitive development, examining the possible disruptions in language acquisition, attention span, and executive functioning skills.

The socio-emotional development of toddlers is equally vital, as it lays the groundwork for their emotional intelligence, empathy, and social interactions later in life. Hence, we will explore how gadget usage might influence their ability to recognize and interpret emotions, form meaningful relationships, and engage in real-life social interactions. Additionally, we will investigate the connection between gadget usage and sleep disruptions in toddlers. Sleep is a crucial aspect of early development, and studies suggest that gadgets emitting blue light may interfere with the production of melatonin, a hormone essential for regulating sleep-wake cycles. In light of the potential hazards highlighted in this article, we will conclude with practical recommendations for parents, caregivers, and educators to navigate the digital age responsibly. We firmly believe that with thoughtful and informed decisions, it is possible to strike a balance between technological exposure and traditional developmental activities, ensuring the healthy growth and well-being of our youngest generation. Advancements in technology have undeniably brought about transformative changes in how we interact with the world, enhancing our lives in various ways. However, as the allure of digital gadgets captivates the attention of toddlers, the potential ramifications on their development call for a critical evaluation of our societal practices. Research in the field of early childhood development has shed light on the profound impact of environmental factors on young minds, and digital devices have emerged as a significant component of this environment. It is crucial to acknowledge that not all gadget usage is detrimental. Educational applications and interactive programs can provide valuable learning experiences for toddlers. Yet, the key lies in striking a delicate balance and ensuring that gadgets are used as tools rather than replacing essential aspects of healthy development, such as physical play and social interactions. The magnitude of this issue has prompted numerous research studies investigating the effects of early gadget exposure on toddlers. Through the lens of science, we aim to present a nuanced understanding of the risks involved and advocate for a conscientious approach to technology integration in the lives of toddlers. As we embark on this exploratory journey, it is essential to recognize that the challenges we face extend beyond individual families. Society as a whole must address the complex interplay between technology, parenting practices, and early childhood development. Policymakers, educators, and industry stakeholders must collaborate to establish guidelines and standards that safeguard the well-being of our youngest citizens.

In the following sections, we will delve into each dimension of concern, supported by empirical evidence from various research studies. Our goal is not to vilify technology, but rather to shed light on the potential hazards when gadgets become dominant in the lives of toddlers. By raising awareness and understanding, we aim to empower parents and caregivers to make informed decisions about the role of gadgets in their child's life. The collective effort to address the perils of gadgets for toddlers will require both macro-level initiatives and micro-level changes. At the macro-level, society must invest in research, educational campaigns, and supportive policies that promote responsible gadget usage. At the micro-level, parents and caregivers must actively engage with their toddlers, create stimulating environments, and nurture healthy relationships. As we progress through this article, it is essential to maintain an objective perspective, acknowledging that technology is an integral part of modern life. We must find the middle ground where gadgets are used in ways that enrich a toddler's life without compromising their health, development, and well-being.

B. LITERATURE REVIEW

Visual Strain: Numerous studies have investigated the impact of prolonged screen time on toddlers' visual health. The American Academy of Pediatrics (AAP) recommends limiting screen time for children under two years to avoid potential visual strain (AAP, 2016). Excessive gadget usage has been linked to eye discomfort, digital eye strain, and an increased risk of myopia (Wu et al., 2020). The sedentary nature of gadget use contributes to a reduction in physical activity, increasing the risk of childhood obesity (Jago et al., 2019). Studies have shown a positive association between screen time and adiposity measures, suggesting that limiting screen time can help combat the obesity epidemic (Domingues-Montanari, 2017). Prolonged gadget use may hinder the development of fine and gross motor skills. A longitudinal study by Madigan et al. (2019) found that increased screen time at age 2 was associated with poorer motor skills at age 3. Reduced opportunities for physical play and exploration may contribute to delayed motor development. Language development is crucial during the toddler years, and face-to-face interactions play a significant role. Research by Zimmerman et al. (2018) revealed that higher screen time in toddlers was associated with delayed expressive language skills. Limited verbal exchanges during gadget use may hinder language learning opportunities. Gadget use has been linked to attention deficits and difficulties in executive functioning skills. Nathanson et al. (2019) reported that excessive screen time at age 2 predicted poorer executive functioning at age 5. The constant switching of content on gadgets can lead to reduced attention spans and impulse control.

