Teachers' gestures boost math learning

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A study co-authored by Kimberly Fenn, Michigan State University, assistant professor of psychology, suggests students whose teachers use hand gestures learn better in math. Credit: Michigan State University

Students perform better when their instructors use hand gestures – a simple teaching tool that could yield benefits in higher-level math such as algebra.

A study published in *Child Development*, the top-ranked educational psychology journal, provides some of the strongest evidence yet that gesturing may have a unique effect on learning. Teachers in the United States tend to use gestures less than teachers in other countries.

"Gesturing can be a very beneficial tool that is completely free and easily employed in classrooms," said Kimberly Fenn, study co-author and assistant professor of psychology at Michigan State University. "And I think it can have long-lasting effects."

Fenn and Ryan Duffy of MSU and Susan Cook of the University of Iowa conducted an experiment with 184 second-, third- and fourth-graders in Michigan elementary classrooms.

Half of the students were shown videos of an instructor teaching math problems using only speech. The others were shown videos of the instructor teaching the same problems using both speech and gestures.

The problem involved mathematical equivalence (i.e., 4+5+7=__+7), which is known to be critical to later algebraic learning. In the speech-only videos, the instructor simply explains the problem. In the other videos, the instructor uses two hand gestures while speaking, using different hands to refer to the two sides of the equation.

Students who learned from the gesture videos performed better on a test given immediately afterward than those who learned from the speech-only video.

Another test was given 24 hours later, and the gesture students actually showed improvement in their performance while the speech-only students did not.

While previous research has shown the benefits of gestures in a one-on-one tutoring-style environment, the new study is the first to test the role of gestures in equivalence learning in a regular classroom.

The study also is the first to show that gestures can help students transfer learning to new contexts – such as transferring the knowledge learned in

an addition-based equation to a multiplication-based equation.

Fenn noted that U.S. students lag behind those in many other Western countries in math and have a particularly hard time mastering equivalence problems in early grades.

"So if we can help them grasp this foundational knowledge earlier," she said, "it will help them as they learn algebra and higher levels of mathematics."

Provided by Michigan State University

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