

DEEP DIVE

# The benefits of special interests in autism

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*Illustration by Lisk Feng*

The first time Autumn Van Kirk noticed a computer was in her kindergarten classroom — it was an Apple 2, and she could not keep her hands off it. “I was playing with it one day. I was, like, ‘Hey, check this out. There’s little knobs and buttons and stuff. What do these do?’” The teacher ran over and said, “What are you doing? You can’t touch that!” Van Kirk recalls. Her parents got a talking to as well. But it would have taken a lot more than that to discourage Van Kirk’s interest in technology. She built a computer from stray parts when she was 13 or 14, and in college, she programmed a website that she ran from a server in her closet. Today she is a team leader for a top global tech company in Houston, Texas.

Van Kirk, 38, has leveraged one of the hallmarks of autism, an intense and often narrow focus on a specific topic, into a career. She is not alone. Livestock industry consultant Temple Grandin and automobile restorer **John Elder Robison** are famous for turning their special interests into careers. And in response to a **2020 Twitter post** by autistic blogger Pete Wharmby — “Anyone #autistic managed to make a living from a special interest?” — dozens of people responded that their passions had led to jobs as diverse as librarian, TV producer, tattoo artist, train conductor and paleontologist.

But it’s only in the past decade or so that autism professionals have begun to recognize the value of these intense interests that emerge in early childhood. Clinicians have historically called them circumscribed interests, and they belong to the category of diagnostic criteria for autism called “restricted, repetitive patterns of behavior, interests or activities,” which also includes movements such as hand-flapping and an insistence on rigid routines. A distinguishing aspect of special interests is their intensity: They can be so absorbing that they are the only thing the person wants to do or talk about.

These interests are extremely common among people with autism: **75 to 95 percent** have them. An interest may involve collecting items such as postcards or dolls, listening to or playing music in a repetitive way, or focusing intensely on a narrow topic, such as insects fighting. Special-interest topics may be commonplace — things such as trains, gardening or animals — but people on the

spectrum sometimes gravitate toward more quirky fascinations such as toilet brushes, tsunamis or office supplies.

Whatever the subject, interests may hijack family life, and children may throw tantrums when parents try to redirect them. The sister of one autistic man complained in a 2000 study that his **interest in maps** “swallow[s] up everything, all the time. We can’t talk about anything else.” Teachers and therapists frequently discourage interests out of a belief that they distract from schoolwork and make it harder to fit in with peers.

But research conducted over the past 15 years is revealing what many people with autism have long known — namely, that special interests are valuable to people on the spectrum. In addition to occasionally launching a career, they reliably build self-confidence and help people cope with emotions. Studies also suggest they can help autistic children gain social skills and learn.

“The real paradigm shift is thinking about special interests as more positive.” Rachel Grove

This research is also changing the scientific understanding of what special interests are. Experts used to consider them an avoidance activity, something autistic people did to manage negative emotions such as anxiety. But increasingly, studies reveal that these interests are intrinsically rewarding. “There’s been a lot of negative language used around special interests, things like ‘inflexible’ and ‘obsessions,’” says psychologist Rachel Grove, a research fellow at the University of Technology Sydney in Australia. “The real paradigm shift is thinking about special interests as more positive.”

Instead of trying to erase or squelch special interests, teachers and clinicians are starting to leverage them. Educators are working them into the curriculum. Psychologists are finding ways to mitigate the problematic behaviors associated with interests without discouraging the interests themselves. And neuroscientists are beginning to probe how the brain processes special interests, to better understand the neural circuitry involved.

Special interests can dramatically improve children’s life skills, as journalist **Ron Suskind** revealed in his 2016 documentary, “Life, Animated,” about how his son Owen’s passion for Disney movies helped him learn to speak. Experts hope that the research on interests will help many more children who can be otherwise hard to reach. “Sometimes you hear this phrase, ‘To meet the child where the child is,’” says neuroscientist **John Gabrieli** of the Massachusetts Institute of Technology. “If this is their natural motivating capacity, then rather than try to suppress it, it might be more helpful to the child to build on it.”

