

# WHAT RESEARCH TELLS US ABOUT SCREEN TIME AND YOUNG CHILDREN\*

**B**eginning in infancy, screen technologies dominate the lives of many young children, and they have significantly altered childhood.<sup>1,2,3</sup> But how do we best support young children's health, development, and learning in a digital world? To date, research tells us that screen time has no real benefit for infants and toddlers.<sup>4</sup> For older children, the context in which they use media, the nature of the content they experience, and the amount of time they spend with screens are all important considerations.<sup>5</sup>

For children over 3, studies show that some exposure to thoughtfully constructed media content can promote pro-social behaviors<sup>6</sup> and contribute to learning,<sup>7</sup> especially when a caring adult is actively involved.<sup>8</sup>

On the other hand, some screen content can be harmful to children. Games and digital activities that limit children to a predetermined set of responses have been shown to diminish creativity.<sup>9</sup> Exposure to media violence is linked to aggression, desensitization to violence, and lack of empathy for victims.<sup>10</sup> Media violence is also associated with poor school performance.<sup>11</sup>

Even the formal features of media content—the visual techniques used in programming—can affect young children. For preschoolers, watching just 20 minutes of a fast-paced cartoon show has been shown to have a negative impact on executive function skills, including attention, the ability to delay gratification, self-regulation, and problem solving.<sup>12</sup>

Setting limits on the time young children spend with screen technologies is as important as monitoring content is for their health, development, and learning. The new technologies haven't displaced television and video in children's lives—they have added to screen time.<sup>13</sup> Extensive screen time is linked to a host of problems for children including childhood obesity,<sup>14</sup> sleep disturbance,<sup>15,16</sup> and learning,<sup>17</sup> attention,<sup>18</sup> and social problems.<sup>19</sup> And time with screens takes away from other activities known to be more beneficial to their growth and development.<sup>20</sup>

Media use begins in infancy. On any given day, 29% of babies under the age of 1 are watching TV and videos for an average of about 90 minutes. Twenty-three percent have a television in their bedroom.<sup>21</sup> Time with screens increases rapidly in the early years. Between their first and second birthday, on any given day, 64% of babies and toddlers are watching TV and videos, averaging slightly over 2 hours. Thirty-six percent have a television in their bedroom.<sup>22</sup> Little is known about the amount of time children under 2 currently spend with smartphones and tablets, but in 2011 there were three million downloads just of Fisher Price apps for infants and toddlers.<sup>23</sup>

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\* A version of this section first appeared in Linn, S. (2012). *Healthy kids in a digital world: A strategic plan to reduce screen time for children 0-5 through organizational policy and practice change*. A report by the Campaign for a Commercial-Free Childhood for Kaiser Permanente Community Health Initiatives Grants Program. Available at: <http://www.commercialfreechildhood.org/healthykidsdigitalworld>

## ON ANY GIVEN DAY....

29% of babies under 1 year watch TV and videos for an average of 90 minutes.

64% of children 12 – 24 months watch TV and videos averaging just over 2 hours.

Data vary on screen time for preschoolers. But even the most conservative findings show that children between the ages of 2 and 5 average 2.2 hours per day.<sup>24</sup> Other studies show that preschoolers spend as much as 4.1<sup>25</sup> to 4.6 hours<sup>26</sup> per day using screen media. As children grow older, screen time increases and they tend to use more than one medium at the same time. Including when they're multi-tasking, 8- to 18-year-olds consume an average of 7 hours and 11 minutes of screen media per day—an increase of 2.5 hours in just 10 years.<sup>27</sup>

More research is needed. There is, for instance, some evidence that, for preschoolers, having limited access to a computer at home may contribute to learning, while access to video games does not. But the researchers did not track what children were doing on the computer. They also found that using a computer just once a week is more beneficial than using it every day—suggesting a little may go a long way, and that too much screen time may interfere with learning for young children.<sup>28</sup>

To get a sense of how and why too much screen time can negatively affect learning, and promote or exacerbate other problems for children, it's important to look first at what young children need for healthy growth and development.

