



# Mindsets and the Learning Environment: Relationships Between Mindsets and Academic Outcomes in a Statewide System of Higher Education

BY JESS HENNESSEY

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Previous research has found that learning mindsets may play a particularly important role as students navigate challenging academic transitions, such as the move from high school to postsecondary education. However, less is known about why this relationship exists. How might students' initial beliefs about growth mindset, belonging, and the value of school relate to important indicators of academic success? Are these learning mindsets more impactful for some students than others, and might they function differently depending on the college learning environment?

This project, led by Chris Hulleman and Stephanie Wormington, explored whether students' learning mindsets as they enter college are related to their academic success during the first two years of school. They collected data at both public 2-year community colleges and public 4-year institutions across the state of Tennessee. They also explored whether the relationship between these learning mindsets and academic outcomes differed depending on students' background characteristics and school-level characteristics (see Table 1).

The research team chose to look at differences across these characteristics for two main reasons. First, they wanted to understand whether there are specific learning mindsets that are higher leverage for certain groups of students or in particular learning environments, or whether these relationships held constant across populations and settings. Second, these findings could be useful in identifying promising mindset interventions that colleges could implement in the field.

## STUDY DESIGN

Almost 6,000 first-time, first-year college students were recruited from 13 community colleges and six 4-year institutions across Tennessee.

During the first weeks of the school year, participants completed a survey on their thoughts and beliefs about school, including measures of growth mindset, belonging, and value of college for their future career. The researchers tracked the relationship between these thoughts and beliefs on the one hand, and several indicators of academic success on the other hand. The academic indicators included overall grade point average (GPA), likelihood of remaining enrolled in school (i.e., retention), and the ratio of earned-to-attempted credit hours.

## KEY FINDINGS

- Students who reported a stronger sense of belonging at the beginning of college had higher grade point averages (GPAs), were more likely to remain enrolled, and earned more credits than their peers
- On average, students in this study's sample were lower achieving according to national metrics. As the students progressed through their postsecondary education, initial feelings of belonging were stronger predictors of second and third semester outcomes for students with greater incoming advantage relative to their peers in the sample (e.g., continuing versus first generation; above versus below the sample average on incoming achievement)
- Students attending a 4-year college reported higher levels of growth mindset, belonging, and value for future careers than students attending 2-year college
- Students' learning mindsets and academic outcomes did not vary depending on their enrollment in learning support courses or based on the specific institution they attended

## SAMPLE

The data included 5,981 first-time, first-year college students in Tennessee, across 19 institutions, who either attended community college and took at least one co-requisite class (i.e., a credit-granting support course for students below college-level in mathematics, English, and/or reading) or who attended 4-year college. About 75% of the sample attended community college and about 25% attended 4-year college. Their average composite ACT score was around 17 (compared to a national average of 20). The sample encompassed students from diverse backgrounds, with 62% female, 61% White, 25% Black/African American, 6.5% Latinx, and 67% first-generation college students.

Participants completed surveys on growth mindset, belonging, and perceived value of school to their future career in the first few weeks of fall semester. The researchers also measured student- and school-level characteristics (see Table 1).

**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.

Indicators were captured during each fall and spring semester so that researchers could examine relationships between belonging and academic indicators at discrete timepoints (e.g., GPA in semester 2) as well as cumulatively (e.g., cumulative GPA for semesters 1 and 2) over students' first two years of college.

**TABLE 1. STUDENT- AND SCHOOL-LEVEL CHARACTERISTICS MEASURED**

Factor Level	Features Measured
Student	Gender, race/ethnicity, first-generation status, ACT score
School	Type of institution (2-year or 4-year), gender composition, racial/ethnic composition, rural student composition, percentage of Pell-eligible students, student-to-instructor ratio

## KEY FINDINGS

***Students who reported a stronger sense of belonging at the beginning of college had higher GPAs, were more likely to remain in enrolled, and earned more credits than their peers***

Students' sense of belonging was one of the strongest predictors of retention, along with prior academic achievement (as measured by ACT composite scores).

