SAVANTS · EPISODE 5

Carbon Calculators: When Mathematics Becomes a Sense

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Welcome to a new episode of our 'Savants' series. If you have followed our previous meetings, you will remember that we have explored memories that never forget and hands that paint without having studied art. Today, however, we are going to enter a territory that seems straight out of a science fiction movie: the world of mathematical savants or 'human calculators.' But be careful, because the name is misleading. While a pocket calculator processes data following a series of logical steps, for these individuals, mathematics is not a process, but a sensory experience, almost like smelling a flower or watching a sunset.

Imagine for a moment that someone asks you what 83 raised to the fourth power is. You would probably look for a piece of paper, a pencil, and take a long time to multiply. Or perhaps they ask you what day of the week March 14th fell on every year from 1800 to today. For most of us, this is a titanic task. However, for savants like Daniel Tammet or the famous twins George and Charles, the answer is not the result of effort, but something that simply 'appears.' Daniel, for example, describes that for him, numbers have unique shapes, colors, and textures. The number 1 is bright and white; 9 is huge and dark. When he has to do a complex calculation, he doesn't do the math: he simply observes how two shapes merge in his mind to create a third. The answer is the landscape left after the union.

- Amazing cases of prime number calculation (numbers only divisible by themselves).
- Calendar calculation: knowing the day of the week for any date in seconds.

- Numerical synesthesia: when figures transform into visual art.

One of the most fascinating cases was that of the twins George and Charles, who could identify if a twenty-digit number was prime almost instantaneously. For the rest of the world, finding prime numbers requires complex algorithms and supercomputers. For them, it was like identifying an old friend in a crowd. But how is it possible for a biological brain, made of flesh and neurons, to skip all the logical steps that take the rest of us an eternity and simply 'see' the answer immediately?

The Mind Beyond the Algorithm

To understand this phenomenon, we must first tear down a fundamental myth: mathematical savants are not doing 'quick calculations' in their heads in the same way the rest of us would. When an engineering student multiplies two large numbers, they use their prefrontal cortex to keep the numbers in their 'working memory' and apply a series of learned rules. It is like climbing a staircase step by step. In contrast, in the savant's brain, the process seems to be automatic and non-conscious. It is more similar to what happens when you recognize your mother's face: you don't analyze the distance between her eyes or the curve of her nose to conclude who she is; you just know it instantly. We call this process 'holistic processing.'

The Landscape of Numbers: Synesthesia

The case of Daniel Tammet is the best map we have to explore this territory. Daniel has synesthesia, a condition where the senses merge. For him, numbers are not abstract symbols on a piece of paper, but entities with personality. Imagine that each number is a piece of a three-dimensional puzzle that has a color, a texture, and even a specific weight. When Daniel multiplies, he is not applying a multiplication table. He describes seeing two complex shapes that begin to interact in his mind, and the space left between them, or the new shape they create by fitting together, is the result of the calculation. It is a way of 'geometrizing' mathematics.

This gives us a key scientific clue. In the brain of a mathematical savant, the areas responsible for processing numbers (such as the parietal lobe) are hyper-connected with the areas that process vision and shapes (such as the visual cortex). It's as if instead of having separate cables for sound and image on a TV, the cables were twisted together, allowing information to flow from one system to another effortlessly. For Daniel, the number 289 is ugly, while the number 333 is beautiful and round. This 'aesthetic of the number' is what guides his calculation ability.

The Mystery of Prime Numbers

One of the most impressive achievements of savants is the identification of prime numbers. Professional mathematicians have spent centuries looking for patterns in prime numbers, and although formulas exist, identifying whether a ten or twelve-digit number is prime requires considerable computing power. However, cases have been documented of savant twins who spent hours 'exchanging' six-digit prime numbers as if they were telling jokes. How did they do it?

Some researchers suggest that savants are not 'calculating' divisibility, but rather detecting irregularities in patterns. Imagine a fabric with a very complex repetitive pattern. If there is a small error in the weave, your eye will detect it immediately, even if you cannot mathematically explain the flaw. For a savant, a composite number (which is not prime) has a 'shape' that fits into a known division pattern, while a prime number stands out as an anomaly, like a discordant note in a perfect symphony. Their brain has internalized the structure of numbers in such a way that numerical order and chaos are felt physically.

Calendar Calculators: The Map of Time

Another common phenomenon is the ability to say what day of the week October 22, 1924, was in less than a second. For most of us, time is an abstract line. For the savant, the calendar seems to be a spatial grid, a mental map that they can scan with their eyes. They are not counting days; they are 'seeing' where the date falls in a pre-constructed mental structure.

Neuroimaging studies show that while we use the logical areas of the brain for these tasks, savants often activate areas of the right hemisphere related to visual pattern recognition and long-term memory. It's as if they have hacked their own hardware to use a powerful graphics card instead of a slow word processor to solve the same problem.

Hidden Potential or Extreme Specialization?

The question that arises is: do we all have this potential? Some scientists, like Allan Snyder, believe we do. He argues that all our brains perform these massive calculations for simple things, like calculating the trajectory of a ball coming toward us or processing shadows to understand depth. The difference is that, in a normal brain, these calculations occur 'under the hood' and the results are delivered to us already processed so we don't get distracted. In the savant, due to a different brain architecture (often related to autism), access to those 'raw data' is open.

In conclusion, mathematical savants are not computers; they are poets of numbers. They teach us that logic is not the only way to reach the truth. Sometimes, beauty, shape, and sensory intuition can be much faster paths to the heart of reality. In our next episode, we will explore how this amazing processing capacity translates into language, discovering the savants who can learn a language in less than a week. Is language also a form of landscape for the human brain?