



Mindsets and the Learning Environment: Understanding the Impact of “Psychologically Wise” Classroom Practices on Student Achievement

BY JESS HENNESSEY

RESEARCH SNAPSHOT | SUMMER 2018

An ideal learning environment develops students’ feelings of competence, connectedness, and purpose. When these conditions are met, students are more likely to choose challenging tasks, persist in the face of difficulty, learn more deeply, and achieve at higher levels.¹

Within this project, the researchers examined how teachers create these kinds of classrooms through their verbal messaging. In particular, the researchers were interested in taking a magnifying glass to the classroom to see how teachers weave messages of growth, belonging, purpose, and affirmation (or their opposite) into their day-to-day practice, as well as whether creating learning environments that may support adaptive learning mindsets through these verbal messages is related to teachers’ ability to promote gains in students’ math achievement.

STUDY DESIGN

The researchers leveraged prior empirical work to focus on an important yet understudied topic: how teachers create cultures of growth and other adaptive learning mindsets in their classroom. While a single intervention can have positive effects, a teacher who embeds inclusive messages of growth and potential into their daily practices should have larger and more consistent benefits.

The research team used middle school math classrooms as their sample because student perceptions of teacher support generally deteriorate during this time, particularly in math classrooms, as mistrust grows between students and school adults.^{2,3}

Within this study, the team analyzed 20 videos of middle school math classrooms from the Measures of Effective Teaching (MET) dataset. The research team developed a literature-based coding scheme to identify teacher-generated messages along four psychological dimensions—growth, belonging, purpose, and affirmation (see Table 1).

Using insights from the literature and outside experts, the team developed a preliminary list of teacher actions that should promote learning mindsets (such as process praise), along with a list of teacher actions that could potentially undermine learning mindsets (such as ability praise). The

KEY FINDINGS

- Observational tools were important for understanding how teachers shaped the psychological experiences of students in their classrooms in ways that mattered for student achievement
- In-depth video analysis of middle school math classrooms revealed that teachers who conveyed messages of growth, belonging, purpose, and affirmation saw greater gains in their students’ standardized math test scores than did other teachers
- The measure of psychologically wise teaching correlated with other established classroom inventories but explained additional variance in students’ growth in test scores
- Students with higher incoming achievement received more psychologically wise messages than students with lower incoming achievement

RESEARCH TEAM

- [Geoffrey Cohen](#) (PI), Stanford University
- Tanner LeBaron Wallace (Co-PI), University of Pittsburgh
- [Ronald Ferguson](#), Harvard University
- Qiana Lachaud, University of Pittsburgh
- Hannah Sung, University of Pittsburgh

Areas of Expertise: Psychology, Education, Observational Methods, and Policy

messages that promoted learning mindsets were labeled as psychologically “wise” messages, while those that could undermine them were labeled as psychologically “inattentive” messages.

The researchers then used a sophisticated coding scheme they developed to calculate a value for the overall psychological wisdom conveyed by the teacher in each classroom. This score was created by observing the frequencies of each type of message teachers conveyed to students during the observational period.

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.

