Deleterious Associations with Baby, Toddler, and Caregiver Digital Device Use

Global Research Highlights and Additional Documents Referenced in GAINING Alerts (2019-2026)

Associations with Atypical Brain Development

Associations between digital media use and brain surface structural measures in preschool-aged children

Hutton, J. S., Dudley, J., DeWitt, T., & Horowitz-Kraus, T. (2022). Associations between digital media use and brain surface structural measures in preschool-aged children. *Scientific reports*, *12*(1), 19095. https://doi.org/10.1038/s41598-022-20922-0

(USA)

Study found associations between "higher digital media use and lower cortical thickness and sulcal depth among 3- to 5-year-olds in brain areas supporting primary visual processing and higher-order functions such as top-down attention, complex memory encoding, letter recognition and social cognition."

Associations with Atypical Neural Activity

Associations Between Infant Screen Use, Electroencephalography Markers, and Cognitive Outcomes

Law, E. C., Han, M. X., Lai, Z., Lim, S., Ong, Z. Y., Ng, V., Gabard-Durnam, L. J., Wilkinson, C. L., Levin, A. R., Rifkin-Graboi, A., Daniel, L. M., Gluckman, P. D., Chong, Y. S., Meaney, M. J., & Nelson, C. A. (2023). Associations Between Infant Screen Use, Electroencephalography Markers, and Cognitive Outcomes. *JAMA pediatrics*, *177*(3), 311–318. https://doi.org/10.1001/jamapediatrics.2022.5674

(SINGAPORE, USA, NEW ZEALAND, CANADA)

"Infant screen use was associated with altered cortical EEG activity before age 2 years; the identified EEG markers mediated the association between infant screen time and executive functions."

Associations with Executive Functioning and Emotional Reactivity

Early-Childhood Tablet Use and Outbursts of Anger

Fitzpatrick, C., Pan, P. M., Lemieux, A., Harvey, E., Rocha, F. A., & Garon-Carrier, G. (2024). Early-Childhood Tablet Use and Outbursts of Anger. *JAMA pediatrics*, *178*(10), 1035–1040. https://doi.org/10.1001/jamapediatrics.2024.2511

(CANADA)

"Child tablet use at age 3.5 years was associated with more expressions of anger and frustration by the age of 4.5 years. Child proneness to anger/frustration at age 4.5 years was then associated with more use of tablets by age 5.5 years."

Longitudinal Associations Between Use of Mobile Devices for Calming and Emotional Reactivity and Executive Functioning in Children Aged 3 -5

Radesky, J. S., Kaciroti, N., Weeks, H. M., Schaller, A., & Miller, A. L. (2023). Longitudinal Associations Between Use of Mobile Devices for Calming and Emotional Reactivity and Executive Functioning in Children Aged 3 to 5 Years. *JAMA pediatrics*, *177*(1), 62–70. https://doi.org/10.1001/jamapediatrics.2022.4793

(USA)

Study suggests that "frequent use of mobile devices for calming young children may displace their opportunities for learning emotion-regulation strategies over time; therefore, pediatric health care professionals may wish to encourage alternate calming approaches."

Screen Time and Executive Functioning in Toddlerhood: A Longitudinal Study

McHarg, G., Ribner, A. D., Devine, R. T., & Hughes, C. (2020). Screen Time and Executive Function in Toddlerhood: A Longitudinal Study. *Frontiers in psychology*, *11*, 570392. https://doi.org/10.3389/fpsyg.2020.570392

(UK, USA)

"Screen time at age 2 is negatively associated with the development of executive functions in toddlerhood from age 2 to 3, controlling for a range of covariates including verbal ability."

Associations with Atypical Sensory Processing

Early-life Digital Media Experiences and Development of Atypical Sensory Processing

Heffler, K. F., Acharya, B., Subedi, K., & Bennett, D. S. (2024). Early-Life Digital Media Experiences and Development of Atypical Sensory Processing. *JAMA pediatrics*, *178*(3), 266–273. https://doi.org/10.1001/jamapediatrics.2023.5923

(USA)

"Early-life TV or video exposure was associated with atypical sensory processing in low registration, sensation seeking, sensory sensitivity, and sensation avoiding domains of the Infant-Toddler Sensory Profile, after controlling for perinatal and demographic variables."

Associations with Language Delay

The Relationship between Language and Technology: How Screen Time Affects Language Development in Early Life—A Systematic Review

Massaroni, V., Delle Donne, V., Marra, C., Arcangeli, V., & Chieffo, D. P. R. (2023). The Relationship between Language and Technology: How Screen Time Affects Language Development in Early Life-A Systematic Review. *Brain sciences*, *14*(1), 27. https://doi.org/10.3390/brainsci14010027

(ITALY)

Systematic review of 18 articles shows "prolonged screen time and exposure to screens in the first 2 years of life can negatively affect language development and communication skills, in terms of comprehension and vocabulary range. In addition, overexposure to screens in the early years can affect overall cognitive development, especially attention to environmental stimuli, social experiences, problem solving, and communication with others, e.g., the alternance of rhythms and roles in a conversation."

