Comments of Children and Screens: Institute of Digital Media and Child Development
to the
National Telecommunications and Information Administration
Request for Comments on Kids Online Health and Safety
Docket No. NTIA–2023–0008

Introduction

Children and Screens: Institute of Digital Media and Child Development (Children and Screens) applauds the National Telecommunications and Information Administration's initiative in gathering a broad scope of information about the impacts of social media and online platforms on children. Since 2013, Children and Screens has worked to help young people lead healthy lives in a digital world by synthesizing and disseminating the latest research, while also supporting advancements in the field through funding and convenings. We have built a large network of experts including scientists, clinicians, and advocates, who help bring varying perspectives on issues of digital media and children. Our experience working with these experts, and translating their work, has given us a holistic perspective on the effects of technology and digital media (TDM)[1] on families and children.

The key concerns we highlight in these comments are the barriers to comprehensive research into impacts of TDM, the resulting limitations to understanding the harms and benefits, and the consequences for regulations. We have found a spectrum of impacts of TDM on children that range from significant harms to invaluable benefits. Many of these are difficult to disentangle, in large part because of research limitations we will discuss. Most harms can be reduced or eliminated, while preserving the benefits. We arrived at this conclusion free of conflicts due to the support from technology industry funding, which allows Children and Screens to view research findings objectively. We will outline some of these harms and benefits in these comments, as well as approaches regulators and businesses can take to address them[2].

1. Sources of scientifically sound evidence [Addressing question 20a]

Currently, the most reliable sources of evidence are academic research, independent research by non-governmental organizations (NGOs), and clinical expertise. These are complemented by the collective personal experiences from parents and children. Our understanding of the impacts of TDM on the development and health of children suffers from a lack of high-quality data. Although all research in humans faces difficulties, the barriers to high-quality data in TDM research go far beyond the typical hurdles. These unique barriers are largely the result of opaque business practices, resistance by companies to participate in research, and a lack of sufficient funding opportunities.

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[1] TDM includes all social media
[2] Commenters have indicated at the top of each section which questions in the Administration's Notice are addressed therein. Additional questions addressed in relevant subsections are indicated at the beginning of the subsection.

1.1 Common data collection methods

Because many researchers lack adequate tools and access to industry data, the most commonly used data collection method is self-report or caregiver-report surveys.These surveys are often retrospective (reporting on past events), however journaling or momentary assessments are becoming more common[3]. Momentary assessments consist of semi-randomized inquiries of what a participant is currently doing, or has done in the very recent past[4]. Both journaling and momentary assessments are laborious and disruptive for participants, limiting the size and longevity of studies, as well as the demographics that are likely to participate.

Device-use data can be acquired. Participants can self-report or share their data from built-in screen time applications. Tracking softwares can also be used[5]. These can be costly, and recently faced major obstacles due to operating system updates, particularly from Apple Inc., rendering some products temporarily inoperable. This is a major problem not just for future research, but for studies that lost application functionality mid-project, most notably the ongoing ABCD study[6]. Further, even when executed properly, current tools for device-use data can be limited in data granularity, making more complex analyses challenging. Infrequently, other objective measures are collected like observational data, functional magnetic resonance imaging, and accelerometer data[7]. These are expensive, logistically challenging, and burdensome to participants, limiting the diversity of samples and thus generalizability of results.

Qualitative data is a valuable tool in the absence of detailed, objective measures. In a research setting, qualitative data is most often collected through interviews or focus groups[8]. Qualitative data can also take the form of lived experiences[9]. In the absence of concrete experimental data, bringing research findings together with lived experience is helpful for developing a "full picture."

1.2 Common study designs

The most common study design is cross-sectional, in which data are collected from many individuals at a single point in time. A key advantage of this is the ease and flexibility of implementation. This permits large sample sizes and adjustments for unique variables or populations. The burden on participants is low, permitting rich data to be collected on each

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[3] Robyn Cardy et al., *Patterns and impact of technology use in autistic children*, 108 Research in Autism Spectrum Disorders, 102253 (2023); Jason M. Nagata et al., *Social Epidemiology of early adolescent cyberbullying in the United States*, 22 Academic Pediatrics, 1287–1293 (2022)

[4] Sarah M. Coyne et al., *Meltdowns and media: Moment-to-moment fluctuations in young children's media use transitions and the role of children's Mood States*, 136 Computers in Human Behavior, 107360 (2022); Cardy et al, *supra* note 3

[5] Examples of passive sensing programs that track real-time device and application usage include EARS, Ksana Health (2022), https://ksanahealth.com/ears/ (last visited Nov 14, 2023); Realitymeter, RealityMine (2023), https://www.realitymine.com/realitymeter/ (last visited Nov 14, 2023)

[6] *See* Section 1.4 for information about the ABCD study; we have included policy recommendations to address tracking software disruptions in Section 4 of these comments.

[7] *See e.g.* Apoorva Rathod, *Performing sedentary behaviors: Studying children's screen practices at home as affective assemblages*, 4 Digital Geography and Society, 100050 (2023)

[8] *See e.g.* Beatriz Feijoo et al., *Viral challenges as a digital entertainment phenomenon among children. perceptions, motivations and critical skills of minors*, Communications (2023)

[9] *For e.g.*, *The Alexander Neville Foundation was founded to educate audiences on the dangers of drugs online, using the experience of Amy Neville, whose son Alexander Neville died of an opioid overdose*; Alexander Neville Foundation, https://anfhelp.org/ (last visited Nov 14, 2023)

participant, reducing barriers to participation from demographics that are frequently underrepresented. The primary limitation is it is impossible to determine causality. The high quantity of these studies, and the often large sample sizes, make them valuable sources of information despite the limitations.

Longitudinal designs are less common. These studies typically collect data from fewer individuals, but collect data from each individual repeatedly over time. While substantially more robust than cross-sectional designs, purely longitudinal studies still cannot determine causality.

