



# Mindsets and the Learning Environment: A Neurobiological Investigation of the Relationship between Early Adverse Experiences and Growth Mindset among Children

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RESEARCH SNAPSHOT | MAY 2019

Early childhood adversity has been linked to a range of negative developmental outcomes, including poor academic performance and school dropout,<sup>1</sup> and studies indicate that up to one-half of U.S. children will experience some form of adversity by the time they reach adulthood.<sup>2</sup> Still, wide variation exists in both the nature of these experiences, and in how they influence children.<sup>3</sup>

In this project, the researchers compared two groups of children with different levels of exposure to caregiving-related adversity. One group was recruited based on increased risk for caregiving-related adversity exposure through early experiences of institutional care, foster care, significant parental separations, or previous contact with child protective services. The researchers explored whether and how children's beliefs about their ability to learn might have a buffering effect against the negative academic effects that are commonly associated with adverse experiences.

## STUDY DESIGN

Children completed exercises that assessed the degree to which they hold a fixed mindset (the belief that intelligence and ability are set in stone) or a growth mindset (the belief that intelligence and ability can be developed). They also completed a battery of measures on vocabulary, matrix reasoning, reading, and numerical operations to obtain measures of cognitive performance. Finally, they completed neurocognitive testing to assess cognitive control (e.g., self-regulation). Parents were interviewed about their children's caregiving history and completed a mindset measure.

To evaluate fixed mindset among young children, the team needed to develop a new tool to assess beliefs about whether ability is fixed or malleable, because existing tools were not recommended for use with children under ten. The researchers used a measure of growth mindset developed by Carol Dweck and adapted it by writing child-friendly vignettes about characters who are working on mathematics, spelling, and drawing. Three characters start out lacking an ability and then work hard to acquire it, while three other characters start out very skilled but do not have an opportunity to

## KEY FINDINGS

- The researchers developed and validated a new measure of fixed mindset appropriate for research with children ages four to ten.
- While children's mindsets were not associated with their history of early caregiving-related adversity, evidence suggests that holding a growth mindset could help to mitigate the negative academic impacts of adversity. Children with growth mindsets, regardless of their exposure to adversity, scored higher on measures of cognitive performance and control.
- Parents' failure mindsets were also positively associated with children's cognitive control.

## RESEARCH TEAM

- [Andrei Cimpian](#) (Co-PI), New York University
- Nim Tottenham (Co-PI), Columbia University
- Kali Trzesniewski, University of California, Davis

*Areas of Expertise:* Sociology, Educational Evaluation and Policy, Economics

## SAMPLE

The sample included 249 six- to 12-year-old children (48% male and 52% female) who are part of a five-year, federally-funded longitudinal study in Nim Tottenham's lab, as well as their parents. 144 children had experienced early caregiving-related adversity. The sample also included a comparison group of 105 children who had never experienced significant caregiving-related adversity.

## 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.

practice their skill. Children were asked whether they thought the characters' abilities would change based on their situations, and the researchers rated their fixed mindset accordingly.

Parents' mindset about ability to learn was assessed by asking them to rate their agreement with statements like, "No matter how much intelligence you have, you can always change it quite a bit," and their failure mindset (which indicates the extent to which people see failure as a learning opportunity or as something to be avoided) was assessed by asking them to rate their agreement with statements like, "Experiencing failure facilitates learning and growth."

## KEY FINDINGS

***The researchers developed and validated a new measure of fixed mindset appropriate for research with children ages four to ten.***

The research team validated this measure by testing the same children twice, with four weeks between, to ensure that results were consistent. They also confirmed that higher growth mindset scores correlated with existing behavioral measures that are associated with growth mindset.

Overall, they saw wide variety in children's scores, with most scores landing below the mean for fixed mindset. In other words, most scores landed on the growth mindset-oriented side of the scale.

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When the research team compared the group of children that had experienced early caregiving-related adversity to the group that had not, they did not find any group-based differences in mindsets. This lack of association held true when the researchers grouped children who had faced similar types and quantities of adverse experiences, suggesting that mindsets may not be affected by early caregiving-related adversity when those beliefs are measured in early to middle childhood.

There was, however, a positive relationship between growth mindset and cognitive performance and control. Children's responses indicating that they viewed skills and ability as malleable were associated with higher

performance on vocabulary, matrix reasoning, and reading tests. They were also associated with higher cognitive control. In other words, children who held a growth mindset were better able to ignore distracting information, inhibit impulsive behavior, and focus on tasks. These relationships held true even after controlling for children's estimated IQ.

***Parents' failure mindsets were positively associated with children's cognitive control.***

As with children's mindsets, the researchers did not find any differences in parents' mindsets based on their children's exposure to early caregiving-related adversity. There was also no relationship observed between children's and parent's mindsets.

The researchers found that when parents held adaptive failure mindsets (that is, they were more likely to recognize failure as an opportunity for learning and growth) there was a positive association with certain aspects of children's cognitive control.

## INSIGHTS & FUTURE DIRECTIONS

The results of this study and related lines of inquiry could ultimately have the potential to aid in efforts to create more supportive learning environments and improved outcomes for children. Prior research has shown that adaptive learning mindsets can be a protective factor for students whose families are facing economic disadvantage<sup>4</sup> and for students who are experiencing academic difficulty.<sup>5</sup> It follows that there may be a similar buffering effect for students who have experienced adversity.

Further, the current project is part of a five-year longitudinal study that will continue developmental neuroscience research with the children in this sample. This neuroscientific assessment is an important addition to the field of mindset science and our understanding of the development of learning mindsets. Many neural bases of academic performance (e.g., dorsolateral prefrontal cortex, parietal cortex, basal ganglia) remain malleable into late adolescence, suggesting that positive social influences experienced even after early adversities can have a powerful impact on students' academic trajectories.

### References

1. [Shonkoff et al., 2012](#)
2. [Felitti et al \(1998\); Finkelhor, Ormrod, & Turner \(2009\)](#).
3. [Gee et al., 2013; Masten et al., 1990; Tottenham, 2012](#)
4. [Claro et al., 2016](#)
5. [Paunesku et al., 2015](#)

## ABOUT THE MINDSETS & THE LEARNING ENVIRONMENT INITIATIVE

The Mindset Scholars Network launched a new interdisciplinary initiative in Fall 2016 to explore how learning environments shape the mindsets students develop about learning and school. The project's aim is to generate scientific evidence about how educators, school systems, and structures can convey messages to students that they belong and are valued at school, that their intellectual abilities can be developed, and that what they are doing in school matters.

Fourteen projects were awarded over two rounds of this initiative. Funding for the initiative was generously provided by the Bill & Melinda Gates Foundation, Joyce Foundation, Overdeck Family Foundation, and Raikes Foundation.