

The advantages of autism

04 May 2010 by David Wolman

MICHELLE Dawson can't handle crowded bus journeys, and she struggles to order a cup of coffee in a restaurant because contact with strangers makes her feel panicky. Yet over the past few years, Dawson has been making a name for herself as a researcher at the Rivière-des-Prairies hospital, part of the University of Montreal in Canada.

Dawson's field of research is the cognitive abilities of people with autism - people such as herself. She is one of a cadre of scientists who say that current definitions of this condition rely on findings that are outdated, if not downright misleading, and that the nature of autism has been fundamentally misunderstood for the past 70 years.

Medical textbooks tell us that autism is a developmental disability diagnosed by a classic "triad of impairments": in communication, imagination and social interaction. While the condition varies in severity, about three-quarters of people with autism are classed, in the official language of psychiatrists, as mentally retarded.

Over the past decade or so, a growing autistic pride movement has been pushing the idea that people with autism aren't disabled, they just think differently to "neurotypicals". Now, research by Dawson and others has carried this concept a step further. They say that auties, as some people with autism call themselves, don't merely think differently: in certain ways they think better. Call it the autie advantage.

How can a group of people who are generally seen as disabled actually have cognitive advantages? For a start, research is challenging the original studies that apparently demonstrated the low IQ of people with autism. Other studies are revealing the breadth of their cognitive strengths, ranging from attention to detail and sensitivity to musical pitch to better memory.

More recently, brain imaging is elucidating what neurological differences might lie behind these strengths. Entrepreneurs have even started trying to harness autistic people's talents ([see "Nice work if you can get it"](#)). "Scientists working in autism always reported abilities as anecdotes, but they were rarely the focus of research," says Isabelle Soulières, a neuropsychologist at Harvard Medical School in Boston, who works with Dawson. "Now they're beginning to develop interest in those strengths to help us understand autism."

The fact that some people with autism have certain talents is hardly a revelation. Leo Kanner, the psychiatrist who first described autism in the early 1940s, noted that some of his patients had what he termed "islets of ability", in areas such as memory, drawing and puzzles. But Kanner's emphasis, like that of most people since, was on autism's drawbacks.

Today it is recognised that autism varies widely in terms of which traits are present and how prominently they manifest themselves. The cause remains mysterious, although evidence is pointing towards many genes playing a role, possibly in concert with factors affecting development in the womb.

A single, elegant explanation capturing all that is different about the autistic mind has so far proved elusive, but several ideas have been put forward that attempt to explain the most notable traits. Perhaps one of the best known is the idea that autistic people lack theory of mind - the understanding that other people can have different beliefs to yourself, or to reality. This account would explain why many autistic people do not tell

lies and cannot comprehend those told by others, although the supporting evidence behind this theory has come under fire lately.

Verbal cues

People with autism are also said to have weak central coherence - the ability to synthesise an array of information, such as verbal and gestural cues in conversation. In other words, sometimes they can't see the wood for the trees.

The idea of the autistic savant, with prodigious, sometimes jaw-dropping, talents has taken hold in popular culture. Yet savants are the exception, not the rule. The usual figure cited is that about 1 in 10 people with autism have some kind of savant-like ability. That includes many individuals with esoteric skills that are of little use in everyday life - like being able to instantly reckon the day of the week for any past or future date.

The reality is that children with autism generally take longer to hit milestones such as talking and becoming toilet-trained, and as adults commonly struggle to fit into society. Only 15 per cent of autistic adults have a paying job in the UK, according to government figures. The mainstream medical view of autism is that it represents a form of developmental brain damage. But what if that view is missing something?

The first way in which Dawson challenged the mainstream view was to address the association between autism and low IQ. In 2007, Dawson and Laurent Mottron, head of the autism research programme at the University of Montreal, published a study showing that an autistic person's IQ score depends on which kind of test is used. With the most common test, the Weschsler Intelligence Scale, three-quarters of people with autism score 70 or lower, which classifies them as mentally retarded, as defined by the World Health Organization's *International Classification of Diseases*. But when the team administered a different, yet equally valid, IQ test known as the Raven's Progressive Matrices, which places less weight on social knowledge, most people with autism scored at a level that lifted them out of this range (*Psychological Science*, vol 18, p 657).

