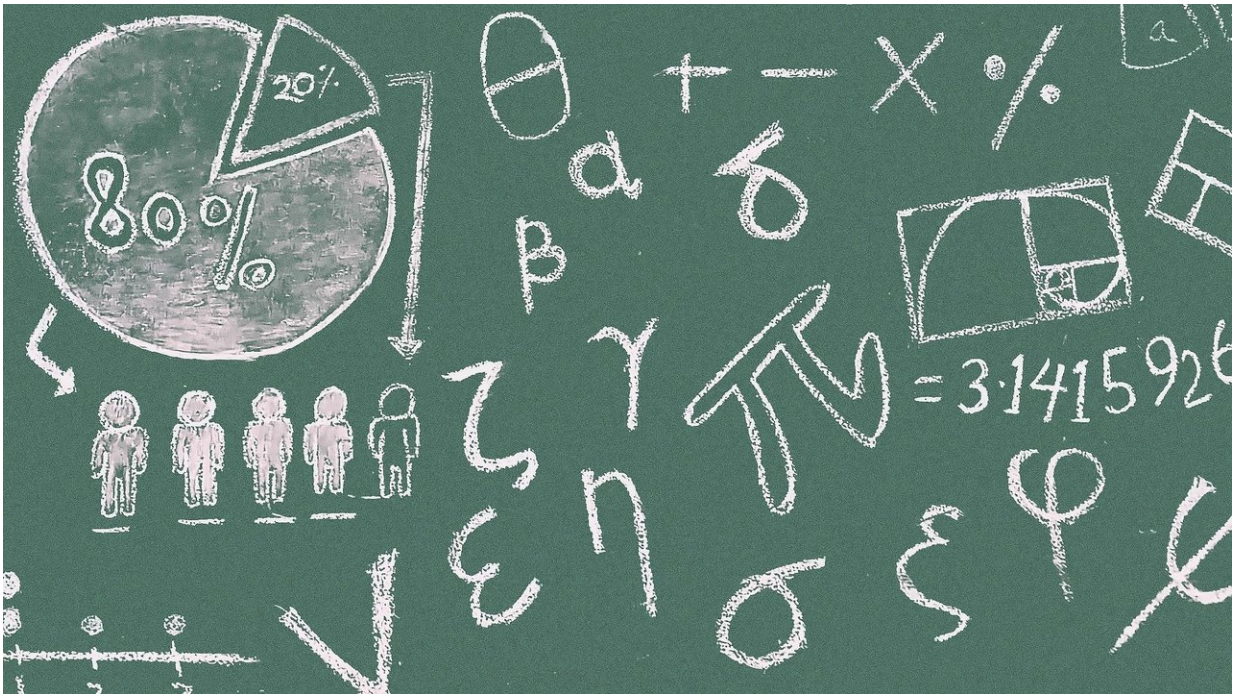


Divide and conquer: A new formula to minimize 'mathemaphobia'

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Math: it's the subject some kids love to hate, yet despite its lack of popularity, mathematics is critical for a STEM-capable workforce and vital for Australia's current and future productivity.

In a new study by the University of South Australia in collaboration with the Australian Council for Educational Research, researchers have been

exploring the impact of anxiety on learning [math](#), finding that boosting [student](#) confidence, is pivotal to greater engagement with the subject.

Math anxiety, or "mathemaphobia," is the sense of fear, worry and nervousness that students may experience when participating in mathematical tasks.

In Australia a quarter to a third of Australian secondary students report feeling tense, nervous or helpless when doing math, and it's this reaction that's influencing their decisions to study math.

Lead researcher, Dr. Florence Gabriel says math anxiety is one of the biggest barriers to students choosing to study it, especially at senior school and tertiary levels.

"Many of us would have felt some sort of math anxiety in the past—a sense of panic or worry, feelings of failure, or even a faster heart rate—all of which are associated with stress," Dr. Gabriel says.

"Math anxiety is essentially an [emotional reaction](#), but it's just like stress in other situations. When students experience math anxiety, they'll tend to hurry through math questions, lose focus, or simply give up when it all seems too hard. Not surprisingly, these reactions compound and lead to poor math achievement—and later a reluctance to engage with the subject at all. To break this cycle, our research shows that we need to build and grow [student confidence](#) in math, especially before starting a new math concept. This draws on the notion of self-regulated learning—where students have the ability to understand, track and control their own learning. By drawing a student's attention to instances where they've previously overcome a difficult math challenge, or to a significant math success, we're essentially building their confidence and belief in their own abilities, and it's this that will start to counteract negative emotions."

The study assessed the responses of 4295 Australian 15-year-old students that participated in the 2012 cycle of the OECD's Program for International Student Assessment (PISA).

It focussed on the psychological factors of math learning: motivation (the belief that math is important and useful for their future); math self-concept (the belief in their ability to do math); math anxiety (self-feelings when doing math); perseverance (their willingness to continue to work on difficult problems); math self-efficacy (their self-belief that they can successfully solve math problems); and math literacy (the ability to apply math to the real world).

"Importantly, our research shows the domino effect that these variables have on one another," Dr. Gabriel says.

"Through structural equation modeling, our data shows that low motivation and self-concept will lead to math anxiety, which in turn affects perseverance, self-efficacy and, ultimately, math achievement. By developing a student's ability to reflect on past successes—before math [anxiety](#) sets in—we can break through some of the negative and emotional beliefs about math and, hopefully, pave the way for students to accept and engage with math in the future."

More information: Florence Gabriel et al. The impact of mathematics anxiety on self-regulated learning and mathematical literacy, *Australian Journal of Education* (2020). [DOI: 10.1177/0004944120947881](https://doi.org/10.1177/0004944120947881)

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