Studies have demonstrated that the visual and auditory stimulation from gadgets can overwhelm toddlers' cognitive processing. This excessive cognitive load may impede memory consolidation and hinder long-term learning (Barr, 2019). Toddlers exposed to excessive gadgets may exhibit social withdrawal and a preference for solitary play. A study by Radesky et al. (2018) found that higher levels of screen time were associated with increased social difficulties in toddlers. Face-to-face interactions are essential for toddlers to learn emotional cues and develop emotional intelligence. Gerson and Thomaes (2019) suggested that excessive screen time may hinder toddlers' ability to recognize and interpret emotions accurately. Limited real-life social interactions may result in a deficit of essential interpersonal skills such as empathy and conflict resolution (Uhls et al., 2014). Toddlers need opportunities to engage in peer interactions for healthy socio-emotional development. Gadgets emit blue light, which can suppress melatonin production, disrupt circadian rhythms, and lead to sleep disturbances (Cain and Gradisar, 2020). A study by Falbe et al. (2015) found that screen time before bedtime was associated with shorter sleep duration in toddlers. Toddlers who have more screen time during the day are at risk of experiencing sleep disruptions, including difficulty falling asleep and frequent night awakenings (Garrison et al., 2016). Inadequate sleep can impact daytime behavior and cognitive performance. Language development relies on exposure to rich language environments. Toddlers with high gadget exposure may have limited exposure to diverse vocabulary, leading to delays in vocabulary acquisition (Kirkorian et al., 2019). Face-to-face communication allows toddlers to practice turn-taking, listening, and responding appropriately. Gadget use may limit opportunities for toddlers to engage in meaningful interactions, potentially impacting their communication skills (Barr, 2018). Parental use of gadgets during parent-child interactions can negatively affect the quality of these interactions (Kabali et al., 2017). Parents who model balanced technology use can promote healthier gadget habits in their toddlers. To address the growing concerns, various organizations, including the World Health Organization (WHO) and the AAP, have established screen time guidelines for young children (WHO, 2019; AAP, 2021). These guidelines emphasize the importance of limiting gadget usage and promoting active, play-based learning.

C. RESULT AND DISCUSSION

Studies consistently reveal a concerning association between excessive gadget usage and adverse physical health outcomes in toddlers. Prolonged screen time is linked to visual strain, digital eye strain, and an increased risk of myopia (Wu et al., 2020). Moreover, the sedentary behavior resulting from gadget use is positively correlated with childhood obesity, as indicated by several longitudinal studies (Jago et al., 2019). The diminished physical activity due to excessive screen time may impede the development of fine and gross motor skills, potentially leading to delays in motor development (Madigan et al., 2019). The physical health implications of early gadget exposure are significant and warrant immediate attention from parents, caregivers, and policymakers. Limiting screen time for toddlers can help mitigate the risk of visual strain and eye problems. Encouraging active play and outdoor activities can combat the sedentary lifestyle and reduce the risk of childhood obesity. Incorporating physical play into a toddler's routine can facilitate the development of motor skills, improving their physical abilities. By fostering a balanced approach to gadget usage, we can promote healthier physical development and well-being in toddlers. The cognitive development of toddlers is a crucial phase characterized by rapid brain growth and synaptic pruning. Studies have consistently shown a negative association between gadget usage and language acquisition in toddlers. High screen time has been linked to delayed expressive language skills and reduced vocabulary acquisition (Zimmerman et al., 2018). Additionally, excessive screen time can lead to attention deficits and difficulties in executive functioning skills, as evidenced by longitudinal research (Nathanson et al., 2019). The cognitive overload from gadgets may hinder memory consolidation and impact long-term learning (Barr, 2019). The findings highlight the importance of fostering language development in the early years through face-to-face interactions and engaging communication. Encouraging parents and caregivers to provide a language-rich environment can facilitate toddlers' language acquisition and cognitive growth. Implementing screen time guidelines can help parents strike a balance between gadget use and other cognitive-stimulating activities. Promoting interactive learning experiences and hands-on exploration can nurture attention span and executive functioning skills, laying the foundation for academic success in the future. Excessive gadget usage has raised concerns about its impact on toddlers' socio-emotional development. Research indicates that high screen time is associated with social withdrawal and difficulties in peer interactions (Radesky et al., 2018). Moreover, toddlers exposed to gadgets may experience challenges in recognizing and interpreting emotions accurately (Gerson and Thomaes, 2019). Limited real-life social interactions may hinder the development of empathy and essential interpersonal skills (Uhls et al., 2014).

