Turns Out, Counting on Your Fingers Makes You Smarter

Children who have better perception of their hands tend to be more skilled at math, research shows.

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Recent research shows that finger recognition is correlated with math skills. Photo: Getty Images

Jo Craven McGinty

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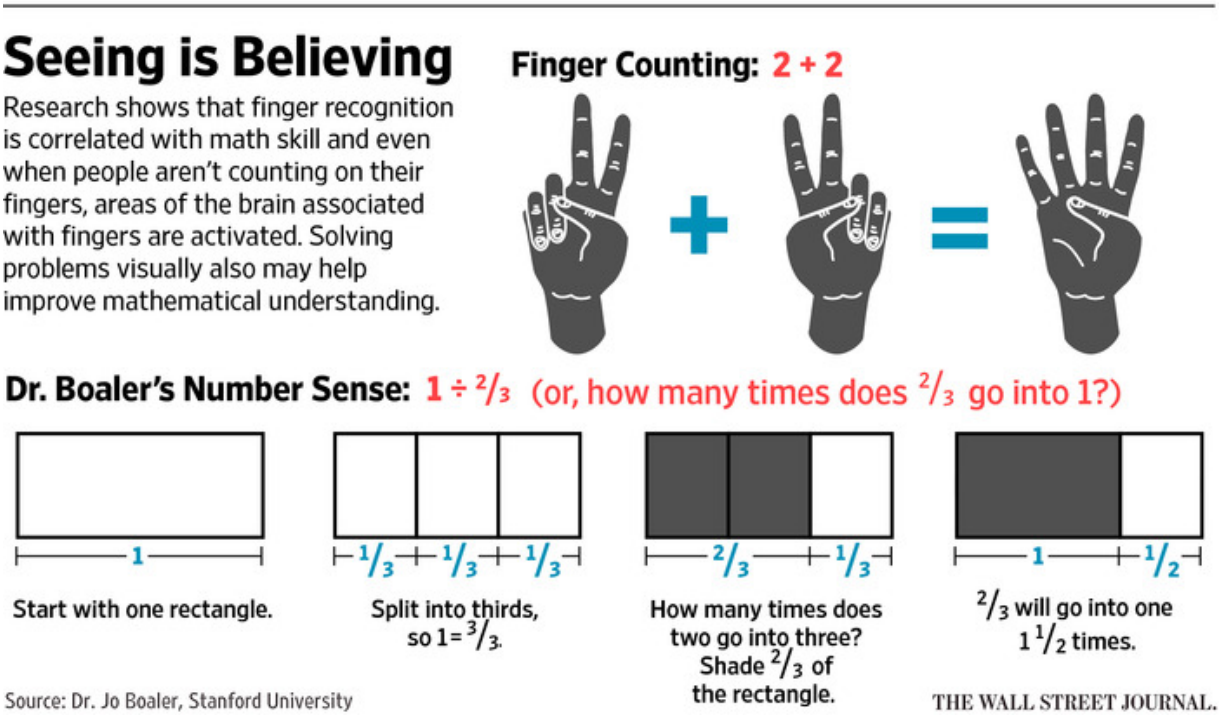
Have you ever noticed children secretly counting on their fingers?

If so, tell them they can pull their hands from beneath the table. Although many people discourage finger counting for fear it impedes learning, it appears the opposite is true.

Recent research shows that finger perception—the ability to distinguish, name, or recognize the fingers—is correlated with math skill, and even when people aren't manually ticking off numbers, areas of the brain associated with fingers are still activated.

You may not be counting on your fingers, but your brain is.

To see how the mind works[1] while performing arithmetic, Ilaria Berteletti, an educational neuroscientist at Gallaudet University, and a research partner scanned the brains of 39 children ages 8 to 13 while they mentally subtracted and multiplied single-digit numbers.



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The scans revealed two regions of the brain associated with fingers—the somatosensory area, which responds to sensations such as pressure, pain or heat, and

the motor area, which controls movement—were both active during subtraction, even though the children did not use their fingers to arrive at the answers.

It's the first study to show evidence that the sensory area of the brain plays a functional role in mathematical problem solving.

There was no similar brain activity during multiplication, which the researchers interpreted as a reflection of how children learn to subtract versus how they learn to multiply.

"You probably learned subtraction using your fingers," Dr. Berteletti said. "Multiplication was probably presented verbally and with rote memorization. For us, it's evidence that the two types of operations rely on different networks."

Scientists don't know whether finger recognition makes children better at math or whether using fingers for math improves recognition, but what is known for sure is that children who have better finger perception tend to be more skilled at mathematics.

Previous studies have shown that a 6-year-old child's finger perception is a better predictor of math success in the next grade than standard test scores, and training children to improve their finger sense has been demonstrated to also improve their arithmetic.

"What scientists find, and this is what's so stunning, is that as you increase your finger perception, you increase your math performance," said Jo Boaler, a professor of mathematics education at Stanford University and co-founder of the nonprofit website youcubed, which provides teaching resources to build finger[2] and number[3] sense. "The brain scientists say that without finger perception and finger counting, numbers will never have a normal representation in the brain."

To test someone's finger recognition, or finger gnosia, researchers block the person's hands from view, touch one or two fingers, and then ask the person to identify which of their fingers was tagged. People with weak finger sense have trouble differentiating one finger from another.

While researchers like Dr. Boaler and Dr. Berteletti believe finger sense is deeply

connected to mathematical achievement and should be cultivated, math teachers have traditionally regarded fingers as a bridge to mental representations of numbers and abstract thinking that, after a time, should be discouraged.

"I think the idea of don't count on your fingers is still out there, but math has moved to the idea that fingers and other manipulatives play an important role," said Douglas Clements, executive director of the Marsico Institute of Early Learning and Literacy at the University of Denver's Morgridge College of Education. "We want them to move off fingers but not so soon that when they need concrete representations they don't have it."

Once the movements becomes internalized, Dr. Berteletti said, children will naturally outgrow finger counting.

"It's not something parents should be scared of," she said. "It's OK."

The connection between fingers and math was documented in the 1940s when people with brain injuries lost the ability to perform calculations and, at the same time, identify their fingers. Scientists are still puzzling out the link, but one possibility is that finger recognition helps people visualize abstract concepts.

To demonstrate how visualization can improve mathematical understanding at all levels, Dr. Boaler uses the problem of one divided by two-thirds. The abstract solution involves multiplying one by the reciprocal of the fraction and then converting the result, an improper fraction, to a mixed number.

Dr. Boaler, who encourages students to work out problems like these with diagrams and pictures to "see why the answer is what it is," offers this visual solution. Divide a rectangle into thirds and shade two of the segments to depict how one divided by two-thirds equals one-and-a-half.

The goal is to augment, not replace, abstract computations.

"We're not saying everyone should count on their fingers their entire life and not develop the ability to add abstractly," Dr. Boaler says. "What's being said is if you really know your fingers well, that's going to help you, and it will help you throughout your life."

It’s a strategy, she says, that you can count on.

Write to Jo Craven McGinty at Jo.McGinty@wsj.com[4]

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4. mailto:Jo.McGinty@wsj.com