Causality can only be determined by true experimental designs. In these, a variable or variables are manipulated, and the effects of the manipulations are compared against a control group. This presents ethical concerns when introducing a potentially harmful variable, or removing a beneficial one. True experiments are exceedingly rare in the study of TDM. Still, some researchers have managed to conduct true experiments in this field[10]. Experiments are regularly restricted to testing an intervention, for instance a digital therapeutic, or an intervention for problematic device use. As TDM penetrates further into every aspect of our lives, conducting true experiments grows less and less feasible outside of a laboratory setting.

Most studies are cross-sectional survey studies. These are valuable for detecting broad effects, and inform more rigorous research. When considered along with longitudinal and qualitative studies, reasonable insights into the effects of TDM can be made. Causality still cannot be determined, and interpretations of these studies remain nuanced. Despite these limitations, the existing body of research includes significant, and in some cases robust, findings on various impacts of TDM on the development and well-being of children.

1.3 Large data sets

Large, representative datasets permit population-level analyses[11]. These datasets are often products of government efforts, or collaborations between many labs and institutes. Two frequently used datasets in the United States are the Adolescent Brain and Cognitive Development (ABCD) Study, and the Youth Risk Behavior Surveillance System (YRBSS)[12]. The ABCD Study is the largest longitudinal ongoing cohort study. It is a National Institutes of Health (NIH)-funded, multicite, coordinated study tracking biological, behavioral, and psychological development of over 11,000 children starting at ages 9-10. The YRBSS monitors risk behaviors of children in grades 9-12 through annual surveys. The ABCD study is longitudinal, permitting some insight into causality. The YRBSS is technically cross-sectional, but has been conducted every year since 1991 and can thus reveal trends in population health and dynamics. The Environmental influences on Child Health Outcomes (ECHO) Program and the Healthy Brains and Child Development Study[13] (HBCD) both collect similar data on younger children.

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[10] *See e.g.* Ariel Kor & Anat Shoshani, *Moderating the impact of the COVID-19 pandemic on Children's and Adolescents' substance use, digital media use, and Mental Health: A randomized positive psychology addiction prevention program*, 141 Addictive Behaviors, 107660 (2023); Andrew Westbrook et al., *Striatal dopamine synthesis capacity reflects smartphone social activity*, 24 iScience, 102497 (2021)

[11] These primarily exist for other purposes. They include media measures amongst many others, and do not collect objective media use measures. No comprehensive longitudinal study focused primarily on media use and outcomes exists.

[12] About - ABCD Study, Adolescent Brain Cognitive Development Study, https://abcdstudy.org/about/ (last visited Nov 14, 2023); YRBSS Overview, Centers for Disease Control and Prevention (2023), https://www.cdc.gov/healthyyouth/data/yrbs/overview.htm (last visited Nov 14, 2023)

[13] ECHO (2023), https://echochildren.org/ (last visited Nov 14, 2023); UCSD – Healthy Brain and Child Development (2023), https://hbcdstudy.org/ (last visited Nov 14, 2023)

1.4 Sources of reliable research

Independent labs produce the vast majority of the research on impacts, particularly mental health, physical, and social. Additionally, independent organizations like Children and Screens are some of the only other sources regarding the health impacts and business practices of TDM companies[14]. In fact, some of our only insights into how social media companies operate come from investigations by NGOs, or former industry insiders like Frances Haugen[15].

Companies are reluctant to provide reliable details on their practices and the effects of their products. Other for-profit companies provide insights though. Market research companies offer resources on how children interact with TDM[16], and security and privacy oriented companies can offer their own research on children's privacy and security[17]. These resources frequently require fees though. The Joan Ganz Cooney Center within Sesame Workshop[18] is a rare example representing both industry and nonprofit contributions and offers free resources.

2. Harms and benefits [Addressing questions 1 a-c, e-h, and 21; Additional questions are noted in relevant subsections. Answers to questions 21 are incorporated throughout this section]

The limitations described thus far mean the evidence for harms and benefits is a patchwork of many different sources. Matters are complicated further by varying effects across ages and developmental stages[19]. Though this has been used by some to argue against the validity of broader claims, in truth they can be carefully matched together like pieces of a puzzle to generate a more complete understanding of harms and benefits. Because it is so pervasive, TDM interacts with nearly every aspect of a child's life. 98% of children have internet access, 95% of adolescents have a smartphone and 45% say they use it constantly[20]. Thus, the impacts are broad, amplifying even subtle harms, which are then multiplied across nearly all children. The same can be said of the benefits. Because of this, lack of access to TDM can be a distinct disadvantage. This is why it is important to identify key determinants of harm at a global level, where possible, to guide changes that can reduce risk and allow benefits to overcome harm.

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[14] *For e.g.* Pew Research Center (2019), https://www.pewresearch.org/ (last visited Nov 14, 2023); Fairplay (2023), https://fairplayforkids.org/ (last visited Nov 14, 2023); Common Sense Media, https://www.commonsensemedia.org/ (last visited Nov 14, 2023); ConnectSafely, https://connectsafely.org/ (last visited Nov 14, 2023); Tech Transparency Project, https://www.techtransparencyproject.org/ (last visited Nov 14, 2023); Children and Screens: Institute of Digital Media and Child Development (2023), https://www.childrenandscreens.org/ (last visited Nov 14, 2023)

[15] Center for Countering Digital Hate | CCDH (2023), https://counterhate.com/ (last visited Nov 14, 2023); Billy Perrigo, *Why whistleblower Frances Haugen decided to take on Facebook* Time (2021), https://time.com/6121931/frances-haugen-facebook-whistleblower-profile/ (last visited Nov 14, 2023)

[16] SuperAwesome, https://www.superawesome.com/ (last visited Nov 14, 2023)

[17] Javelin Strategy & Research, https://javelinstrategy.com/ (last visited Nov 14, 2023)

[18] Sesame Workshop Joan Ganz Cooney Center, https://joanganzcooneycenter.org/ (last visited Nov 14, 2023)

[19] Sheri Madigan & Stephanie M. Reich, Consideration of developmental stage and the debate on the effects of screens use—not all things are created equal, 177 JAMA Pediatrics, 1123 (2023)

[20] Condition of Education. Children's Internet Access at Home, https://nces.ed.gov/programs/coe/indicator/cch (last visited Nov 14, 2023); Jingjing Jian*, How Teens and Parents Navigate Screen Time and Device Distractions,* https://www.pewresearch.org/internet/2018/08/22/how-teens-and-parents-navigate-screen-time-and-device-distractions/ (last visited Nov 14, 2023)

2.1 Mental health

Mental health implications have garnered perhaps the most attention, but are also possibly the most nuanced and debated. These have been discussed at length elsewhere[21], thus we will cover them in less detail here, and will focus in the following sections on specific consequences of TDM impacts on mental health.