## NURTURING HEALTHY BRAIN DEVELOPMENT

Modern science confirms what the early childhood community has known for years—that infants, toddlers, and young children learn through exploring with their whole bodies, including all of their senses. For optimal development, in addition to food and safety, they need love. They need to be held, and they need plenty of face-to-face positive interactions with caring adults. Developing children thrive when they are talked to, read to, and played with. They need time for hands-on creative play, physically active play, and give-and-take interactions with other children and adults. They benefit from a connection with nature and opportunities to initiate explorations of their world.<sup>29</sup>

In the last few decades, discoveries in the neurosciences have made clear why the early years of life are so critical. The basic architecture of the human brain develops through an ongoing, evolving, and predictable process that begins before birth and continues into adulthood. Early experiences literally shape how the brain gets built. A strong foundation in the early years increases the probability of positive outcomes later. A weak foundation does just the opposite.<sup>30</sup>

Babies begin life with brains comprised of huge numbers of neurons, some of which are connected to each other, and many of which are not. As children grow and develop, everything they experience affects which neurons get connected to other neurons. Repeated experiences strengthen those connections, shaping children's behavior, habits, values, and responses to future experiences. The experiences young children *don't* have also influence brain development. Neurons that aren't used—or synaptic connections that aren't repeat-

**“It's our insides that make us who we are, that allow us to dream and wonder and feel for others. That's what's essential. That's what will always make the biggest difference in our world.”**

Fred Rogers

ed—are pruned away, while remaining connections are strengthened.<sup>31</sup> This means that how young children spend their time can have important, lifelong ramifications. For better or worse, repeated behaviors—including behaviors such as watching television, playing video games, and playing with phone apps—can become biologically compelled habits.<sup>32</sup> In fact, behavioral research shows that the more time young children spend with screens, the more they watch later on,<sup>33</sup> and the more difficulty they have turning off screens as they become older.<sup>34</sup>

Most of the research on screen addiction has focused on television. But studies are beginning to document the addictive potential of computers and video games as well.<sup>35</sup> New neuro-imaging techniques provide biological evidence of the addictive properties of some screen media. Dopamine, a neurotransmitter associated with pleasure, reward, and alertness, is released in the brain during fast-moving video games<sup>36</sup> in a manner similar to its release after the consumption of some addictive drugs.<sup>37</sup> In a survey of children 8 to 18 years old, one in four said that they “felt addicted” to video games.<sup>38</sup>

## THE IMPACT OF EXCESSIVE SCREEN TIME ON DEVELOPMENT AND WELLBEING

Research links many of the health and social problems facing children today to hours spent with screens.

**The erosion of creative play and interaction with caring adults:** Studies show that the more time infants, toddlers, and preschoolers spend with screens, the less time they spend engaged in two activities essential to healthy development and learning.<sup>39</sup> Screen-time takes children away from hands-on creative play—the kind of give-and-take activities that children generate and control, and that are specific to their interests and abilities.<sup>40</sup>

Screens also take time away from children’s interactions with caring adults. Even when parents co-view television or videos with children, they spend less time engaged in other activities with their children.<sup>41</sup> And parents talk less to children when they are watching television together than when they are engaged in other activities.<sup>42</sup> In fact, they talk less to children when television is on in the background as well.<sup>43</sup> Newer technologies may also interfere with parent-child conversations. The so-called interactive electronic books—in which screen images respond to touch with sound effects or words or simple movements—are less likely to induce the kind of adult-child interactions that promote literacy than traditional books do.<sup>44</sup>

For young children, the added sounds and movements associated with many e-books have been linked to lower levels of story understanding and may hinder aspects of emerging literacy.<sup>45</sup> There is little or no research about literacy, young children, and the web. But