Mobile Device Use is Associated with Expressive Language Delay in 18-Month-Old Children

van den Heuvel, M., Ma, J., Borkhoff, C. M., Koroshegyi, C., Dai, D. W. H., Parkin, P. C., Maguire, J. L., Birken, C. S., & TARGet Kids! Collaboration (2019). Mobile Media Device Use is Associated with Expressive Language Delay in 18-Month-Old Children. *Journal of developmental and behavioral pediatrics : JDBP*, *40*(2), 99–104. https://doi.org/10.1097/DBP.0000000000000630

(CANADA)

Study demonstrated a "significant association between mobile media device use and parent-reported expressive speech delay in 18-month-old children."

Screen Time and Parent-Child Talk When Children Are Aged 12 to 36 Months

Brushe, M. E., Haag, D. G., Melhuish, E. C., Reilly, S., & Gregory, T. (2024). Screen Time and Parent-Child Talk When Children Are Aged 12 to 36 Months. *JAMA pediatrics*, *178*(4), 369–375. https://doi.org/10.1001/jamapediatrics.2023.6790

(AUSTRALIA)

This cohort study found a negative association between screen time and measures of parent-child talk across those early years. For every additional minute of screen time, children heard fewer adult words, spoke fewer vocalizations, and engaged in fewer back-and-forth interactions.

Associations with Problem-solving Developmental Delay

Screen Time at Age 1 Year and Communication and Problem-Solving Developmental Delay at 2 and 4 Years

Takahashi, I., Obara, T., Ishikuro, M., Murakami, K., Ueno, F., Noda, A., Onuma, T., Shinoda, G., Nishimura, T., Tsuchiya, K. J., & Kuriyama, S. (2023). Screen Time at Age 1 Year and Communication and Problem-Solving Developmental Delay at 2 and 4 Years. *JAMA Pediatrics*, *177*(10), 1039–1046. https://doi.org/10.1001/jamapediatrics.2023.3057

(JAPAN)

Study shows "association between screen time among young children and subsequent developmental outcomes." Results suggest "a dose-response association between longer screen time at age 1 year and developmental delays in communication and problem-solving at ages 2 and 4 years."

Associations with Peer Social Functioning Problems

Longitudinal Associations Between Screen Time and Children's Language, Early Educational Skills, and Peer Social Functioning

Gath, M., Horwood, L. J., Gillon, G., McNeill, B., Woodward, L.J. (2026) *Developmental Psychology, 62(3), 638–652.* https://doi.org/10.1037/dev0001907

(NEW ZEALAND)

"Results indicate that more than 1.5 hour of daily direct screen time at age 2 was associated with below average language and educational ability and above average levels of peer relationship problems at age 4.5."

Associations with Caregiver Device Use in Child's Presence (Technoference)

Parental Technology Use in a Child's Presence and Health and Development in the Early Years: A Systematic Review and Meta-Analysis

Toleda-Vargas, M., Chong, K.H., Maddren, C.I., Howard, J.H., Wakefield, B., Okely, A.D. *JAMA Pediatrics,* May 5;179(7):730-737. doi: 10.1001/jamapediatrics.2025.0682

(AUSTRALIA)

Twenty-one studies from 10 countries were included in the meta-analysis. Significant associations were found between parental technology use in the child's presence and cognition, internalizing behavior and emotions, externalizing behavior, prosocial behavior, attachment, and screen time.

Associations between audible technoference, quality of parent-infant interactions, and infants' vocabulary development

Corkin, M, Henderson, A., Peterson, E., Kennedy-Costantini, S., Sharplin, H. Morrison, S.

Infant Behavior and Development Volume 64, August 2021, 101611. https://doi.org/10.1016/j.infbeh.2021.101611

(NEW ZEALAND)

Higher frequency of parent mobile phones audible notifications was associated with lower infant vocabulary scores and led parents to become generally more directive towards their infants, with less responsiveness and scaffolding; Higher levels of infant exposure to background TV were also associated with decreased parental scaffolding. Infant vocabularies were larger when parents turned off or put away mobile devices when with their infants.