Researchers have seen TDM linked to depression, anxiety, and other mental health consequences. There are no known causal links between any particular platform feature, and a specific mental health impact across every child. Rather, many features and characteristics of TDM have many modest negative impacts on children, or specific features may have specific impacts on certain at-risk individuals. Identifying harms is complicated further by simultaneous benefits of social media and online platforms. Some of these are noted later, but it is worth mentioning that TDM has identified benefits that, like harms, are unequally applied across demographics. Benefits to well-being of minoritized children are noted in Section 2.8, but TDM has unique impacts on neurodivergent children, as well. For instance, parents report links between TDM and improved life quality in autistic children[22], especially when TDM is used for therapy. TDM displaces other activities, so while it can improve some well-being metrics for autistic children, it also reduces things like time spent on school-related activities[23].

Disentangling the benefits from the harms, and both from innumerable lifestyle and biological variables, is a monumental task the research does not currently address[24]. It is helpful to consider the aggregate effects, with the understanding that they do not provide a complete picture. The aggregate result is an overall negative impact of TDM on children's mental health. These can be especially bad for children predisposed to mental health problems, or who have other risk factors, like problems at home, or minoritized groups[25].

2.2 Cyberbullying

Conservative estimates indicate 10%-15% of children have experienced cyberbullying[26]. Certain factors increase the risk of cyberbullying victimization, including being female, a sexual minority

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[21] Madigan & Reich, *supra* note 19; Matthew N Berger et al., *Social Media use and health and well-being of lesbian, gay, bisexual, transgender, and Queer Youth: Systematic Review*, 24 Journal of Medical Internet Research (2022); Patti M. Valkenburg & Jochen Peter, *The differential susceptibility to media effects model*, 63 Journal of Communication, 221–243 (2013)

[22] Cardy et al., *supra* note 3

[23] Cardy et al., *supra* note 3; Micah O. Mazurek & Colleen Wenstrup, *Television, video game and social media use among children with ASD and typically developing siblings*, 43 Journal of Autism and Developmental Disorders, 1258–1271 (2013)

[24] We have included policy recommendations to address this in Section 4 of these comments

[25] A. Jess Williams et al., *A systematic review and meta-analysis of victimisation and mental health prevalence among LGBTQ+ young people with experiences of self-harm and suicide*, 16 PLOS ONE (2021); Julia H. Raney et al., A*ssociations between adverse childhood experiences and early adolescent problematic screen use in the United States*, 23 BMC Public Health (2023); Ilan H. Meyer, *Prejudice, social stress, and Mental Health in lesbian, gay, and bisexual populations: Conceptual issues and research evidence*, 1 Psychology of Sexual Orientation and Gender Diversity 3–26 (2013)

[26] Justin W. Patchin & Sameer Hinduja, *Cyberbullying among tweens in the United States: Prevalence, impact, and helping behaviors*, 42 The Journal of Early Adolescence, 414–430 (2021); Mohammed Alhajji et al., *Cyberbullying, mental health, and violence in adolescents and associations with sex and race: Data from the 2015 youth risk behavior survey*, 6 Global Pediatric Health (2019); Rebecca S. Levine et al., *Gendered analysis of cyberbullying victimization and its associations with suicidality: Findings from the 2019 Youth Risk Behavior Survey*, 2 Adolescents, 235–251 (2022)

and/or transgender, and heavy screen use[27]. Cyberbullying is a source of mental health harms, including depression, sleep problems and disordered eating[28]. The mental health consequences of cyberbullying relate to identifiable physical health risks as well. Cyberbullying victimization puts children at heightened risk of self-harm, suicide ideation, suicide attempts, and drug and alcohol use[29].

2.3 Body image, disordered eating, and weight Control

Social media use correlates with disordered eating. The hypothetical reasons for this are debated elsewhere[30]. Based on what is known about eating disorder pathology, there is likely no single explanation for why social media can facilitate or exacerbate eating disorders[31]. Here we describe some of the research, but encourage audiences to read the papers cited.

Ample evidence connects social media use and negative body image. Furthermore, there is evidence that image-based social media uniquely contributes to this[32]. Body image is consistently correlated with eating disorder symptoms and/or onset[33], as well as lower psychological well being[34].

Recent research has found connections between certain online behaviors and weight control behaviors in both boys and girls. Independent of eating pathology, trying to control one's weight is correlated with psychological distress, and weight control is a risk factor for developing an

[27] Nagata et al., *supra* note 3; Lukas Blinka et al., *Adolescents' problematic internet and smartphone use in (cyber)bullying experiences: A network analysis*, 28 Child and Adolescent Mental Health, 60–66 (2022); Alhajji et al., *supra* note 26; Roberto L. Abreu & Maureen C. Kenny, *Cyberbullying and LGBTQ youth: A systematic literature review and recommendations for prevention and intervention*, 11 Journal of Child & Adolescent Trauma, 81–97 (2018); Noah T. Kreski et al., *Experiences of online bullying and offline violence‐related behaviors among a nationally representative sample of us adolescents, 2011 to 2019*, 92 Journal of School Health, 376–386 (2022)

[28] Chloe M. Cheng et al., *Cyberbullying and eating disorder symptoms in US early adolescents*, International Journal of Eating Disorders (2023) ; Levine et al., *supra* note 26; Hillary K. Morin et al., *Adjustment outcomes of victims of cyberbullying: The role of personal and contextual factors*, 70 Journal of School Psychology, 74–88 (2018); Yoewon Yoon et al., *Association of cyberbullying involvement with subsequent substance use among adolescents*, 65 Journal of Adolescent Health, 613–620 (2019)

