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## INTRO

- Critical shortage of adults earning degrees and pursuing careers in STEM-related fields (NSF, 2015).
  - Insufficient participation by U.S. citizens critically endangers sustainability of technology-based society (NSF, 2010; PCAST, 2010).
- Female workforce in engineering = 15%, physical sciences = 28% and computer/mathematical = 26% in 2015
- Hispanics' (6%) and African Americans' (5%) employment rate in STEM occupations is lower than their share of the US adult population (15% and 12%, respectively) (NSF, 2018).
- Early academic experiences affect one's motivation to learn and later skill development (Heckman, 2006)
  - Goal: understand children's early experiences to address occupational disparities long-term.
- Ecological frameworks (Bronfenbrenner, 2005) indicate importance of classroom context in developmental trajectories of competency-beliefs.
- Gap: Understanding mechanisms linking teacher practices and classroom climate to students' competency-beliefs in STEM content areas (science, technology, engineering, math).

## RESEARCH QUESTIONS

- How do relations between different aspects of teacher practices relate to teacher perceptions of classroom climate?
- What are the relations between classroom climate and student report of competence in math and engineering-related activities/skills?

## METHOD

- Grades K-5 from Southwestern schools
- Teacher Reports** (N = 154, 90.9% female)
  - Classroom Practices (PRA)
  - Classroom Climate (CLI)
- Student Report** (N = 1629, 51.6% female)
  - Competence (COM)

## RESULTS

RQ	Variables	$\beta$	SE	t-value
1	CLI-NEGENV on PRA-GEN	0.22	0.08	2.90**
2	COM-MATH on CLI-NEGENV	-0.29	0.10	-2.84**
2	COM-MATH on CLI-RESP	-0.35	0.12	-2.87**
2	COM-A/S on CLI-RESP	0.11	0.03	3.08*

\*Significant at  $p < .05$ , \*\*Significant at  $p < .001$

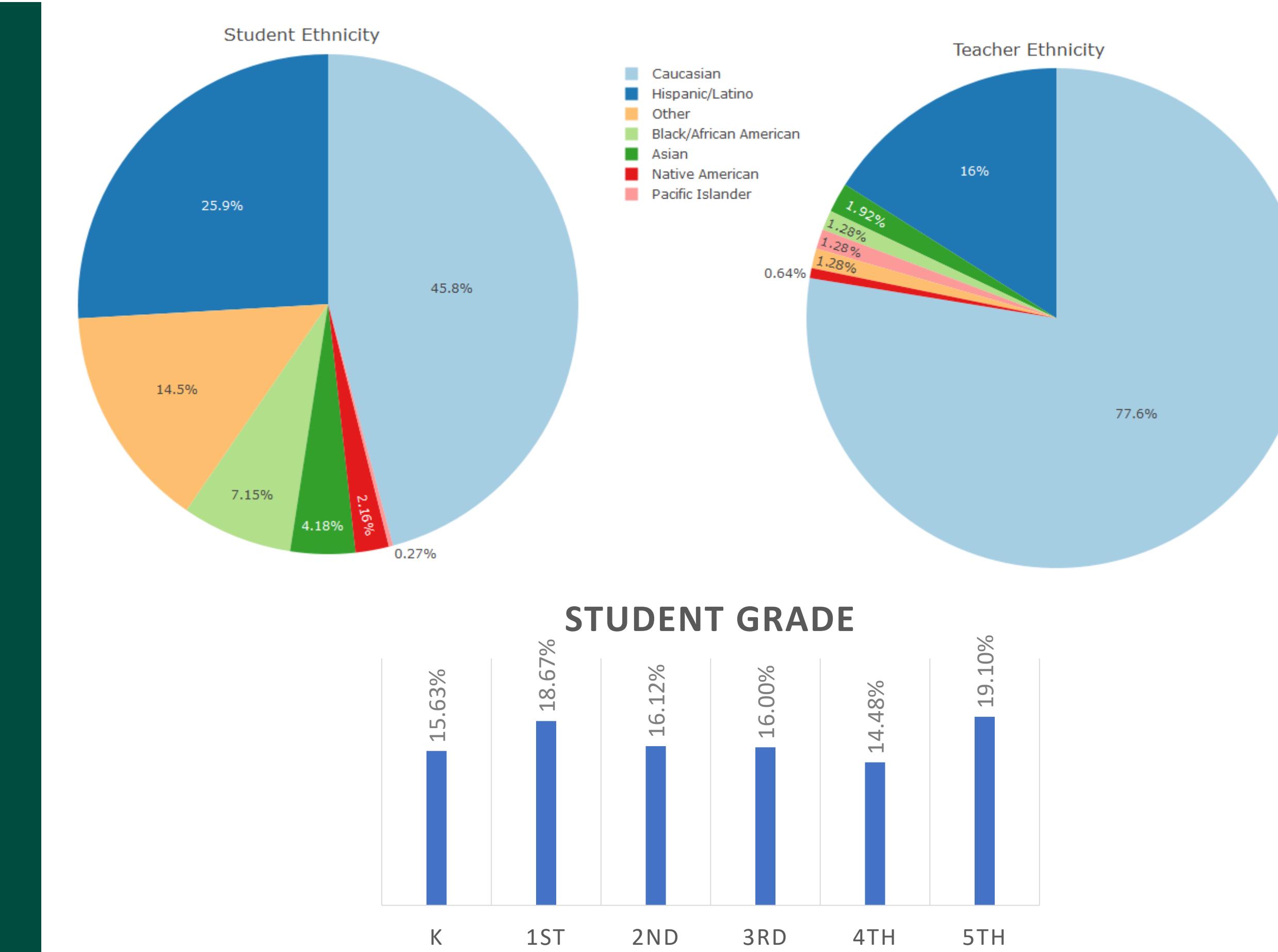
## DISCUSSION

- Teachers should re-evaluate classroom practices and take steps to minimize/eliminate gendered stereotyped practices.
- A positive classroom environment fosters higher levels of competence, so teachers need to be cognizant of fostering a positive environment.
- Respect also affects perceptions of competence, so classroom practices can incorporate respect-promoting aspects.

# Gender stereotyped practices in the classroom negatively influence students' perceived math competence.

# A respectful classroom environment positively relates to engineering competence.

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**Teacher Report Measures**

- Classroom Practices (PRA)
  - 4 Growth Mindset (PRA-GRO): e.g., "Encourage students to ask the teacher why the class is learning a topic." [Dweck, 2015; Mindset Works]
  - 5 Gender Stereotyped (PRA-GEN): e.g., "Create girl and boy teams for friendly competitions." [Gaertner & Miller, 2010, unpublished]
  - Likert-scale 0 - 4 ("Never" to "All of the time")
- Classroom Climate (CLI) [Lickona & Davidson, 2003]
  - 9 Peer (CLI-PEER): e.g., "Students work well together."
  - 4 Negative Environment (CLI-NEGENV): e.g., "Students show poor sportsmanship."
  - 4 Respect (CLI-RESP): e.g., "Students behave respectfully toward all school staff (including secretaries, custodians, and aides)."
  - Likert-scale 0 - 4 ("Almost never" to "Almost always")

**Student Report Measures**

- Competence (COM) [Eccles & Wigfield, 2002; Wheeler et al., 2019, unpublished]
  - 1 Math (COM-MATH): e.g., "How good are you at math?"
  - 10 Engineering Activities and Skills: (COM-A/S) e.g., "How good are you at trying out your ideas?"
  - Likert-scale 0 - 3 ("Not at all good" to "Very good")

