Good at math? It means little if you're not confident

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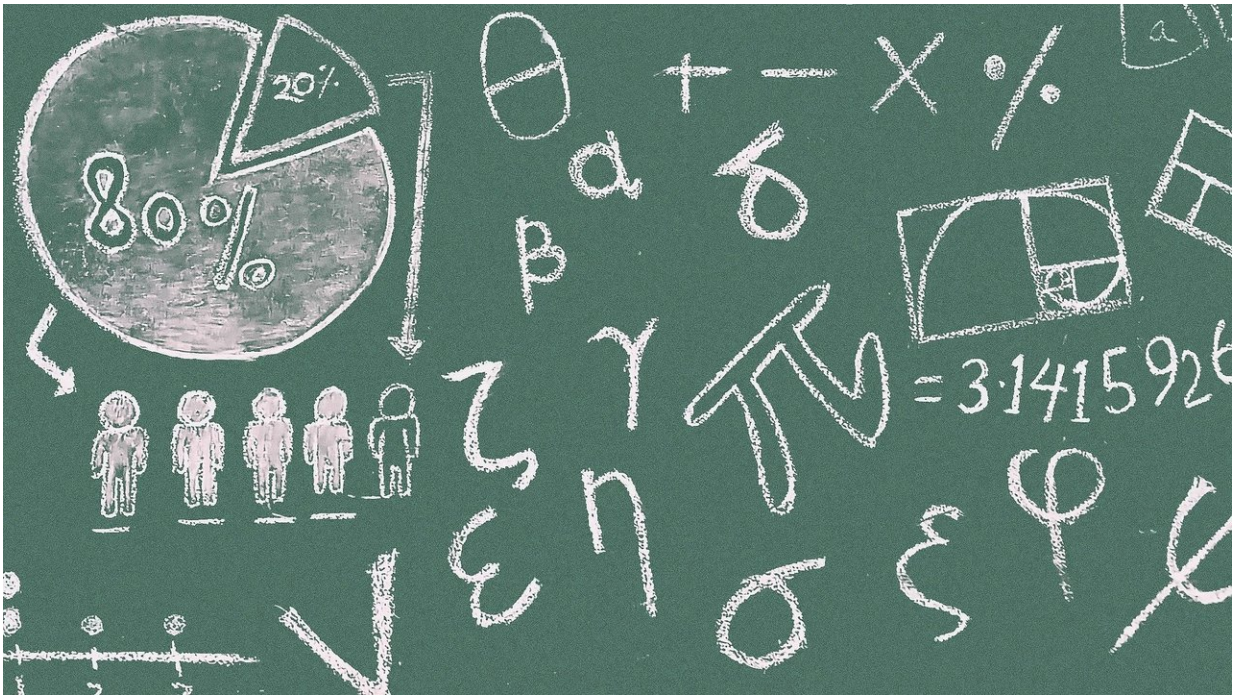

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Being good at math relates to better financial and medical outcomes—unless you don't have confidence in your own abilities with numbers, new research suggests.

In two studies, researchers found that the key to success in personal finances and dealing with a complex disease was a match between a

person's math abilities and how comfortable and assured he or she felt using those skills.

A lack of numeric confidence can essentially wipe out most of the advantage a person with good math skills may have, said Ellen Peters, who completed the work as a professor of psychology at The Ohio State University.

And the effects were not small. Take, for example, people who scored 100 percent on a math test used in this research, published today (Sept. 9, 2019) in the journal *PNAS*.

Having high confidence in their math ability compared to low confidence was the equivalent of having $94,000 more in annual income.

"If you have low numeric confidence, all the math skills in the world appear not to help much," said Peters, who is now at the University of Oregon.

"We think that those who lack confidence don't persist with the numbers when the going gets tough or tedious. As a result, their skills aren't used."

In both studies, participants took a test that measured their objective math skills. They also completed a questionnaire that measured how confident and self-assured they felt using numbers.

Those who scored high in numeric confidence reported feeling comfortable in their abilities with numbers and believed they were good with fractions and probabilities. These people are likely to enjoy doing number-related tasks more, Peters said.

Most importantly, they are more likely to persist when a math-related

task is tedious or difficult, she said.

In the first study, the researchers investigated self-reported financial outcomes among 4,572 Americans who participated in the Understanding America Study, run by the University of Southern California.

Participants reported various financial outcomes, such as credit card debt, investments and whether they had payday loans.

Results showed that the interaction between participants' objective math scores and their numeric confidence predicted how well they were doing financially—as the above example from the study revealed.

The second study involved 91 patients at Ohio State's Wexner Medical Center who were being treated for lupus.

Lupus has no cure, but medical interventions and lifestyle changes can help control it. However, it takes good math skills to navigate the disease, such as understanding the risks and benefits of drugs, using correct drug doses and making good health insurance and provider choices, Peters said.

But just as importantly, because it is a chronic disease, patients must persist using these math skills over a lifetime in order to adhere to multiple timed medications, navigate frequent treatment changes and adopt healthy behaviors.

Results showed that the interaction between patients' objective math skills and their numeric confidence was related to how their physicians rated disease activity, such as new rashes or seizures.

Those who scored high in skill and confidence showed less disease

activity than those who had the skills but not the confidence.

But the worst outcomes came to those who thought they were great at math, but actually were not.

Among those who had high confidence, patients who were good at math had only a 7 percent chance of having bad disease activity—compared to 44 percent who had low math skills.

"If you have low ability and high confidence, you may end up making mistakes that you don't recognize. You're not asking for help because you think you don't need it, so you end up in worse shape," Peters said.

So how many people are mismatched between their abilities and skills?

In these two studies, 18 to 20 percent had good math skills and low confidence. Another 12 to 13 percent had bad math skills combined with high confidence.

"Almost a third of our population is mismatched in ways that could harm them," Peters said.

The results suggest that efforts to improve people's math skills or their numeric confidence alone may not be helpful.

"More of one is not necessarily better if you don't increase both," she said.

The best advice for everyone should be to understand their skills, Peters said. For some, that may mean to "be open to the possibility that you're good at math," she said. For others, it may mean asking for and accepting help as needed.

More information: Ellen Peters el al., "Despite high objective numeracy, lower numeric confidence relates to worse financial and medical outcomes," *PNAS* (2019). www.pnas.org/cgi/doi/10.1073/pnas.1903126116

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