



Making a Classroom a Community: Research on Middle School Belonging

In partnership with the Madison Metropolitan School District (MMSD), the [Madison Education Partnership](#) (MEP) sought to understand how classroom belonging reflects and shapes student learning. We designed and conducted the *Making a Classroom a Community* project, supported by a grant from the Student Experience Research Network.¹ This project advances cutting-edge scientific knowledge about the role of belonging in helping students respond to educational adversity and embrace positive beliefs about their capability to succeed in school.

What motivated this project?

Researchers have established that students' sense of belonging in school is both an important reflection of forces that shape their educational careers and a key determinant of their educational investments and success. In reflection of this, each year the MMSD School Climate Survey asks students to report on their sense of belonging in school. But questions about *school*/belonging may overlook important differences in *classroom* belonging. Classrooms present distinct social contexts in which students experience varying degrees of belonging. A positive overall sense of belonging at school may, for example, mask a student's sense of isolation and alienation in a specific course such as mathematics.

What did we learn?

We surveyed students on their general sense of belonging at school, as well as their belonging in their specific math and English language arts classrooms. We also asked math teachers to complete a companion survey designed to reveal how teachers' mindsets are related to student sense of belonging, academic identity, and student success. We found:

1. **Although the two are closely related, classroom belonging is distinct from school belonging.** Students can experience a low sense of overall school belonging but high classroom belonging and vice versa.
2. **Teachers who express a greater sense of efficacy with respect to math are teachers whose students, on average, express greater levels of math classroom belonging,** adjusted for their own attributes and prior year achievement in math.
3. **Classroom belonging did not systematically differ across racial/ethnic groups, nor by gender.**

Details on the above findings are presented at the end of the report.

¹ The Student Experience Research Network ([SERN](#)) of leading psychologists, sociologists, and education researchers focused on examining how students' identity, beliefs, and attitudes pertaining to schooling affect their educational trajectories. The research reported here was supported by a grant from the SERN. Opinions expressed do not represent the views of the Network.

These learnings suggest that as teachers and administrators strive to promote greater belonging, whole-school interventions may not be enough. We need to consider what happens inside the classroom as well – the things teachers do to make their classrooms into communities. The evidence presented in this report shows teachers matter; their beliefs contribute to how students experience their classrooms.

What data did we gather and how did we analyze it?

MMSD administered the MEP *Making a Classroom a Community* digital student survey from Monday, January 27, to Friday, February 14, 2020. Where possible, we drew items for the survey from existing surveys, including MMSD’s climate surveys, the U.S. Department of Education’s [High School Longitudinal Study](#) and the University of Chicago Consortium on School Research’s [Becoming Effective Learners Survey](#) (student and teacher versions). MEP developed the survey in consultation with substantive experts including Principal Investigator, Patti Schaefer (MMSD) and consultants, Mesmin Destin (Northwestern University), Jessica Calarco (Indiana University), and Jaymes Pyne (Stanford University). We also got methodological advice from the University of Wisconsin-Madison Survey Center. The survey sought to measure several aspects of students and teacher beliefs and practices, including:

Within the 5 MMSD middle schools participating, we surveyed:

- 1,887 students (83% response rate)
- 60 teachers (70% response rate)

Students	Math teachers
School belonging	School belonging
Classroom belonging in math & ELA classes	Relational trust (with other teachers, principal)
Confidence as a learner	Growth vs. fixed mindset for students
Fixed vs. growth mindset	Beliefs about learning for diverse learners
	Confidence in skill as a math teacher
	Hypothetical responses to student behavior (i.e., failure to complete homework, poor performance on an assessment)

*Note: links to the surveys are in the first row of the table above.

Prior to administration, research team members met with school-site leaders (typically, math instructional coaches) to explain the goals of the survey, ensure plans were in place to administer it during math period, and answer questions. All middle school students (grades 6-8) at four schools and 6th grade students at one school could participate in the survey during their math periods. We asked these students’ teachers to complete the survey outside of their contract hours and were provided with a modest cash incentive for completion.