TABLE 1. EXAMPLES AND DESCRIPTIVE FEATURES OF WISE AND INATTENTIVE TEACHER PRACTICES

<i>Message Category</i>	<i>Descriptive Features</i>	<i>Classroom Example</i>
Growth wise	<ul style="list-style-type: none"> Multiple solution paths welcomed and encouraged Mistakes understood as valuable learning opportunities 	<ul style="list-style-type: none"> Teacher slows students down and says she wants “good explanations,” seeming to want to provide more challenge and to focus on process rather than quick, effortless answers as well as to encourage broader participation in the lesson.
Growth inattentive	<ul style="list-style-type: none"> Goals framed as obtaining a correct answer Public assessments made about difficulty level 	<ul style="list-style-type: none"> Teacher has students use white boards to report answers to practice problems. When all students hold up the correct answer, teacher says, “Good, everybody came to a consensus,” seeming to suggest that the important goal is getting to the correct answer quickly.
Belonging wise	<ul style="list-style-type: none"> Classmates and teacher positioned on same team Shared humanity recognized 	<ul style="list-style-type: none"> When a student tries to ask an individual question, the teacher stops the student and says, “Check in with your table first,” seeming to suggest peers are resources for learning. Teacher then says if the “table has a question, raise their hand so I can check it,” seeming to suggest the question should come from the collective rather than the individual.
Belonging inattentive	<ul style="list-style-type: none"> Students positioned as on their own Increased probability for public embarrassment 	<ul style="list-style-type: none"> While students are talking, teacher says, “Excuse me, my time. Excuse me, it’s my time,” seeming to suggest a ‘teacher versus student’ attitude, and only what the teacher needs or wants really matters.
Affirmation wise	<ul style="list-style-type: none"> Students feel supported and valued Student contributions encouraged 	<ul style="list-style-type: none"> Teacher has a private word with a student who has his head down and seems to be ill; teacher starts by asking, “What’s going on?” after which the teacher allows the student to leave the classroom to go get a drink of water, seeming to suggest a respect for student’s basic needs for respect and dignity.
Affirmation inattentive	<ul style="list-style-type: none"> Lack of transparency displayed Students ‘othered’ 	<ul style="list-style-type: none"> When a student says he left his notebook in another classroom, the teacher responds, “Not today. That’s two days in a row you would have had to leave to get something. Not today,” seeming to suggest that she does not trust the student and that she is keeping track of when students do things that do not earn her approval.
Purpose wise	<ul style="list-style-type: none"> Lesson or task connected to bigger picture or real life 	<ul style="list-style-type: none"> Teacher reads aloud a box in the textbook that states, “When will I use this?” seeming to suggest it is worth taking some instructional time in the lesson to highlight why what students are learning may be useful.
Purpose inattentive	<ul style="list-style-type: none"> Academic goals framed as test prep goal without context Practice framed as not meaningful 	<ul style="list-style-type: none"> During a review session, a teacher says, “This is what tests are going to do. They are going to make it look like it’s not correct,” seeming to suggest to students that they should remember this problem because they will encounter it again on a test indicating a goal of test preparation.

KEY FINDINGS

Observational tools were important for understanding how teachers shaped the psychological experiences of students in their classrooms in ways that mattered for student achievement

In using the videos, the research team was able to get clear insight into real-time teacher actions that influence students' psychological experiences at school.

In-depth video analysis of classrooms revealed that teachers who conveyed messages of growth, belonging, purpose, and affirmation saw greater gains in their students' standardized math test scores than did other teachers

These psychologically wise teaching practices predicted roughly 29% of the variance in student growth, exceeding the predictive power of established classroom inventories (e.g., the Classroom Assessment Scoring System) measuring the quality of classroom instruction and emotional climate. When considered simultaneously, psychologically wise teaching and the quality of the mathematical content instruction explained one-third of the variability in students' growth in standardized math test scores.

The measure of psychologically wise teaching correlated with other established classroom inventories but explained additional variance in students' growth in test scores

The psychologically wise teaching measure developed in this study correlated with the Danielson Framework for Teaching: Creating an Environment of Respect and Rapport, as well as the Classroom Assessment Scoring System (CLASS): Emotional Support, ($r = .59, .52$, respectively) yet it still explained variance in student growth in standardized math test scores on top of these measures.

Students with higher incoming achievement received more psychologically wise messages than students with lower incoming achievement

There was a significant relationship between students' prior achievement entering the classroom and the psychological messages they received from teachers, $t(18) = 2.99, p < .001$, with higher prior achieving students receiving more psychologically wise messages than lower prior achieving students. This relationship was not significant for psychologically inattentive messages.