## Its own reward:

The Autistic Self Advocacy Network describes special interests as “narrow but deep.” The drive to engage with them is powerful. For example, in a 1996 study that used **various rewards** to discourage disruptive behaviors, young children with autism preferred access to their special interest over favorite foods. And in a 2014 study of 76 adults with **Asperger syndrome**, people reported spending an average of 26 hours per week on their interests. “There is nothing typical about this involvement,” says psychologist **Mary Ann Winter-Messiers** of Bushnell University in Eugene, Oregon. “A lot of people who have never seen it, they’ll say, ‘Well, all kids have hobbies.’ No, this is not a hobby; this is completely different.”

In autistic children with **intellectual disability**, special interests may take the form of **repetitive behaviors** such as lining up objects, whereas for those without intellectual disability, these interests can become areas of precocious competency. Some special interests are transient, others lifelong. **Bill Davies**, professor of acoustics at the University of Salford in England, who is autistic, says he was always interested in sound. “As a kid, I was very into patterns of words, rhymes, bits of tunes. I liked repeating them,” he says. “When I found out you could do a whole degree in acoustics, I didn’t want to study anything else. I still don’t.”

A 2020 study of nearly 2,000 children on the spectrum showed that they had, on average, **eight special interests** at a time. Van Kirk estimates she has had about 100 so far. “They often interweave with one another,” she says.

“This is not a hobby; this is completely different.” Mary Ann Winter-Messiers

She and others say they often sacrifice sleep, forget to shower, and lose track of important tasks in pursuit of their interests. “It can potentially be distressing, because it’s like I literally cannot stop thinking about the first three years of the French and Indian War [or] whatever that thing happens to be,” Van Kirk says. “It’s this thing that gives us a lot, but it can eat up a lot of our spare cycles, if you will, our compute cycles.”

Nevertheless, studies increasingly suggest that the majority of autistic people feel enriched, not controlled, by their interests. One of the first researchers to explore the potential benefits of special interests was Winter-Messiers. Instead of relying solely on the observations of parents, teachers or

clinicians, as most investigators previously had, she wanted to learn about special interests from autistic people themselves. In a 2007 study, her team conducted in-depth interviews with 23 children and adolescents with Asperger syndrome, during which the researchers made careful notes on body language, self-stimulating behaviors, facial expressions and tone of voice.

Winter-Messiers and her colleagues found that **talking about special interests** reduced other autism traits. For example, children who spoke at first with flat affect became enthusiastic when discussing their special interest. They fidgeted less, made more eye contact, and their speech shifted from vague comments such as “Uh, I don’t think so, I just, whatever,” to complex, vocabulary-rich statements. Many of the young people were also better able to initiate conversation and organize their thoughts. “We found it across every single major area of deficit,” Winter-Messiers says. “It was incredible.”

Subsequent research indicates other benefits to special interests. For instance, in a 2017 study of 80 adults with autism, 65 described their **special interests as positive**, 74 considered them calming, and 77 felt strongly that children’s special interests should be encouraged. They used words such as “lifeline” to describe the role their interests played in their lives. And in a 2018 study, Grove and her colleagues found that special interests are tied to **improved subjective well-being** in adults with autism and increased satisfaction with social contacts and leisure time. “Our special interests are the air that we breathe,” Van Kirk says. “When we’re engaged in special interests, we’re living our best lives.”

A 2015 study by Grove’s team points to a potential basis for this positive effect. She and her colleagues developed a survey to understand what motivates autistic people to engage with their interests. The questions measured both **intrinsic motivation** — an inner drive or curiosity — and extrinsic motivation, a desire for recognition or tangible rewards. The team asked 610 people, 158 of whom were autistic, to rate statements such as “I like the feeling of being totally immersed in my special interest” and “When I do well at my special interest, I feel important.” The autistic people were more intrinsically motivated than the non-autistic people, the researchers found. The autistic people also more often reported feeling a sense of ‘flow.’ For them, engaging in an interest was its own reward.

