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Kids Across the Spectrums

Growing Up Autistic in the Digital Age

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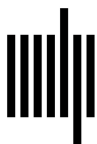
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3 LEARNING

Over a cup of coffee at her kitchen table, April—mother of Sofia, a 5-year-old nonspeaking autistic Latina girl—explained that her daughter’s sleep, as well as her own, had been completely thrown off lately. “[Sofia is] awake from 2:00 a.m. to 7:00 a.m. every day,” April shared, “And then she’ll fall asleep until like 11:30, 12:00 [p.m.] because she’s exhausted from being up all night.” Like many other children across the United States that summer, Sofia was not attending camp and mostly stayed home, spending the day in her Boston apartment. Without a regular schedule, media was increasingly becoming part of Sofia’s every waking moment, and she was awake for more of each day. April reported that Sofia will reflexively “grab the iPad, that’s the first thing she does [when she wakes up]. Even if she doesn’t use it, she needs to touch it.” Sofia loved watching the educational preschool cartoon *Clifford the Big Red Dog* on the PBS KIDS video and YouTube apps. She was starting to rely on the iPad not only to structure her day but also to regulate her behavior. April said that “it’s the only thing that will keep her calm enough to not start hitting. She doesn’t have anything going on . . . she’s just not burning that energy at all.” Though far from ideal, April felt like there were no alternatives to Sofia’s constant media use. “I know why she’s not sleeping good and I’m just like . . . can’t do anything about it right now,” she sighed, “I can only do so much at home.”

Frustration over being able to “only do so much at home” was a common refrain among individuals during the summer of 2020 in the wake of the coronavirus pandemic. “Shelter in place,” “stay at home,” and “safer at home” orders went into effect in mid-March 2020, urging people to leave home only

if necessary.¹ In the absence of a coordinated national effort to effectively address the public health crisis, states such as Massachusetts took measures to physically close schools and move learning into virtual classrooms to prevent the spread of COVID-19.² Some parents took on another full-time job overseeing their children's schooling in addition to working remotely, while record numbers of Americans became unemployed.³ Students with disabilities encountered additional educational barriers with the loss of in-person physical, speech, and occupational therapy, and low-income students contended with a lack of high-quality internet access.⁴ Being "safer" at home was also relative to the safety within and outside of one's home, including neighborhood and racial health disparities that affected the likelihood of contracting and surviving the coronavirus.

Except all of what April described with Sofia—not going to camp, staying inside, and being tethered to the iPad—happened in July 2019, seven months before the pandemic started. While many people made hard choices and major sacrifices in 2020, interlocking forms of structural inequality meant that Sofia was already intimately familiar with being socially distanced and technologically mediated. Why was she not attending camp? Local programs for autistic kids at \$6,000 for just three weeks were far too expensive. April had recently left her job as a daycare provider because she could not function at work after staying up so late with Sofia. April had the option of sending her to summer school but opted out after a terrible summer prior when Sofia was placed, she said, into "an empty room with a blue table and a stack of paper and crayons and that's it." Why was Sofia not leaving home? Her parents had been priced out of their gentrified neighborhood and moved into a more affordable apartment with April's family—but one with no parks, playgrounds, or subway stops in walking distance. Taking the bus somewhere would have overwhelmed Sofia's easily dysregulated sensory system.

And why was Sofia spending so much time with media? On top of the issues that have already been mentioned, she had been on a never-ending waitlist for behavioral and speech therapy for the past nine months. A local hospital's pediatric autism center notified April of openings at therapy practices in the area, but those health-care providers never seemed to have availability when she called. Sofia's experiences match up with research indicating that compared to their White peers, Latino children receive fewer autism services and their parents feel less empowered to advocate on their behalf.⁵ Shifting from "waitlist to waitlist to whatever," in April's words, and

the resulting gap in therapeutic services led to Sofia having a lot of spare time on her hands. Whatever Sofia was doing, it mostly involved a screen. Sofia's grandmother, Claudia, observed that when her granddaughter is "in school and she has therapy, she doesn't think about technology at all . . . but nothing to do, she's back to *Clifford* all day." Sofia was consuming a significant amount of publicly funded educational media in large part because she had not been receiving the formal enrichment that her public school was legally obligated to provide her.

This chapter focuses on the potential for learning that media and technology offer autistic children like Sofia—with a focus on academic and creative pursuits—and the concurrent barriers they face in accessing a high-quality education. (As for the digital learning obstacles and opportunities borne specifically of the pandemic, I will address those more thoroughly in this book's conclusion.) A common refrain among parents with whom I spoke was that their child learned a great deal through their self-directed and unstructured media use at home, sometimes even more so than in school. Autistic kids also demonstrated and told me enthusiastically about information, skills, and talents that digital tools helped them to cultivate. This may reflect the compelling nature of technology as well as autistic children's attraction to audiovisual media, but it is also an indictment of the lack of engaging, inclusive, and affordable in-person educational and leisure opportunities for kids on the spectrum beyond their homes and in their neighborhoods. The same factors shaping young people's unequal educational opportunities—including structural inequalities rooted in race, class, and geography—also impact the learning possibilities for autistic children in varied ways.

Disabled children's technology use has primarily been understood in society through a curative or rehabilitative lens, placing more emphasis on kids that need fixing than on systems that need overhauling.⁶ Neurodivergent students tend to figure into cultural narratives of learning and educational technology on a largely superficial level, thereby reinforcing their outsider or "special" status. Through the analytic lens of the sociotechnical shaping of sociality, in this chapter I unpack popular concepts and key theories in learning and technology and present them from another angle that questions the social norms underpinning them; for example, juxtaposing a recent emphasis in education circles on children's "interest-driven" learning with media and the pathologization of autistic people's so-called special interests. I argue that popular assumptions about the inherent tech-savviness

of kids on the spectrum overlook the support, mentorship, and resources that they need to develop a wide range of digital skills and critical literacies to thrive in an uncertain world.

AUTISM, EDUCATION, AND LEARNING WITH TECHNOLOGY

I begin with a broad overview of the formal (i.e., in school) and informal (i.e., out of school) educational landscape for autistic children, with a focus on the US context, and the extent to which technology has been successfully incorporated into their learning outside of the school environment.

FORMAL LEARNING

Students receiving special education services through autism eligibility in the United States comprise approximately 10 percent of all students in special education and around 1 percent of all students enrolled in elementary and secondary schools, or one in eighty-one students.⁷ School eligibility for special education services is not a proxy for an autism diagnosis, though; one in eighty-one is far less than the Center for Disease Control and Prevention's medical estimates of autism prevalence as one in forty-four children. There are several reasons for this discrepancy, including the fact that many students on the spectrum are not identified by schools or identified as qualifying for special education services through a different disability category.⁸ States also vary in how they determine special education eligibility for autism services due to differences in state-level education spending and the availability of medical providers who can diagnose autism.⁹ Individual factors additionally influence autism eligibility in schools; for instance, White families with higher socioeconomic statuses are more likely to advocate that their child be labeled with autism instead of an intellectual disability due in part to the cultural stigma associated with the latter.¹⁰

The US Individuals with Disabilities Education Act (IDEA) of 1990 (revised in 2004) states that all children have a right to a "free appropriate public education in the least restrictive environment."¹¹ For students with disabilities, the IDEA mandates the creation of an Individualized Education Program (or Plan) (IEP) to ensure this right. IEPs are personalized to each child and outline educational goals, objectives, and services that a student will receive in school. The IEP is revised annually in a meeting with key stakeholders including parents, teachers, administrators, and students when appropriate. IEPs can

leave much to be desired, however. Many parents report finding the process stressful and taxing, especially those who are low-income, immigrant, and/or Black and Latino.¹² Though their attendance at the IEP meeting is mandatory, caregivers are often not provided the opportunity to give meaningful input.¹³

Some disabled students who do not require special instruction or related services but still need some accommodations (e.g., extended time for test taking) have 504 Plans instead of IEPs. These plans derive from Section 504 of the Rehabilitation Act of 1973, a civil rights law prohibiting disability discrimination in programs that receive federal assistance (such as from the Department of Education).¹⁴ Still, whether a child has an IEP or 504—or nothing—is not reflective of the child alone. For example, Meena, an immigrant and mom of 5-year-old Eashan (Asian/Indian, boy), said that he “does not have an IEP at school. It will be a fight to get him. It’s just hard for me to push, because I am already going through a lot with my other son [Adhi],” who is also autistic and has complex needs.