Dawson believes her personal connection to this field of inquiry gives her unique insights. Recently, she began wondering if autistic strengths might already have surfaced in research settings, only to be buried in a literature dominated by the view of autistic people as damaged goods. "No one had ever thought to ask: What cognitive strengths have been reported in the literature?" she says.

After reviewing thousands of papers and re-examining the data, Dawson says she has found dozens that include empirical evidence of autistic strengths that are cloaked by a preoccupation with deficits.

Take, for example, a 2004 study where autistic and non-autistic people did sentence comprehension tests while lying in a brain scanner (*Brain*, vol 127, p 1811). The autistic volunteers showed less synchronicity between the different language areas of the brain as they performed the task. The authors speculate that this could explain some of the language problems seen in autism. Yet according to the results section, the autistic group did better at this particular comprehension task than the control group. "The researchers use the higher performance in one area to speculate about deficit elsewhere," says Dawson.

Attention to detail

Evidence for autistic advantages is also coming in from new studies. One strength derives from an aspect of autism that has long been seen as one of its chief deficits: weak central coherence. The flip side of an inability to see the wood for the trees is being very, very good at seeing trees.

Psychologists investigate the ability to aggregate or tease apart information by showing volunteers drawings of objects such as a house, and asking them to identify the shapes embedded within it, like triangles and rectangles. Numerous studies have shown that people with autism can do these tasks faster and more accurately. And that's not just with pictures; autistic people also do it with music, in tasks such as identifying individual notes within chords.

Maretha de Jonge, a child psychiatrist at the University Medical Centre in Utrecht, the Netherlands, who has done such studies, explains that "weak" in the context of central coherence doesn't have to mean inferior in daily life. "Weakness in integration is sometimes an asset," she says. It can be useful to filter out external stimuli if you are writing an email in a noisy coffee shop, for example, or are searching for a camouflaged insect in a rainforest. Recasting weak central coherence as attention to detail and resistance to distraction suggests a mode of thought that could have advantages.

Other autistic strengths are harder to paint as disabilities in any way. For example, Pamela Heaton of Goldsmiths, University of London, has shown that people with autism have better musical pitch recognition.

On the visual side, a few autistic savants who are immensely talented artists are well known, but recent studies suggest superior visuospatial skills may be more common in autism than previously supposed. Autistic people are better at three-dimensional drawing, for example, and tasks such as assembling designs out of blocks printed with different patterns (*Journal of Autism and Developmental Disorders*, vol 39, p 1039).

Brain scans indicate that this may be because people with autism recruit more firepower from the brain's visual areas when doing such tasks. They may even use their visual areas for other thought processes. Mottron's team found that people with autism were completing the reasoning tasks in the Raven's IQ test by using what is usually regarded as the visual part of the brain, along with more typical intelligence networks (*Human Brain Mapping*, vol 30, p 4082).

Many researchers note that people with autism seem hypersensitive to sights and sounds. In 2007, based partly on this finding, Kamila Markram and Henry Markram and Tania Rinaldi of the Swiss Federal Institute of Technology in Lausanne set out a theory of autism dubbed the "intense world syndrome" (*Frontiers in Neuroscience*, vol 1, p 77). According to this, autism is caused by a hyperactive brain that makes everyday sensory experiences overwhelming.

One of their planks of evidence is autopsy findings of structural differences in the brain's cortex, or outer layer. People with autism have smaller minicolumns - clusters of around 100 neurons that some researchers think act as the brain's basic processing units - but they also have more of them. While some have linked this trait to superior functioning, the Lausanne team still framed their theory as explaining autism's disabilities and deficits.