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### SCREEN TIME INCREASES AS CHILDREN GROW

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**“At Google and all these places, we make technology as brain-dead easy to use as possible. There’s no reason why kids can’t figure it out when they get older.”**

Google executive, Alan Eagle, quoted in Richtel, M. (2011, October 21). *A Silicon Valley school that doesn't compute*. New York Times, p. A1.

it’s important to note that studies of adults suggest that attributes of the internet, such as hyperlinks and the rapid introduction of new information, may undermine reading comprehension as well as deep thinking.<sup>46</sup>

**Undermining learning, school performance, and peer relationships:** For children under 3, research demonstrates that screen media are a poor tool for learning language and vocabulary<sup>47</sup> and suggests that they are actually linked to delayed language acquisition.<sup>48</sup> In contrast, socio-dramatic play has been associated with significant gains in language use and comprehension.<sup>49</sup> By the time children turn 10, every additional hour of television they watched as toddlers is associated with lower math and school achievement, reduced physical activity, and victimization by classmates in middle childhood.<sup>50</sup>

School-age children with 2 or more hours of daily screen time are more likely to have increased psychological difficulties, including hyperactivity, emotional problems, and difficulties with peers.<sup>51</sup>

Given that children’s screen time increases as they get older, it’s important to note that negative effects continue through adolescence. Time with television and video games has been linked to problems with attention.<sup>52</sup> Adolescents who watch 3 or more hours of television daily are at especially high risk for poor homework completion, negative attitudes toward school, poor grades, and long-term academic failure.<sup>53</sup> Studies of new media are only just beginning to emerge. Even as social networking sites are being marketed to young children, a study by Stanford University researchers has found that girls ages 8 to 12 who are heavy users of social media are less happy and more socially uncomfortable than their peers.<sup>54</sup>

**Childhood obesity:** Starting in early childhood, time with screen media is an important risk factor for childhood obesity.<sup>55 56 57</sup> The more time preschoolers spend watching television, the more junk food<sup>58</sup> and fast food<sup>59</sup> they are likely to eat. In fact, for each hour of television viewing per day, children, on average, consume an additional 167 calories.<sup>60</sup>

Studies also show that increased food intake and overweight are linked to video-game use.<sup>61</sup> And while active video games were heralded as a means of encouraging exercise in children, those who own active video games, such as those for the Wii video-game console, do not show an increase in physical activity.<sup>62</sup>

**Sleep disturbance:** Hours with television are linked to irregular sleep patterns in infants and toddlers<sup>63</sup> and to sleep disturbance in preschoolers<sup>64</sup> and children ages 6 to 12.<sup>65</sup> Time with video games is also linked to sleep disturbance in children and adolescents.<sup>66</sup>

**Extensive exposure to harmful commercialism:** Since the advent of television, screen media have been targeting children with advertising for a host of products including food, toys, clothing, accessories, and more. With the weakening of federal regulations in the 1980s and the proliferation of media produced for kids, marketing to children has increased exponentially. In 1983, companies were spending \$100 million annually targeting children.<sup>67</sup> Now they are spending over \$17 billion.<sup>68</sup>

Most screen media for children is commercially driven. And beloved screen characters routinely market products and more media to young viewers—to the detriment of their

health and wellbeing. Childhood obesity,<sup>69</sup> discontent about body image<sup>70</sup> and eating disorders,<sup>71</sup> sexualization,<sup>72</sup> youth violence,<sup>73</sup> family stress,<sup>74</sup> underage drinking,<sup>75</sup> and underage tobacco use<sup>76</sup> are all linked to screen-based advertising and marketing. So is the erosion of creative play.<sup>77</sup> In addition, research shows that, regardless of their commercial content, television and videos are less apt to generate creativity and imagination than books—which require more of children.<sup>78</sup>

For over 30 years, the food, marketing, media, and toy industries have successfully blocked meaningful government regulation of marketing to children. They have many avenues for reaching children, but advertising on screen media is their primary gateway. Reducing the amount of time children spend with screens is one of the few immediately available strategies for limiting marketers' access to, and impact on, children.