“School” itself can take many different shapes for autistic kids. Children on the spectrum may be enrolled in public or private school (the latter of which is not tied to the IDEA or required to follow IEPs), or, alternatively, may be homeschooled. Physical schools can generally be challenging places for students on the spectrum for various reasons, as they “are usually physically large, noisy, and chaotic, transitions between classes occur frequently throughout the school day, and the social milieu becomes ever more complex as children progress.”¹⁵ It is important to consider classroom configuration as well. A student might do best in a mainstream school and classroom, a special education classroom in a mainstream school, in a hybrid version of those two arrangements, or in a separate school for kids with neurodevelopmental disabilities. Many autistic children, however, end up in segregated or self-contained classrooms because their schools fail to design individualized instruction and provide staff support in integrated classrooms.¹⁶

Across these arrangements, there are significant gaps in research on the educational outcomes of autistic students, particularly adolescents and those with intellectual disabilities. Individual education plans for students in specialized settings primarily focus on life skills and developmental areas, whereas mainstream settings emphasize academic progress.¹⁷ Students on the spectrum are often excluded from academic measures like standardized tests and not offered alternative assessments.¹⁸ Studies also show that up to 85 percent of youth in juvenile detention facilities have disabilities

like autism that make them eligible for special education services, but only 37 percent received those services while in school, with a disproportionate number being Latino and Black children.¹⁹ Autistic children with intellectual disabilities and from minoritized backgrounds are perpetually being “readied” to learn, in lieu of learning, even in school. The stakes of not having one’s educational needs met by schools are simply much higher for some kids on the spectrum than for others.

INFORMAL LEARNING

School may be the primary site of autistic children’s education, but it is not the only location. Young people learn in both formal and informal educational settings.²⁰ Formal learning is primarily classroom-based learning, is provided by trained teachers, and offers a consistent community of fellow learners. It has limited flexibility in terms of incorporating content that does not fit into a specific curriculum or set of educational standards. In contrast, informal learning happens outside the classroom in spaces including afterschool programs, extracurricular clubs, community-based organizations, museums, libraries, and children’s own homes. These spaces generally provide more flexibility and experimentation with respect to educational content, though this lack of structure can also make learning outcomes harder to track. Many informal learning opportunities also require major investments of time, money, and other resources (e.g., equipment, supplies) on the part of parents outside of the support they (especially mothers) are already expected to formally provide (e.g., homework help, classroom volunteering).²¹

Questions of formality and informality in education concern not just where one learns but also what counts as learning.²² Sociocultural learning theory, popularized by developmental psychologist Lev Vygotsky, highlights the pivotal function that social environment and cultural norms serve in a learner’s development.²³ High-quality informal learning can have several educational, social, and cultural advantages for children and adolescents. Young people may significantly benefit from developing hobbies and pursuits that follow a less rigid schedule than do the school day and calendar. This includes time for learning that is spontaneous and self-paced and that occurs within longer, uninterrupted stretches. Informal learning also offers opportunities for direct family and intergenerational involvement in a variety of roles such as coaches, collaborators, and onlookers. Out-of-school learning may be self-guided and motivated by personal interests, as well as propelled by social connections, friendships, and relationships.²⁴

As with formal learning settings, children on the autism spectrum face unique barriers to accessing informal learning opportunities. Physical spaces can present challenges for autistic youth with sensory sensitivities who find it hard to stay still, quiet, or focused within such environments. Even settings such as museums and libraries that may have “autism friendly” or “sensory sensitive” programming (i.e., special hours with reduced capacity, greater freedom to move about, less harsh lighting, and lowered sound) present their own access barriers. This includes programming that is inconveniently scheduled (i.e., early in the morning), prohibitively expensive, rarely offered, or difficult to access via public transit.²⁵ Drop-in or casual programs also tend not to provide personalized support for autistic learners unless delivered by a private aide or parent, which inherently privileges families with more resources. For autistic youth like Sofia, all of these issues factor into the outsized function of media as a facilitator of low-cost, convenient, and independent learning at home.

DIGITAL MEDIA AND INFORMAL LEARNING

Media and technology play an increasingly pivotal role in out-of-school learning contexts for children and adolescents. The internet and networked communication technologies blur distinctions between formal and informal learning environments (e.g., school-provided laptops that students take home and use for nonschoolwork-related purposes). Technological and digital media skills may be cultivated through informal learning activities, including those that are mentor-led and learner-initiated.²⁶ For example, a child can watch YouTube videos to teach themselves digital photo editing, or they can attend a club or camp (in person or virtual) through which they receive personalized instruction. However, significant gaps exist between learners in reaching their goals. There is a difference, for instance, between an adolescent without home internet or computer access watching that same instructional YouTube video on a smartphone shared with younger siblings whom they also must regularly care for while a single parent works, and another viewing the video on their own computer with reliable, high-quality broadband internet at home during ample leisure time. Such disparities tend to result in upper- and middle-class children who come to school “prepared” to learn and poor- and working-class students who have not benefitted from such preparation. The rush to technocentric solutions to educational inequality often leads to greater divides, particularly without an understanding of the social infrastructures, political environments, and cultural expectations into which technologies enter.²⁷

With respect to the informal digital learning of disabled and autistic youth, programs focused on science, technology, engineering, and math (STEM) have launched in recent years, though few and far between.²⁸ Such activities are often borne of partnerships between community organizations, educational institutions, and academic researchers.²⁹ Many center on job preparation in the tech sector, noting high unemployment among adults on the spectrum.³⁰ Tech Kids Unlimited, for example, is a nonprofit program in New York City that provides neurodivergent adolescents with computer science and technology training (e.g., app development, video editing) in a social environment with a low student-to-teacher ratio.³¹ The IDEAS Maker Program is based on the New York Hall of Science's museum-based maker program and has run as an informal club in New York University's ASD Nest autism-inclusion middle schools.³² Despite these organized programs, there has been little research into racially and socioeconomically diverse autistic children's mentor-led and self-directed learning with media and technology in out-of-school settings, and there have been few studies on the social, cultural, and political tensions that emerge across their formal and informal learning environments.³³

NEURODIVERGENT LEARNERS IN A NETWORKED WORLD

I take up this work next by identifying patterns in how digital media and learning play out in the everyday lives of autistic youth. I do so by critically engaging with five key concepts that cut across the learning sciences and the sociology of education: (1) learning ecologies, (2) educational media, (3) media literacy, (4) interest-driven learning, and (5) concerted cultivation. Through my conversations and observations with autistic kids and their parents, I found that many are getting a lot educationally out of media and technology, but what they are learning is often unexpected and hard to measure, and how they are learning it is not always straightforward.

LEARNING ECOLOGIES

Cathleen knew that something was amiss one day when her son, 6-year-old Sebastian (Latino and White, boy), suddenly “had all this *Peppa Pig* language [and was speaking] with a British accent,” referring to the animated children's TV show from the United Kingdom starring the eponymous pig. The fact that Sebastian had out of the blue started talking like a Brit was not the surprising

part to Cathleen. In addition to autism, Sebastian was diagnosed with Fragile X, a syndrome caused by a genetic mutation on the X chromosome that can also result in difficulties with sensory regulation.³⁴ Cathleen said that “kids with Fragile X mimic anything,” which for Sebastian included things he heard and saw on TV. No, what was curious to Cathleen was that it had been at least a year since her son had even watched an episode of *Peppa Pig*, at least to her knowledge. There was only one place where he could have accessed the show without her direct supervision. “I said, ‘Sebastian, are you watching *Peppa Pig* at school?’” Cathleen recalled.

