

Digital Inequality and Developmental Trajectories of Low-income, Immigrant, and Minority Children

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Children growing up in the United States today are more ethnically and racially diverse than at any time in the nation's history. Because of rising income inequality, almost half of the 72 million children in the United States are also growing up in low-income families, with immigrant and children of color disproportionately likely to be within their ranks. Children in low-income households are more likely to face a number of social challenges, including constrained access to the Internet and devices that connect to it (ie, digital inequality), which can exacerbate other, more entrenched disparities between them and their more privileged counterparts. Although the American Academy of Pediatrics' new guidelines encourage clinicians to reduce children's overexposure to technology, we argue for a more nuanced approach that also considers how digital inequality can reduce low-income children's access to a range of social opportunities. We review previous research on how digital inequality affects children's learning and development and identify areas where more research is needed on how digital inequality relates to specific aspects of children's developmental trajectories, and to identify what interventions at the family, school, and community levels can mitigate the adverse effects of digital inequality as children move through their formal schooling. On the basis of the evidence to date, we conclude with guidelines for clinicians related to supporting digital connectivity and more equitable access to social opportunity for the increasingly diverse population of children growing up in the United States.

The United States hit a demographic milestone in July 2011: the majority of infants born that month were nonwhite for the first time in the nation's history.¹ Population diversity within the next generation is on the rise; 25% of US children are Hispanic,² 14% are non-Hispanic African American, and 5% are non-Hispanic Asian American.³ Furthermore, the share of US children who are either immigrants or the US-born children of immigrants, of any origin, grew from 18% to 25% between 1994 and 2014.⁴

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Racial and ethnic diversity in the United States has increased concurrently with income inequality. By 2014, almost half (44%) of US children were living in low-income families. Children of color are disproportionately likely to be within their ranks; 65% of African American children live in low-income families, as do 62% of both American Indian and Hispanic children, compared with 31% of white and 30% of Asian American children. Likewise, more than half (54%) of children with immigrant parents are growing up in low-income homes, compared with 40% of those with US-born parents.⁵

Children in low-income households are also more likely to live in under-served, racially delineated neighborhoods, attend underresourced schools, and have irregular access to health care and other services.⁶ These children and their families are also disproportionately likely to experience digital inequality, that is, constrained access to the Internet and devices that connect to it.⁷⁻⁹ Medical professionals are more likely to argue for less media use than for more, citing concerns about media time displacing crucial developmental activities like exercise, play, and sleep. The new guidelines from the American Academy of Pediatrics (AAP)^{10,11} reflect continued emphasis on these concerns, which are crucial for children across the income spectrum. We argue, however, that digital inequality can also be considered as a critical developmental issue without negating those concerns. Because digital inequality is linked to many of the entrenched forms of social disparity that adversely affect child development, limited Internet access has potential to compound inequalities between more and less privileged children as information resources, services, and opportunities continue to migrate online.¹²

CURRENT STATE

Although an impressive body of research has amassed around media and children's development, the majority of researchers to date have focused on "WEIRD" families, that is, those that are Western, Educated, Industrialized, Rich, and Democratic.¹³ In the United States, researchers conducting studies have focused primarily on white and middle-class families,¹⁴ meaning that we know comparably less about digital inequality's effects on low-income children and families and on children's development in particular. Although some researchers have documented that low-income African American and Hispanic youth and their families consume significantly more media than their white, middle-class counterparts, few of those studies have had researchers consider how social class, race, family circumstances, and sex impact these patterns of technology adoption and use.

To develop a more comprehensive understanding of how parents and children experience digital inequality and its consequences, 2 of the authors (V.S.K. and C.G.) recently interviewed 336 low-income Hispanic parents and children (in grades K-8) in Arizona, California, and Colorado. Those interviews informed a subsequent nationally representative telephone survey of 1191 parents of school-aged children, from all racial and/or ethnic backgrounds, who reported annual household incomes less than the US median (~\$65 000 per year; US Census Bureau, 2013).^{8,9} Our findings shed light on how connectivity affects a range of developmental opportunities for lower-income children; we highlight some key themes below.

Consequences of Being "Underconnected"

Our most fundamental finding is that simply asking whether families do

or do not have Internet access does not capture how families experience digital inequality. We found that 94% of surveyed parents have some kind of Internet connection (including 90% of families living below the federal poverty line). In addition, 81% of parents report having at least 1 computer at home, 80% own a smartphone, and 67% own a tablet.⁹

However, many of these families are also "underconnected" in some way. Just over half (52%) of surveyed parents with home Internet access report that their connection is too slow to do the things they wish to do online, a quarter (26%) feel that too many people share the same computer for them to have enough time on it, and one-fifth (20%) report that their Internet was cut off in the last year because of nonpayment. Among the 23% of parents who only have Internet access via a smartphone or tablet (ie, "mobile-only" families), 29% have hit their data limits in the past year, 24% have had their phone service cut in the past year because of nonpayment, and 21% feel that too many people share the same device for them to have sufficient time with it.⁸

The more connectivity challenges families face, the less they use the Internet to help them access opportunities that support family stability and well-being. For example, parents with mobile-only access are significantly less likely to apply for jobs or services they qualify for online (42%, vs 56% of those with access via a computer),⁸ including health-related resources, which are increasingly migrating online.¹⁵ The authors of previous research have established that the Americans who are most likely to experience health disparities (that is, those who are low-income, less educated, African American, and/or Hispanic) are the same groups who are disproportionately likely to be mobile-only.^{16,17} Taken together, these findings suggest that

being underconnected can further constrain access to medical resources for the children and families who need them most.