Mottron's team has published an alternative theory of autism that they believe more fully and accurately incorporates autistic strengths. Their "enhanced perceptual function model" suggests autistic brains are wired differently, but not necessarily because they are damaged (*Journal of Autism and Developmental*

Disorders, vol 36, p 27). "These findings open a new educational perspective on autism that can be compared to sign language for deaf people," says Mottron.

While Henry Markram maintains that autism involves a "core neuropathology", he told *New Scientist* that the intense world idea and Mottron's theory are "aligned in most aspects". "Of course the brain is different, but to say whether the brain is damaged or not depends on what you mean by damaged."

What other cognitive abilities make up the autistic advantage? More rational decision-making seems to be one - people with autism are less susceptible to subjective or emotional factors such as how a question is worded (*New Scientist*, 18 October 2008, p 16). Still, until the idea of the autistic advantage gains ground, the full range of autistic strengths will remain unknown.

Yet the idea seems to be taking root. When speaking at the TED conference in Long Beach, California, in February, professor of animal science Temple Grandin, who has autism, was cheered after quipping that Silicon Valley wouldn't exist without the condition. She also claimed the tech-heavy crowd was probably stacked with "autism genetics".

Galling message

Perhaps it will prove impossible to draw all-encompassing conclusions about the advantages and disadvantages of a condition described as a spectrum. Autism includes brilliant engineers, music prodigies who can't unload a dishwasher, maths savants who can't speak, and other combinations of talent and disability.

It is important to note, however, that the concept of the autistic advantage has not been universally welcomed. A number of researchers, as well as parents of autistic people, are leery of too much emphasis on autistic strengths. They fear it could lead society to underestimate some people's impairments and the difficulties they face.

That outcome could threaten funding for badly needed social services and therapy programmes. As one researcher who did not want to be identified put it: "Michelle Dawson's first-hand experience is valuable. But her experience doesn't necessarily map onto other people's."

For a parent struggling with a child who cannot feed or use the toilet themselves it must be galling to hear that the condition may be advantageous. Yet other parents may be equally fed up of hearing uniformly negative messages about their children's potential. Perhaps only by considering the advantages of autism as well as its disadvantages can those affected reap better opportunities in life.

As far as Dawson is concerned, what matters most is evidence. Last year, at an autism conference, she presented a poster on her work. "When people looked at my results, they said, 'It's so good to see something positive!' I said that I don't see it as positive or negative. I see it as accurate."

Nice work if you can get it

Thorkil Sonne, founder of the IT firm Specialisterne in Copenhagen, Denmark, has led private-sector efforts to capitalise on autistic strengths, such as memory and attention to detail. His company employs 48 people, 38 of whom have autism.

After receiving training, employees work as IT consultants to other firms. Sonne, a former IT consultant himself, founded the company in 2004, soon after his son was diagnosed with autism. "I am just a father who reacted in despair by establishing a company tailored to meet the working conditions of people with autism," he says.

Specialisterne is no charity, though. The company turns a healthy profit - £120,000 in 2008 - and branches will soon open in the UK, Iceland and Germany. In Chicago, a non-profit start-up called Aspiritech is based on Sonne's model.

Michelle Dawson, an autistic cognition researcher at the University of Montreal, Canada, who has the condition herself, is hopeful that such enterprises will improve public attitudes and career opportunities for people with autism. Yet she cautions against pigeonholing people: "Asking what kind of job is good for an autistic is like asking what kind of job is good for a woman," she says.

Sonne says it is not his intention to stereotype autistic people as data-entry drones. The IT connection is because that's where his experience lay, but he's already ramping up the operation to cater to individual preferences and talents. He recently established an education programme for adolescents with autism, and hired a music and art teacher. Sonne says: "Our ambition is to work out a model in which people who struggle with traditional expectations of social skills can excel."

*David Wolman is a science writer in Portland, Oregon. His book *Righting the Mother Tongue* is available from HarperCollins/Smithsonian Books*

<http://www.newscientist.com/article/mg20627581.500-the-advantages-of-autism.html?full=true>