That is the experience of Mariana De Niz, 33, an autistic microscopist at the University of Lisbon in Portugal. De Niz became fascinated by pathogens while growing up in Mexico City, Mexico. When she was a little girl, officials launched a public information campaign to eradicate cholera. “I found it super interesting,” she recalls, “I became sort of obsessed.” In her current research, De Niz studies *Trypanosoma brucei*, the sleeping-sickness parasite. She is known for making compelling images that require a degree of patience some of her colleagues say they could never muster. She often spends hours following a single *T. brucei* and capturing its most ephemeral movements. She gets so absorbed in the experience that she often forgets to eat, and her ophthalmologist says she is wearing out her eyes. “It’s this world that I go into,” she says. “I just feel that time doesn’t pass.”

## Taking up real estate:

The drive that people with autism bring to special interests is akin to a non-autistic person's focus on personal relationships, says neuroscientist **Kevin Pelphrey** of the University of Virginia Brain Institute. "Looking at other people, looking at their faces, reading emotions — that's something that for the vast majority of typically developing people, they're born with it, and then they develop a high level of expertise and never stop adding to it throughout development," Pelphrey says. This consuming focus on other people could conceivably fit the definition of a special interest, Pelphrey says, except that it's "not very special because it's one that everybody does."

The parallel between ordinary sociality and autistic fascination may have a biological basis, Pelphrey says. Multiple areas of the human brain evolved to manage social cues and relationships. "That's a lot of real estate," he says. A new hypothesis suggests that if an autistic child is born without the pull toward people, those brain areas adapt to focus on objects or concepts instead. Scientists know that the brain can divert unused structures to other purposes. For example, in blind people, the area usually dedicated to sight **can rewire** to manage a tactile activity: deciphering Braille.

Preliminary research hints that the brain's reward system in people with autism may be calibrated to respond more to interests than to the interpersonal experiences that most non-autistic people find gratifying. In a 2018 experiment, 39 autistic and 22 non-autistic children played a game inside a magnetic resonance imaging machine. When a child scored, she received either a **social reward** — a video of a smiling actor giving a thumbs up — or a video showing her personal interest. The two sets of children were equally good at the game, but the non-autistic children had stronger brain responses for the thumbs up than the autistic children did, and less brain activation for their own interest. "It was what we call a double dissociation," says the study's lead investigator **Benjamin Yerys**, a child psychologist at the Children's Hospital of Philadelphia in Pennsylvania, "where one group is really high with one kind of stimulus, and the other group is very high on the other one."

Further evidence suggests that social brain regions are dedicated to special interests. In a 2016 study, researchers scanned 21 autistic and 23 non-autistic boys while they viewed images of their own or others' **special interests or hobbies**. They found that a part of the brain called the **fusiform face area** that is typically responsive to faces seems in autistic children to be oriented instead toward special interests. In the study, this brain region was slightly more active in the brains of autistic than non-autistic people, says study investigator **Jennifer Foss-Feig**, a psychologist at the Icahn School of Medicine at Mount Sinai in New York City — only it was responding to Lego Bionicles, dirt bikes and other special interests, rather than faces. The finding is in line with the idea that the fusiform face area's role is broader than face recognition, that it governs recognition of any object about which a viewer has expertise.

In the same experiment, Foss-Feig's team found a clue to why special interests may be **so all-consuming**. Both groups of children showed a heightened response to their own interest, compared with others' interests, in brain regions governing emotion, which likely underlies the interests' rewarding qualities. But the brain's 'salience network,' which directs attention, became much more active in the children with autism in response to images of their interests. "The degree to which [special interests] suck the attention away is higher, which may be one reason why these interests may be more interfering," Foss-Feig says. Indeed, the researchers found that the children whose salience network engaged the most were the ones whose parents reported that the special interest posed the most intense difficulties for day-to-day living.

A deeper neuroscience question remains: Do special interests fill an absence, engaging social brain areas that might otherwise be idle, as one hypothesis suggests? Or are autistic people simply born more oriented toward certain objects or ideas, and because of that orientation are less inclined toward the social world? "It's sort of like a chicken-and-an-egg question," Foss-Feig says. The next step for this research, she says, is to design studies that follow autistic children from infancy, scanning the brain at intervals to learn how it responds to social and nonsocial stimuli over time.