After asking him multiple times and eventually talking with one of his teachers, Cathleen deduced that Sebastian had been viewing the program on the iPad every morning at school for the past few months. Upon arrival, Sebastian’s school aide brought him straight to the learning resource center, where he could avoid the clamor and chaos of the hallways for 15–20 minutes before joining his kindergarten class. At some point, the center’s staff had started to use the iPad as a behavioral management tool to get Sebastian to sit at a table and do work. Cathleen found this pedagogical practice to be frustrating in multiple respects. Her son’s time in the “learning resource center” was being spent watching a TV show that to her was more commercial than educational. She did not like that Sebastian was watching TV for fun in the same location where he received academic instruction at other times of the day. She additionally bemoaned the fact that Sebastian’s iPad time was an unearned reward at school, which was very different from how she and her husband managed his technology use at home.

Multiple breakdowns in parent-school communication had clearly occurred. “I still don’t have all of the information,” Cathleen said, “I don’t know how long he’s watching the iPad for. I don’t know if it’s a whole show or if it’s just a few minutes.” She wished that someone in the resource center had sought her consent. “Nobody asked if that was okay, how we feel about iPad use at school,” she remarked. No one had solicited her approval of the content either, which she would have objected to. After the fact, Cathleen proposed that her son at least watch an educational show like *Wild Kratts* or play with a letter recognition app on the iPad. She was less than thrilled when the staff came back to her and “suggested that it was going to be *Paw Patrol* and I was like, ‘Absolutely no way is he going to school to watch *Paw Patrol*,’” a preschool show that, like *Peppa Pig*, is thin on curriculum. Nor had any representative from school asked about Sebastian’s media use

or morning routine at home. If they did, they would have learned that he and his younger brother usually watched 30 minutes of TV after breakfast. “Then he goes to school and gets immediately given an iPad,” Cathleen said exasperatedly.

Understanding how and why communication had failed between Cathleen and Sebastian’s teachers requires taking a closer look at the factors that influence any one child’s learning. Psychologist Urie Bronfenbrenner proposed the ecological systems theory to explain the direct and indirect ways that human development shapes and is shaped by society at multiple interconnected levels or “nested systems.”³⁵ The ecological part of the theory highlights how social contexts envelop one another and are in constant interaction. Bronfenbrenner identified five such systems: microsystem, mesosystem, exosystem, macrosystem, and chronosystem. The “microsystem” immediately surrounds a child and includes the activities, spaces, and people they regularly encounter (e.g., Sebastian’s parents, aide, and teachers). At the mesosystem level are the interactions between those entities; for example, parent-teacher communication. The “exosystem” surrounds the mesosystem and microsystem, and it encompasses larger institutional factors such as school district policies. These three systems are enclosed by the “macrosystem,” or the broader culture and social norms, like White upper-middle-class parents’ expectations of a positive relationship with their children’s schools. Lastly, the “chronosystem” describes the circumstances impacting how a child grows up at any given era in history and how the individual person and their environments also change over time.

Children are not passive observers in Bronfenbrenner’s framework. They both act on and are acted upon by these systems; for instance, kids influence their parents’ caregiving practices, which, in turn, impact their own lives. This dynamism holds especially true for the incorporation of digital media and technology into each level of the nested spheres, spanning the online spaces where kids hang out (microsystem), federal and state laws protecting their digital privacy (exosystem), and societal “moral panics” about their potentially excessive media use (macrosystem).³⁶ The ecology metaphor in Bronfenbrenner’s theory extends to the “media ecologies” that young people inhabit, or the structures and conditions of their engagement with digital and nondigital media. It also applies to their “learning ecologies,” meaning the social and cultural contexts in which they learn (i.e., formal and informal learning settings, physical and virtual environments).³⁷

With respect to the learning ecologies of autistic youth, parents of kids on the spectrum are more likely than those of children with other disabilities to be dissatisfied with their relationship with their child's school and with home-school communication.³⁸ Dialogue between parents and teachers is of particular importance for autistic children because many like Sebastian have significant communication challenges that limit what they might be able to share at home about school.³⁹ Ultimately, Cathleen suspected that the cause for the miscommunication about Sebastian's TV time was more institutional than individual, or, in other words, that it concerned the exosystem more so than the microsystem. "I'm not blaming them," Cathleen said of the learning center staff. She explained by bringing up Sebastian's prior educational contexts. "[He] went from this . . . amazing preschool program and you're very connected to what's happening" to elementary school where "you don't get the same information" from teachers, she said. Though he was currently enrolled in one of the most well-funded school districts in Massachusetts, K-12 classrooms were overcrowded, and teachers had increased student caseloads. It was not the biggest deal that Sebastian came home from school talking like Peppa Pig, but the incident represented a larger disconnect within and across the learning spaces that he inhabited daily.

EDUCATIONAL MEDIA

Cathleen's preference for Sebastian watching certain shows at school (if he had to) also speaks to questions of what makes media educational, especially for kids on the spectrum whose cognitive development may not follow a linear path. Children do not only learn from media created with education in mind. They model behavior they regularly see and repeat words they frequently hear from all kinds of media (much to their parents' chagrin). Most explicitly educational media created for US audiences is intended for preschoolers and early elementary-age children. There is a drop-off in educational media consumption around age 8 because children become busier with school and less content is produced for adolescents. Kids can learn both academic skills (e.g., STEM, literacy) and socioemotional skills (e.g., self-awareness, decision-making) from such content; the former, though, is generally easier for younger children to comprehend and the latter, for older kids.⁴⁰ Young children can also be confused by media marketed as educational but that has no underlying curriculum or is poorly designed (e.g., too quickly paced).⁴¹ Productions from major industry players (e.g., Nick Jr.,

PBS KIDS) usually go through some form of vetting with education advisors (e.g., script review).

Very little research has been conducted on what autistic kids learn from educational media designed for a mass child audience. Some studies fold such content into interventions for children on the spectrum; for example, determining if certain episodes teach social and emotional skills.⁴² Other work centers on the use of media as a reward or reinforcer in behavioral therapy, as well as on the messages that parents receive from clinicians about using media with their autistic child for therapeutic and educational purposes at home.⁴³ For example, Amy, mom of Isabella (age 5, White, girl), noted, “I think almost all of the games or apps that we have were recommended by her ABA [applied behavior analysis] folks. [Those all] have some educational component.” Many kids on the spectrum excel at recognizing patterns and alternative problem solving, talents which lend themselves to educational games and puzzles. The ease of pausing, rewinding, and rewatching content on phones and tablets aids in their retention of letters and words. Difficulties with executive functioning and sensory processing, however, can also limit the efficacy of educational media for this audience, such as apps that have extra “gamified” elements that distract from learning goals.⁴⁴

“IT’S FREE EDUCATION” Many parents, especially of preschool and early elementary-age autistic kids, were excited by the learning potential of YouTube, mobile devices, and other forms of digital media. YouTube, the world’s largest host of video content, would never be characterized as an educational media platform, but it does host material from public broadcasters like PBS and BBC, alongside lower-budget, pseudo-educational material from producers like ChuChuTV.⁴⁵ Phil, father of 4-year-old Chris (Asian/Cambodian and White, boy), plainly stated, “YouTube, I’m a big fan. Free. It’s free education.” Raina thought it was easier for her 4-year-old daughter Zahra (Azerbaijani) to comprehend material on screen than in print: “I believe she can learn more during one hour of media than she would learn from [a] book at this age.” Molly, mom of 4-year-old Abbey (White, girl) also noted that traditional media was less effective as an educational tool. “Some [kids] like books. Some like laptops,” Molly said, “[Abbey’s] thing is going to be either my phone or the tablet. As long as she’s learning, I could really care less.”

