BEHAVIOR

Debate Arises over Teaching "Growth Mindsets" to Motivate Students

Research shows conflicting data on the impact of the intervention, but a major new study confirms it can work

By Lydia Denworth on August 12, 2019

Credit: Getty Images

In her 2006 book *Mindset*, psychologist Carol Dweck of Stanford University identified the power of beliefs. “They strongly affect what we want and whether we succeed in getting it,” she wrote. “Changing people’s beliefs—even the simplest beliefs—can have profound effects.” She then argued that people who possess “fixed mindsets” believe their intelligence or personality cannot change. They are more likely to focus on performing well on familiar tasks, to shy away from challenge and to be less resilient in the face of failure. By contrast, those with a “growth mindset” believe their intelligence or personality is malleable. They see challenge as an avenue to improvement and are better prepared to learn. Dweck cited exemplars of growth mindsets, including Michael Jordan, Charles Darwin, photographer Cindy Sherman and Lou Gerstner, who rescued IBM.

The idea quickly caught the public imagination, and the book became a best seller. Dweck’s TED talk has nearly 10 million views. The mindset approach has been applied in stress and mental health research, in conflict resolution and in corporate boardrooms.

But it has been especially influential in education as a way to help students, low achievers in particular, reach their full potential. After the success of Dweck's book, schools around the world began to teach mindsets as a learning technique, and companies sprang up selling mindset materials to teachers and parents.

Then came the pushback. Like several other major ideas from psychology, mindset research, which began in the 1980s, has been reexamined in the current rigorous era of social science. A soon-to-be published study that attempted to replicate two of Dweck's most-cited papers reported "little or no support for the idea that growth mindsets are beneficial for children's responses to failure or school attainment." And while some mindset-based education interventions had good results, others found no effect on student outcomes. A few methodological questions about Dweck's work have emerged (as have questions about the replications and failed interventions), but the loudest criticism makes the claim that mindset research overpromised and underdelivered. "Millions of dollars have gone into funding mindset research. If it turns out this doesn't work, that's a massive lost opportunity," says psychologist Timothy Bates of the University of Edinburgh, senior author of the replication study.

Even mindset's proponents recognize that the concept was disseminated too far too fast. "Any popular idea in education gets spread way ahead of how ready the science is," says psychologist David Yeager of the University of Texas at Austin. He is a leader among the new generation of mindset researchers that has begun to refine the science underlying interventions. Dweck says she used to think that growth mindset was a simple concept.

"But then we started becoming aware of all the ways that it might be misunderstood or not implemented in a compelling way. One thing we've learned in the past five to 10 years is how the nuances matter."

Yeager and Dweck's latest work takes these subtleties into account. A paper they and their colleagues published on August 7 in *Nature* confirms that mindset interventions can work at scale, especially for low-achieving students, but that context is critical. Exposure to two short, low-cost online programs led to higher grades for lower-achieving ninth graders (the average improvement was 0.1 grade point). Schools that fostered climates celebrating academic success and curiosity saw the largest gains: some students got another half a grade point or slightly more, and the likelihood of failure (a D or F average) fell by 8 percent. In addition, high- and low-achieving ninth graders chose more challenging math courses in 10th grade.

The study is notable not only for its findings but for its methods, which met today's exacting scientific requirements and then some: It is a randomized controlled trial of more than 12,000 students from a nationally representative sample of public schools. The authors preregistered their hypotheses and analysis plan (a step that prevents fishing for positive results), and the intervention was administered by an independent research firm. And the statistical analysis was reviewed independently, too. The work has also been replicated by a separate set of researchers in a study of more than 6,500 students in Norway. (That replication will be published separately.)

Some question whether this level of improvement—a mere 0.1 grade point boost, for instance—is meaningful. "They're claiming what most people think of as minuscule effects," Bates says. "This best case cannot be even a tiny part of a solution to the problems that need solving in education." That critique mirrors other reviews of mindset research. In two meta-analyses, cognitive psychologist Brooke Macnamara of Case Western Reserve University and her colleagues found what they considered "weak" effects that were similar to the findings in the new national study. If the results are not going to be "profound," Macnamara says, "the companies that sell growth-mindset-intervention products should be clear about that in their advertising."

But educational economists such as Susan Dynarski of the University of Michigan have argued that educational interventions must be judged in real-world settings, where

small effects can be important. Matthew Kraft, an educational economist at Brown University, has reviewed almost 800 randomized controlled trials of education interventions and found a median effect size of 0.1 standard deviation on student achievement outcomes. By comparison, the mindset study's intervention was more effective than half of those interventions, which is particularly impressive for such a short, inexpensive program, says Kraft, who was not involved in the work but is part of the Mindset Scholars Network. That small bump in grade point average, he argues, could be the difference between a student passing or failing exit exams or being eligible for an Advanced Placement course.