MEP researchers analyzed student and teacher survey responses to identify factors associated with higher and lower senses of classroom belonging. We looked at how the experience of classroom belonging varied among students in the same class and between classes to understand the extent to which classroom belonging is explained by students' characteristics in comparison with classroom characteristics.

What do we plan to do next?

We plan to extend this work to further understand classroom belonging and the role of teachers.

Future analyses include:

1. Investigating associations between teacher practice, student classroom belonging and student learning.
2. Evaluating the relationships between teachers' beliefs about how student experiences of educational adversity shape their learning styles relate to student outcomes.
3. Analysis of how teachers may respond to different types of students when they do not turn in their homework, score poorly on exams or request additional accommodations.

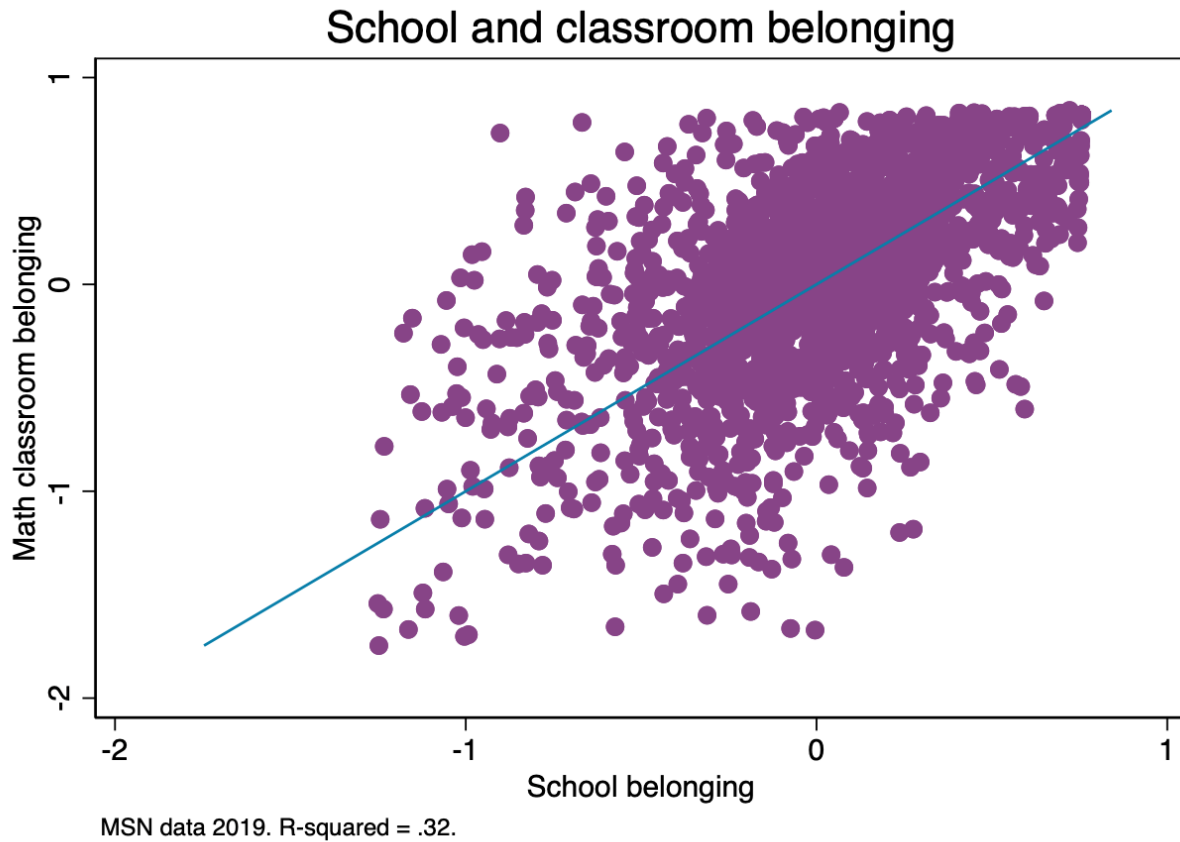
Key Findings

1. Although the two are closely related, classroom belonging is distinct from school belonging. Students can experience a low sense of overall school belonging but high classroom belonging and vice versa.