Parents were prepared to make tradeoffs to maximize the educational benefits of media, including what others might characterize as excessive

screen time. As Leslie, mom of 3-year-old Oscar (White, boy), put it, “I really wanted to limit his exposure to screens. But I figure . . . it’s not like we’re watching violent train wrecks on YouTube. We’re watching letters.” Parents of minimally speaking children regularly said that their child made more attempts at speech and vocalization when they were able to replay sounds and words on a digital device. “Most of [what] he watches on YouTube have things like [the song] ‘Farmer in the Dell’ in the background while Spider-Man is driving the car off the cliffs,” Tara said about the viewing habits of her 3-year-old minimally speaking son Ryan (White)—videos which combined the violent train wrecks and letters mentioned by Leslie. Tara added, “I’ll let him watch that video 50,000 times if it’s going to make him be able to sing that song.” Angelica, mom of 4-year-old minimally speaking Bella (Cape Verdean, girl), likewise claimed that her daughter had learned “a lot of words and speech . . . through these videos on YouTube. And I understand people saying . . . too much of that is bad for them. But for me, I honestly think it’s helped her.”

Some caregivers considered learning with technology at home to be just as, if not more, beneficial than learning in formal settings. “Basically, the iPad taught him all his colors, all his letters, all his numbers, all his shapes,” said Peter, dad of 6-year-old Danny (White, boy). “Do you think more so than school?” I replied, to which Peter said, “Absolutely.” Amir, father of 5-year-old Imay (Asian/Nepalese, boy), said of his son’s YouTube viewing, “I think he learn from those videos, he learn. In class, in his school, they don’t.” Educational media could also supplement other kinds of in-person and extracurricular learning. Eight-year-old Karim (Middle Eastern/Algerian, boy), who is Muslim, attended religious and cultural instruction every Saturday. His mom, Nour, who worked in higher education, introduced an app called *Adnan the Teacher of Qu’ran* to him to help him memorize verses and learn Arabic.

Sensory processing played an additional role in how autistic children learned from educational media and managed their attention amid various technological demands. For Abbey, multitasking with media was more a facilitator of learning than a distraction from it. I observed her focused on a game on Molly’s iPhone while facing the living room window. Preschool cartoon *Doc McStuffins* played behind her on the television set—a special crossover episode with characters from the classic *Winnie the Pooh* series. “Hi, Eeyore,” Abbey said, without looking back at the TV. A few seconds later, an on-screen character said the same line. It was common for Abbey

to anticipate and recite speech from shows that she watched repeatedly. “I don’t know what it is. Just seeing it on the screen, in the way it’s presented, it just absorbs in her mind,” Molly remarked. Though “background television” (i.e., when the TV is on, but no one is watching) is generally understood to have various negative impacts on young children’s cognition and speech, that research is based on studies of nonautistic kids.⁴⁶ Other research has suggested that background television heightens “autism spectrum disorder-like symptoms” for infants and toddlers.⁴⁷ The TV on in the background was very much front of mind, however, for Abbey, even as she looked down at the iPhone in her hand. The “education” in educational media can mean different things among autistic children based on social expectations of their learning outcomes and the benefit that they derive relative to other educational contexts.

FOREIGN LANGUAGE I was surprised by how much one topic—non-English language learning—figured into the media consumed by the autistic kids I spent time with, including those living in English-speaking monolingual and multilingual households. Such media included YouTube videos of letters and words, educational app video screengrabs, and dubbed cartoons. Rob, father of 13-year-old Luke (White, boy) commented, “You’ll be sitting here, and you’ll hear Elmo [coming from his iPad], and then you’ll realize it’s in . . . Portuguese.” Kids derived pleasure from videos that were identical save for being in a different language, which could be attractive to autistic children preferring patterns and predictability. “There’s [a *Sesame Street*] rubber duck song he likes to watch, but he’ll watch it in like three different languages,” Jessie said of her 4-year-old son Patrick (White). Three-year-old Carter (Black and White, boy) enjoyed “watching [music videos of] ‘Wheels on the Bus’ in like five different languages,” said his mom, Simone. It was hard to say to what extent the kids, the technology, or the global reach of YouTube were driving this phenomenon, or if they were even possible to fully separate.

Another underlying individual factor might have been the condition of hyperlexia, a term derived from the Greek words for “over” (*hyper*) and “word” (*lexis*). Hyperlexia in children is characterized by having advanced reading skills without explicit instruction and a strong orientation toward reading material among those younger than age 5.⁴⁸ Hyperlexia is strongly associated with autism: 84 percent of those who have hyperlexia are estimated to be people on the spectrum.⁴⁹ Autistic toddlers are more likely than typically

developing children to display interest in literacy-related toys.⁵⁰ There is contention over whether hyperlexia is a disability or “superability,” a medical condition or cultural form of “autistic poetics” (i.e., linguistic techniques that people on the spectrum use to create art and meaning).⁵¹ Hyperlexic children are drawn to numbers and letters, videos of which there are no shortage of on YouTube. Oscar’s mom, Leslie, noted of his ability to say the Cyrillic letter Я, “We did not teach him this. He learned this from watching a video.”

Some studies have identified a co-concurrence of hyperlexia and difficulties with spoken language.⁵² Interestingly, it was primarily nonspeaking or minimally speaking autistic kids—as with Luke, Carter, and Patrick—who tended to be the heaviest viewers of this video genre. During her steady consumption of *Clifford* YouTube videos during one of my visits, I noticed Sofia watching one on her iPad that sounded like it was in Polish and pointed it out to April. “Oh yeah, you know how many languages I hear?” she replied. Next thing I knew, Sofia had switched to another *Clifford* video in French. “She always finds them. They have everything on YouTube,” April remarked. The design of the YouTube app facilitated her daughter’s repeated viewing. “Sofia’s watched all these videos on the side,” April said, pointing to the app’s sidebar. She also noted the contrast between Sofia’s challenges with embodied oral speech and her appetite for dubbed *Clifford* clips. “Sofia, if you end up speaking many languages when you talk, I will be very impressed,” she joked with her daughter.

April was not alone in seeing a glimpse of her autistic child’s future in her current consumption of foreign language YouTube videos, which to some parents suggested far greater intelligence than many assumed. During my visit, I must have heard the word “elephant” in about four different languages in the YouTube videos that Abbey scrolled through on Molly’s iPhone. Molly pointed to Abbey’s recitation of foreign language content as evidence of her cleverness. “For the longest time, we thought she was speaking a different language because of all of the videos she watched in Spanish and French,” Molly said, “It’s honestly amazing. It’s the one way I can guarantee she’s processing it.” Molly’s emphasis on the need to have proof of Abbey’s intelligence speaks to how autistic kids’ skills and competencies are often missed or overlooked in formal educational environments. Her informal learning with media offered a different trajectory than the path expected of Abbey. Molly spoke with awe about her daughter’s talent, noting that one day she could end up at Harvard or “be a translator.”

Nina, mom of 11-year-old Raul (Latino, boy), noted that YouTube was not the only site that kids used to search for and consume such content. Using Google Images, Raul had found a website of bootleg cartoon episodes “that he can’t get access to otherwise because YouTube doesn’t have all full episodes usually.” After finding a video he loved, Raul would search for it in a different language by either reading the title in English or identifying the same visual thumbnail of a screengrab from the video. “I feel like he’s learned a lot” from those videos, said Nina, “He’s memorized the scripts . . . and the different language could be Spanish, Russian, Mandarin.” After watching videos on the website, “sometimes he tries to find these things on iTunes, like the episode in that language and then he changes our iTunes setting to another country to try to purchase.” Endless availability and ease of access across different digital media platforms was a significant contributor to autistic children’s consumption of educational media and media that they learned from, which were not necessarily the same thing.

