LEARN TO THINK BETTER: TIPS FROM A SAVANT

YOU MAY NEVER HAVE THE MEMORY OF RAIN MAN, BUT YOU CAN STILL GET TIPS FOR IMPROVING YOUR COGNITIVE PERFORMANCE FROM THIS EXTRAORDINARY THINKER

By Jonah Lehrer

Daniel Tammet, who can recite the first 22,514 digits of the mathematical constant pi.
Jerome Tabet

MORE FROM THIS ISSUE OF MIND

This author has two books, Born on a Blue Day *and* Embracing the Wide Sky*, the latter of which came out in January. He is also a linguist and holds the European record for reciting the first 22,514 digits of the mathematical constant pi.* Scientific American Mind *contributing editor Jonah Lehrer chats with Tammet about the way his memory works, why the IQ test is overrated, and a possible explanation for extraordinary feats of creativity.*

Scientific American Mind: Your recent memoir, *Born on a Blue Day*, documented your life as an autistic savant. You describe, for example, how you are able to quickly learn new languages and remember scenes from years earlier in cinematic detail. Are you ever surprised by your own abilities?

Daniel Tammet: I have always thought of abstract information—numbers, for example—in visual, dynamic form. Numbers assume complex, multidimensional shapes in my head that I manipulate to form the solution to sums or compare when determining whether they are prime or not.

For languages, I do something similar in terms of thinking of words as belonging to clusters of meaning so that each piece of vocabulary makes sense according to its place in my mental architecture for that language. In this way, I can easily discern relations between words, which helps me to remember them.

In my mind, numbers and words are far more than squiggles of ink on a page. They have form, color, texture, and so on. They come alive to me, which is why as a young child I thought of them as my “friends.” I think this is why my memory is very deep, because the information is not static. I say in my book that I do not crunch numbers (like a computer). Rather I dance with them.

None of this is particularly surprising for me. I have always thought in this way so it seems entirely natural. What I do find surprising is that other people do not think in the same way. I find it hard to imagine a world where numbers and words are not how I experience them!

Mind: In *Embracing the Wide Sky*, you criticize the IQ test as a vast oversimplification of intelligence. You write: “There is no such thing as proofs of intelligence, only intelligence.” Could you explain what you mean by that?

Tammet: When I was a child, my behavior was far from being what most people would label “intelligent.” It was often limited, repetitive and antisocial. I could not do many of the things that most people take for granted, such as looking someone in the eye or deciphering a person’s body language, and only acquired these skills with much effort over time. I also struggled to learn many of the techniques for spelling or doing sums taught in class because they did not match my own style of thinking.

I know from my own experience that there is much more to intelligence than an IQ number. In fact, I hesitate to believe that any system could really reflect the complexity and uniqueness of one person’s mind or meaningfully describe the nature of his or her potential.

The bell curve distribution for IQ scores tells us that two thirds of the world’s population has an IQ somewhere between 85 and 115. This means that some four and a half billion people around the globe share just 31 numerical values (“he’s a 94,” “you’re a 110,” “I’m a 103”), equivalent to 150 million people worldwide sharing the same IQ score. This sounds a lot to me like astrology, which lumps everyone into one of 12 signs of the zodiac.

Even if we cannot measure and assign precise values to it in any “scientific” way, I do very much think that intelligence exists and that it varies in the actions of each person. The concept is a useful and important one for scientists and educators alike. My objection is to thinking that any “test” of a person’s intelligence is up to the task. Rather we should focus on ensuring that the fundamentals (literacy, etcetera) are well taught and that each child’s diverse talents are encouraged and nourished.

Mind: You also describe some recent scientific studies on what happens inside the brain when we learn a second language. Do you think this research should change the way we teach languages?

Tammet: Thanks to the advances in modern scanning technology, we know more today than ever before just what’s happening inside the brain when we’re learning a language. That we can speak at all is nothing less than an astonishing cognitive achievement.

