New Research: Students Benefit from Learning That Intelligence Is Not Fixed

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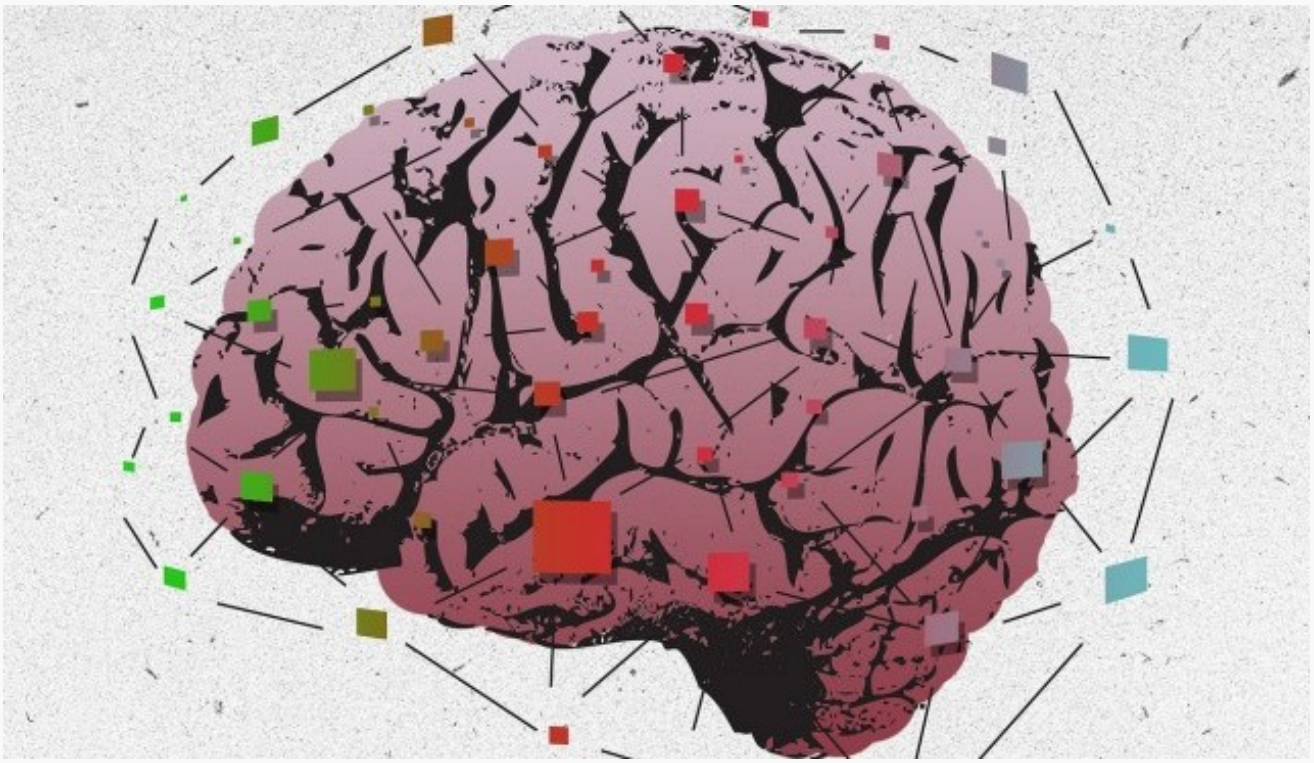

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Teaching students that intelligence can grow and blossom with effort – rather than being a fixed trait they're just born with – is gaining traction in progressive education circles. And new research from Stanford is helping to build the case that nurturing a "growth mindset" can help many kids understand their true potential.

The new research involves larger, more rigorous field trials that provide some of the first evidence that the social psychology strategy can be effective when implemented in schools on a wide scale. Even a one-time, 30-minute online intervention can spur academic gains for many students, particularly those with poor grades. The premise is that these positive effects can stick over years, leading for example to higher graduation rates; but long-term data is still needed to confirm that.

Earlier, well-designed tests of simple and relatively inexpensive growth-mindset interventions had surprisingly shown improvements in students' grades over weeks or months. For instance, promising results from one famous experiment – an eight-session workshop in 91 seventh graders in a New York City school – led psychology researchers Carol Dweck and Lisa Blackwell to start up Mindset Works, a company that offers a computer-based program called Brainology.

However, all the original intervention studies were small and left some educators and policymakers unconvinced. "Some folks, I think, are skeptical just because the effects are big and because they come from something that's so

small," said Stanford behavioral scientist David Paunesku. "And I think it's fair that extraordinary claims require extraordinary evidence." There were doubts, too, whether the classroom-based growth-mindset techniques would work if broadly put into practice without intensive training or supervision from the experts who developed them.

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To address those issues, Dweck, Paunesku and associates started the Stanford Project for Education Research That Scales (PERTS) with the goal of conducting large-scale randomized, controlled trials of distilled mindset interventions that were briefer and could be easily delivered by internet. The program, which is directed by Paunesku, collaborates with schools in testing various experimental psychology strategies for shifting the ways students think about their education, so as to motivate them to work hard.

A Light Touch Leads to Meaningful Change

In one intervention trial that was part of his Ph.D. dissertation, Paunesku worked with colleagues to enlist 1,594 students at 13 U.S. high schools, including 519 under-performing teens with the lowest GPAs. In spring semester 2012, the kids all logged online for a 30-minute, no-frills slideshow presentation (which they were only told was part of a general study of how and why students learn).

