

[credit card debt](#) based on the amount they owe, minimum monthly payments and an annual percentage rate.

These people are innumerate, meaning they're unskilled with numbers. Numerate people, in contrast, are mathematically proficient.

[In our research](#) as psychologists, we measure numeracy with a [math test](#). If you can answer the following question correctly, your response falls in the [top half of well-educated Americans](#), and you are highly numerate:

"Out of 1,000 people in a small town, 500 are members of a choir. Out of these 500 members in the choir, 100 are men. Out of the 500 inhabitants that are not in the choir, 300 are men. What is the probability that a randomly drawn man is a member of the choir?" (The answer is at the end of this article.)

People who are better at answering these kinds of [math](#) questions [make decisions differently](#) than those who struggle with them. The highly numerate [search for](#) and [think hard about](#) numbers when they make decisions. Ultimately, they [trust numbers more](#) and have a clearer understanding of what the [numbers mean for their decisions](#).

The less numerate, however, [rely more on compelling stories](#) and [emotional reactions](#) in decisions rather than the hard facts. They tend to make worse decisions for themselves when numbers are involved.

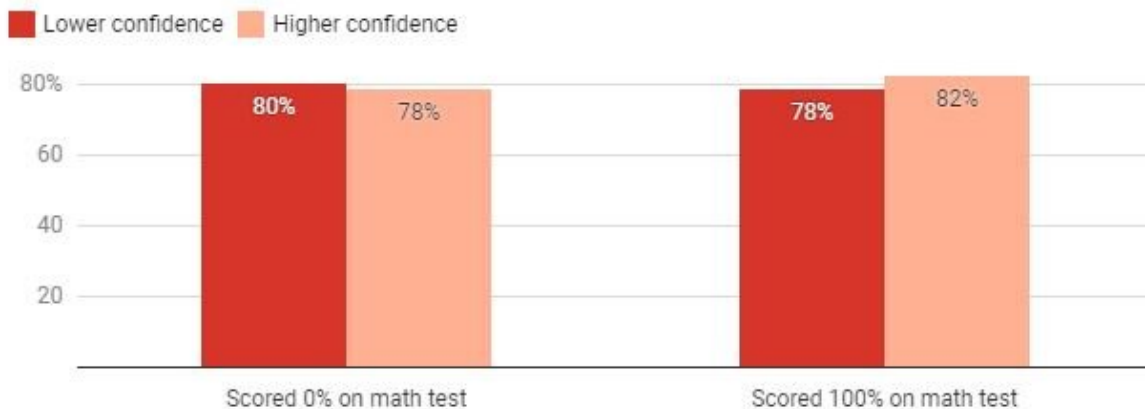
Being numerate doesn't guarantee you'll use numbers well in decisions, though. Confidence matters too. We [measure numeric confidence with questions](#) like "How good are you at working with fractions?" More numerically confident people [stick longer](#) with even tedious or difficult mathematical tasks. For best outcomes, you need to use numbers correctly, and you need to persist when the going gets tough. That is, you need to be numerate and you need to be numerically confident.

But [our new research suggests](#) that more is not always better when it comes to [number](#) skills and number [confidence](#). Instead, having a good understanding of your ability—a match between ability and confidence—is critical.

How do math skills relate to financial outcomes?

Both objective numeracy and numeric confidence matter to financial outcomes. People who scored 100% on a math test and also had high confidence in their numeric skills reported better personal finances than those who had high confidence but lacked the math skills to back it up.

Percentage of good outcomes for people with...



Clear-eyed assessment of one's own numeracy

To investigate this connection between math ability and confidence, we carried out two separate studies.

In one, we measured 13 self-reported good financial outcomes among 4,572 Americans—things like not having high credit-card debt or a

payday loan. Out of our 13 possible financial outcome scenarios, we then counted up how many good outcomes each person experienced.

In the second, we collected data on physician-reported disease activity among 91 lupus patients. Less [disease activity](#)—for example, better medical test results or fewer new rashes—means a healthier patient.

We saw the best financial and health outcomes in those with high numeracy and high numeric confidence. "Mismatched" individuals—with either high ability and low confidence, or low ability and high confidence—experienced the worst outcomes.

And the effects were not small.

Individuals in our financial survey who scored perfectly on our math test and also had high confidence in their ability—meaning their ability and confidence matched—reported 82% of the good financial outcomes that were possible, and therefore only 18% of the possible bad outcomes, like filing for bankruptcy. People who scored just as well on the test but had low confidence in their numeric skills—so were mismatched—reported fewer good outcomes, only 78%.

