



# Impact of a Growth Mindset Intervention on Key Predictors of Academic Success in a Nationally Representative Sample

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RESEARCH SUMMARY | SUMMER 2019

The National Study of Learning Mindsets (NSLM) is the largest-ever randomized controlled trial of a growth mindset program in the U.S. in K-12 settings. The study examined the effects of a brief online growth mindset program on students' grades in 9<sup>th</sup> grade and advanced course-taking in 10<sup>th</sup> grade. The NSLM focused on this critical transition to high school because adolescents' performance during this time is a predictor of their future educational attainment, financial success, health, and well-being.

The study combined a test for cause-and-effect (a randomized experiment) with a sample that enables claims about an entire population (a nationally representative probability sample), in this case the more than 12,000 regular public high schools in the U.S.<sup>1</sup> This sophisticated, highly unusual design enabled the study team to understand which kinds of students in which kinds of schools would benefit most from the short online program designed to foster a growth mindset.

An independent firm (ICF International) delivered the intervention and collected the data. The predictions and analyses were pre-registered according to scientific best practices to minimize potential sources of bias and enhance reproducibility. Additional details on the study design, sample, and intervention are available [here](#).<sup>2</sup>

During the 2015-16 school year, 9<sup>th</sup> grade students at the chosen schools were randomly assigned to complete either the growth mindset program or a control activity during two, 25-minute sessions. The carefully-crafted and extensively pilot-tested growth mindset activity vividly conveyed to students that intellectual abilities are not fixed but can be developed. Students were asked to reflect on ways to strengthen their brains by

## SUMMARY

An online growth mindset intervention had positive effects on key predictors of high school graduation and college success for 9<sup>th</sup> grade students in a large, nationally representative sample of U.S. public high schools.

persisting on challenges, and to describe how they could use a stronger brain to make a difference for things that matter to them, such as their family, community, or a social issue.

An article published in *Nature* in 2019 reported results from more than 12,000 students attending 65 schools in the NSLM that shared students' academic records with the study team.

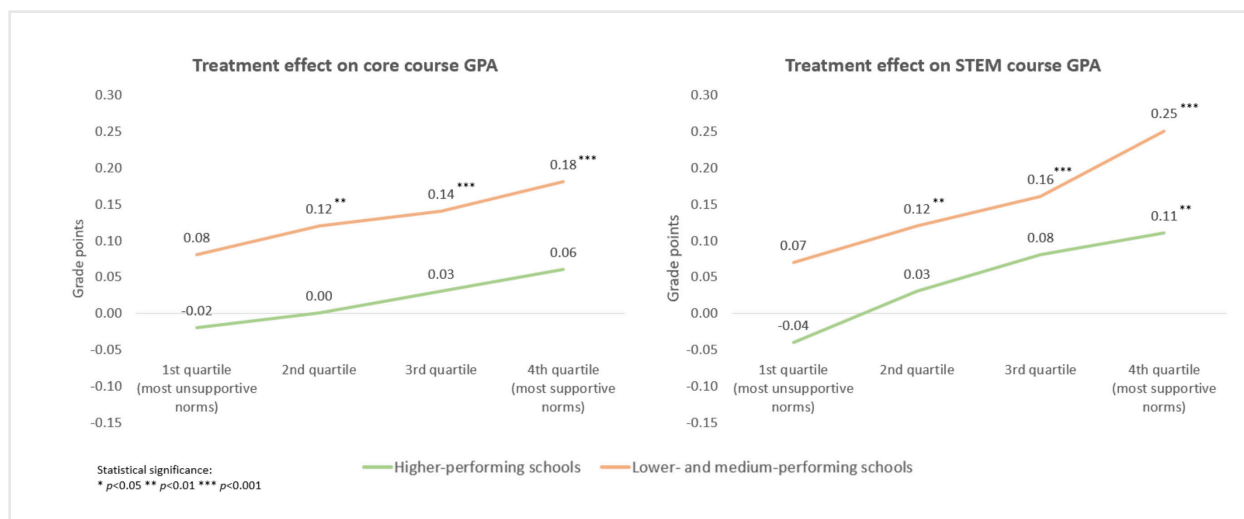
## KEY FINDINGS

**Positive effects on mindsets.** The intervention reduced the prevalence of self-reported fixed mindsets (the belief that intellectual ability cannot be developed), replicating multiple [earlier studies](#) conducted with smaller, convenience samples of students. The effects were consistent across all student subgroups.