Associations with Infant Psychophysiological Stress

"Hot stuff": Behavioural and affective thermal responses to digital and non-digital disruptions during early mother-infant interaction

Nazzari, S., Morgese Zangrandi, M., Bottini, G., Salvato, G., Provenzi, L. Biological Psychology Volume 196, March 2025, 109027. https://doi.org/10.1016/j.biopsycho.2025.109027

(ITALY)

Findings show that both digital and non-digital distractions disrupt parent-infant interactions, leading to physiological and behavioural responses in mother-infant dyads. Parental unresponsiveness due to digital and non-digital distractions leads to infant behavioural distress, with digital disruptions also triggering a distinct thermal affective response.

Associations with Lower Mother-to-Infant Attachment Quality

Associations between maternal technology use, perceptions of infant temperament, and indicators of mother-to-infant attachment quality

Alvarez Gutierrez, S., & Ventura, A. K. (2021). Associations between maternal technology use, perceptions of infant temperament, and indicators of mother-to-infant attachment quality. *Early human development*, *154*, 105305. https://doi.org/10.1016/j.earlhumdev.2021.105305

(USA)

"Greater technology use during mother-infant interactions was significantly associated with greater infant negative affectivity. Greater technology use was also significantly associated with lower mother-to-infant attachment quality and greater hostility toward motherhood."

Associations with Decreased Sleep Quantity and Quality

Relationships between screen viewing and sleep quality for infants and toddlers in China: A cross-sectional study

Lin, Y., Zhang, X., Huang, Y., Jia, Z., Chen, J., Hou, W., Zhao, L., Wang, G., & Zhu, J. (2022). Relationships between screen viewing and sleep quality for infants and toddlers in China: A cross-sectional study. *Frontiers in pediatrics*, *10*, 987523. https://doi.org/10.3389/fped.2022.987523

(CHINA)

"Screen time negatively related to total sleep time and nighttime sleep among infants and toddlers. Authors consider small portable screens used over long periods of time "real neurodevelopmental disruptors."

Associations with Diminished Motor Skills

Screen Time and Developmental Performance Among Children at 1-3 Years of Age in the Japan Environment and Children's Study

Yamamoto, M., Mezawa, H., Sakurai, K., Mori, C., & Japan Environment and Children's Study Group (2023). Screen Time and Developmental Performance Among Children at 1-3 Years of Age in the Japan Environment and Children's Study. *JAMA pediatrics*, *177*(11), 1168–1175. https://doi.org/10.1001/jamapediatrics.2023.3643

(JAPAN)

"We found a bidirectional association between TV/DVD screen time and developmental scores in the communication domain from age 1 to 2 years. Additionally, we observed negative associations between TV/DVD screen time at age 2 years and the developmental scores in gross motor, fine motor, and personal-social domains at age 3 years."

Associations with Development of Autistic-like Symptoms and Autism

Toddler Screen Time: Longitudinal Associations with Autism and ADHD Symptoms and Developmental Outcomes

Hill, M. M., Gangi, D. N., & Miller, M. (2024). Toddler Screen Time: Longitudinal Associations with Autism and ADHD Symptoms and Developmental Outcomes. *Child psychiatry and human development*, 10.1007/s10578-024-01785-0. Advance online publication. https://doi.org/10.1007/s10578-024-01785-0

(USA)

Greater screen time is associated with increased symptoms of autism spectrum disorder (autism), attention-deficit/hyperactivity disorder (ADHD), and lower scores on measures of development in preschool-aged community samples.

Association Between Screen Time Exposure in Children at 1 Year of Age and Autism Spectrum Disorder at 3 Years of Age

Kushima, M., Kojima, R., Shinohara, R., Horiuchi, S., Otawa, S., Ooka, T., Akiyama, Y., Miyake, K., Yokomichi, H., Yamagata, Z., & Japan Environment and Children's Study Group (2022). Association Between Screen Time Exposure in Children at 1 Year of Age and Autism Spectrum Disorder at 3 Years of Age: The Japan Environment and Children's Study. *JAMA pediatrics*, *176*(4), 384–391. https://doi.org/10.1001/jamapediatrics.2021.5778

(JAPAN)

"Among boys, longer screen time at 1 year of age was significantly associated with autism spectrum disorder at 3 years of age. With the rapid increase in device usage, it is necessary to review the health effects of screen time on infants and to control excessive screen time."

Association of Early-Life Social and Digital Media Experiences With Development of Autism Spectrum Disorder–Like Symptoms

Heffler, K. F., Sienko, D. M., Subedi, K., McCann, K. A., & Bennett, D. S. (2020). Association of Early-Life Social and Digital Media Experiences With Development of Autism Spectrum Disorder-Like Symptoms. JAMA pediatrics, 174(7), 690–696. https://doi.org/10.1001/jamapediatrics.2020.0230

(USA)

"This cohort study found greater screen exposure and less caregiver-child play early in life to be associated with later ASD-like symptoms. Further research is needed to evaluate experiential factors for potential risk or protective effects in ASD."