Technology in Children's Learning and Development

The AAP's new guidelines on children's media use modify the previous recommendation of no screen time until age 2, citing mounting evidence that appropriate content and adequate adult guidance can enable children to learn with screens from their earliest years.^{10,18,19} Although the AAP still recommends limiting screen time for school-aged children, the guidelines now strongly encourage parents to reflect on how their children engage with technology by developing family media use plans in collaboration with pediatricians.¹¹ These personalized plans account for different types of learning activities and consider individual children's developmental stages and needs. The AAP also highlights how technology use can benefit academic performance.¹¹ Our previous research (by K.C.) supports this link, revealing that providing low-income, minority students with access to technology increases their self-efficacy in content areas such as math and science²⁰ and enhances learning through active engagement, participation in groups, frequent interaction and feedback, and real-world connections.²¹

Connectivity does not only enable student learning in the classroom. Because students spend most of their waking hours in their communities and with family members and peers, technology can connect their learning experiences across different social contexts (ie, online and off-line, at school, at home, and in other locations)²² in ways that positively contribute to their social-emotional development.²³ Those experiences in turn can augment their academic development and success. The authors of previous

research have shown that higher-income youth have more of these "connected learning" experiences than low-income youth²⁴ and that lower-income youth are less likely to learn about technology from peers and people in their community.²⁵ More research is needed to confirm causality, but these digital inequalities seem to constrain low-income children's opportunities to develop or hone certain social and/or emotional skills and realize the full benefit of classroom technology use.^{26,27}

Our survey results also indicate that Internet connectivity outside of school provides crucial support for children's learning and development. Most (81%) surveyed parents report that their children (ages 6–13) play educational games and go online to look up information that they are interested in. For parents with older children (ages 10–13), 81% report that their children go online for homework, 46% to collaborate with other students and 40% to connect with teachers.⁹

Consistent connectivity therefore contributes to children developing the deep relationships with teachers and peers critical for both subject mastery and general school success.

We find that children with mobile-only connectivity have less access to these developmental opportunities. Children in mobile-only households are significantly less likely to use the Internet daily (31%, vs 51% with home access) or to go online for information about things they are interested in (35%, vs 52%). This last point is particularly troubling because interest-driven learning, prompted by children's own interests and curiosities (as opposed to by adults' directives), directly contributes to learning motivation and self-confidence.²⁸ Children with mobile-only access have fewer outlets to pursue interest-driven learning and fewer daily opportunities to hone the digital

skills that are quickly becoming fundamental literacies.

We also find that technology use is embedded in children's social development within their families. Roughly half (53%) of children help their parents to use and learn about technology; 77% of parents help their children to do the same. School-aged siblings also socialize each other to technology use, with 81% helping each other learn about computers or mobile devices at least sometimes.⁸ Previous research reveals that children can learn either via instruction from a more learned person (be it a parent or a sibling) or by reinforcing their own skills in the process of guiding someone else's learning.^{20,29,30} Given how frequently children are engaging with technology with siblings and parents in both expert and learner roles, our findings suggest that families' joint technology engagement is an important component of how children develop social and technical skills at home and school.⁹

FUTURE RESEARCH

We recommend 3 priority areas for research on the basis of our review of the current literature. The first reflects concerns about particular outcomes; we know a good deal about how digital inequality correlates with other forms of social disparity, but we need to know more about the causal relationships between connectivity and specific developmental consequences for children. The second is to identify particular areas in which targeted initiatives can effectively support parents and communities in mitigating those negative effects. The third takes an asset-based approach, seeking to build on existing family strengths in supporting one another's learning and development.

1. How do variations in family connectivity (and forms of under-connectivity) affect

specific aspects of children's developmental trajectories, including their access to regular health care and other checks on their overall well-being?

2. What interventions at the family, school, and community levels can mitigate the adverse effects of under-connectedness on low-income children before they begin (and as they move through) their formal schooling?
3. What kinds of supports beyond the family can best reinforce the forms of parent-child, child-parent, and sibling-sibling learning with technology already evident within low-income families?

RECOMMENDATIONS

New AAP guidelines for clinicians include helping families to create balance between media use, physical activity, and rest; develop digital literacy; and identify negative behaviors like sexting, cyberbullying, and improper Internet usage.^{10,11} To those important recommendations, we add specific guidelines for

clinicians to consider about digital inequality's influence on families and on children's learning and development:

- Consider how families' levels of connectivity may exacerbate other social inequalities that impact child well-being. It is important that providers not presume that families have consistent access to online resources, because our findings reveal that many do not. Furthermore, pediatricians and other health care professionals can be resources for families by alerting them to opportunities for subsidized broadband access, local digital literacy training (eg, coding classes for kids), and other resources;
- Recognize and validate how children and parents engage with technology together. We find that in low-income families, learning with technology involves dynamic exchanges during which children guide parents almost as often as the reverse. In families in which parents have less than a high school diploma or are not proficient in English,

parents depend on children's help more often than they provide it. Providers should recognize that any instructions they give a family that require seeking additional information or resources online is likely to be led by the child, and providers should tailor their suggestions accordingly³¹; and

- Support parents in ensuring their children have a "balanced" media diet. Even when children facilitate parents' technology use, parents usually remain the family authority. Advice on how to vary their children's media diet by amount, types of content, forms of interaction around that content, and balancing tech time with nontechnology activities (eg, board games, time outdoors, or self-guided play) can provide parents with much-needed frameworks for supporting their children's play and learning.

ABBREVIATION

AAP: American Academy of Pediatrics

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