MEDIA LITERACY

Though there were obvious educational benefits to the foreign language cartoons, some parents also expressed concerns about inappropriate content that children might encounter through their web browsing. April (who spoke Spanish and English) said of the Polish *Clifford* video, “I don’t know what they’re saying but hopefully [not] anything bad.” Nina mentioned one time when Raul’s grandmother, a Cuban immigrant, was watching him, she discovered that he was viewing a YouTube video of the preschool program *Backyardigans* “and they’re cussing in Spanish.” Nina was also considering restricting Raul’s access to the website where he had found the full-length foreign language episodes. “I think I should block it,” she mused, “because there’s all these advertisements on the side that [have] women posing suggestively. . . . So those are the things I have to be careful of, because usually what he’s looking up is pretty innocent.”

With advances in touchscreen computing and voice-enabled search (e.g., Apple’s Siri), the internet has never been more accessible to children on the spectrum, especially those with difficulties typing and spelling. Parents of autistic kids face a tricky balance in helping their children to maximally benefit from information, media, and communication technologies while protecting them from online risks and vulnerabilities.⁵³ Concerns include threats to privacy, safety, and mental well-being, and span content risks (i.e., aggressive

and hateful material), contact risks (i.e., victimization), conduct risks (i.e., victimizing), and contract risks (i.e., consumer exploitation).⁵⁴ Disabled children experience more online harms than their nondisabled peers, and their parents are more worried about them engaging with content that encourages self-harm, promotes political and religious extremist groups, or is sexually explicit.⁵⁵ Parents of disabled kids are also more likely to actively manage their child's internet use through rules, discussion, and co-use, in large part because they are likelier to believe that technology can support their child's social and emotional learning. There is a dearth of research, however, on how neurodivergent children learn to analyze, create, and reflect upon the credibility of information and media messages (i.e., media literacy) and how they engage in safe, responsible, and cooperative internet use (i.e., digital citizenship).⁵⁶

On YouTube and in the Apple and Google app stores, there is a great deal of media masquerading as “educational” and “for kids” but that contains explicit (i.e., violent, sexual) content. For example, several parents discussed their child being drawn to fake PBS KIDS videos on YouTube that were not kid friendly. Bella's mom, Angelica, said that she and her husband had stopped letting Bella watch PBS “on YouTube because there [were] videos [with] flashing lights and a bunch of weird sounds. It was kind of creepy because she really wanted to watch it and there was nothing that was productive about it.” Karim favored YouTube clips of the animated show *Caillou* (which originally aired on PBS KIDS in the United States). “*Caillou* is my favorite show. I like his bald head,” Karim said of the titular character, a boy with no hair. *Caillou* has a cult following on the internet, with his YouTube videos generating significant views, as do ones of Baldi, another hairless boy character from an app called *Baldi's Education in School 3D*. Common Sense Media notes that *Baldi* “is marketed in app stores as an educational game, but it's actually a horror title set in a school.”⁵⁷

Nour repeatedly complained about Karim watching fan-produced *Caillou* and *Baldi* videos on YouTube that were animated by using the software program GoAnimate. The videos contained gore and violence, and Nour worried about Karim repeating or reenacting what he heard and saw. I sat with Karim as he watched one such video about *Caillou* bringing a murdered girl back from the dead and another in which a teacher hits *Baldi* with a ruler. Karim commented that the *Baldi* video was “funny . . . cause his teacher hits him,” but also asked Nour and me questions that indicated his confusion about the inner state of the character (“Does the teacher like him? . . .

Why does he get mad? He made a mistake?"). Nour was concerned that if Karim mimicked the language or behavior in the videos, it "could get him in trouble" with his teachers, who she talked about being "really good or really bad" depending on the school year. Having a disciplinary record at school could also have a disproportionately negative impact on Karim, a Muslim boy of North African descent, if it led to further criminalization. Nour recognized the pleasure that Karim derived from watching the videos, as she did not totally prohibit them, but also felt like she was fighting a losing battle.

Some autistic children recognized the strengths and weaknesses in their media literacy skills. They were also cognizant of gaps in the social support around them to further develop these competences and of the shortcomings of digital tools and platforms. When asked what he does not like about media and technology, 9-year-old Cody (White, boy) said "sharing a lot about yourself with everyone. That's why I don't do YouTube." He did, however, enjoy "making new games for everyone" on Scratch, on which he had an anonymous profile. Thirteen-year-old Adrian (White, boy) regretted that he had used his actual first and last name as his Scratch username when he first signed up at age 7, especially considering that the platform does not allow usernames to be changed.⁵⁸ "I was a complete idiot. Or, not I was a complete idiot. I can blame this all on my parents," he remarked half-jokingly. Adrian realized only after the fact that having a personally identifiable username meant that he lacked anonymity. "You can look up a username and then find what they made. Usernames are meant to be a lot less like secure information you shouldn't give away," he said. Having the same username allows for continuity in a virtual space for kids but can also limit the fluidity of youth identity.⁵⁹ Adrian worried that his username "would attract attention" to the projects he created as a form of self-exploration and play. He had invested so much time and energy into the online community that leaving the site or creating a new account (from scratch, pun intended) was not an option. There are many gaps in the formal and informal educations that children on spectrum receive, but considering their deep personal investments in online spaces, media literacy and digital citizenship stand out as areas of particular need.

INTEREST-DRIVEN LEARNING

Many of the autistic tweens and adolescents with whom I spoke reported that social media, the internet, and other networked communication technologies

served an educational function in their lives, including for informational purposes and developing creative pursuits. Cody said that his favorite YouTube channel was SmarterEveryDay. “It’s a series of science videos. They do cool stuff.” “Videos that are informal or like entertaining, like this is the stuff I like to watch,” said 12-year-old Saylor (White, girl), who showed me how-to cooking videos and slime making tutorials on her TikTok feed. Eleven-year-old Rosalita (White, girl) used various forms of media to cultivate a deep interest in animals and pets, like asking Amazon’s Alexa to explain what an Asian elephant was, comparing the brain sizes of a T-Rex and a pterodactyl on a dinosaur app, and using her iPad to take videos of her family’s new kitten. Rosalita’s mom, Pamela, said that such hands-on technology use has “given her this sense of self and ability to do for herself. There’s a level of independence there.” Rosalita confirmed this when she proudly noted, “I like coming up with videos and talking to the video and if there’s a mistake, I just make a new video.”

Over the past decade, educational practitioners, researchers, and designers have sought to maximize the kinds of technical skills and cultural knowledge demonstrated by Cody, Saylor, and Rosalita.⁶⁰ Such efforts build upon the democratic ideal that recruiting students’ interests leads to more meaningful and memorable learning.⁶¹ Hobbies and affinities are central to the idea of “connected learning,” which brings together personal interests, supportive relationships, and academic, civic, and career opportunities against the backdrop of a networked and hypermediated society.⁶² Within a connected learning framework, technology promotes learners’ choice and access across formal and informal settings through active engagement with tools, materials, and other people (i.e., peers, mentors). Digital media can enable kids to cultivate existing interests and discover new ones, find communities that support these interests, and apply their interests to new social contexts.⁶³ Anthropologist Mizuko Ito and colleagues identify two main motivations for young people’s online participation: interest-driven and friendship-driven.⁶⁴ In other words, young people use technology to primarily stay connected with their friends and to pursue their passions (which can also lead to the development of new friendships).⁶⁵

Discussions in educational circles around interest-driven learning have occurred in parallel—though rarely intersect—with discourses surrounding the so-called special or circumscribed interests that many (but not all) autistic people have.⁶⁶ This lack of conceptual overlap is surprising considering how

youth on the spectrum are seemingly implicated in the very definition of interest-driven practices: “what youth describe as the domain of the geeks, freaks, musicians, artists, and dorks, who are identified as smart, different, or creative, and who generally exist at the margins of teen social worlds.”⁶⁷ Why kids on the spectrum have been overlooked as interest-driven learners makes sense, however, when one considers the limited ways in which autistic children are socially configured as learners.⁶⁸ In the medical language of behavioral intervention, autistic people’s intense passions tend to be framed as “rigid fixations” or “restricted interests” that must be widened and watered down to conform to a more socially acceptable ideal. Studies with autistic children and adults find that there are intrinsic rewards (i.e., pleasure) and mental health benefits (e.g., self-confidence) to being able to explore these passions, and negative effects when that exploration is curtailed.⁶⁹