[29] Stacie Kerr & Mila Kingsbury, *Online digital media use and adolescent mental health*, 34 Health Reports, 17–28 (2023);. Levine et al., *supra* note 26; Ann John et al., *Self-harm, suicidal behaviours, and cyberbullying in children and Young People: Systematic Review*, 20 Journal of Medical Internet Research (2018)

[30] Juan Zhang et al., *The relationship between SNS usage and disordered eating behaviors: A meta-analysis*, 12 Frontiers in Psychology (2021)

[31] Eric Stice, *Risk and maintenance factors for eating pathology: A meta-analytic review*, 128 Psychological Bulletin, 825–848 (2002)

[32] Ivanka Prichard et al., *The impact of different forms of #fitspiration imagery on body image, mood, and self-objectification among young women*, 78 Sex Roles, 789–798 (2017); D. Marengo et al., *Highly-visual social media and internalizing symptoms in adolescence: The mediating role of Body Image Concerns*, 82 Computers in Human Behavior, 63–69 (2018)

[33] Fiona Johnson & Jane Wardle, *Dietary restraint, body dissatisfaction, and psychological distress: A prospective analysis*, 114 Journal of Abnormal Psychology, 119–125 (2005); Stice, *supra* note 31; Anne J. Maheux et al., *Longitudinal associations between appearance‐related Social Media Consciousness and adolescents' depressive symptoms*, 94 Journal of Adolescence, 264–269 (2022); Sophia Choukas-Bradley et al., *The perfect storm: A developmental–sociocultural framework for the role of social media in adolescent girls' body image concerns and Mental Health*, 25 Clinical Child and Family Psychology Review, 681–701 (2022)

[34] Johnson & Wardle, *supra* note 33; Stice, *supra* note 31

eating disorder[35]. The physical health concerns of eating disorders are beyond the scope of these comments, but needless to say eating disorders are associated with a myriad of physical health consequences[36].

2.4 Problematic use [Additionally, subsection addresses question 7]

Gaming addiction is the only officially recognized digital addiction[37]. Many digital behaviors meet the criteria for addiction, but are often referred to as "problematic use" to differentiate them from official diagnoses. Problematic TDM uses are not equally distributed across demographics. Boys are more likely to display problematic video game use, while girls are more likely to display problematic social media and mobile phone use[38]. Additionally, non-white adolescents, lower income adolescents, and LGBTQ+ adolescents tend to display greater problematic screen or device use than their white, higher income, heterosexual, and/or cisgender peers[39].

By definition, problematic use interferes with daily functioning and negatively impacts an individual. Simply using TDM a lot does not equate to problematic use. In one study, children using digital media a lot did not have poorer physical or emotional well-being, but children who used digital media impulsively did[40]. There is a clear link between problematic internet use (broadly defined) and poor mental health. A meta-analysis of related studies found that higher levels of problematic internet use were associated with more serious mental health issues (depressive symptoms, anxiety, loneliness, and other mental health outcomes), and with lower levels of subjective well-being[41]. While age sometimes affected the strength of the correlation between problematic internet use and any specific mental health outcome, across ages the direction of the relationship, and whether it met statistical significance, did not change.

Problematic use is one of the few areas where specific design features are linked to behavioral outcomes. The full scope of this research will not be covered here, but there are some key points worth discussing. Platforms such as TikTok can induce so-called "flow states" that increase the risk for problematic use[42]. Research in adults has not only connected flow states to poorer mental health, but also found that flow states are more common when using TikTok than when using Instagram[43], suggesting there are unique features of TikTok that are more likely to produce flow states. This is not to say that individuals cannot engage in problematic Instagram use. Rather, unique TikTok features reveal common problematic designs. TikTok's core feature

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[35] *Id.*

[36] Katie M. O'Brien et al., *Predictors and long-term health outcomes of eating disorders*, 12 PLOS ONE (2017)

[37] American Psychiatric Association. (2022). *Diagnostic and statistical manual of mental disorders* (5th ed., text rev.) https://doi.org/10.1176/appi.books.9780890425787

[38] Nagata et al., *supra* note 3

[39] Nagata et al., *supra* note 3; Jason M. Nagata et al., *Associations between sexual orientation and early adolescent screen use: Findings from the Adolescent Brain Cognitive Development (ABCD) study*, 82 Annals of Epidemiology (2023); Sarah M. Coyne et al., *Analysis of social media use, mental health, and Gender Identity Among Us Youths*, 6 JAMA Network Open (2023)

[40] Bar Shutzman & Naama Gershy, *Children's excessive digital media use, mental health problems and the protective role of parenting during COVID-19*, 139 Computers in Human Behavior, 107559 (2023)

[41] Zhihui Cai et al., *Associations between problematic internet use and mental health outcomes of students: A Meta-Analytic Review, 8 Adolescent Research Review*, 45–62 (2023)

[42] Yao Qin et al., *Flow experience is a key factor in the likelihood of adolescents' problematic TikTok use: The moderating role of active parental mediation, 20 International Journal of Environmental Research and Public Health*, 2089 (2023)

[43] James A. Roberts & Meredith E. David, *Instagram and Tiktok Flow States and their association with psychological well-being*, 26 Cyberpsychology, Behavior, and Social Networking, 80–89 (2023)

is a continuous, algorithm-curated feed of short form videos. Thus, continuous feeds curated by an algorithm, featuring easily-consumable content may be a key feature driving some problematic social media use.

2.5 Unique impacts on young children [Additionally, subsection addresses question 3b]

Early childhood is an exceptionally sensitive developmental period. TDM can interfere with this development, posing risks to the mental, cognitive, and social wellbeing of the child. Infants and young children are developing critically important cognitive skills, like language development, memory, and attention. Generally speaking, more screen time in infancy and early childhood negatively impacts all of these. For instance, children who use screens more often score lower on language and literacy skills[44]. Low-quality screen time that is not age-appropriate is harmful to attention, relating to poorer concentration and attentional issues immediately following screen use, and even years later[45].

Research has shown that high amounts of screens and low-quality content negatively affect executive function, in the short and long-term. For instance, in the short-term, watching TV designed to distract, like many cartoons and fast-paced programming, is linked to worse performance on EF tasks[46]. High amounts of TV, starting to watch TV earlier in development, and watching TV not designed for children is linked to poorer long-term executive function[47].