Half the group watched a lesson explaining the basic anatomy of the brain, but the other half received a growth-mindset "treatment": They read an article that described scientific research findings about the brain's malleability and explained that, just as people can get stronger by working out their muscles, anyone who works out their brain through learning can get smarter. The presentation also noted it could be helpful to try different studying strategies. Then, the teens were asked to summarize what they'd learned by composing a note of advice to a hypothetical struggling student.

For example, as one student wrote, "The more you practice or study the more you learn. Your brain has neurons inside that grow whenever you learn something new. Even though you may struggle in a certain subject the neurons in your brain are making new connections and your brain is getting stronger and smarter. … Struggling in school is absolutely normal and we may feel and call ourselves 'dumb' during these times. If you practice using better ways to study and learn you will get smarter and might struggle less."

By the end of spring term, encouraging changes were afoot, particularly in the students struggling with low GPAs: the proportion who earned satisfactory grades rose to 49 percent from 43 percent the previous semester, a relative gain of 14 percent. Students in the control condition, however, showed a slight downward slide. A 14 percent improvement might not sound like much, but it represents that many more kids who lifted themselves above poor or failing grades, Paunesku said. "Hopefully, that will put these kids on a different trajectory where they would be more likely to actually graduate high school," he said. Students who don't perform well early in the school year usually end up doing worse and worse and are at risk for dropping out.

Fostering other kinds of academic mindsets may help as well. The same study also tested a "sense-of-purpose" psychology intervention (in a separate 30-minute online session) designed to get the teens to link their schoolwork to a meaningful broader purpose – such as preparing for future goals that "make a positive impact on the world." That motivational strategy was roughly as effective as the growth-mindset training, Paunesku said. (Combining the two didn't add up to a bigger benefit.)

"The hypothesis would then be that later on, when the students take the AP classes or when they just encounter a more challenging concept or when they go off to college, that having these more adaptive academic mindsets will serve them well," he said. To determine whether that's true, the PERTS researchers would have to track the high schoolers' performance over longer time-frames; for instance, they'll be doing two-year follow-ups in some other growth-mindset studies targeting community college students. But such longitudinal work is difficult and costly.

Other not-yet-published, large-scale trials from PERTS and affiliated researchers such as University of Texas (UT) psychologist David Yeager are likewise finding modest boosts in achievement from growth-mindset messages tailored to other learners – ranging from students doing Khan Academy math problems online (who were exposed to single sentences such as, "If you make a mistake, it's an opportunity to get smarter!") to incoming UT Austin freshmen who log into a 30-minute online intervention.

Bringing Growth Mindsets into Schools

Designing online interventions that are quick is critical for wide-scale testing and uptake, Paunesku said, because schools might be hesitant to relinquish class time for them. The PERTS growth-mindset session is much shorter than Mindset Works' Brainology curriculum for middle students, which entails weekly lessons over five to 16 weeks and costs $20 per student for a group of 20 or more. Paunesku and his colleagues are now updating their no-frills interventions with a higher production quality and more engaging content. If further research confirms effectiveness and enough funding support is available, they'd like to make the materials freely accessible to schools, he said.

But Paunesku cautions that "academic mindset interventions are not magic bullets." There may be many reasons why half of the low-performing kids who received the growth-mindset lesson still failed to earn satisfactory grades. Some may not have found the online presentation persuasive enough, he said, if they grew up repeatedly hearing "fixed"-mindset attitudes – such as, "some people are just bad at math" – from parents and peers. And even if students adopt a more adaptive mindset, other obstacles may still loom: A child might have trouble focusing in class because he's hungry or anxious about being bullied, or he may not get enough support from his parents with homework.

Paunesku's high school study is valuable in showing how small changes can have a surprising impact, similar to effects seen in other previous studies of brief growth-mindset messages, said Blackwell, vice president at Mindset Works (which also collaborates with PERTS). However, not only is it not yet known how well the positive impacts of growth-mindset interventions are sustained in the longer term as students encounter more significant challenges and failures in the real world, she notes, but none of the methods work for everybody or do anything to change the classroom contexts in which kids learn.

That is why, Blackwell said, rather than approaching mindsets "solely as an isolated belief within an individual's psychology," Mindset Works has broadened its focus to "changing school and classroom cultures and providing individuals with the tools and strategies to sustain a growth mindset over time." The company rolled out an educator toolkit in 2012 to guide teachers and administrators in cultivating a growth mindset throughout a school.

Paunesku agrees that changing school culture is likely to be fruitful. To complement its half-hour online student interventions, PERTS plans to release an open set of growth-mindset professional development materials, starting with math teachers next year. "There's so much more good that could come if we could effectively communicate to teachers and train teachers how to do this in day-to-day classroom practices," he says.

Experimenting in the Trenches

For many teachers, the growth-mindset philosophy is appealing because it makes intuitive sense. At Cobleskill-Richmondville High School in rural upstate New York, assistant principal Casey Bardin has informally experimented with various academic mindset strategies inspired by work at Stanford, including tactics to bolster a sense of social belonging in disadvantaged students.

Last fall, he held one-on-one "goals meetings" with 70 pupils who were flunking three or more classes. Most lacked a support system at school, with no one to relate to there, he said. Bardin offered encouragement by explaining that intelligence grows with hard effort, and then suggested trying different studying tactics. One kid – an African-American in a predominantly white school – was failing math and four other subjects. After Bardin connected him with a senior

who could help him with math, the two teens worked together in study hall every day. By spring, the African-American student was passing all his classes.