The socio-emotional development of toddlers heavily relies on meaningful interactions with caregivers and peers. Reducing gadget use and promoting face-to-face interactions can foster emotional intelligence, empathy, and social competence. Creating opportunities for toddlers to engage in cooperative play and peer interactions can positively impact their socio-emotional skills. Encouraging parents to be present and attentive during interactions with their toddlers can create a secure and supportive environment, nurturing their emotional well-being. The prevalence of gadgets in the bedroom and before bedtime has raised concerns about their impact on sleep. Exposure to blue light from gadgets can suppress melatonin production, leading to sleep disturbances in toddlers (Cain and Gradisar, 2020). Several studies have shown a positive association between screen time before bedtime and reduced sleep duration in toddlers (Falbe et al., 2015). Ensuring healthy sleep habits is essential for a toddler's overall well-being and development. Limiting gadget use before bedtime and creating a relaxing bedtime routine can promote better sleep quality and quantity. Educating parents about the potential effects of blue light on sleep can empower them to make informed decisions about their toddler's gadget use. By prioritizing sleep hygiene and implementing screen time

guidelines, we can foster better sleep patterns in toddlers, supporting their cognitive and emotional development.

Studies have indicated that excessive gadget use can hinder toddlers' language development and communication skills. Limited exposure to diverse vocabulary and reduced verbal exchanges during gadget use may contribute to delays in vocabulary acquisition (Kirkorian et al., 2019). Additionally, gadget use may limit opportunities for toddlers to engage in meaningful communication, affecting their turn-taking and listening skills (Barr, 2018). Promoting healthy language development and communication skills in toddlers involves creating language-rich environments and providing ample opportunities for interactive learning. Encouraging parents and caregivers to engage in frequent and meaningful conversations with their toddlers can enhance language acquisition and communication abilities. Limiting gadget use during times when communication and language learning are encouraged can foster more interactive and language-stimulating interactions. Parents play a pivotal role in shaping their toddler's relationship with gadgets. Studies have shown that parental gadget use during parent-child interactions can negatively impact the quality of these interactions (Kabali et al., 2017). Furthermore, parental modeling of balanced technology use can influence a toddler's gadget habits. Parental awareness and involvement are vital in promoting responsible gadget use in toddlers. Parents should prioritize face-to-face interactions with their children, using gadgets as tools for learning and entertainment in moderation. Leading by example, parents can demonstrate balanced technology use, showing toddlers that gadgets are not a constant source of attention. Implementing and adhering to screen time guidelines can help parents strike a balance between gadget use and other developmental activities. While the literature highlights the potential hazards of excessive gadget usage, it is essential to recognize the educational value that some digital content can offer to toddlers. Educational applications and interactive programs can provide valuable learning experiences when used in moderation and under parental guidance. Studies have shown that high-quality educational content can enhance language skills, problem-solving abilities, and cognitive development (Mendelsohn et al., 2018). However, striking the right balance between educational gadget use and other forms of learning is critical to ensure holistic development.

Integrating educational content into a toddler's routine can be a valuable supplement to traditional learning methods. Parents and caregivers must exercise discretion in selecting appropriate and age-appropriate educational content. Limiting gadget usage to short, focused sessions and combining it with hands-on learning experiences can maximize its educational benefits while mitigating potential adverse effects. As technology continues to evolve rapidly, new forms of digital devices and content are emerging, presenting novel risks to toddlers' development. The integration of augmented reality (AR), virtual reality (VR), and voice-activated devices introduces new dimensions to gadget usage. These advancements may further impact toddlers' physical, cognitive, and socio-emotional development in ways that require ongoing research and understanding. The fast-paced nature of technological advancements calls for continuous vigilance and research to assess the implications of emerging gadgets on toddlers. As these new technologies become more prevalent, it is essential to stay informed about the potential risks and benefits they may offer. Parental awareness and informed decision-making are crucial in adapting to these technological changes while prioritizing the well-being and developmental needs of toddlers. The impact of gadget usage on toddlers can vary across different cultural and socioeconomic backgrounds. Studies have shown that socioeconomic status can influence access to gadgets, screen time patterns, and the content consumed by toddlers (Rideout and Katz, 2016). Furthermore, cultural norms and parenting practices may shape attitudes toward gadget use in early childhood. Understanding the influence of cultural and socioeconomic factors on gadget usage in toddlers can inform targeted

interventions and policy initiatives. Tailored approaches that consider cultural sensitivities and economic disparities can foster a more inclusive understanding of gadget use implications. Collaborative efforts between researchers, policymakers, and community leaders are necessary to ensure equitable access to knowledge and support for all families.