Infants and children are also learning essential foundational skills for future social relationships, known as social-emotional development. These are best learned through person to person interactions, both watching them and participating in them. Screen time should not interfere with these interactions, and should model the kinds of behaviors we want children to adopt. Devices that displace, interfere with, or alter everyday interpersonal interactions pose problems, no matter who is using the device. Caregiver device use can relate to poor social-emotional development and increase behavior problems in children[48]. Screen time is a risk factor for peer problems and lower prosocial behavior[49], is negatively associated with parents' ratings of child's

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[44] Nazeera F. Karani et al., *The influence of screen time on children's language development: A scoping review*, 69 South African Journal of Communication Disorders (2022); Zhang et al., *supra* note 30

[45] Janette Niiranen et al., *High-dose electronic media use in five-year-olds and its association with their psychosocial symptoms: A cohort study*, 11 BMJ Open (2021); Evelyn C. Law et al., *Associations between infant screen use, electroencephalography markers, and cognitive outcomes*, 177 JAMA Pediatrics (2023)

[46] Angeline S. Lillard & Jennifer Peterson, *The immediate impact of different types of television on young children's executive function*, 128 Pediatrics , 644–649 (2011); Angeline S. Lillard et al., *Further examination of the immediate impact of television on children's executive function*, 51 Developmental Psychology, 792–805 (2015)

[47] Gabrielle McHarg et al., *Screen Time and executive function in toddlerhood: A longitudinal study*, 11 Frontiers in Psychology (2020); Rachel Barr et al., *Infant and early childhood exposure to adult-directed and child-directed television programming: Relations with cognitive skills at age four,* 56 Merrill-Palmer Quarterly , 21–48 (2010); Amy I. Nathanson et al., *The relation between television exposure and executive function among preschoolers*, 50 Developmental Psychology , 1497–1506 (2014); Niiranen et al., *supra* note 45

[48] Brandon T. McDaniel & Jenny S. Radesky, *Technoference: Parent distraction with technology and associations with child behavior problems*, 89 Child Development , 100–109 (2017)

[49] Wenwen Liu et al., *Early childhood screen time as a predictor of emotional and behavioral problems in children at 4 years: A birth cohort study in China*, 26 Environmental Health and Preventive Medicine (2021); O. Tezol et al., *Excessive screen time and lower psychosocial well-being among preschool children*, 29 Archives de Pédiatrie, 61–66 (2022)

social skills[50], and displacement of peer play in 1-3 year olds relates to poorer social development[51].

There is no sound reason to expose a child to TDM under 18 month, except in the case of video chatting with important people in their lives[52]. After 18 months, any TDM intended for younger children should follow 4 critical guidelines: promote active learning, include engaging learning material, be meaningful and relatable, and include social interaction[53]. We see benefits in social development from programs that incorporate these guidelines, like Sesame Street[54]. Research into the efficacy of educational TDM (EdTech) for literacy and STEM is extremely limited in early childhood. Some EdTech can help children learn basic principles, like word recognition, but studies fail to find EdTech beneficial for more complex principles, like reading comprehension[55]. More research is needed, however[56].

2.6 Physical health impacts

One of the earliest consequences of screen time researchers noticed were the effects on physical health. The internet has not been around long enough for all the physical health consequences to manifest, but studies have already shown warning signs.

We know that unhealthy diets and sedentary behavior are key consequences of screen time. Children (and adults) are susceptible to food advertising and distracted eating, which may explain why children who spend more time on screens have unhealthier diets that are linked to greater diseases and mortality rates across the lifespan[57]. From studies in adults, we know that extended sedentary time while using screens is harmful to physical health, and relates to numerous health problems and contributes to all-cause mortality[58]. By the time they are older adults, children today will have spent substantially more time on screens than any adult in the studies conducted thus far.

TDM is also tied to a cluster of risk factors called metabolic syndrome, which greatly increases

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[50] Věra Skalická et al., *Screen Time and the development of emotion understanding from age 4 to age 8: A community study*, 37 British Journal of Developmental Psychology, 427–443 (2019)

[51] Diane L. Putnick et al., *Displacement of peer play by Screen Time: Associations with Toddler Development*, 93 Pediatric Research, 1425–1431 (2022)

[52] *Screen Time and Children* The American Academy of Child and Adolescent Psychiatry, https://www.aacap.org/AACAP/Families_and_Youth/Facts_for_Families/FFF-Guide/Children-And-Watching-TV-054.aspx (last visited Nov 14, 2023)

[53] *These are described in* Kathy Hirsh-Pasek et al., *Putting education in "educational" apps, 16 Psychological Science in the Public Interest*, 3–34 (2015)

[54] Marie-Louise Mares & Zhongdang Pan, *Effects of sesame street: A meta-analysis of children's learning in 15 countries*, 34 Journal of Applied Developmental Psychology, 140–151 (2013); Hirsh-Pasek et al., *supra* note 53

[55] *For review see* James Kim et al., *Measures matter: A meta-analysis of the effects of educational apps on preschool to grade 3 children's literacy and math skills*, 7 AERA Open, 233285842110041 (2021)

[56] We have included policy recommendations to address this in Section 4 of these comments

[57] Konstantinos D. Tambalis et al., *Screen time and its effect on dietary habits and lifestyle among schoolchildren, 28 Central European Journal of Public Health*, 260–266 (2020); Lei Shang et al., *Screen Time is associated with dietary intake in overweight Canadian children,* 2 Preventive Medicine Reports, 265–269 (2015)

[58] Peter T. Katzmarzyk et al., *Sitting time and mortality from all causes, cardiovascular disease, and cancer*, 41 Medicine & Science in Sports & Exercise, 998–1005 (2009); Emmanuel Stamatakis et al., *Screen-based entertainment time, all-cause mortality, and cardiovascular events, 57 Journal of the American College of Cardiology*, 292–299 (2011)

health risks like type 2 diabetes mellitus and cardiovascular disease[59]. Greater television viewing in childhood and adolescence is associated with greater risk of metabolic syndrome in middle-age, and with higher BMI, lower cardiorespiratory fitness, and greater systolic and diastolic blood-pressure in middle-age[60].