Putting interest-driven learning and focused interests (a less pathologizing term for special interests) in conversation with one another highlights similarities and differences between the digital experiences of neurotypical and neurodivergent youth. Young people’s interests in the internet age are many, are interwoven, and change over time with access to endless information about countless topics.⁷⁰ Both autistic and nonautistic kids in school may be discouraged from pursuing passions that are developed at home if those cultural interests do not conform to the White middle-class norms that largely underpin formal education.⁷¹ Adolescence is a critical period for young people to develop interests that become part of their social identities. The relationship between interests and identity development may be forged at a younger age for autistic kids, however, who can express intense interests early on in life.⁷² Children on the spectrum may also be adversely impacted by social isolation resulting from difficulties asking others about their interests (i.e., social reciprocity) and talking about topics other than their specific interest (i.e., conversational flexibility).⁷³

Whose interests are deemed special, and whose are not? Jennifer, mom of 6-year-old Casey (White, girl) and an autistic person herself, explained that such distinctions were not clear cut. She said that “some of the things in [Casey’s] media become her special interests and become the things she wants to talk about. And she doesn’t realize that these other people don’t know, don’t necessarily watch the same shows.” Media and technology are common interests among young people on the spectrum,⁷⁴ including specific shows and movies (reportedly over 80 percent of autistic kids ages 2–17) and related toys and collectible objects (58–72 percent).⁷⁵ Neurotypical and

neurodivergent kids overlap in their popular media interests (e.g., superheroes), though older children on the spectrum are more likely than nonautistic children of the same age to enjoy content geared toward a younger audience.⁷⁶ Jennifer also noted that, autistic or not, it was common for one child not to want to play what another wanted on the playground if they did not consume the same media. “I mean that even happens between the two kids where one of them might be like, ‘That’s not a good game.’ And [it’s] just like, ‘Well, nope, you guys are just watching different shows,’” she said.

Perhaps more importantly, what are the implications for such distinctions between marked and unmarked categories of interests on the everyday lives of autistic kids? Research has found that autistic children benefit both academically and behaviorally from educators who draw upon their focused interests.⁷⁷ Clinical psychologist Kerri Nowell and colleagues write that “a particular interest may facilitate the development of expertise and rich knowledge, and could promote learning by motivating a child to collect information through books and other avenues,” such as YouTube and Google Search.⁷⁸ The following stories of Spencer (age 4, Black, boy) and Diego (age 12, White, boy) highlight why it is important to further extend the possibilities of connected learning to young people on the spectrum while recognizing how their experiences can also significantly diverge from one another in terms of the social, cultural, and material support they receive to pursue their unique passions across their learning ecologies.

SPENCER Spencer took me on an elaborate tour of an elevator right from the living room of his two-story home—which contained no elevators, only stairs—in a middle-class, industrial town outside of Boston. “Do you want timer or elevator?” his mom, Rosie, asked, referring to YouTube videos on different topics, as she cued up the app on their large flatscreen TV. “Elevator,” Spencer replied. When she pressed play, he yelled joyously, “It’s elevator tour time!” “Elevators are his big passion,” Rosie explained. An off-screen narrator discussed tension pullies and counterweights as the camera panned over different elevator parts and button panels. “Let’s go to twenty-three. Let’s go to four level,” said Spencer. He had gotten into the practice of “repeating this and replaying it,” Rosie said, “so that he’s speaking at the same time as this guy and he’s now an elevator tour guide.”

Watching virtual elevator tours on YouTube supplemented the in-person trips that Rosie and her husband made with Spencer to different local multi-story buildings. “Since he was 3, we’ve been going on elevator adventures,”

she said, sometimes multiple times a week. However, Spencer's difficulty with transitions between activities could make these trips challenging. Rosie recalled the events of the prior weekend, when she and her husband took Spencer to the airport to ride all the elevators in the terminals. "He was absolutely fine until he knew exactly where we were, when we got to the last elevator, and then he started screaming," she said. Rosie relied on media to reduce some of the physical and emotional labor involved in these outings as well as to extend Spencer's experiential learning at home. "I realized if I ever can't [take him] twice a day, I'm kind of screwed," she said, "So I went on Amazon and I found a book about elevators."

There were several educational benefits to Spencer's "big passion." Rosie said that "people have recommended not watching TV and not giving screen time, but he gets a lot of language out of it." Spencer also incorporated elevators into his pretend play. He had taken two small audio speakers and would make believe that they were elevator doors, sliding them together and apart as if they were opening and closing. Elevators were additionally intertwined with his hyperlexia and attraction to numbers and letters. "After he discovered the elevator tour [on YouTube], he then recreated the elevator panel with Play-Doh. That's 'L' and 'P' for lobby and parking," she said, pointing to Spencer's creation on a table. Rosie also purchased a T-shirt with an elevator panel on it, just like the ones Spencer saw on YouTube. He liked to wear it and point on his shirt to the buttons (which he could read upside down) as he watched.

I asked Rosie if Spencer's school drew on his love of elevators in their teaching. "No, he's banned from [riding] the elevators" at school, she replied. This ban was instituted even though Rosie had lobbied to have his focused interest incorporated into his IEP. "I have written a substantial portion of his IEP which is very, very kid specific," she explained, "That they will use items of interest to encourage participation. Whether that happens or not, you know you can't control, but at least it is in there." When Spencer had been at daycare, things were different: "The lady [who ran the daycare] drew him an elevator panel, and it was like, she totally gets it." His preschool classroom, in contrast, was not designed with such flexibility in mind.

Spencer's special education teachers did not draw on any of the elevator-related media like virtual YouTube tours that could have substituted for physical visits to the elevator and that might have made his learning more personally resonant. "What I keep arguing for is, 'You need to know what engages him,'" said Rosie, "But when you're in a classroom that's ABA based

and all PECS [Picture Exchange Communication System, an assistive communication program using small, laminated pictures], everything is based off these little squares." Considering that Spencer, a Black boy, lived in a town that was over 80 percent White (based on US Census estimates), his race and disability no doubt also shaped how institutional norms influenced his learning opportunities.⁷⁹ His elation over elevators illustrated what artist and activist Jen White-Johnson refers to as "autistic joy" and its importance as an act of resistance in the lives of Black neurodivergent people.⁸⁰ Ultimately, it may not have been Spencer's interests that were too rigid, but the mode of instruction employed by his teachers and the educational system itself.

DIEGO Not all children encountered teachers, therapists, and other autism professionals who were as inflexible as Spencer's. Diego's story shows how the focused media-oriented interests of kids on the spectrum might be incorporated into educational and therapeutic approaches. His experiences also illustrate, though, that there are tradeoffs with respect to autistic children's agency when "play" becomes "work."⁸¹ Diego—a tall, lanky boy with floppy brown hair—received ABA therapy at home from 3:00 p.m. to 6:30 p.m. each weekday from a behavioral therapist named Tiffany. These sessions focused primarily on practicing life skills like personal hygiene and folding laundry. In between these activities, Diego was allowed to use a spare laptop in the family's den, partly as a break, but also as an opportunity for Tiffany to work with him on communication skills. His mom, Francesca, said that if Diego did not follow directions during the sessions, he could "lose the right" to the computer and have to "[earn it] back," a reinforcement structure characteristic of ABA.