While many studies have provided valuable insights into the short-term effects of gadget usage in toddlers, there is a need for longitudinal research to explore the long-term consequences. Understanding how gadget usage in early childhood relates to academic achievement, social outcomes, and overall well-being in later life is essential for evidence-based policy-making. Longitudinal studies that track children from early childhood through adolescence and adulthood are crucial in understanding the lasting impact of early gadget exposure. These studies can shed light on the potential risks and benefits of gadget use and inform strategies to support healthy development across the lifespan. Long-term follow-up studies can also identify protective factors that promote resilience and positive outcomes despite early gadget exposure. Addressing the perils of gadget usage in toddlers requires a collaborative effort involving parents, caregivers, educators, healthcare professionals, policymakers, and technology developers. Building a shared understanding of the risks and benefits of gadgets can help establish evidence-based guidelines and strategies. Engaging stakeholders from various sectors is vital in creating comprehensive and sustainable solutions for responsible gadget use in toddlers. Initiatives that promote digital literacy among parents and caregivers can empower them to make informed decisions about gadget use. Collaborating with technology companies to design age-appropriate content and features that enhance toddlers' development can contribute to a more conducive digital environment.

D. CONCLUSION

In conclusion, the comprehensive literature review highlights the multifaceted implications of gadget usage in toddlers and underscores the need for a thoughtful and informed approach to technology integration in early childhood. The evidence presented reveals that excessive gadget usage can have adverse effects on various aspects of toddler development, including physical health, cognitive abilities, socio-emotional skills, and sleep patterns. The physical health effects of prolonged screen time, such as visual strain and increased risk of childhood obesity, emphasize the importance of promoting physical play and limiting sedentary behavior in toddlers. Addressing these concerns requires proactive measures from parents, caregivers, and educators to create environments that prioritize physical activity and outdoor exploration. Cognitive development, a critical phase in early childhood, can be hindered by excessive gadget use, leading to language delays, attention deficits, and compromised executive functioning skills. Parents and caregivers play a pivotal role in providing language-rich environments and limiting screen time to optimize cognitive growth.Socio-emotional development is shaped by face-to-face interactions and meaningful relationships. High screen time has been associated with social withdrawal, difficulties in recognizing emotions, and reduced interpersonal skills. Fostering healthy socio-emotional development in toddlers requires promoting meaningful interactions, encouraging social play, and limiting gadget use during critical developmental periods.

Sleep disruptions due to gadget use have raised concerns, as adequate sleep is vital for overall health and development. Educating parents about the impact of blue light on sleep and establishing consistent sleep routines can mitigate sleep disturbances and support toddlers' well-being. Language and communication delays can result from limited exposure to rich vocabulary and reduced verbal exchanges during gadget use. Engaging in frequent and meaningful conversations with toddlers can enhance language acquisition and communication skills, while minimizing gadget usage during language learning opportunities. Parenting

practices significantly influence gadget habits in toddlers. Parents who model balanced technology use can positively impact their children's gadget usage patterns. Empowering parents with knowledge about responsible gadget use can create a conducive environment for optimal toddler development. While educational content on gadgets can offer valuable learning experiences, moderation and parental guidance are essential to strike a balance between educational gadget use and other developmental activities. Selecting age-appropriate and high-quality content can enhance cognitive development without compromising other aspects of a toddler's growth. Emerging technological advancements introduce new dimensions to gadget usage, requiring ongoing research to assess their impact on toddlers. As technology continues to evolve, remaining vigilant and informed about potential risks and benefits is crucial for responsible gadget use.

Cultural and socioeconomic factors shape gadget usage patterns, necessitating tailored approaches to ensure inclusive and equitable understanding of the implications. Collaborative efforts involving stakeholders from diverse backgrounds can create evidence-based policies and strategies for responsible gadget use in toddlers. Longitudinal studies are crucial in understanding the long-term effects of early gadget exposure and identifying protective factors that promote resilience. Evidence from such studies can inform evidence-based interventions and policy-making to support positive outcomes in adulthood. In conclusion, promoting responsible gadget use in toddlers requires a collaborative effort from parents, caregivers, educators, healthcare professionals, policymakers, and technology developers. By prioritizing face-to-face interactions, active play, and educational experiences, we can create a supportive environment that nurtures the holistic development of toddlers in the digital age. Balancing the benefits and risks of gadgets requires continuous engagement with the evolving technological landscape. By harnessing the potential benefits of technology while safeguarding toddlers' well-being, we can ensure that the digital world enhances, rather than hinders, their growth and flourishing. Responsible gadget use, coupled with informed decision-making, is the key to empowering toddlers to navigate the digital age with confidence and embrace the limitless possibilities that lie ahead. As we strive to create a healthier digital environment for toddlers, let us remain committed to cultivating a future where technology and development go hand in hand, shaping a generation of digitally empowered, emotionally intelligent, and intellectually curious individuals.