Just a few percentage points here actually have a big impact on how well someone is doing financially. For instance, our analysis indicates that a person would have to make about US\$94,000 in additional annual income for that same 4% difference in financial outcomes to emerge.

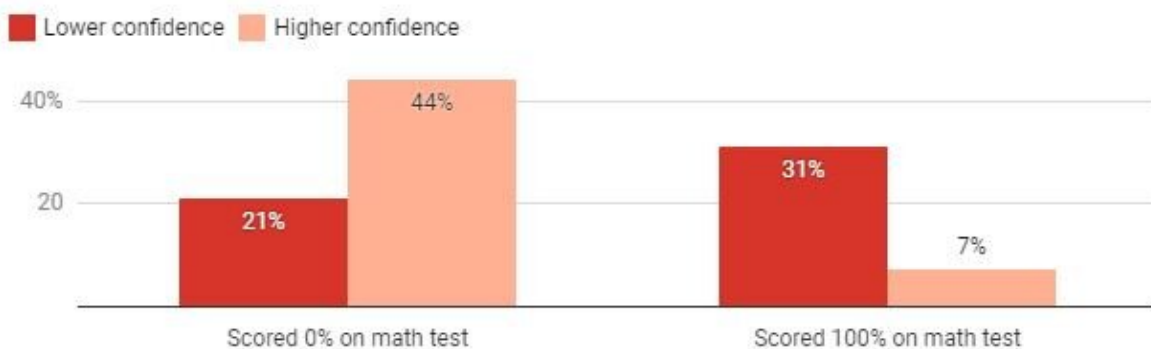
Among lupus patients higher in numeric confidence, if they scored perfectly on our numeracy test, they had only a 7% chance of needing more aggressive treatment to control their disease at their doctor's visit. However, those with high confidence and the lowest numeracy score had a much higher, 44%, chance of needing additional treatment to control their disease.

What we think happens is that people who are more confident about their ability with numbers play a more active role in their health and financial decisions. If they also have good [math skills](#), they can flourish. For example, with high numeric confidence, they would be more likely to engage in decisions about their health. With high numeric skills, they are then better able to choose high-quality doctors and take medications appropriately. But if they have poorer math skills that don't support their confidence, they may make mistakes that go unnoticed and suffer the consequences.

How do math skills relate to disease symptoms?

Both objective numeracy and numeric confidence matter to disease activity. Lupus patients who scored poorly on a math test and also were overly confident about their math skills were more likely to need more aggressive treatment at a doctor's visit. Patients who scored well on the math test and were confident about their numeracy were the least likely to need additional treatment.

Percentage of patients requiring more aggressive treatment...



Credit: The Conversation

For those who are lower in numeric confidence, having good math skills makes little difference to their health or finances, presumably because

they fail to try.

Boosting your own math brain

No matter your own situation, you are bound to encounter numbers in the course of living your life. Here are a few things you can do to help yourself become more numerate—and hopefully improve your financial and physical health.

First, understand your skills.

Believing you are not skilled can harm you, even if it's not true. Be open to the possibility that you are good at math. Then again, believing you are skilled when you aren't also can hurt. Ask for and accept help as needed. For example, you could ask a financial planner to assist with your retirement planning.

Secondly, ask people to communicate numbers in ways that make them easy to understand and use.

Research shows that [how numbers are presented](#) can matter as much as what is presented. For example, you might see a news story that says 1 out of 100,000 people who ate some food got cancer. If that sounds scary, try calculating that proportion as a percentage, or ask your doctor to translate the number to that format. In this case, it's only 0.001%. For many people, a number presented in that first [frequency format seems highly risky](#), even though the equivalent percentage is tiny.

And lastly, practice, practice, practice.

Begin by working on simple math like addition and subtraction. Most important, get feedback. Learning requires knowing what you've gotten right and wrong.

You can also help your numeric confidence and make later practice more effective by maintaining a positive overall view of yourself. One way to do this is to remind yourself about what is truly important to you, like family and friends, religion or politics. This way, you can feel good about yourself even while you attempt to get better at something that challenges you, like math. [Our research](#) shows that taking these steps improves numeracy and outcomes.

These and other results cry out for better math instruction, and for everyone to take math learning and careful communication of numbers more seriously. Many older adults are facing health issues and retirement with insufficient finances. We believe that improving numeracy, numeric confidence and their match will help younger generations to plan better.

And that question about choir membership from above? The correct answer is 25%.

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Provided by The Conversation

Citation: Math skills aren't enough to get through hard decisions (2019, September 10) retrieved 25 April 2024 from <https://phys.org/news/2019-09-math-skills-hard-decisions.html>

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