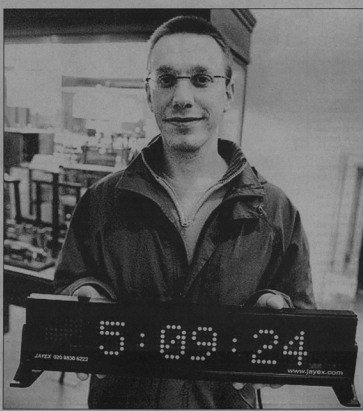


# Windmills of the mind

Daniel Tammet is an autistic savant. He can perform mathematical calculations at breakneck speeds. But, unlike other savants, he can describe how he does it. Now scientists are asking whether his abilities are the key to unlocking the secrets of autism, writes **Richard Johnson**.



A friend of numbers... recalling pi to 22,514 decimal places is simple enough for Daniel Tammet.

Daniel Tammet is talking. As he talks, he studies my shirt and counts the stitches. Ever since the age of three, when he suffered an epileptic fit, he has been obsessed with counting. Now he is 26, and a mathematical genius who can figure out cube roots quicker than a calculator and recall pi to 22,514 decimal places. He also happens to be autistic, which is why he can't drive a car or tell right from left. He lives with extraordinary ability and disability. He is autistic, and his IQ is multiplied by 795. Actually, he isn't "calculating"; there is nothing conscious about what he is doing. He arrives at the answer instantly. Since his epileptic fit, he has been able to see numbers in shapes, colours and textures. The number two, for instance, is a motion, and five is a clap of thunder.

"When I multiply numbers together, I see two shapes. The image starts to change and evolve, and a third shape emerges. That's the answer. It's mental imagery. It's like maths without having to think."

Tammet is a savant, an individual with an astonishing, extraordinary mental ability. An estimated 10 per cent of the autistic population — and an estimated 1 per cent of the non-autistic population — have savant abilities, but no one knows exactly why. A number of scientists hope that Tammet might help us to understand better.

Alan Snyder, from the Centre for the Mind at the Australian National University in Canberra, explains why Tammet is of particular, and international, scientific interest.

"Savants can't usually tell us how they do what they do," says Snyder. "It just comes to them. Daniel can. He describes what he sees in his head. That's why he's exciting. He could be the Rosetta Stone."

There are many theories about savants. Snyder, for instance, believes that all we possess the savant's extraordinary abilities — it's just a question of learning how to access them. "Savants have usually had some kind of brain damage — whether it's an onset of dementia later in life, a blow to the head, or, in the case of Daniel, an epileptic fit. And it's that brain damage which creates the savant. I think it's possible for a perfectly normal person to have savant skills, especially, so working with Daniel could be very instructive."

Scans of the brains of autistic savants suggest that the right hemisphere might be compensating for damage in the left hemisphere.

While many savants struggle with language and comprehension (skills associated primarily with the left hemisphere), they often have amazing skills in mathematics and memory (primarily right hemisphere skills). Typically, savants have a limited vocabulary, but there is nothing limited about Tammet's.

He is creating his own language, strongly influenced by words and their inter-relationships of northern Europe. (He already speaks French, German, Spanish, Lithuanian, Icelandic and Esperanto.)

"Minti" is his own personal exploration of the power of words and their inter-relationship, and he hopes to launch it in academic circles later this year.

The director of the Autism Research Centre at Cambridge University, Simon Baron-Cohen, is interested in what Minti might tell us about savant ability.

"I know of other savants who also speak a lot of languages," he says. "But it's rare for them to be able to reflect on how they do it — let alone create a language of their own."

The ARC team has started scanning Tammet's brain to find out if there are

modules (for number, for example, or for colour, or for texture) that are connected in a way that is different from most of us.

Last year, Tammet broke the European record for recalling pi, the mathematical constant, to the furthest decimal point. He found it easy, he says, because he didn't even have to "think".

To him, pi isn't an abstract set of digits; it's a visual story, a film projected in front of his eyes. He learnt the number forwards and backwards and, last year, spent five hours recalling it in front of an adjudicator. He wanted to prove a point.

"I memorised pi to 22,514 decimal places, and I am technically disabled. I just wanted to show people that disability needn't get in the way."

Tammet is softly spoken, and shy about making eye contact, which makes him seem younger than he is. He lives on the Kent coast, south of London, but never goes near the beach — there are too many pebbles to count. The thought of a mathematical problem with no solution makes him feel uncomfortable. Trips to the supermarket are always a chore.

"There's too much mental stimulus. I have to look at every shape and texture. Every price, and every arrangement of fruit and vegetables. So instead of thinking, 'What cheese do I want this week?', I'm just really uncomfortable."

Tammet has never been asked to work 9 to 5. It would be too difficult to fit around his daily routine. For instance, he has to drink his cups of tea at exactly the same time every day. Things have to happen in the same order: he always brushes his teeth before he has his shower.

"I have tried to be more flexible, but I always end up feeling more uncomfortable. Retaining a sense of control is really important. I like to do things in my own time, and in my own style, so an office with targets and bureaucracy just wouldn't work."

Instead, he has set up a business on his own, at home, writing email courses in language learning, numeracy and literacy for private clients. It has the fringe benefit of keeping human interaction to a minimum. It also gives him time to work on the verb structures of Minti.

Few people on the streets have recognised Tammet since his pi record attempt. But a documentary about his life to be broadcast later this year will change that.