***As students progressed through their postsecondary education, belonging was more important for continuing generation students and comparatively higher achieving students***

In year 1, belonging was equally important for all students regardless of student characteristics. Belonging continued to be positively related to academic outcomes in year 2 for continuing-generation students, while belonging became unrelated or weakly related to outcomes in year 2 for first-generation college students. Belonging was also a stronger predictor of academic outcomes for students with comparatively higher composite ACT scores than students with comparatively low composite ACT scores, though it should be noted that the average ACT score for both groups in this particular sample was relatively low. These group differences emerged only when looking at second-year outcomes, highlighting the importance of tracking these students over time rather than only as they transition to college.

***Students who were attending a 4-year college reported higher levels of growth mindset, belonging, and value than students attending a 2-year college***

On average, self-reports of learning mindsets differed by the type of institution (4-year college vs. 2-year community college), even when controlling for prior achievement; this difference was more pronounced for certain groups of students. For example, continuing-generation male and White students at community colleges tended to report lower belonging than their counterparts at 4-year universities. The difference in belonging between first-generation, female, and Latinx students at community colleges and 4-year universities was less stark.

## RESEARCH TEAM

- [Christopher Hulleman](#) (PI), University of Virginia
- Stephanie Wormington (Co-PI), University of Virginia
- [Ronald Ferguson](#), Harvard University
- Michelle Francis, University of Virginia
- Yoi Tibbetts, University of Virginia
- [Elizabeth Tipton](#), Northwestern University
- [Timothy Wilson](#), University of Virginia

*Areas of Expertise:* Psychology, Statistics, Education, Field Interventions

***Students' learning mindsets and academic outcomes did not vary depending on their enrollment in learning support courses or based on the specific institution they attended***

A key focus of this project was to explore how learning environments, including the institutions students attended and learning support courses (i.e., co-requisite courses) in which they were enrolled predicted their outcomes. However, initial findings suggested that the courses students enrolled in and the individual academic institution that they attended were not related to their learning mindsets or academic outcomes. In other words, there was greater variation in students' learning mindsets and academic outcomes within individual institutions than between institutions.

## INSIGHTS & FUTURE DIRECTIONS

This research is valuable for shedding light on how learning mindsets may play a particularly important role as students navigate challenging academic transitions. So far, this research suggests that a student's sense of belonging matters for GPA and persistence at both 2-year and 4-year colleges. The use of a statewide higher education sample allowed the team to observe these trends for a wide range of students with differing backgrounds and experiences in diverse institutional settings. This means that colleges could potentially improve students' GPAs and retention by intervening on belonging and that these positive effects could be beneficial for students in a variety of contexts.

The project also begins to explore how students may have different psychological experiences of college, suggesting the need for the development of nuanced interventions that are attuned to the differing needs groups of students may have. In their next steps, the researchers will continue to explore how context may influence outcomes; for instance, students pursuing different majors or enrolled in different college-level courses may differ meaningfully from each other. The researchers will also consider findings for students enrolled in technical colleges, which present a different educational model from 2-year and 4-year colleges.

The researchers are continuing to partner with Tennessee to collect new data, including additional longitudinal data on participating students' academic outcomes. Based on these initial findings, they have expanded survey items to capture a wider array of learning mindsets, including different

aspects of belonging and other learning mindsets in different contexts (e.g., math, English). They have also established a partnership with the University System of Georgia, the fifth largest university system in the United States to expand their research beyond Tennessee. They have presented findings to stakeholders in both systems, and are using findings to create data-driven suggestions for direct-to-student interventions, pedagogical changes, and policy.

The research team plans to use their work to develop interventions that are customized for the student population and educational context. Guided by design-based principles, they will test interventions using an iterative process to refine them for various educational settings and student populations. They are also working with faculty and staff at postsecondary institutions and policymakers to share their research and provide trainings on how to create educational spaces that foster adaptive learning mindsets.

### 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.