Because Diego's free time between therapy and other appointments was limited, I agreed to interview him on a school holiday during which Tiffany was scheduled to work with him all day. Francesca said that she planned for Tiffany to "do the real stuff" with Diego in the morning so that when I came in the afternoon, "it could be all about playing. . . . Because you don't want to do the behavioral stuff; you want to see the communication." Due to these parameters, the time I spent with Diego was technically during an "ABA session" but likely an uncharacteristic one, as it seemed more like he was being watched by a sitter while engaging in the kind of "messing around" with media identified by Ito and colleagues as a core learning activity among adolescents.⁸² "This is my computer," Diego said, showing me his laptop,

“When I work, I write notes.” While ABA structured his afterschool hours, what Diego did on the computer was largely of his own making. “We work on following his interest,” Francesca said, “because otherwise [the therapists] don’t really get much out of him,” indicating that there was both intrinsic and extrinsic value associated with his interest-driven learning at home.

Diego’s focused interest was in making “books” on the computer: digital collages of pictures and text about topics from daily life. The idea originally came from Diego’s speech therapists, who had worked with him years earlier to make “Social Stories,” a technique developed by autism educator Carol Gray in the early 1990s to break novel social situations down into a visual series of sequential steps and written cues for children on the spectrum to more easily comprehend.⁸³ Continuing the practice at his leisure, Diego liked to craft narratives about the wider world that he saw portrayed in preschool cartoons (e.g., builders in *Handy Manny*). Diego showed me several books, which had been printed out by his parents and piled in stacks around the den. “This, this, this, this one, this one is all about visiting the dentist,” he said, “And this one is all about visiting the fireman.” In his memoir *Fall Down 7 Times Get Up 8*, autistic author Naoki Higashida writes about how his own relationship to books as a child changed once he could materially insert himself in them. “Picture books might look very simple, but they require imagination to work,” he writes. One day, Higashida’s mother put together a photo book using family pictures with short sentences alongside the images. “It was thanks to this that the whole point of picture books ‘clicked’ for me,” writes Higashida.⁸⁴ Similarly, Diego’s self-made books served as a form of creative expression and way of understanding the social world. As Francesca noted, “I think media for him . . . it’s a language.”

Diego preferred creating media more so than consuming it, which “was unexpected for [my husband and me] in [his] use of electronics,” Francesca said. He used several digital tools to compose the books—including YouTube, Google Image search, a smartphone, and an open-source version of Microsoft Office’s PowerPoint called LibreOffice Impress. PowerPoint might not evoke creativity for many, but it was far simpler for Diego to edit visual elements on Impress than on a program like Adobe Photoshop. He had a school-provided Gmail account, through which he received an email address and access to Google Drive for storage. Using Francesca’s phone, he took hundreds of photographs while running errands with her, as well as snapshots of images on his computer screen. Diego reported that “I took

a lot, a lot of photos on the phone. And then I erase them and then I erase them, erase them to make space for new pictures on the computer,” articulating an understanding of the affordances of digital media. Francesca then sent a selected batch to his Gmail. Besides photographs of his computer screen, Diego also made screenshots of the YouTube clips, cutting and pasting them into Impress, three or four to a slide. He explained, “First, first, I stop the movie. And then, and then I . . . and then take it, a picture . . . and then I put it in there.”

Diego’s books and overall creative process blended fiction and nonfiction. I sat next to him as he viewed an episode of *Caillou* on YouTube. Caillou in the video asked his dad, “Why do you have to work, Daddy?” to which Caillou’s dad responded, “Because I enjoy working, and I make money.” Diego verbally stilled on parts of the dialogue, repeating lines while shaping them into something new. “Look, are you working? Are you working?” he said, “I’m making a, a book about . . . about, about, about people working . . . about people working, w-working.” It was unclear to what extent Diego understood where his world ended and the one depicted on screen began. “I don’t think he has a complete sense that the characters are fictional. In my opinion, he actually feels that these are real people,” said Francesca. For example, during a scene in which Caillou’s dad went to the bank, Diego remarked, “That’s my dad and that’s me.” “Is that Caillou?” I asked him. “Yes,” he replied, “That’s my dad, that’s me.”

Though Diego had some level of digital proficiency, he still needed help from others to execute his projects. “Put the password in,” Tiffany reminded Diego when he sat down at the computer. He dictated text for her and Francesca to write on the slides or to spell out for him so that he could independently type the words letter by letter. As he was not a proficient reader, he also required assistance in using the right search terms to find clip art and stock photos on Google Images. For instance, he asked Tiffany how to spell “tape store” so that he could search for pictures of adhesive tape. His search, however, turned up images of video cassette tape stores, so Tiffany told him to try typing just “t-a-p-e” instead. The interaction reminded me of Vygotsky’s concepts of scaffolding, in which a more experienced person helps someone less advanced learn through gradual steps, and the Zone of Proximal Development, which is the sweet spot when a step is not too easy or difficult. Francesca hoped that Diego’s interest in books could lead to further gains in literacy. “Our goal for these next couple of years is that he can

actually type words on his own and Google search,” she said, “We are still working on this independent thing.”

Diego’s digital bookmarking practice does not fit neatly into binaries like dependence and independence; formal and informal learning; child-led and adult-initiated; or structured and unstructured activity. His sessions with Tiffany involved a negotiation of agency across social actors and materials, in ways that were similar to but also very different from the connected learning of neurotypical kids. She was at once a mentor responsive to Diego’s interests and a clinician whose expertise was in surveilling and remediating autistic children’s behavior. Digital media afforded Diego’s self-guided exploration in a way that stood in stark contrast to the adult-driven format of traditional ABA sessions. Francesca reflected on why Diego’s computer time was so important for his self-determination. “I think he wants to be in control of the experience,” she said, “so if he’s handling the pictures and putting them into position, there is a sense of power, of control, that may not be typically there for him.” Interest-driven digital learning can be very empowering for young people, and potentially for youth on the spectrum in therapeutic settings,⁸⁵ but it is important to keep in mind that disabled and autistic youth are rarely allowed to be in the driver’s seat of their own learning.

CONCERTED CULTIVATION

Long before computers entered homes like Diego’s, technologies such as pianos and encyclopedias were marketed to middle- and upper-class parents as investments in their children’s future careers, happiness, and well-being.⁸⁶ The idea that children’s free time with media should be focused on meeting educational goals is an example of what sociologist Annette Lareau termed “concerted cultivation,” or a parenting style of fostering a child’s talents and skills through leisure time and organized activities (e.g., summer camps, lessons, clubs).⁸⁷ Children not only learn how to do things through these opportunities but also how to act. They gain social capital (i.e., connections) and cultural capital (i.e., knowledge, mannerisms). Upper- and middle-class kids are generally advantaged in schools because of work done outside of school, though many also report feeling exhausted by being overscheduled with activities.⁸⁸

Recent work has illustrated that concerted cultivation is promoted by families across class, yet resulting advancement is more obtainable for middle-class parents than poor or working-class families.⁸⁹ For example,

Crystal, mom of 3-year-old Aaliyah (Black, girl), was currently unemployed and she, Aaliyah, and her husband (who was also not working and on disability leave) lived in subsidized public housing. When Crystal had been working, she was employed by a company that sold educational materials to schools. “I had access to flashcards and manipulating letters and all these free little books,” said Crystal, and she brought them home to Aaliyah, who demonstrated a real attraction to educational media like *Sesame Street*. “I definitely just follow her lead and capitalize on what she loved,” Crystal said. While they did not have much in terms of money, Crystal had amassed some cultural capital and was able to provide Aaliyah with materials that brought out her natural talents and strengths.