Learning a second language, particularly when that language is not one that the person has to use on a regular basis, is an extremely difficult task. I think it is a mistake to underestimate the challenges of it. Students should be aware that the difficulties they will face are inherent in what they are doing and not any failing on their part.

One of the most interesting scientific discoveries about how language works (and how it could be taught) is “phonaesthesia”—that certain sounds have a meaningful relation to the things they describe. For example, in many languages the vowel sound “i” is associated with smallness—little, tiny, petite, niño, and so on—whereas the sound “a” or “o” is associated with largeness—grand, gross, gordo, etcetera. Such links have been found in many of the world’s languages. These findings strongly imply that learners would benefit from learning to draw on their own natural intuitions to help them understand and remember many of the foreign words that they come across.

Another finding, by cognitive psychologists Lera Boroditsky, Lauren A. Schmidt and Webb Phillips, might also offer a useful insight into an important part of learning a second language. The researchers asked German and Spanish native speakers to think of adjectives to describe a range of objects, such as a key. The German speakers, for whom the word “key” is masculine, gave adjectives such as “hard,” “heavy,” “jagged” and “metal,” whereas the Spanish speakers, for whom “key” is feminine, gave responses such as

“golden,” “little,” “lovely” and “shiny.” This result suggests that native speakers of languages that have gendered nouns remember the different categorization for each by attending to differing characteristics, depending on whether the noun is “male” or “female.” It is plausible that second-language learners could learn to perceive various nouns in a similar way to help them remember the correct gender.

Regardless of how exactly a person learns a second language, we do know for sure that it is very good for your brain. There is good evidence that language learning helps individuals to abstract information, focus attention, and may even help ward off age-related declines in mental performance.

Mind: You advocate a theory of creativity defined by a cognitive property you call “hyperconnectivity.” Could you explain?

Tammet: I am unusually creative—from visualizing numerical landscapes composed of random strings of digits to the invention of my own words and concepts in numerous languages. Where does this creativity come from?

My brain has developed a little differently from most other people’s. Aside from my high-functioning autism, I also suffered from epileptic seizures as a young child. In my book, I propose a link between my brain’s functioning and my creative abilities based on the property of hyperconnectivity.

In most people, the brain’s major functions are performed separately and not allowed to interfere with one another. Scientists have found that in some brain disorders, however, including autism and epilepsy, cross-communication can occur between normally distinct brain regions. My theory is that rare forms of creative imagination are the result of an extraordinary convergence of normally disconnected thoughts, memories, feelings and ideas. Indeed, such hyperconnectivity within the brain may well lie at the heart of all forms of exceptional creativity.

Mind: How were you able to recite from memory the first 22,514 numbers of pi? And do you have advice for people looking to improve their own memory?

Tammet: As I have already mentioned, numbers to me have their own shapes, colors and textures. Various studies have long demonstrated that being able to visualize information makes it easier to remember. In addition, my number shapes are semantically meaningful, which is to say that I am able to visualize their relation to other numbers. A simple example would be the number 37, which is lumpy like oatmeal, and 111, which is similarly lumpy but also round like the number three (being 37 _ 3). Where you might see an endless string of random digits when looking at the decimals of pi, my mind is able to “chunk” groups of these numbers spontaneously into meaningful visual images that constitute their own hierarchy of associations.

Using your imagination is one very good way to improve your own memory. For example, actors who have to remember hundreds or even thousands of lines of a script do so by actively analyzing them and imagining the motivations and goals of their characters. Many also imagine having to explain the meaning of their lines to another person, which has been shown to significantly improve their subsequent recall.

Here is another tip from my book. Researchers have found that you are more likely to remember something if the place or situation in which you are trying to recall the information bears some resemblance—color or smell, for example—to where you originally learned it. A greater awareness therefore of the context in which we acquire a particular piece of information can help improve our ability to remember it later on.