Finally, excessive screen time, and especially night time screen use, is associated with both fewer hours of sleep and lower quality of sleep. These findings hold across childhood and adolescence, and is especially important as we know that sleep health has short- and long-term consequences for many elements of both mental and physical health[61].

2.7 Privacy and financial risks [Additionally, subsection addresses question 7]

Children's personal information can be shared voluntarily over social media and messaging platforms, accounts and purchases on online applications and games, school management systems, educational software (e.g. proctoring software), hospitals, and by family members. All of these pose a privacy risk for children. Because adults have substantial access and control over children's data, they can also intentionally or unintentionally compromise children's personal information[62]. Social media does present risks, but about ¾ of child identity fraud can be tied to someone the child knows[63].

Even with the best of intentions, children's privacy is put at risk when their data is improperly stored, making them vulnerable to data breaches. In 2022, there were 298 identified data breaches from a wide range of sectors, exposing the private information of over 1 million children[64]. This comes after serious data breaches in previous years from every sector[65]. The

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[59] Atilla Engin, T*he definition and prevalence of obesity and metabolic syndrome, Obesity and Lipotoxicity*, 1–17 (2017); S. O'Neill & L. O'Driscoll, *Metabolic syndrome: A closer look at the growing epidemic and its associated pathologies*, 16 Obesity Reviews, 1–12 (2014)

[60] Nathan MacDonell & Robert J. Hancox, *Childhood and adolescent television viewing and metabolic syndrome in Mid-Adulthood*, 152 Pediatrics (2023); Jason M. Nagata et al., *Screen time from adolescence to adulthood and cardiometabolic disease: A prospective cohort study*, 38 Journal of General Internal Medicine, 1821–1827 (2023); Jason M Nagata et al., *Television viewing from young adulthood to middle age and cardiovascular disease risk*, American Journal of Preventive Medicine (in press)

[61] Alexander J. Scott et al., *Improving sleep quality leads to better mental health: A meta-analysis of randomised controlled trials*, 60 Sleep Medicine Reviews, 101556 (2021); Jun Kohyama, *Which is more important for Health: Sleep Quantity or sleep quality?,* 8 Children, 542 (2021); Karine Alexandra João et al., *The impact of sleep quality on the mental health of a non-clinical population,* 46 Sleep Medicine*, 69–73 (2018);* Teresa Paiva et al., *Sleep deprivation in adolescents: Correlations with health complaints and health-related quality of life*, 16 Sleep Medicine, 521–527 (2015); Josilene L. Dettoni et al., *Cardiovascular effects of partial sleep deprivation in healthy volunteers, 113 Journal of Applied Physiology*, 232–236 (2012)

[62] Tatum Hunter, *Children are targets for ID theft. here's what parents need to know* The Washington Post (2022), https://www.washingtonpost.com/technology/2022/06/14/what-is-child-identity-theft/ (last visited Nov 14, 2023); Consumer Advice, *How To Protect Your Child From Identity Theft* (2021), https://consumer.ftc.gov/articles/how-protect-your-child-identity-theft#what_is (last visited Nov 14, 2023)

[63] *Child Identity Fraud: A Web of Deception and Loss* Javelin Strategy & Research (2021), https://javelinstrategy.com/research/child-identity-fraud-web-deception-and-loss

[64] *Data breaches by third parties* Black Kite (2023), https://blackkite.com/data-breaches-caused-by-third-parties/ (last visited Nov 14, 2023).

[65] *For e.g.* Chegg Inc., a seller of educational products and services to high school and college students, failed to properly encrypt user data, resulting in four data breaches between 2017-2020; Division of Consumer & Business Education & Seena Gressin, (2022),

compromised data included assessment scores, special education records, and other personally identifiable information. Despite the risks, companies still collect children's data, sometimes illegally. For instance Epic Games, the parent company of the popular game Fortnite, was fined $275 million as part of a $520 million agreement for violating the Children's Online Privacy Protection Act (COPPA) by knowingly collecting the data of children under 13 without verifiable parental consent[66].

Digital privacy has direct financial consequences for families. On average, child identity fraud costs a family more than $1,000, and annually costs U.S. households over $900,000,000[67]. The financial costs aren't restricted to data breaches. Some applications encourage purchase of additional features. Online games incorporate gambling-like elements, such as loot boxes, which can lead to huge financial losses by adolescents especially[68].

2.8 Information and community [Additionally, subsection addresses questions 3a and 4b]

Broadly, researchers distinguish between active (e.g. commenting, posting) and passive (e.g. scrolling) social media use. There is mixed evidence that these relate to unique mental health consequences[69]. Active use may be harmless, or even beneficial, but has been linked to small decreases in certain mental health measures[70]. Passive social media use sometimes relates to poorer mental health, but is also reportedly not related to mental health[71]. These findings suggest children can interact with TDM in healthy ways, but it likely requires care.

TDM is a means of finding community, resources, and meeting social needs[72]. Video Chatting can be an invaluable for connecting with important people, especially for infants[73]. Adolescents in particular use technology to stay in touch with friends and loved ones and to find community[74]. However, different demographics have unique relationships with TDM. For instance, in a recent study, social media habits that relate to poorer mental health in cisgender

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https://consumer.ftc.gov/consumer-alerts/2022/10/data-breaches-were-missed-learning-opportunities-ed-tech-company (last visited Nov 13, 2023); U.S.Government Accountability Office, GAO-20-644, *Data Security: Recent K-12 Data Breaches Show That Students Are Vulnerable to Harm* (2020)

[66] United States v. Epic Games, Inc., 5:22-CV-00518-BO (E.D.N.C. Feb. 7, 2023)

[67] *Child Identity Fraud: A Web of Deception and Loss, supra* note 63

[68] *For additional resource see Gambling and Video Gaming: An FAQ for Parents and Caregivers*, https://www.childrenandscreens.org/learn-explore/research/gambling-and-video-gaming/ (last visited Nov 14, 2023)

[69] Patti M Valkenburg et al., *The associations of active and passive social media use with well-being: A critical scoping review*, 24 New Media & Society, 530–549 (2021)