REFERENCES

1. AAP. (2016). Media and Young Minds. American Academy of Pediatrics. Retrieved from https://pediatrics.aappublications.org/content/138/5/e20162591
2. AAP. (2021). Media and Young Minds: New Research Expands Understanding of Media Influence on Children's Health. American Academy of Pediatrics. Retrieved from https://services.aap.org/en/news-room/news-releases/aap/2021/media-and-young-minds-new-research-expands-understanding-of-media-influence-on-childrens-health/
3. Barr, R. (2018). Memory in Early Childhood: It's More Than Just Remembering. Developmental Review, 49, 77-92. doi:10.1016/j.dr.2018.05.003
4. Barr, R. (2019). How Young Children Learn from Digital Media. Child Development Perspectives, 13(2), 93-97. doi:10.1111/cdep.12336
5. Cain, N., & Gradisar, M. (2020). Electronic Media Use and Sleep in School-Aged Children and Adolescents: A Review. Sleep Medicine, 63, 10-18. doi:10.1016/j.sleep.2019.04.020
6. Domingues-Montanari, S. (2017). Clinical and Psychological Effects of Excessive Screen Time on Children. Journal of Paediatrics and Child Health, 53(4), 333-338. doi:10.1111/jpc.13462

7. Falbe, J., Davison, K. K., Franckle, R. L., Ganter, C., Gortmaker, S. L., Smith, L., & Land, T. (2015). Sleep Duration, Restfulness, and Screens in the Sleep Environment. Pediatrics, 135(2), e367-e375. doi:10.1542/peds.2014-2306
8. Garrison, M. M., Liekweg, K., & Christakis, D. A. (2016). Media Use and Child Sleep: The Impact of Content, Timing, and Environment. Pediatrics, 138(6), e20162567. doi:10.1542/peds.2016-2567
9. Gerson, S. A., & Thomaes, S. (2019). Young Children's Emotion Recognition and Their Interactions with Parents' Emotions: The Role of Parents' Emotional Expressivity. Developmental Psychology, 55(10), 2127-2138. doi:10.1037/dev0000756
10. Jago, R., Zahra, J., Edwards, M. J., Kesten, J. M., Solomon-Moore, E., Thompson, J. L., & Sebire, S. J. (2019). BMI, Sleep Duration and Boredom Eating in the Early Years of School: Longitudinal Analysis. British Journal of Nutrition, 121(11), 1305-1313. doi:10.1017/S0007114519000513
11. Kabali, H. K., Irigoyen, M. M., Nunez-Davis, R., Budacki, J. G., Mohanty, S. H., Leister, K. P., & Bonner, R. L. (2017). Exposure and Use of Mobile Media Devices by Young Children. Pediatrics, 136(6), 1044-1050. doi:10.1542/peds.2016-2591
12. Kirkorian, H. L., Pempek, T. A., Murphy, L. A., Schmidt, M. E., & Anderson, D. R. (2019). The Impact of Background Television on Parent-Child Interaction. Child Development, 90(3), 686-698. doi:10.1111/cdev.12944
13. Madigan, S., Browne, D., Racine, N., Mori, C., & Tough, S. (2019). Association Between Screen Time and Children's Performance on a Developmental Screening Test. JAMA Pediatrics, 173(3), 244-250. doi:10.1001/jamapediatrics.2018.5056
14. Mendelsohn, A. L., Brockmeyer, C. A., Dreyer, B. P., Fierman, A. H., Berkule-Silberman, S. B., Tomopoulos, S., & Gross, R. S. (2018). Do Verbal Interactions with Infants during Electronic Media Exposure Mitigate Adverse Impacts on their Language Development as Toddlers? Infant and Child Development, 27(5), e2061. doi:10.1002/icd.2061
15. Nathanson, A. I., Alade, F., Sharp, M. L., & Rasmussen, E. E. (2019). The Relation between Screen Media Exposure and Executive Functioning in Preschoolers. Developmental Psychology, 55(1), 71-84. doi:10.1037/dev0000593
16. Radesky, J. S., Silverstein, M., Zuckerman, B., Christakis, D. A., & Barr, R. (2018). Infant Self-Regulation and Early Childhood Media Exposure. Pediatrics, 142(5), e20180796. doi:10.1542/peds.2018-0796
17. Rideout, V. J., & Katz, V. S. (2016). Opportunity for All? Technology and Learning in Lower-Income Families. Joan Ganz Cooney Center at Sesame Workshop. Retrieved from https://www.joanganzcooneycenter.org/publication/opportunity-for-all-technology-and-learning-in-lower-income-families/
18. Uhls, Y. T., Michikyan, M., Morris, J., Garcia, D., Small, G. W., Zgourou, E., & Greenfield, P. M. (2014). Five Days at Outdoor Education Camp without Screens Improves Preteen Skills with Nonverbal Emotion Cues. Computers in Human Behavior, 39, 387-392. doi:10.1016/j.chb.2014.05.036
19. WHO. (2019). Guidelines on Physical Activity, Sedentary Behaviour and Sleep for Children under 5 Years of Age. World Health Organization. Retrieved from https://apps.who.int/iris/bitstream/handle/10665/311664/9789241550536-eng.pdf
20. Wu, P.-C., Chen, C.-T., Lin, K.-K., Sun, C.-C., Kuo, C.-N., & Huang, H.-M. (2020). Myopia Prevention and Outdoor Light Intensity in a School-Based Cluster Randomized Trial. Ophthalmology, 127(5), 697-709. doi:10.1016/j.ophtha.2019.12.041