How is math classroom belonging related to school belonging?

While there is a positive relationship between math classroom belonging and school belonging, the two experiences are distinct.

Figure 1: Relationship between school and classroom belonging



The figure above shows the level of school belonging on the x-axis, and the level of math classroom belonging on the y-axis. The blue line plots the expected level of math classroom belonging for every level of school belonging. The closer the dots are to the line the more classroom belonging is just a reflection of school belonging. While math classroom and school belonging are certainly related, knowing students' levels of school belonging accounts for only 32% of the variation we observe in math classroom belonging.

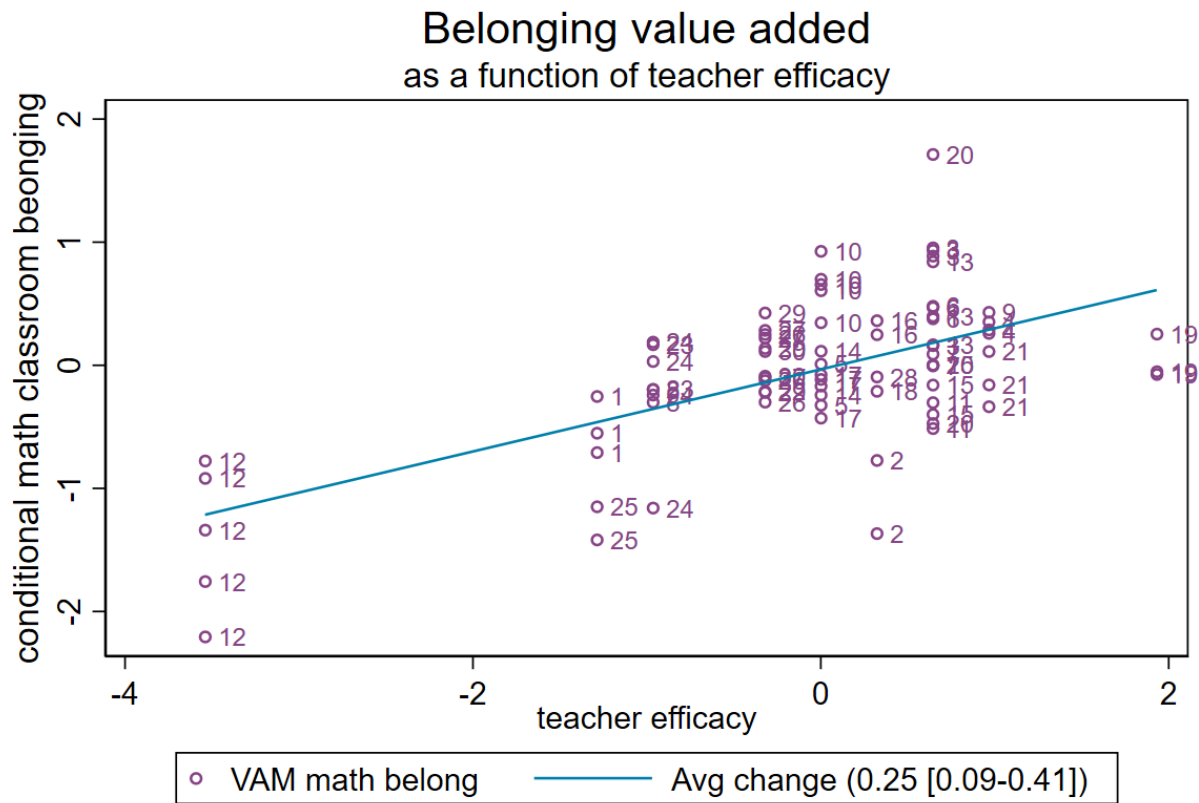
2. Teachers who express a greater sense of efficacy with respect to math are teachers whose students, on average, express greater levels of math classroom belonging, adjusted for their own attributes and prior year achievement in math.

How is teacher efficacy related to math classroom belonging?