"The highlight of filming was to meet Kim

Peek, the real-life character who inspired the film *Rain Man*. Before I watched *Rain Man*, I was frightened. As a nine-year-old schoolboy, you don't want people to point at the screen and say, 'That's you'. But I watched it, and felt a real connection. Getting to meet the real-life *Rain Man* was inspirational."

Peek was shy and introspective, but he sat and held Tammet's hand for hours. "We shared so much — our love of key dates from history, for instance. And our love of books. As a child, I regularly took over a room in the house and started my own lending library. I would separate out fiction and non-fiction, and then alphabetise them all. I even introduced a ticketing system. I've read more books than anyone else I know. So I was delighted when Kim wanted to meet in a library."

Peek can read two pages simultaneously, one with each eye. He can also recall, in exact detail, the 7600 books he has read. When he is at home in Utah, he spends afternoons at the Salt Lake City public library, memorising phone books and address directories. "He is such a lovely man," says Tammet. "Kim says, 'You don't have to be handicapped to be different — everybody's different.' And he's right."

**"Daniel describes what he sees in his head. He could be the Rosetta Stone."**

Like Peek, Tammet will read anything and everything, but his favourite book is a good dictionary, or the works of GK Chesterton.

"With all those aphorisms," he says, "Chesterton was the Groucho Marx of his day."

Tammet is also a Christian, and likes the fact that Chesterton addressed some complex religious ideas. "The other thing I like is that, judging by the descriptions of his home life, I reckon Chesterton was a savant. He couldn't dress himself, and would always forget where he was going. His poor wife."

Autistic savants have displayed a wide range of talents, from reciting all nine volumes of *Grove's Dictionary of Music* to measuring exact distances with the naked eye. The blind American savant Leslie Lemke played Tchaikovsky's *Piano Concerto No. 1* after he heard it for the first time, and he never had so much as a piano lesson.

And the British savant Stephen Wiltshire was able to draw a highly accurate map of the

London skyline from memory after a single helicopter trip over the city. Even so, Tammet could still turn out to be the more significant.

He was born on January 31, 1979. He was born with another surname, which he prefers to keep private, but decided to change it by deed poll. It didn't fit with the way he saw himself. "I first saw 'Tammet' online. It means oak tree in Estonian, and I liked that association. Besides, I've always had a love of Estonian. Such a vowel-rich language."

As a baby, he banged his head against the wall and cried constantly. Nobody knew what was wrong. His mother was anxious, and would swing him to sleep in a blanket. She breastfed him for two years.

The only thing the doctors could say was that perhaps he was under-stimulated. Then, one afternoon when he was playing with his brother in the living room, he had an epileptic fit.

"I was given medication to control my seizures and told not to go out in direct sunlight. I had to visit the hospital every month for regular blood tests. I hated those tests, but I knew they were necessary. To make up for it, my father, so an autistic savant, bought me a cup of squash to drink while we sat in the waiting room."

"It was a worrying time because my Dad's father had epilepsy, and actually died of it." Tammet's mother was a secretarial assistant and his father a steelworks worker. "They both left school without qualifications, but they made me feel special — all nine of us. As the oldest of nine, I suppose it's fair to say I've always felt special. I was their big brother and I could read them stories."

He remembers being given a Ladybird book called *Counting* when he was four. "When I looked at the numbers I saw 'images. It felt like a place I could go where I really belonged. That was great. I went to this other country whenever I could. I would sit on the floor in my bedroom and just count. I didn't notice that time was passing. It was only when my Mum shouted up for dinner, or someone knocked at my door, that I would snap out of it."

One day his brother asked him a sum. "He asked me to multiply something in my head — like, 'What is 82 x 82 x 82 x 82?' I just looked at the floor and closed my eyes. My back went very straight and I made my hands into fists. But after five or 10 seconds, the answer just flowed out of my mouth."

"He asked me several others, and I got every one right. My parents didn't seem surprised. And they never put pressure on me to perform for the neighbours. They knew I was different, but wanted me to have a normal life as far as possible."

Tammet could see the car park of his infant school from his bedroom window, which made him feel safe. "I loved assembly because we got to sing hymns. The notes formed a pattern in my head, just like the numbers did."

The other children didn't know what to make of him, and would tease him. The minute the bell went for playtime he would rush in. "I went to the playground, but not by the play. The place was surrounded by trees. While the other children were playing football, I would just stand and count the leaves."

After leaving his secondary school with three A-levels (German, French and German, all grade Bs), he decided to want to teach — only not the predictable, learn-by-rote type of teaching. For a start, he went to teach in Lithuania, and he worked as a volunteer.

"Because I was so good at my own recall, I was given a lot of leverage. The times of the classes weren't set in stone, and the structures were all of my own making. It was also the first time I was introduced as 'Daniel' rather than 'the guy who can do weird stuff in his head.' It was such a pleasant relief."

Later, he returned home to live with his parents, and found work as a maths tutor.

When he hit teaching, Tammet likes to hang out with his friends on the quiz team. His knowledge of particular cultures lets him down, but he's a show-in when it comes to the maths questions. "I do love numbers," he says. "It isn't just an intellectual or aloof thing that I do. I really feel that there is an emotional attachment, a caring for numbers. I think this is a human thing — in the same way that a poet understands a river or a tree through metaphor, my world gives me a sense of numbers as personal. It sounds silly, but numbers are my friends."