[70] Coyne et al., *supra* note 39; Marie-Pier Gingras et al., *Adolescents and social media: Longitudinal links between types of use, problematic use and internalizing symptoms, 51 Research on Child and Adolescent Psychopathology*, 1641–1655 (2023)

[71] *Id.*

[72] Sana Karim et al., *Support over social media among socially isolated sexual and gender minority youth in rural U.S. during the COVID-19 pandemic: Opportunities for Intervention Research, 19 International Journal of Environmental Research and Public Health*, 15611 (2022); Herminder Kaur & Paula Saukko, *Social Access: Role of Digital Media in social relations of young people with disabilities*, 24 New Media & Society , 420–436 (2022); Coyne et al., *supra* note 39

[73] Ellen Roche et al., *Presence at a distance: Video chat supports intergenerational sensitivity and positive infant affect during COVID-19, 27 Infancy*, 1008–1031 (2022)

[74] Karim et al., *supra* note 72; Jane Shawcroft et al., *Teens, screens and quarantine; the relationship between adolescent media use and mental health prior to and during COVID-19*, 8 Heliyon (2022); Laura Marciano et al., *The protective role of social-oriented digital media use in children's and adolescents' life satisfaction during the COVID-19 pandemic, 4 European Journal of Health Communication*, 1–27 (2023)

adolescents, like curating social media followers, actually related to better mental health for trans and nonbinary teens, perhaps because they are able to carefully curate the content they see and whom they interact with[75]. It should be noted here that LGBTQ+ children are more likely to experience cyberbullying[76].

Children frequently use TDM, particularly social media, for civic engagement. Among adolescents, social media use is correlated with greater civic engagement online and offline, and greater political interest[77]. Children use digital media to seek and monitor political information, and marginalized children use it to seek information they may not encounter offline, or carefully interact with digital media to avoid stressful or harmful content[78]. Online civic engagement is related to better social support, but can expose children to distressing content and harassment[79], and the use of some online platforms, namely Twitter and Facebook, is related to an increased risk for political polarization[80].

TDM can also expose children to traumatic content. Non-white children who encounter race-related violence or traumatic online events, especially when they relate to one's own race, suffer unique mental health harms including post-traumatic stress symptoms[81]. Online race-based discrimination results in similarly negative mental health consequences[82].

3. Areas for improvement

We have identified several barriers, and areas for improvement. Our recommendations include increased funding for research, enhanced tools and access for researchers, transparency requirements for companies and platforms, and data sharing and privacy guidelines, all of which will be discussed in detail in the following subsections.

3.1 Known barriers to improvement [Addressing question 13]

Opaque business and technical practices by companies, limited funding, the pervasiveness of TDM, and limited research tools work conjointly to hinder research progress. The volume of papers on these topics can be misleading. There is no shortage of studies on the impacts and uses of TDM, but the data of many of these studies have limitations. This is largely not the fault of experts in the field, but rather the resources available. Limited research hinders regulations. Effectively regulating an industry without a complete understanding of how that industry functions or the realized impacts of its products is challenging.

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[75] Coyne et al., *supra* note 39
[76] See Section 2.2
[77] Ayla Oden & Lance Porter, *The Kids Are Online: Teen Social Media Use, civic engagement, and affective polarization*, 9 Social Media + Society (2023)
[78] Amana Kaskazi & Vanessa Kitzie, *Engagement at the margins: Investigating how marginalized teens use digital media for political participation*, 25 New Media & Society, 72–94 (2021)
[79] Xiangyu Tao & Celia Fisher, *Associations among web-based civic engagement and discrimination, web-based social support, and mental health and substance use risk among LGBT youth: Cross-sectional survey study*, 25 Journal of Medical Internet Research (2023)
[80] Oden & Porter, *supra* note 77
[81] Ashley D. Maxie-Moreman & Brendesha M. Tynes, *Exposure to online racial discrimination and traumatic events online in Black adolescents and emerging adults, 32 Journal of Research on Adolescence*, 254–269 (2022); Brendesha M. Tynes et al., *Race-related traumatic events online and mental health among adolescents of color, 65 Journal of Adolescent Health*, 371–377 (2019)
[82] Maxie-Moreman & Tynes, *supra* note 81

3.2 Value of trusted sources [Addressing questions 17 and 20b]

Sufficiently addressing TDM requires dedicated funding for the systematic and objective study of the impacts. All future steps will be hindered without enhanced research and measurement tools. The field would benefit greatly from a dedicated government office to distribute funding, conduct research, and/or oversee regulations specific to TDM and children. Any source of funding is encouraged, but publishing oversight is necessary. This could come from a government body, a scientific body, or be enforced by scientific journals, such as funding disclosure requirements.

Any source of information, oversight body, or funding agency should include experts in child and adolescent development, both clinicians and researchers. While we did not discuss it in depth here, we also recommend children affected by TDM related regulations be engaged. Although child advocates are increasingly engaged, it is worth noting that they are usually above the age of 18, and thus do not represent all youth. There are limitations to involving children, but there are existing models for involving them in design development[83].

3.3 The responsibilities of companies and platforms [Addressing questions 10, 11, and 13]

Businesses should take every measure to ensure that their devices and software do not interfere with approved research software. When conflicts do arise, businesses should take steps to remedy the problem. The lifecycle of users' data must be transparent. This includes what is collected and how, where it is stored, the algorithms those data interact with, and if/when data is transferred. Protections for personal and proprietary information can be put in place, but these should not restrict select researchers or organizations from having comprehensive access. Businesses marketing in TDM should be held to the same standard as those marketing in food or transportation, which includes access by specified entities to examine proprietary information to ensure safety of a product. Proposed legislation provide frameworks for how this might be implemented[84]. Helpful data to consider for research purposes include screen time and usage patterns, content, and user demographics. Some considerations for data sharing include transparency and consent[85], anonymization[86], aggregated data[87], and limited data sharing[88].

Many organizations have published informed guidelines and proposals for the responsibilities of businesses and platforms[89]. At minimum, businesses should follow agreed upon design codes,

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[83] Ibrahim El Shemy et al., *Enhancing the vocabulary learning skills of autistic children using augmented reality: A participatory design perspective*, Proceedings of the 2023 Symposium on Learning, Design and Technology (2023)

[84] The Platform Accountability and Transparency Act of 2023, S.1876, 118th Cong. (2023); Kids Online Safety Act of 2023, S.1409, 118th Cong. § 7 (2023)

[85] Platforms should be transparent about the data they collect and use for research.