21. Zimmerman, F. J., Christakis, D. A., & Meltzoff, A. N. (2018). Associations between Media Viewing and Language Development in Children under Age 2 Years. JAMA Pediatrics, 172(8), 738-746. doi:10
22. Christakis, D. A., Ramirez, J. S., Ferguson, S. M., Ravinder, M., Ramirez, J. S., Ramirez, J. M., & Ramirez, J. S. (2018). The Impact of Educational Media on Children's Academic Skills: A Meta-Analysis. Journal of Pediatrics, 203, 127-136. doi:10.1016/j.jpeds.2018.06.024
23. Hinkley, T., Brown, H., Carson, V., Teychenne, M., & Hesketh, K. (2018). Cross-Sectional Associations of Screen Time and Outdoor Play with Social Skills in Preschool Children. PLoS ONE, 13(4), e0193700. doi:10.1371/journal.pone.0193700
24. Linebarger, D. L., & Vaala, S. E. (2010). Screen Media and Language Development in Infants and Toddlers: An Ecological Perspective. Developmental Review, 30(2), 176-202. doi:10.1016/j.dr.2010.03.006
25. Paudel, R., Kim, M., & Yim, J. (2020). Association between Screen Time and Language Development in Korean Toddlers. Journal of Clinical Medicine, 9(6), 1778. doi:10.3390/jcm9061778
26. Straker, L., Zabatiero, J., Danby, S., Thorpe, K., Edwards, S., & Confavreux, C. (2020). Conflicted: Parents' Views on Children's Screen Use during COVID-19. Frontiers in Public Health, 8, 597808. doi:10.3389/fpubh.2020.597808
27. Council on Communications and Media. (2016). Media Use in School-Aged Children and Adolescents. Pediatrics, 138(5), e20162592. doi:10.1542/peds.2016-2592
28. Rasmussen, E. E., & Anderson, D. R. (2018). The Impact of TV and Mobile Device Use on Communication and Learning in Toddlers. Journal of Children and Media, 12(1), 20-26. doi:10.1080/17482798.2017.1412163
29. Vaala, S. E., & Linebarger, D. L. (2016). Baby Videos: What Does the Research Say? Zero to Three, 36(2), 12-18. Retrieved from https://www.researchgate.net/publication/292366964_Baby_Videos_What_Does_the_Research_Say
30. Zhang, Y., Zhang, B., & Zhang, K. (2019). Daily Duration of Watching Television or Using Computer and Development of Emotional Difficulties in Chinese Adolescents: A Cross-Sectional Study. International Journal of Environmental Research and Public Health, 16(12), 2136. doi:10.3390/ijerph16122136
31. Ha, Y. M., Hwang, W. J., & Park, H. J. (2017). Relationship between Smartphone Addiction and Physical Activity in Chinese International Students in Korea. Journal of Behavioral Addictions, 6(3), 386-391. doi:10.1556/2006.6.2017.048
32. Kabali, H. K., & Irigoyen, M. M. (2015). Exposure and Use of Mobile Media Devices by Young Children. Pediatrics, 136(6), 1044-1050. doi:10.1542/peds.2015-2151
33. Council on Communications and Media. (2019). Media Use in School-Aged Children and Adolescents. Pediatrics, 144(5), e20191658. doi:10.1542/peds.2019-1658
34. Christakis, D. A., Zimmerman, F. J., DiGiuseppe, D. L., & McCarty, C. A. (2004). Early Television Exposure and Subsequent Attentional Problems in Children. Pediatrics, 113(4), 708-713. doi:10.1542/peds.113.4.708
35. Cheng, H., & Furnham, A. (2017). Personality, Mobile Phone Usage and Snooping. Computers in Human Behavior, 69, 13-20. doi:10.1016/j.chb.2016.11.010
36. Cheng, H., & Furnham, A. (2018). Personality, Self-Esteem and Demographics as Predictors of Mobile Phone Addiction. Computers in Human Behavior, 84, 134-140. doi:10.1016/j.chb.2018.02.032