Teachers who express a greater sense of efficacy with respect to math teach students who, on average, express greater levels of math classroom belonging, adjusted for students' attributes and prior year achievement in math. This represents a moderate association, as a standard deviation increase in teacher growth mindset is associated with between a quarter and a third of a standard deviation increase in average student math classroom belonging.²

² Teacher 12 is a negative outlier. Omitting teacher 12 from the sample results in a slightly weaker but still positive and significant estimate of the relationship between teachers efficacy and math classroom belonging.

Figure 2: Value-added model of teacher efficacy on math classroom belonging



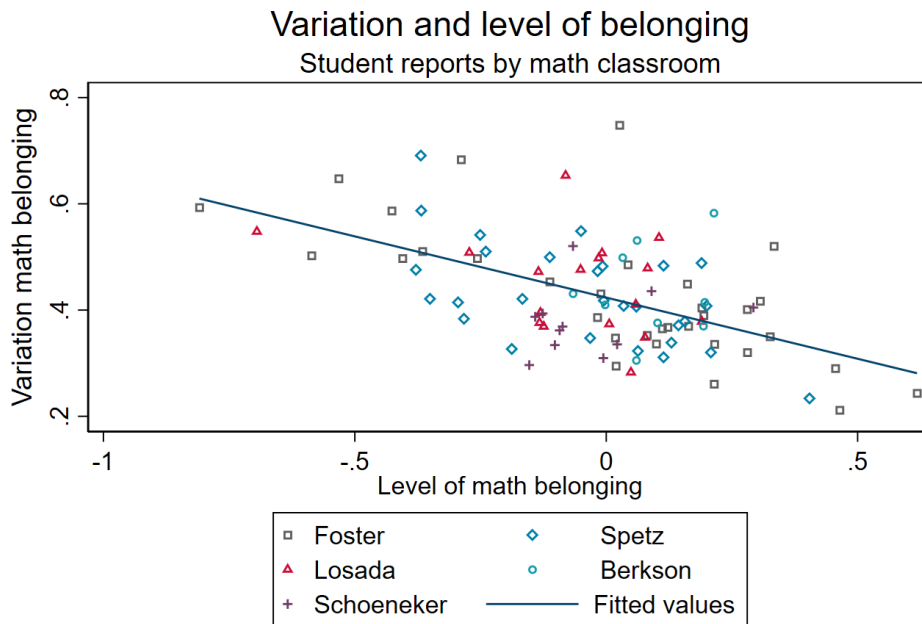
VA conditions on race,sex,parent education, FRPL, IEP, ELL, prior test score and grades in math

The figure above shows the relationship between adjusted math classroom belonging (y-axis) and teacher efficacy (x-axis). Teacher efficacy is calculated from teachers' responses to a survey of their mindsets, attitudes, and beliefs pertaining to math instruction. Teachers are matched to the classrooms and students to whom they are assigned as Primary Teacher in mathematics. Numbers identify teachers, most of whom have multiple classes. Adjusted math classroom belonging is the average level of math classroom belonging in each classroom adjusted for differences among students in demographic characteristics, language, special needs and prior year achievement in mathematics.

How is the average level of math classroom belonging related to the variability in student feelings of belonging within math classes?

In general, classrooms with a *lower* average level of student-reported math classroom belonging have *higher* variability in student experiences of math classroom belonging. The range of belonging across classrooms varies by school.

Figure 3: Level of math belonging related to variation of belonging in classroom



Classroom of 8 or more. Schools names are pseudonyms

The figure above plots how much students' reported levels of belonging vary within a particular classroom against average levels of math classroom belonging for each of the 98 classrooms included in this study. The less variation in math belonging there is in a classroom the more students share a common experience of belonging, whether high or low. Each point on the graph represents a classroom, not a teacher. Teachers have between 1 and 5 classrooms. We also designate the points by school. In general, we find that classrooms with a higher sense of belonging are those in which students are more likely to *share* a sense of belonging. In contrast, the experience of students in classrooms characterized by a lower average sense of belonging are more mixed. We suspect that this reflects greater intentionality on the part of teachers in high-belonging classrooms to create inclusive and supportive classroom cultures but cannot verify that this is the case with the data available to us.