**Positive effects on key academic predictors of high school graduation and college success.** The intervention had benefits for both lower- and higher-achieving students. It improved grades in core academic subjects (mathematics, English language

1. The NSLM included a national sample of 76 regular public high schools. The schools were selected using sophisticated sampling techniques so that the results of the study could be generalized to the more than 12,000 regular public high schools in the U.S. Schools that were excluded from the sampling frame include charter and private schools, schools with specialized missions or populations (e.g., 'suspension' schools or schools for people who are visually impaired), schools with fewer than 25 9<sup>th</sup> graders, and schools that do not have 9<sup>th</sup> grade as the lowest grade. These regular public high schools serve more than 80% of 9<sup>th</sup> grade students in the U.S.

2. None of the authors will benefit financially from the intervention because it will be given away at no cost.



**Figure 1.** Effects of the growth mindset intervention on 9<sup>th</sup> grade core course GPA and STEM course GPA as a function of school performance levels and the presence of peer norms supporting challenge-seeking

arts, science, and social studies) in 9<sup>th</sup> grade among previously lower-achieving students. It also increased enrollment in advanced mathematics courses in 10<sup>th</sup> grade among both higher- and lower-achieving students (this result was obtained in a sub-sample of 41 schools that shared 10<sup>th</sup> grade enrollment data).

**Positive effects on grades of lower-achieving students.**

For students whose grades were below the median in their school, the intervention improved their GPA in core courses by 0.10 grade points relative to similar students in the control condition. The intervention also reduced the proportion of these students with a D or F average in their core courses by over 5 percentage points. These effects are substantial when compared to the most successful large-scale, time-consuming, and rigorously evaluated interventions with adolescents in the educational research literature, and they are particularly notable given the low cost and time investment of the online program.

**Effects on grades were related to school factors.** Effects were larger in some types of schools and smaller in others. In medium- and lower-performing schools<sup>3</sup> in which the peer climate (the “norms”) supported the pursuit of challenging academic work, the intervention increased core course GPA by 0.15 points and STEM course GPA by 0.17 points on average among lower-achieving students. In these schools, the intervention also reduced the likelihood of D or F averages in core courses by 8 percentage points among these students. Again, these effects compare very favorably to those documented in rigorous experimental

studies of education interventions with adolescents (see Kraft 2018), many of which are time and cost intensive. Figure 1 shows the effects of the intervention on core course GPA and STEM course GPA as a function of school performance and peer norms present in the school climate.

**Positive effects on advanced mathematics course-taking were observed among both higher- and lower-achieving students.** The intervention increased students’ likelihood of taking Algebra II or higher in 10<sup>th</sup> grade by 3 percentage points, elevating advanced course-taking from a base rate of 33% to a rate of 36% (this result was obtained in a sub-sample of 41 schools that shared 10<sup>th</sup> grade enrollment data). In the highest performing quarter of schools, the intervention increased the likelihood of taking Algebra II or higher in 10<sup>th</sup> grade by 4 percentage points.

**IMPLICATIONS FOR PRACTICE AND POLICY**

Findings from the National Study of Learning Mindsets suggest that a carefully developed and tested but brief online growth mindset intervention can offer a way to improve key academic indicators and promote the pursuit of more challenging coursework as students make the critical transition to high school. That is, the intervention had policy-relevant effects on important predictors of high school and college success.

The results underscore that **brief, direct to student growth mindset interventions can be scalable and cost effective.**

3. Medium- and lower-performing schools represent the bottom 75% of schools nationally in terms of performance, as determined by combining several sources of data: within-state rankings based on test scores, average PSAT scores, and Advanced Placement (AP) test-taking data (including the proportion of students at the school who take AP tests and their test scores).

They also imply that the intervention's effects are shaped by the resources and learning opportunities present in the school environment, including the extent to which schools make challenging coursework available to students.

**Researchers are also vitally interested in understanding how educators can themselves cultivate growth-oriented cultures in their schools.** The NSLM results suggest that educators in all schools should pay particular attention to cultivating norms that value the pursuit of challenging schoolwork.

Many common practices in schools can convey to students that their abilities are fixed, from how educators grade and give feedback to how students are tracked and sorted. Moreover, students receive different messages about their ability depending on who they are and where they go to school. In ongoing and future research, scientists hope to identify the array of practices that promote a growth mindset and to develop programs that teach educators how to deploy them effectively. Such efforts will take us closer to understanding the full potential of mindset science to enrich and improve students' learning.

**This research summary highlights findings from the following article:** Yeager, D. S., Hanselman, P., Walton, G. M., Murray, J. S., Crosnoe, R., Muller, C., ... Dweck, C. S. (2019). A national experiment reveals where a growth mindset improves achievement. *Nature*. doi: 10.1038/s41586-019-1466-y

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## **MINDSET** SCHOLARS NETWORK

The Mindset Scholars Network is a group of leading social scientists dedicated to improving student outcomes and expanding educational opportunity by advancing our scientific understanding of students' mindsets about learning and school.