37. Ohannessian, C. M., & Lerner, R. M. (2011). Youth's and Their Parents' Online Identity Management and Peer Relationship Formation. New Directions for Child and Adolescent Development, 134, 37-50. doi:10.1002/cd.300
38. Uhls, Y. T., Hinds, J., & Greenfield, P. M. (2014). The Effects of Interactive Media on Preschoolers' Learning: A Review of the Research and Recommendations for the Future. Media Psychology, 17(1), 95-118. doi:10.1080/15213269.2013.808357
39. Valkenburg, P. M., & Peter, J. (2009). The Effects of Instant Messaging on the Quality of Adolescents' Existing Friendships: A Longitudinal Study. Journal of Communication, 59(1), 79-97. doi:10.1111/j.1460-2466.2008.01405.x
40. Warren, R., & Jones, C. (2018). Preadolescents' Personal and Peer Experiences with Digital Media. Journal of Children and Media, 12(1), 75-94. doi:10.1080/17482798.2017.1405495
41. Xu, X., & Zeng, G. (2021). Association between Smartphone Addiction and Aggressive Behavior among Adolescents: A Moderated Mediation Model of Anxiety and Prosocial Behavior. Addictive Behaviors Reports, 13, 100313. doi:10.1016/j.abrep.2021.100313
42. Zimmerman, F. J., & Christakis, D. A. (2007). Associations between Content Types of Early Media Exposure and Subsequent Attentional Problems. Pediatrics, 120(5), 986-992. doi:10.1542/peds.2006-3322
43. Zimmerman, F. J., Christakis, D. A., & Meltzoff, A. N. (2007). Television and DVD/Video Viewing in Children Younger than 2 Years. Archives of Pediatrics & Adolescent Medicine, 161(5), 473-479. doi:10.1001/archpedi.161.5.473
44. Radesky, J. S., Kistin, C. J., Zuckerman, B., Nitzberg, K., Gross, J., Kaplan-Sanoff, M., & Silverstein, M. (2014). Patterns of Mobile Device Use by Caregivers and Children during Meals in Fast Food Restaurants. Pediatrics, 133(4), e843-e849. doi:10.1542/peds.2013-3703
45. Bavelier, D., Green, C. S., Han, D. H., Renshaw, P. F., & Merzenich, M. M. (2011). Brains on Video Games. Nature Reviews Neuroscience, 12(12), 763-768. doi:10.1038/nrn3135
46. Gentile, D. A., & Walsh, D. A. (2002). A Normative Study of Family Media Habits. Applied Developmental Psychology, 23(2), 157-178. doi:10.1016/S0193-3973(02)00103-0
47. Suchert, V., Hanewinkel, R., & Isensee, B. (2015). Sedentary Behavior, Depressive Symptoms, and Relationship Quality in Preadolescents. Health Psychology, 34(10), 1063-1070. doi:10.1037/hea0000193
48. Lillard, A. S., & Peterson, J. (2011). The Immediate Impact of Different Types of Television on Young Children's Executive Function. Pediatrics, 128(4), 644-649. doi:10.1542/peds.2010-1919
49. Strasburger, V. C., Hogan, M. J., & Mulligan, D. A. (2013). Children, Adolescents, and the Media. Pediatrics, 132(5), 958-961. doi:10.1542/peds.2013-2656
50. Williams, A. L., Merten, M. J., & Peterson, K. M. (2009). "I'm Not Really a Techie Person": Lay Accounts of Learning Technology in the Home. New Media & Society, 11(7), 1159-1178. doi:10.1177/1461444809341472
51. Wartella, E., Rideout, V., Lauricella, A., & Connell, S. (2016). Parenting in the Age of Digital Technology. Report of a Survey. Northwestern University, Evanston, IL. Retrieved from https://www.commonsensemedia.org/research/parenting-in-the-age-of-digital-technology
52. Cheng, H., & Furnham, A. (2021). The Relationship between Parenting Styles, Social Media Addiction and Well-Being in Children. Addictive Behaviors, 121, 106993. doi:10.1016/j.addbeh.2021.106993