Relatively little has been written about concerted cultivation and children on the autism spectrum, or about the intersection of their technology use and their parents’ efforts to channel informal learning opportunities into career potential.⁹⁰ Computer coding is one area of digital media and learning that has been well-studied in terms of the challenges that marginalized youth face in leveraging the technical skills they develop in formal and informal learning settings for professional advancement.⁹¹ Several adolescent autistic boys that I spent time with (largely from upper-middle class households) were enrolled in coding classes and/or had highly educated parents who co-used computer coding games and websites with them. Other parents (mostly middle- and working-class) were excited by the idea of their autistic sons gaining greater job security in life through their technical talents but did not have same means to increase the likelihood of such outcomes.⁹²

Cody, for example, was offered Scratch programming classes in his after-school program in a wealthy Boston suburb, which his parents supplemented with an additional weekend course. “It ended up just being him, so it basically was like a private Scratch programming class, and I think he got a lot out of that,” said his dad, Bobby. Cody showed me one Scratch game he made about falling and exploding watermelons. “I built it. I think gravity is a bit too hard, though,” he said of the game mechanics. I also visited 5-year-old Max (Asian/Vietnamese and White, boy) and his mom, Norah, while he played the codeSPARK Academy kids’ coding app on an iPad. Norah said that Scratch was a little too open-ended for Max and that he did better with codeSPARK’s problem-solving games, which featured a set of characters called The Foos. Norah paid US \$8 per month for a subscription because Max tended to speed through the levels. “The Foos is the funnest

game I have ever played. The Foos, The Foos, The Foos!” Max exclaimed after Norah let him play an extra level.

In addition to afterschool piano lessons and a math enrichment course, 8-year-old Jeremiah (White, boy) also took live virtual HTML lessons with a private tutor over video chat through a platform called UCode. His mom, Natasha, called it “the ideal learning model for him” because Jeremiah did not have to socialize with other kids, which he found to be stressful. Furthermore, she thought that remote, one-on-one afterschool learning at home was “so great for spectrum kids and kids who have a specialized interest” because “the connection of that topic to a social setting can almost kill the interest.” At their own pace, they could pursue their “obsession of the moment in a really safe environment where you’re comfortable, all the environment’s controlled, [and] there are no unexpecteds or unknowns.” Jeremiah’s positive experience with UCode enabled him to envision a future in the tech industry. When he was taking the class, Natasha said that “he wanted to work for Minecraft. He wanted to work for Mojang [the video game company that developed Minecraft] and be a game designer, is what he was saying. I think this learning how to program was making him feel like he was working toward that.”

Other parents, though, did not have technical fluency like Bobby and Natasha, nor were they able to help their children finish difficult levels on a coding game, as Max sometimes asked of Norah. Pedro, an unemployed immigrant from Brazil, placed a lot of faith in technology. “The future is there,” he repeated multiple times during our interview. Pedro dreamed about his autistic sons Bryan (age 7, White) and Matt (age 9, White) having job prospects in the tech industry. Since “everything [they like] is related to technology,” Pedro said, “I’m trying to convince them to learn how to code. . . . They can code for Roblox tomorrow and, in 5 years, they can code for Android.” The main motive behind Pedro’s encouragement was economic in nature; he hoped that Bryan and Matt might be able to parlay recreational coding into eventual employment and financial independence.

In some ways, Pedro’s dreams as an immigrant parent were very typical. “I want to see my kids’ betterment. They need to survive, make their own money,” he said. But his nudging was also related to anxiety about his sons not being able to take care of themselves later in life within a society that offered little support to autistic adults. Pedro was especially worried about Matt being “very very behind in school.” He imagined traditional

pathways for advancement like college not being available to his son and saw technology as one sector in which he could still have a lucrative job without a degree. Interestingly, while Pedro was more wishful, his wife Beca remained skeptical about Bryan and Matt's future careers in computer coding. "[Pedro] thinks [the internet and technology] could be a breakthrough for the children," she said, "I'm not quite sure, you know, about that." Beca's ambivalence was specific to her sons, but it speaks to the larger social, cultural, and political barriers that autistic children face when it comes to media and technology making a meaningful difference in their learning, to their lives once they age out of the formal education system, and to general critiques of techno-optimism and the belief that technology alone can bridge opportunity gaps for marginalized youth.

REFLECTIONS ON LEARNING

New media and online spaces offer many pathways for informal learning among kids on the spectrum. These areas include language and social communication, STEM education, and creativity. Technical features that enable autistic youth to consume, create, and remix media in a more accessible manner span voice control, predictive text, and automated recommendation systems. Several affordances of new media also make learning easier and simpler for them, such as portability, replicability, repeatability, and predictability.⁹³ Social and cultural factors play a major role in the effectiveness of these tools for learning, like the physical materials available to a given child at home and the interactions that they have with caregivers and other adult mentors. Factors outside the home—including parents' field of employment and the willingness of schools to adapt to autistic children's needs and interests—additionally shape these dynamics.

Youth on the spectrum have unique challenges navigating media in pursuit of learning and expression. These obstacles are partly related to their disabilities, but they also manifest because of the limiting societal conditions that information and communication technologies make possible. Autistic kids may have difficulty discerning inappropriate content on YouTube that is purposely disguised as educational, videos which have proliferated due to the website's profit model and Google's lack of government regulation. Youth on the autism spectrum who prefer patterns and predictability and have a higher threshold for audiovisual sensory stimuli

may be more likely to imitate problematic behavior that they can easily and repeatedly view online. They have much to gain from participating in online learning communities but are also at higher risk for violations of privacy and safety without concurrent support for developing digital literacy skills.⁹⁴ Along with these challenges, autistic kids also bring great strengths like persistence, problem solving, and focused interests that can be leveraged for further digital skill- and knowledge-building.

For racially and socioeconomically diverse children on the autism spectrum to thrive into later adolescence and adulthood, and for their engagements with media and technology to contribute to that success, their digital learning must be understood with far more complexity and nuance than it is at present. Considering both the successes and failures of remote school for autistic kids during the COVID-19 pandemic, especially for low-income children of color in the United States, the potential positive impacts of virtual tutoring and video chat for informal learning (as illustrated by Jeremiah) merit further study. Dismissing autistic children's talents as "savant," like being able to read at an early age, oversimplifies the role that context plays in how children acquire knowledge. Their experiences with digital media converge with, but also complicate, current thinking in educational technology circles. For all the hype and hope about technology disrupting education, tools like tablet computers, machine learning, and artificial intelligence often work to make autistic children's behavior easier for others to control and manage more so than to proactively promote their personal growth. For Sebastian, for example, watching Peppa Pig and her classmates in a cartoon on an iPad was no replacement for an in-person inclusive education. The field of education should expect more for autistic kids and presume greater competence in their capacity to learn.

Parents of autistic children have both considerable hopes and fears about the digital world and their child's place in it, including as a space for learning and path toward future job opportunities.⁹⁵ These beliefs and attitudes are relative to their dreams and worries about the quality of their child's formal education and informal learning opportunities, as well as the broader individual and societal futures that they imagine.⁹⁶ Several parents discussed how their autistic child learned more from unstructured media use at home than from traditional teaching in school. Such statements may say less about the potentials of technology and more about the failures of special education as it currently exists in the United States: woefully

underfunded by the federal government and mired by discriminatory practices that disproportionately impact autistic youth of color. The gaps that various parents mentioned between early childhood education settings and elementary school—in incorporating autistic children’s interests, in building upon their learning from media at home, and in open dialogue between caregivers and educators—are also worth continued exploration.

Many existing concepts and theories in youth, learning, and technology are helpful for understanding the media and learning ecosystems of autistic kids, but much is missed if their experiences are not incorporated into shifting those discourses too. The affordances of new and mobile media, combined with individual tendencies and preferences, mean that technology can make learning both easier and harder for autistic kids. The educational benefits of digital media for this population are bound up with everything else that they learn through online spaces, for better and for worse. Youth on the spectrum have the potential to significantly benefit from technical and social innovations within and outside of the traditional classroom, but that promise is inconsistently realized for many, if not for most. The next chapter adds to this discussion by providing a more in-depth look at the family context of autistic children’s media use for learning, leisure, and connection. In addition, the functional purposes of technology in households with young people on the spectrum will be examined.

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