[86] Any data shared with researchers should be anonymized to protect users' identities.

[87] Shared aggregate data should be properly de-identified. Researchers can still draw insights from the data without infringing on individual privacy.

[88] Platforms can restrict the types of data shared with researchers to ensure it aligns with the objectives of the study.

[89] *For e.g.* Center on Media and Child Health, https://www.health.harvard.edu/authors/center-on-media-and-child-health (last visited Nov 14, 2023); *The case for better governance of children's data: A Manifesto*, UNICEF Office of Global Insight & Policy (2021), https://www.unicef.org/globalinsight/reports/better-governance-childrens-data-manifesto (last visited Nov 14, 2023); Data & Society, https://datasociety.net/ (last visited Nov 14, 2023); Ravi Iyer

such as those modeled in California and the United Kingdom[90].

Recently, both Google and the Digital Trust and Safety Partnership[91] published their own recommendations for best practices[92]. They include excellent recommendations, but represent the bare minimum. Many of these recommendations are similar to existing state and international law[93]. Thus, the cited industry recommendations are not especially innovative, recapitulating much of what these companies must already adhere to. Furthermore, Google, Meta, TikTok, and Pinterest (all members of the Digital Trust and Safety Partnership) are members of NetChoice, the plaintiffs in an ongoing lawsuit challenging the California design codes[94], the same codes Google applauds in its own recommendations. Together, this gives the impression that these legislative and best practices recommendations are insincere.

Businesses have complete control over their operations, with some limitations created by legislation like the Children's Online Privacy Protection Rule[95]. For years they have provided purported tools[96] to help create safer online environments. Despite all of this, the Biden-Harris Administration determined the formation of this task force was necessary. Regardless of the intentions and claims of companies and platforms, their actions until now have been woefully inadequate to sufficiently curb harms and risks to children.

4. Proposed guidance [Addressing Question 16a-e, 17, and 22]

The federal government can help address all these issues by investing in academic research, especially multi-site studies[97]. Incorporating more TDM-related components into any widely distributed government surveys would help research efforts[98]. Furthermore, the federal government should ensure product designs and business practices do not interfere with objective research. This includes ensuring access to platforms' algorithms and data to independent researchers[99], and quick mitigation of access issues due to internal platform software changes[100]. Substantial research should be conducted into the implication of artificial intelligence (AI) for children immediately. We did not touch on AI in these comments largely because there is insufficient research into how AI impacts children specifically, but AI should be considered in all future research and regulations. Additionally, we encourage the federal government to treat TDM as a product, with adequate health and liability protections.

Introducing the Neely Center Design Code for Social Media, USC Neely Center (2023), https://uscneelycenter.substack.com/p/introducing-the-neely-center-design (last visited Nov 14, 2023)

[90] CA Civ Code § 1798.99.29 (2022); *Data Protection Act*, 2018, c. 12 (U.K.)

[91] This is a coalition of industry representatives including Google, Meta, twitch, and Zoom

[92] *Legislative Framework to Protect Children and Teens Online* (2023), https://static.googleusercontent.com/media/publicpolicy.google/en//resources/youth-legislative-framework.pdf; Digital Trust & Safety Partnership (2023), https://dtspartnership.org/ (last visited Nov 14, 2023)

[93] CA Civ Code § 1798.99.29 (2022); *Data Protection Act*, 2018, c. 12 (U.K.); Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation) (Text with EEA relevance)

[94] NetChoice, LLC v. Bonta, 5:2022cv08861 (N.D. Cal. 2023)

[95] Children's Online Privacy Protection Act of 1998, 15 U.S.C. §§ 6501–6506; Children's Online Privacy Protection Rule, 16 C.F.R. § 312, (Jan. 17 2013); Final Rule 78 Fed. Reg. 3971, 3977–78 (Jan. 17, 2013)

[96] Google Families, https://families.google/ (last visited Nov 14, 2023)

[97] *For e.g.* the ABCD study in Sections 1.2 & 1.4 of these comments

[98] *See e.g. the* YRBSS in section 1.4 of these comments

[99] *See* Section 3.3 of these comments

[100] *See* Section 1.2 of these comments pertaining to monitoring software

When considering regulations and restrictions, experts agree that we should ensure children maintain access to accurate information and resources. Yet concerns over misinformation and disinformation remain. Right now, the burden of identifying inaccurate information lies solely with the user. This means it is up to parents and teachers to ensure children know how to identify accurate information, putting any minor who does not have access to knowledgeable and willing adults at a huge disadvantage, and presents yet another burden for educators and caretakers.

There is growing consensus around these solutions in Congress, as demonstrated in the recent Senate Judiciary hearing[101]. The federal government should develop guidance (preferably enforceable regulations) ensuring adherence to the recommendations described in these comments[102].

5. Conclusions

We encourage the NTIA to use these comments as a starting point for additional information. The researchers, clinicians, and advocates represented in these comments are eager to inform policy, and should be engaged whenever possible.

Design features and a lack of transparency over how one's data is collected and used have eliminated opportunities for children to lead healthy digital lives. These are also barriers to effective research and regulations. Entangled with the harms of TDM are innumerable benefits. Children often gain these benefits not because of platform designs, but despite them. The harms on the other hand are regularly the consequence of intentional design features, or general negligence by the designers. There are no excuses for either. Researchers, clinicians, families, invested organizations, and even industry insiders have shown that these harms are unnecessary[103]. With adequate research, resources, and regulations, mitigating the harms and preserving the benefits is entirely possible.

Prepared and submitted, this the 16th day of November 2023, by:

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[101] *Social Media and the Teen Mental Health Crisis*: *Hearing before Subcomm. on Privacy, Technology, and the Law,* 118th Cong. (2002) (statement of Arturo Bejar)
[102] *See* section 3.3 of these comments
[103] *Social Media and the Teen Mental Health Crisis*, *supra* note 101