## Teaching tool:

Whereas neuroscientists are just beginning to explore the biology of special interests, educators have been experimenting with them for more than 30 years. In a 2016 study, researchers **examined 20 studies**, dating as far back as 1990, in which teachers used students' special interests in the classroom. In some of the studies, teachers used special interests as a reward for good behavior, and in others, they incorporated special interests directly into the curriculum. The researchers found that all of the tactics were successful, but that students fared best when their interest was integrated into learning.

In one case, a second-grade teacher gave a student books on Thomas the Tank Engine, her special interest, and in a couple of months, the child's reading comprehension had improved from a first- to a mid-second-grade level. In another instance, teachers used a child's interest in the Titanic to teach social skills, using the phrase "Iceberg right ahead!" to reinforce the importance of keeping one's distance. The tactic helped this boy remember not to stand too close to classmates.

Preliminary results from an ongoing brain-imaging study by Gabrieli's team support the potential utility of special interests as an educational tool. The team has been brain-scanning children with and without autism while they listen to stories written by the study team that are about either their specific interest — soccer, dragons and the like — or nature. So far, the researchers have tested 20 children. For the autistic children, listening to a story about their special interest activated key

language regions in the brain much more strongly than hearing a nature tale. Because much of the learning that takes place at school is auditory, Gabrieli says, the results suggest that working a special interest into a lesson could be a way to engage children with autism.

Using special interests in the classroom is not yet standard. But at P.S. 32 in Brooklyn, New York, where autistic and non-autistic children learn together, teachers routinely incorporate special interests, and they see both academic and behavioral benefits. For example, a 6-year-old girl whose interest was outer space had trouble stopping what she was doing to move to the next activity. Her teachers turned the girl's folder into a rocket ship, cutting off the corners and drawing bolsters, a cabin and flames. "I would say, 'Okay, I'm opening the hatch; the work needs to go inside and board the rocket ship, blast-off in 10,'" says teacher Jenny Licata. "Transitions are not a problem anymore, because that's fun."

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Teachers say special interests help children connect more with peers, and some evidence supports this observation. In a 2012 study, researchers designed **school lunch clubs** around the interests of three children with autism (movies, comics and card games) and advertised them to classmates through announcements and flyers. The children with autism had been socially isolated, but when they met with these clubs, they interacted with peers 85 to 100 percent of the time.

Some teachers balk at encouraging special interests, out of concern children will become distracted, says Shari Boylan, a special-education master teacher at P.S. 32. That notion does not make sense, she says, because these interests are often on a child's mind anyway. "You can't withhold a child's special interest when their special interest is in their brain," she says. And discouraging a special interest can cause distress. In a 2000 study, a boy who was fascinated with the calendar described how he felt when his interest was devalued. "I was so much knocked down, in the sense that my passion with time was just a waste of time," he said.

In 2019, psychologist **Alan Smerbeck** of the Rochester Institute of Technology in New York developed a survey designed to **untangle the positive and negative** aspects of special interests. The 68-item questionnaire can flag difficult behaviors surrounding an interest — such as pursuing it at the expense of other important tasks, or not valuing other people's interests — so that these can be addressed without discouraging the interest itself. The answers to the survey might suggest, for example, that a child needs to learn to talk less with peers about her interest, to avoid being teased or bullied and build stronger relationships. "Rather than making the goal to reduce the interest, we

can make the goal to reduce the problem,” Smerbeck says.

Special interests may offer **long-term practical benefits**, says **Kristie Patten**, associate professor of occupational therapy at New York University. In a 2017 survey her team conducted, 62 percent of respondents said their interests had helped them succeed in life, and 86 percent reported that they are working in a job or studying in a program that incorporates the interest. “We have pathologized some of these things with autism that really, if we flip them and view them as strengths, the outcomes are going to be so much better,” she says.

In a professional context, the accumulation of specific, eclectic knowledge can be invaluable. Van Kirk once solved a catastrophic security problem for one of her company’s corporate clients by noticing a tiny anomaly in reams of code. “I remember those weird, obscure little things that you only see three or four times in a career,” she says. “And people come to me for those skills.”

Research shows that beyond such practical benefits, a special interest often has deeper value. “It reduces stress. It helps the person to calm down when they’re upset,” Smerbeck says. The top-rated item on his survey? “These interests seem to make my child genuinely happy.”