## ABOUT THE DIGITAL DIVIDE

Proponents of incorporating new technologies into early childhood settings argue that young children from low-income families must acquire “technology handling skills” or they will fall behind children from wealthier communities.<sup>79</sup> Since many children in low-income communities lag behind in experiences important to learning and literacy, such as early exposure to a rich and varied vocabulary<sup>80</sup> and access to books,<sup>81</sup> it is argued that postponing, or reducing, experiences with new technologies will create another barrier to academic success.

The term “digital divide” was coined in the 1960s to describe inequalities in access to computer technology.<sup>82</sup> By the 1990s, its meaning expanded to include inequality in access to the internet.<sup>83</sup> Inequality in access still exists, but the gap is closing.<sup>84</sup> The meaning of the digital divide has become more nuanced, especially for children. Concern is growing about how they are using the new screen technologies, how much time they spend, and what it's replacing.

According to a survey published in 2011, children ages 0 to 8 from low-income families spend significantly more time with television and videos than their wealthier peers.<sup>85</sup> It also shows that there is still a significant gap in ownership of home computers and mobile devices such as smartphones and tablets.<sup>86</sup>

At the same time, data from the survey showing the relationship between income level and how much time young children spend with new technologies paint a more ambiguous picture. Children from all income levels spend about the same amount of time playing games on digital devices and engaged in other computer-based activities including homework.<sup>87</sup>

Additional information is clearly needed for early childhood educators to make informed decisions about technology and the needs of children from low-income communities. Rapid developments in the availability and pricing of mobile devices will likely affect access and the amount of time children spend with them. As yet, there is no evidence that introducing screen technologies in early childhood means children will be more adept when they're older. That means we can't make an evidence-based comparison to “book-handling skills.” And, finally, there is an urgent need for research to determine if adding screen technologies of any kind in early childhood settings will increase or decrease gaps in achievement.

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## CONCLUSION

More independent research is needed on the impact of screen technologies on young children. But whether you believe that early childhood settings should include screen time or not, there is enough evidence to draw these conclusions: Many young children are spending too much time with screens at the expense of other important activities. There's no evidence that screen time is educational for infants and toddlers, and there is some evidence that it may be harmful. Some carefully monitored experience with quality content can benefit children over 3. But what's most important for children is lots of time for hands-on creative and active play, time in nature, and face-to-face interactions with caring adults. And, regardless of content, excessive screen time harms healthy growth and development.

Based on the available research, the next three sections of this guide contain practical information and suggestions for making your own decisions about using screen technologies with young children.

The American Academy of Pediatrics, the American Public Health Association, and the National Resource Center for Health and Safety in Child Care and Early Education recommend the following guidelines for screen time in early care and early education settings:

- In early care and education settings, media (television [TV], video, and DVD) viewing and computer use should not be permitted for children younger than two years.
- For children two years and older in early care and early education settings, total media time should be limited to not more than 30 minutes once a week, and for educational or physical activity use only.
- During meal or snack time, TV, video, or DVD viewing should not be allowed.
- Computer use should be limited to no more than 15-minute increments except for homework and for children who require and consistently use assistive and adaptive computer technology.
- Parents/guardians should be informed if screen media are used in the early care and education program.
- Any screen media used should be free of advertising and brand placement. TV programs, DVD, and computer games should be reviewed and evaluated before participation of the children to ensure that advertising and brand placement are not present.

American Academy of Pediatrics, American Public Health Association, National Resource Center for Health and Safety in Child Care and Early Education (2011). *Caring for our children: National health and safety performance standards: Guidelines for early care and education programs* (3rd ed.). Elk Grove Village, IL: American Academy of Pediatrics; Washington, DC: American Public Health Association.