Why Does Growth Mindset Impact Achievement Differently Across Schools? Unpacking the Mediation Mechanism from a National Multisite Randomized Experiment

BY XU QIN

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The National Study of Learning Mindsets (NSLM) was designed to understand which kinds of students, in which kinds of classrooms and in which kinds of schools, are most likely to benefit from a short online program designed to foster a growth mindset during the transition to high school. Prior research has found that the program was particularly effective in improving lower-achieving students' grades, while the impact varied across schools.[1]

In this study, researchers investigated how the impact was generated by looking into its underlying mediation mechanism. In other words, they hypothesized that the growth mindset program may have improved students' grades by a) decreasing their beliefs that intelligence is innate and cannot change (i.e., fixed mindset) and b) increasing their challenge seeking behaviors. They further evaluated how the *mediation mechanism* varied across different types of schools, to understand which school contexts best positioned lower-achieving students to benefit from a growth mindset program and why.

Study Design

In the NSLM, a random sample of students was assigned to complete a brief online module, consisting of two 25-minute sessions, designed to foster a growth mindset. Students read and listened to materials describing scientific evidence about how the brain works and why people can grow their intellectual abilities over time. The program encouraged students to think about why they might want to grow their brain in order to make a difference on something that matters to them, such as their family, community, or a social issue they care about.

In this study, by applying a novel analytic method developed by Xu Qin and colleagues, the researchers investigated how the impact of the growth mindset program on 9th grade GPA was transmitted through students' fixed mindset beliefs and challenge seeking behaviors, as measured in the second session of the program, as well as how this effect varied across schools. Fixed mindset was measured by how much students agreed with three statements including, "Your intelligence is something about you that you can't change very much." Challenge seeking was measured by students' choice between an easy

Key Findings

- The growth mindset program used in the National Study of Learning Mindsets improved students' grade point average (GPA) in part by decreasing beliefs that intelligence is innate and cannot change (i.e., fixed mindset) and by increasing challenge seeking behavior.
- The program's effect varied across schools in ways that were connected to students' challenge seeking behavior.

Research Team

- **Early Career Fellow:** Xu Qin, University of Pittsburgh
- Alberto Guzman-Alvarez, University of Pittsburgh
- Ming-Te Wang, University of Pittsburgh
- Stephanie Wormington, Center for Creative Leadership

Areas of expertise: Quantitative methods, motivation, educational psychology

Sample

This study leverages data from the National Study of Learning Mindsets (NSLM), the largest-ever randomized controlled trial of a growth mindset program in the U.S. in K-12 settings, in which a brief online growth mindset program was administered to 9th grade students during the 2015-2016 academic year. The NSLM features a nationally representative probability sample of regular U.S. public high schools. Additional information about the NSLM sample of schools and students can be accessed here. In this study, the researchers focus on lower-achieving students, defined as those whose GPAs were no more than the school median prior to random assignment. The sample includes approximately 6,260 students in 65 schools.

MINDSET SCHOLARS NETWORK

The National Study of Learning Mindsets Early Career Fellowship is a project of the Mindset Scholars Network and the University of Texas at Austin Population Research Center. 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. The University of Texas at Austin Population Research Center aims to provide outstanding infrastructure resources and sustain a dynamic interdisciplinary culture geared toward facilitating the highest level of population-related research among its faculty members and graduate and undergraduate trainees.

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This snapshot was published at the close of the National Study of Learning Mindsets Early Career Fellowship and captures in-progress work.

mathematics assignment, in which they were more likely to get most problems right but not learn new things, and a difficult mathematics assignment, in which they were more likely to get more problems wrong but learn something new.

The schools that participated in the NSLM were selected through a probability sampling procedure.[2] To ensure that the results of the present study were generalizable to the entire population of regular public high schools in the U.S., the researchers employed a sample weight to adjust for sample and survey designs and a nonresponse weight to account for nonresponse. The latter is designed to safeguard against, for example, a situation in which only highly engaged students responded to the survey, therefore skewing the study results so that they only apply to highly engaged students.

To enhance causal interpretations of the results (in other words, to identify how the *causal effect* of the growth mindset program on 9th grade GPA was transmitted through fixed mindset and challenge seeking), the researchers controlled for several factors that may confound the relationship between fixed mindset and 9th grade GPA or the relationship between challenge seeking and 9th grade GPA, including gender, race/ethnicity, age, maternal education, and 8th grade GPA. They also conducted a sensitivity analysis, to evaluate whether a potential unmeasured confounder would easily alter the study's conclusions.

Key Findings

The growth mindset program improved students' GPA in part by decreasing beliefs that intelligence is innate and cannot change (i.e., fixed mindset) and increasing challenge seeking behavior.
The growth mindset program significantly improved lower-achieving students' 9th grade GPA. Our analysis reveals that over one quarter of the program impact was transmitted through students' decreased fixed mindset beliefs and increased challenge seeking behavior.

The program's effect varied across schools in ways that were connected to students' challenge seeking behavior.
The growth mindset program heterogeneously influenced lower-achieving students' GPA across schools, partly because challenge seeking behavior played different mediating roles in the underlying mechanism of the growth mindset program's effect across schools. In particular, its role tended to be stronger among medium-achieving schools than among lowest- and highest-achieving schools.

Insights and Future Directions

This study evaluates the between-school variation in the causal mechanisms of the growth mindset program's impact, continuing a conversation that has already begun in the NSLM literature about heterogeneity in growth mindset program treatment effects.

The findings support the idea that, learning that one's intellectual abilities can grow over time, lower-achieving students who participated in the growth mindset program had stronger belief in their ability to change their intelligence and became more willing to face intellectual challenges, compared to those who did not participate in the program. The differences in impact across schools may suggest that 1) in lowest-achieving schools, a lack of resources or a lack of peer norms that support challenge seeking may render it difficult for a growth mindset program to stimulate lower-achieving students' desire to seek challenges; and 2) in highest-achieving schools, which more often have plentiful resources and many high-achieving students, a growth mindset program does not add much to motivating lower-achieving students' challenge seeking behavior.

Understanding *whether* the growth mindset program was effective in different school settings and *why* is important because it has important implications for designing programs that not only stimulate students' mindset growth but also enhance school environments that support students' learning. The researchers will further develop advanced statistical methods to improve estimation efficiency.

References

[1] Yeager et al., 2019
[2] Tipton et al., 2016

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