Newsweek
What matters most

Smarter People Gesture More When They Talk – So Will Kids Become Smarter if They Gesture?

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There's an exciting report in next month's issue of *Intelligence*. That study, when combined with earlier work from the University of Chicago, suggests that there may be an entirely new way to develop the brain's reasoning ability.

In the *Intelligence* study, researchers had 28 teenagers come to a lab at Berlin's Humboldt University. In order to minimize the possible variables, the invited teens were all quite similar– all about 17 years-old, same socioeconomic backgrounds and similar schools. They also had about the same level of *crystallized intelligence* – that being the mental ability to apply rules they've already learned to new situations.

Where the teens differed was in their *fluid intelligence* (Gf)– the ability to reason their way through entirely new novel situations. Some teens were high in fluid intelligence; others were average. (Most neuroscientists believe that the reasoning ability captured in Gf is the sign of true brilliance.)

The researchers asked the teens to look at a series of complex geometric images; their task was to discern patterns between the images. Once the teens had done that, the researchers videotaped the boys as they explained how they'd solved the problems. A month later, the boys returned to the lab for a structural MRI scans of their brains.

The boys higher in fluid intelligence did better at the image task. And, fascinatingly, when verbally described their problem-solving, the higher Gf boys also used hand-gestures to do so. They used their fingers to form the rectangles and triangles they'd seen. They wiggled their hands back and forth, their digits reenacting how the boys mentally manipulated the images during the task. Compared to the boys with average Gf, the high Gf group used more than four times the number of hand gestures during their explanations.

Then, the researchers analyzed the teens' brain scans, especially "Broca's area" – what is considered to be the root of language comprehension. For the boys who were higher in Gf and gestured more, the cortices of their brains were thicker in Broca's area.

If this all seems like odd brain trivia – smarter people gesture more when they talk – it has the potential to be much more than that.

University of Chicago professor Susan Goldin-Meadow is one of the world's leading researchers on gesture. She has proven that gestures aren't just mere unconscious flapping of the hands. Gesturing isn't even about communicating from one person to the next. (Goldin-Meadow discovered that if you put blind-from-birth people in a room together for a conversation, they still gesture to one another.)

Instead, Goldin-Meadow and her team have shown that gesturing actually facilitates people's ability to reason. You can even teach a child a new method of problem-solving, simply by teaching that kid a new gesture.

That's exactly what Dr. Susan Wagner Cook was able to do. A former graduate student in Goldin-Meadow's lab, Cook spent her days at nearby elementary schools.

There's a common stumbling block for kids in math: equivalence. Knowing how to solve a problem such as 3 + 4 + 2 =__ + 7. Sure, it looks easy to you, but, in the third and fourth grades, a lot of kids will quickly put a "9" in the blank. Some are perplexed as to the presence of the "+7," but others don't even notice it's there.

So Cook divided third and fourth graders (none of whom could correctly solve an equivalence problem) into three groups. All the kids were taught to solve the problems. But one group was given a phrase to say aloud to help guide them. They were told to say, “I want to make one side equal to the other side."

Cook didn't tell the second group of kids to say anything. Instead, she told the second group to make a strange hand-gesture as they solved the problem – they were to wave their hands on both sides of the equation as they totaled the sum. The third set of kids was taught to say the phrase *and* make the wave-gesture.

Immediately after the training, the kids were tested to see how much they had learned. All of them had improved their ability.

Then, four weeks later, the children were in their regular classrooms when the teachers surprised them with a pop quiz of equivalence problems. Disaster struck. Of the kids taught to say the instructional phrase, 90% had forgotten how to solve the problems.

Amazingly, more than 90% of the kids who used the gesture in their training *remembered* how to solve the problems. Making the gesture helped encode the memory for long-term retrieval.

"You'd think that their minds were twice as occupied," observed Goldin-Meadow. But rather than overloading their brains with competing thoughts, the gesture supported their learning.

To make this even more perplexing and mysterious (and cool): Goldin-Meadow's team believe the specific gestures used don't matter. They've repeated the experiment with different kids and different gestures. Making a gesture that's symbolically relevant improves the result, but the results are still very good no matter what.

Truthfully, Goldin-Meadow hasn't completely determined what's driving this strange phenomenon. But her chief theory is that gesturing "lightens the mental load" of learning: it lessens learning's demands because the gesturing somehow engages other parts of the brain in the problem-solving.

Perhaps ideas just aren't as cumbersome, because of the motion-memory link. For example, researchers have found that when a person hears words describing a body's motion (*e.g.*, "kick"), that triggers activity in the parts of the brain associated with that motion. Still other scholars have shown that it's easier to remember speech events when a gesture accompanied the speech. Goldin-Meadow can get kids to remember a story better, if she asks them to use gestures when they repeat the tale.

Now think back to that new finding in *Intelligence*: kids with higher fluid intelligence gesture more – and they have thicker brain cortices in Broca's area.

It's too early to come up with any definite explanations for the intelligence-brain-structure-gesture relationship. But the German scientists are well-aware of Goldin-Meadow and Cook's success in gesture-training. So the neuroscientists are considering that the possibility that, when kids frequently produce certain gestures, it may affect how their brains physically develop. Thus, use of gestures wouldn't just help a child problem-solve in that moment. It could also lead to better overall cognitive performance and higher fluid intelligence.

In a few years, we may be able to help a child learn – even change his IQ – with just a wave of the hand.