Screen time reduction and focus on social engagement in autism spectrum disorder: A pilot study

Heffler, K. F., Frome, L. R., Garvin, B., Bungert, L. M., & Bennett, D. S. (2022). Screen time reduction and focus on social engagement in autism spectrum disorder: A pilot study. *Pediatrics International: official journal of the Japan Pediatric Society*, *64*(1), e15343. https://doi.org/10.1111/ped.15343

(USA)

"In young children (18 to 40 months) with ASD and high screen time, this intervention study, though small, was associated with 1) a significant reduction in the children's screen time, 2) a significant reduction in the children's autism symptoms and 3) a significant reduction in parent stress."

Associations with Greater Risk of Accidental Injury

Hold the Phone! Cell Phone-Related Injuries in Children, Teens, and Young Adults Are On the Rise - Peter W Guyon, Jamie Corroon, Karen Ferran, Kathryn Hollenbach, Margaret Nguyen, 2020

Guyon, P., Corroon, J., Ferran, K., Hollenbach, K., Nguyan, M. (2020) *Sage Open Pediatrics (GPH)* https://doi.org/10.1177/2333794X209684

(USA)

Age-adjusted incidence rates demonstrate increases in cell phone-related injuries across all age groups on average from 2002 to 2015, with children 2 years of age and under experiencing the single highest incidence (159 injuries per 100 000) in 2014.

Associations with Exposure to Artificial Intelligence Products

The Role of Affectionate Caregiver Touch in Early Neurodevelopment and Parent-Infant Interactional Synchrony
Corozza, S., Leong, V. (2021) *Frontiers in Neuroscience,* Jan 5;14:613378. doi: 10.3389/fnins.2020.613378
(UK, SINGAPORE, GERMANY, SWEDEN)
The authors propose a unique role for affectionate human touch as an essential pathway to establishing and maintaining parent-infant interactional synchrony at behavioral and neural levels.

Additional Documents Cited in GAINING Alerts

Changes in Brain Weight During the Span of Human life: Relation of Brain Weights to Body Heights and Body Weights

Digital Ecosystems, Children, and Adolescents: Policy Statement | Pediatrics | American Academy of Pediatrics

Charter for Care of Young Children

German National Screen Time Guidelines

Screen use by children aged under 5 - GOV.UK

Technoference: Parent Distraction With Technology and Associations With Child Behavior Problems | Child Development | Oxford Academic

AI in the Early Years: Examining the implications of GenAI toys for young children

AI Toys Advisory - Fairplay

Generation AI starts early: A guide to technologies already shaping young children's lives | Brookings

Prevalence and Characteristics of Manipulative Design in Mobile Applications Used by Children

Early and Excessive Exposure to Screens (EEES): A New Syndrome

Special Education Is Getting More Expensive, Forcing Schools to Make Cuts Elsewhere

Poll Shows Increases in Hearing, Speech, and Language Referrals, More Communication Challenges in Young Children

The lifetime social cost of autism: 1990–2029 - ScienceDirect

Infants' physiological and behavioral reactivity to maternal mobile phone use – An experimental study - ScienceDirect

The effects of background television on the toy play behavior of very young children - PubMed

Association between Screen Use and Child Language Skills

Elevated background TV exposure over time increases behavioural scores of 18-month-old toddlers - Chonchaiya - 2015 - Acta Paediatrica - Wiley Online Library

The impact of background television on parent-child interaction - PubMed

Infants' background television exposure during play: Negative relations to the quantity and quality of mothers' speech and infants' vocabulary acquisition - Elise Frank Masur, Valerie Flynn, Janet Olson, 2016

Learning From Video: A Meta-Analysis of the Video Deficit in Children Ages 0 to 6 Years - Strouse - 2021 - Child Development - Wiley Online Library

Media and Young Minds | Pediatrics | American Academy of Pediatrics

Global Prevalence of Meeting Screen Time Guidelines Among Children 5 Years and Younger: A Systematic Review and Meta-analysis | Media and Youth | JAMA Pediatrics | JAMA Network

Explaining Adherence to American Academy of Pediatrics Screen Time Recommendations With Caregiver Awareness and Parental Motivation Factors: Mixed Methods Study - PubMed

Young Children and Screens: Guidelines for Intervention during the Perinatal Period from the French National College of Midwives - Bernard - 2022 - Journal of Midwifery & Women's Health - Wiley Online Library

Skype me! Socially Contingent Interactions Help Toddlers Learn Language

Guidelines on physical activity, sedentary behaviour and sleep for children under 5 years of age

Screen time of toddlers in Paris suburbs: Quantitative and qualitative analysis

Managing Postpartum Depression

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