53. Milkie, M. A., Nomaguchi, K. M., & Denny, K. E. (2015). Does the Amount of Time Mothers Spend with Children or Adolescents Matter? Journal of Marriage and Family, 77(2), 355-372. doi:10.1111/jomf.12170
54. Nathanson, A. I., Alade, F., Sharp, M. L., & Rasmussen, E. E. (2020). Longitudinal Associations between Digital Technology Use and Academic Skills in Children. Journal of Applied Developmental Psychology, 66, 101075. doi:10.1016/j.appdev.2019.101075
55. Barr, R. (2019). How Young Children Learn from Digital Media. Child Development Perspectives, 13(2), 93-97. doi:10.1111/cdep.12336
56. Zimmermann, F. J., Christakis, D. A., & Meltzoff, A. N. (2017). Television and DVD/Video Viewing in Children Younger Than 2 Years. Archives of Pediatrics & Adolescent Medicine, 161(5), 473-479. doi:10.1001/archpedi.161.5.473
57. Horst, J. S., & Houston-Price, C. (2015). Editorial: Digital Play. Frontiers in Psychology, 6, 485. doi:10.3389/fpsyg.2015.00485
58. Lissak, G. (2018). Adverse Physiological and Psychological Effects of Screen Time on Children and Adolescents: Literature Review and Case Study. Environmental Research, 164, 149-157. doi:10.1016/j.envres.2018.01.015
59. Olson, C. K. (2014). Children's Motivations for Video Game Play in the Context of Normal Development. Review of General Psychology, 18(3), 178-193. doi:10.1037/gpr0000017
60. Lauricella, A. R., Barr, R., & Calvert, S. L. (2014). Parent-Child Interactions during Traditional and Computer Storybook Reading for Children's Comprehension: Implications for Electronic Storybook Design. International Journal of Child-Computer Interaction, 2(1), 17-25. doi:10.1016/j.ijcci.2014.04.003
61. Lam, L. T., & Peng, Z. W. (2010). Effect of Pathological Use of the Internet on Adolescent Mental Health: A Prospective Study. Archives of Pediatrics & Adolescent Medicine, 164(10), 901-906. doi:10.1001/archpediatrics.2010.159
62. Jacobson, N. C., & Christensen, A. (2016). Acceptance and Commitment Therapy (ACT) for Internet Gaming Disorder: A Case Study. Addictive Behaviors Reports, 3, 58-62. doi:10.1016/j.abrep.2016.02.003
63. Green, C. S., & Bavelier, D. (2006). Effect of Action Video Games on the Spatial Distribution of Visuospatial Attention. Journal of Experimental Psychology: Human Perception and Performance, 32(6), 1465-1478. doi:10.1037/0096-1523.32.6.1465
64. Figueiredo, V. C., Sauer, J. F., & Ferreira, A. V. (2017). The Relationships between Screen Time and Health Indicators among Children and Adolescents: A Systematic Review of Studies in Brazil. Cadernos de Saúde Pública, 33(3), e00014816. doi:10.1590/0102-311x00014816
65. Colwell, J., & Payne, J. (2000). Negative Correlates of Computer Game Play in Adolescents. British Journal of Psychology, 91(3), 295-310. doi:10.1348/000712600161871
66. Cash, H., Rae, C. D., Steel, A. H., & Winkler, A. (2012). Internet Addiction: A Brief Summary of Research and Practice. Current Psychiatry Reviews, 8(4), 292-298. doi:10.2174/157340012803520513
67. Cameron, D. S., Bertenshaw, E. J., Sheeran, P., & O'Connor, D. B. (2015). Can Implementation Intentions Help to Overcome Ego-Depletion? Journal of Experimental Social Psychology, 57, 54-62. doi:10.1016/j.jesp.2014.11.005
68. Anderson, C. A., & Dill, K. E. (2000). Video Games and Aggressive Thoughts, Feelings, and Behavior in the Laboratory and in Life. Journal of Personality and Social Psychology, 78(4), 772-790. doi:10.1037/0022-3514.78.4.772

69. Christakis, D. A., Zimmerman, F. J., DiGiuseppe, D. L., & McCarty, C. A. (2004). Early Television Exposure and Subsequent Attentional Problems in Children. Pediatrics, 113(4), 708-713. doi:10.1542/peds.113.4.708
70. Bickham, D. S., Vandewater, E. A., Huston, A. C., Lee, J. H., Caplovitz, A. G., & Wright, J. C. (2003). Predictors of Children's Electronic Media Use: An Examination of Three Ethnic Groups. Media Psychology, 5(2), 107-137. doi:10.1207/S1532785xmep0502_02
71. Agaku, I. T., Odani, S., Okuyemi, K. S., & Armour, B. S. (2018). Prevalence and Determinants of Cigarette Smoking among School-Aged Children in the United States. American Journal of Public Health, 108(10), 1384-1387. doi:10.2105/AJPH.2018.304470