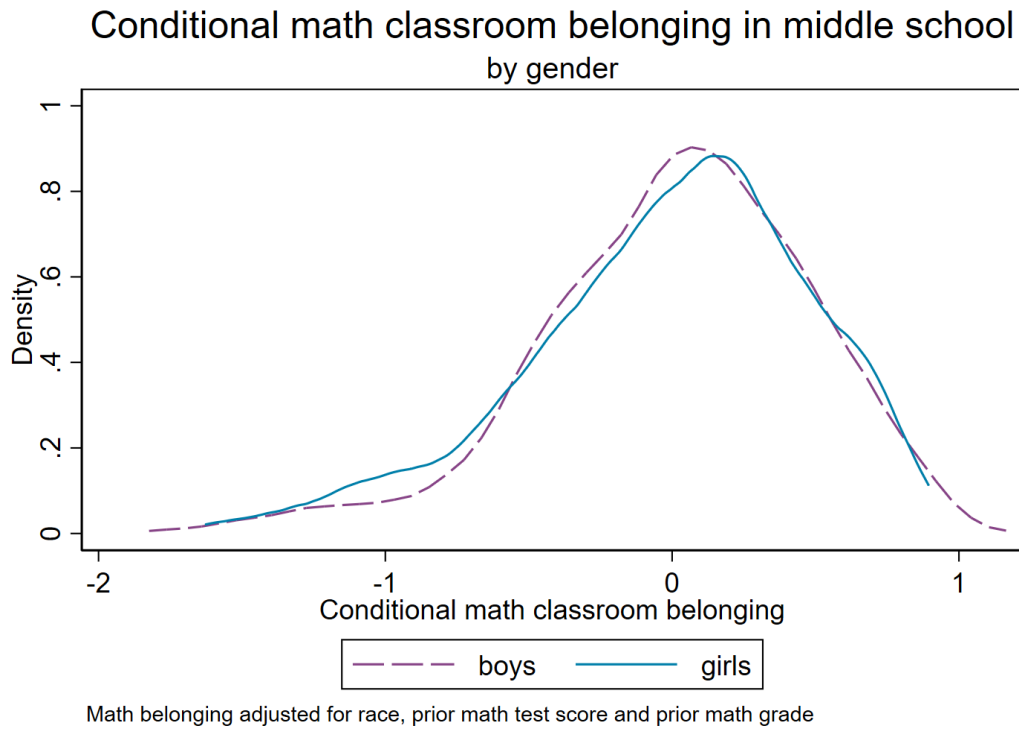
3. Classroom belonging did not differ systematically vary by race/ethnicity, nor by gender. When controlling for other characteristics, we found no discernible difference in the distributions of math classroom belonging of these different demographic groups.

Are there gender differences in math classroom belonging?

We find no meaningful difference in either the average level of math classroom belonging or variability in math classroom belonging by gender.³ Relatively few students report a very low sense of math classroom belonging (below -1).

³ These data come from MMSD datasets, which codify gender as a binary variable. We, therefore, are presenting the data in this way.