In Praise of Effort

The concept of mindsets was a direct response to the self-esteem movement. A seminal series of Dweck's studies, published in 1998, concerned the effect of praise on motivation. Dweck, then at Columbia University, and one of her colleagues administered a series of puzzles to about 400 fifth graders. After completing the first puzzle, children praised for their effort ("You must have worked hard") as opposed to their intelligence ("You must be smart") were far more likely to choose a more challenging puzzle to do next. In 2007, after moving to Stanford, Dweck and psychologist Lisa Blackwell, then at Columbia, conducted another important study. They followed 373 seventh graders to see whether mindset predicted grades two years later. With a subset of students, they also performed the first mindset intervention, explicitly teaching kids about the brain and that intelligence can be developed. Having a growth mindset predicted higher grades,

while a fixed mindset predicted a flat-grade trajectory. Compared with those who did not receive the intervention, those who did showed greater motivation in the classroom.

Like many mindset researchers, Yeager encountered Dweck's work as a graduate student at Stanford. He had taught middle school and wanted to use mindsets to improve education. During graduate school, he worked at the nearby Carnegie Foundation for the Advancement of Teaching, where he became interested in the challenge of effectively implementing academic theories at scale. He was encouraged by a Carnegie project called Statway, which, in part, used growth mindset instruction to help community college students pass remedial math courses (a barrier for many in getting their degree.)

In 2015 Dweck, Yeager and others co-founded the Mindset Scholars Network, an interdisciplinary group dedicated to furthering research on learning mindsets. Yeager also began organizing the ambitious national study he and Dweck have just published. That meant developing an effective, brief intervention that could be delivered directly to students. Larger, longer interventions with trained instructors had been found to work well and might have produced stronger results, but they would not be feasible in thousands of schools with many competing demands for classroom time. The final materials, which will be free to educators and researchers, consist of two 25-minute online sessions. They describe the brain as a muscle that grows stronger with use and include a letter-writing activity to help kids internalize the message.

At the same time, Dweck realized that there were problems with how mindsets were being used. Pinning a poster about growth mindset on the wall of a classroom does not help if the teacher creates an environment where kids are afraid of making a mistake, she says. "The environment has to support the belief change and the behaviors that come with it." She began to warn of "false growth mindset" and included a new chapter to address the subject in an updated edition of *Mindset*. "The important thing is learning in progress," she says. "That is brought about not only by effort but by trying new strategies and by seeking appropriate help and input." Dweck also divested her interest

in Mindset Works, a company that sells mindset materials under the brand Brainology. (Her former colleague Blackwell remains involved with Brainology, and there is still a link to the company on the Web site for Dweck's book.)

The attempted replication of Dweck's work that is about to be published concerned the 1998 study on praise and part of the 2007 study. Bates and his student Yue Li conducted a series of studies in a group of more than 600 Chinese students. Their results were mixed but mostly found no effect. The positive effects they found were of much smaller magnitude than in Dweck's studies. "It just wasn't working strongly enough or reliably enough to be anything other than an artifact," Bates says. Yeager and Dweck question some of Bates's findings, and Dweck reanalyzed her data and made it publicly available. The debate is likely to continue in the coming months in academic journals. For now, Dweck is proud of her work on praise and stands by it, and she notes that praise is not part of the mindset intervention in the national study.

Attempted interventions in the U.K., Peru and Argentina are more comparable. In Peru, there were positive effects in one out of three school districts. In the U.K. and Argentina, there were none. Alejandro Ganimian, an assistant professor of psychology and economics at New York University, who led the Argentina study, says, "It seemed to me at the start that it would be more simplistic. It's humbling." He isn't giving up yet and plans to do some smaller pilot tests and to investigate possible reasons the program did not work, including the intervention design or the age of the students (he studied 12th graders).

Dweck and Yeager's recent *Nature* findings underscore the realization that successful mindset interventions appear to require finesse. "The national study showed us how much more there is to learn," Yeager says. They spent years fine-tuning the materials they used and are confident in their appropriateness for ninth graders but cannot be sure about other populations or about the materials used in other interventions. "Just because it's easy to deliver doesn't mean it's easy to develop," Yeager says.

Education is not the only field where mindset interventions are being tested. Clinical psychologist Jessica Schleider of Stony Brook University studies the effectiveness of brief interventions in treating adolescent depression and anxiety.* In mindsets, she saw parallels with cognitive-behavioral therapy, which teaches individuals they have agency over their thoughts and behaviors. With John Weisz of Harvard University, Schleider created a short intervention that generated significant improvements in both parent- and youth-reported levels of depression. Mindful of the backlash against mindsets in education, Schleider intends to proceed slowly. “I want to really understand what we’re doing, why exactly it’s working and what the component parts are before heading to dissemination,” she says.

The new motto for mindset science, then, seems to be this: tone down the hype and hone the details. Dweck and Yeager hope to build on their national study to learn more about what makes for a fertile learning environment and how to create supportive conditions elsewhere. “We have really good evidence that under the right conditions, you can lift a portion of that burden of the fixed mindset from students,” Yeager says. “That is a valid thing to be working on as a school. The treatment gives students a hypothesis about their own learning and what high school is like. It is up to us to create an environment in which that hypothesis is true.”

**Editor’s Note (8/12/19): This story was edited after posting. It originally described Jessica Schleider as a cognitive psychologist.*

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