INSIGHTS & FUTURE DIRECTIONS

The use of the MET data expanded the mindset measurement toolkit by coding and analyzing videos of middle school math classrooms, offering insights into teacher actions that would not be possible through survey instruments alone. This methodology allowed the researchers to shine a light into the "black box" of effective teaching.

Teachers play a key role in creating psychologically supportive environments for students and this study offers a first look at the relationships between specific teacher actions that either encourage or undermine messages of growth, belonging, purpose, and affirmation and how these messages relate to

SAMPLE

Videos of 20 middle school math classrooms came from the [Measures of Effective Teaching \(MET\) dataset](#), the largest and most comprehensive dataset linking student psychological variables and classroom instructional practice to student achievement. The sampled classrooms were all from a single district. The researchers restricted the sample to class sections with racial diversity by dropping class sections outside the interquartile range (i.e., below the 25th and above the 75th percentile) for percentage of students of color in the class.

For the first 20 minutes of each video, the research team identified when teachers conveyed the following psychologically "wise" messages: that students' intelligence can grow (growth mindset), that students belong in the academic classroom (belonging), that the work students engage in matters (purpose), and confirmation that students can adequately meet the demands of their classroom (affirmation). They also identified when teachers conveyed psychologically inattentive messages, such as the idea that intelligence is a fixed trait or when teachers used extrinsic rewards to motivate students.

students' academic achievement.

The study also suggests that classrooms are multifaceted spaces with countless interactions between students and teachers throughout the day. This adds a layer of complexity to the understanding of classroom dynamics and creates a need for further research to be mindful of instructional, institutional, and societal contextual layers that may influence these interactions and perceptions.

While this initial study examined a small sample of classrooms to establish the coding plan and to observe initial trends, future research could expand the coding system to a larger group of classrooms within the MET dataset and explore whether psychologically wise teaching scores predict students' self-reported learning mindsets.

Additionally, the researchers plan to explore how these teacher messages may differentially influence certain groups of students. Because the decline in trust between teachers and students tends to be steeper for students of color as they contend with the reality of racial bias, discrimination, and stereotyping,^{4,5,6} teacher support may be especially important for cultivating growth and learning among members of historically marginalized groups.^{7,8} These studies would require new data sources focused on student perceptions of particular instructional interactions.

References

1. Wigfield, A., Eccles, J. S., Roeser, R. W., & Schiefele, U. (2008). Development of achievement motivation. *Child and Adolescent Development: An Advanced Course*, 406-434.
2. Urdan, T., & Schoenfelder, E. (2006). Classroom effects on student motivation: Goal structures, social relationships, and competence beliefs. *Journal of School Psychology*, 44(5), 331-349.
3. Yeager, D. S., Purdie-Vaughns, V., Hooper, S. Y., & Cohen, G. L. (2017). Loss of institutional trust among racial and ethnic minority adolescents: A consequence of procedural injustice and a cause of life-span outcomes. *Child Development*, 88(2), 658-676.
4. McKown, C., & Weinstein, R. S. (2003). The development and consequences of stereotype consciousness in middle childhood. *Child Development*, 74(2), 498-515.
5. Toshalis, E., & Nakkula, M. J. (2013). Prioritizing motivation and engagement. *Anytime, Anywhere Student-Centered Learning for Schools and Teachers*.

6. [Okonofua, J. A., Walton, G. M., & Eberhardt, J. L. \(2016\). A vicious cycle: A social-psychological account of extreme racial disparities in school discipline. *Perspectives on Psychological Science*, 11\(3\), 381-398.](#)
7. [McHugh, R. M., Horner, C. G., Colditz, J. B., & Wallace, T. L. \(2013\). Bridges and barriers: Adolescent perceptions of student–teacher relationships. *Urban Education*, 48\(1\), 9-43.](#)
8. [Wallace, T. L., & Chhuon, V. \(2014\). Proximal processes in urban classrooms: Engagement and disaffection in urban youth of color. *American Educational Research Journal*, 51\(5\), 937-973.](#)

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.