Figure 4: Differences in math classroom belonging by gender

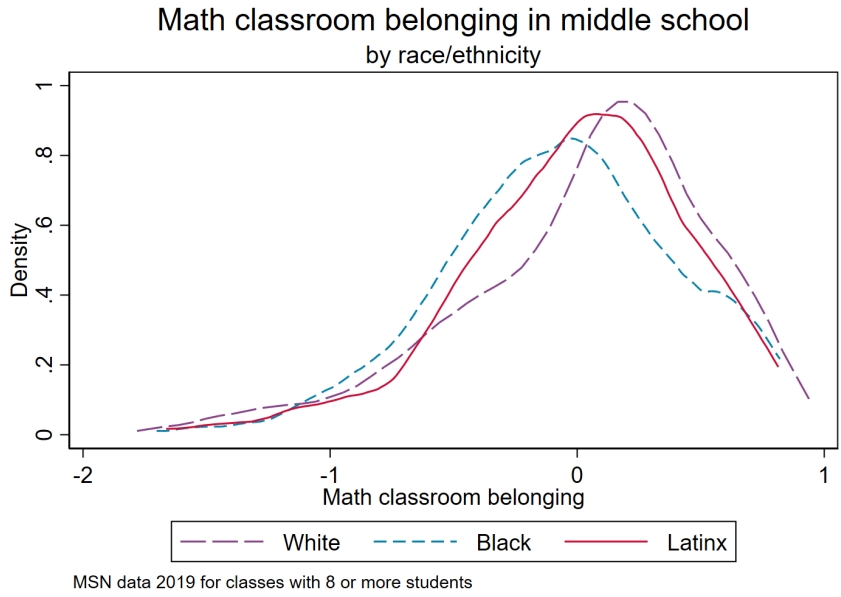


The figure above shows smoothed histograms (i.e., a way of visualizing the distribution of the frequency of values of a variable) of math classroom belonging by gender across classrooms and schools. This smoothed histogram shows the distribution of different math classroom belonging scores, where 0 on the x-axis is equal to the average classroom belonging score. The y-axis shows the relative frequency of these x values. The higher the value of y, the higher the frequency of a given score. The figure adjusts for differences among students in previous year math grade, math test scores and race. These adjustments, however, do little to change the overlap between distributions of math classroom belonging by gender.

Are there racial/ethnic differences in math classroom belonging?

We find **small differences in math classroom belonging among racial/ethnic groups** (Figure 3), yet even these modest differences can be largely attributed to differences among students in previous year math grade and math test scores, as seen in Figure 4. Overall, **relatively few students report a very low sense of math classroom belonging**, as seen by the left skewed distributions.

Figure 5: Raw differences in math classroom belonging by race/ethnicity



The figures above shows smoothed histograms (i.e., a way of visualizing the distribution of the frequency of values of a variable) of math classroom belonging by race/ethnicity across classrooms and schools. Although the distributions of math classroom belonging among White, Black, and Latinx students overlap for the most part, the Latinx distribution of math classroom belonging (in red) shows slightly lower levels of belonging than the White distribution (in purple) and the Black distribution (in teal) is lower still.

Figure 6: Differences in belonging by race/ethnicity conditioning on prior achievement and gender

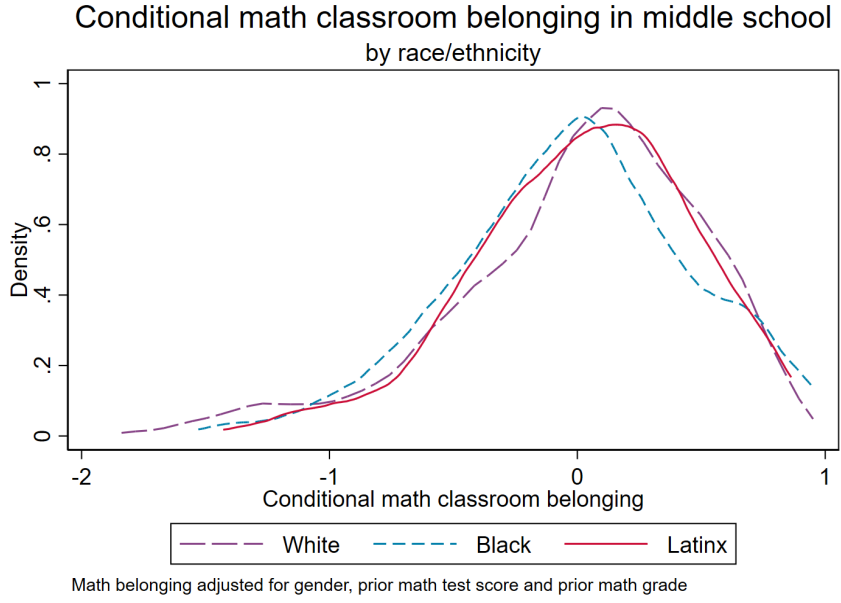


Figure 4 is similar to Figure 3, showing smoothed histograms of math classroom belonging by race/ethnicity across classrooms and schools, but adjusts these distributions for gender, prior math test score, and prior math grade.