STUDENT-TEACHER RELATIONSHIPS DRIVE HELP-SEEKING FOR MATH LEARNING CHALLENGES

KEVIN JARBO[1], NIKKI G. LOBCZOWSKI[2], J. ELIZABETH RICHEY[1], ELISE MORTON[3] & KEN KOEDINGER[1]

[1]CARNEGIE MELLON UNIVERSITY, [2]UNIVERSITY OF PITTSBURGH [3]GEORGIA INSTITUTE OF TECHNOLOGY

INTRODUCTION

- Social and academic integration key to college success (Tinto, 2012)
- Seeking and receiving help from others, particularly teachers, after academic challenges promotes academic success (Sebesta & Speth, 2017)
- Positive student-teacher interactions promote integration and help-seeking (Newman, 2002)

What kind of student-teacher interactions promote student help-seeking to overcome learning challenges?

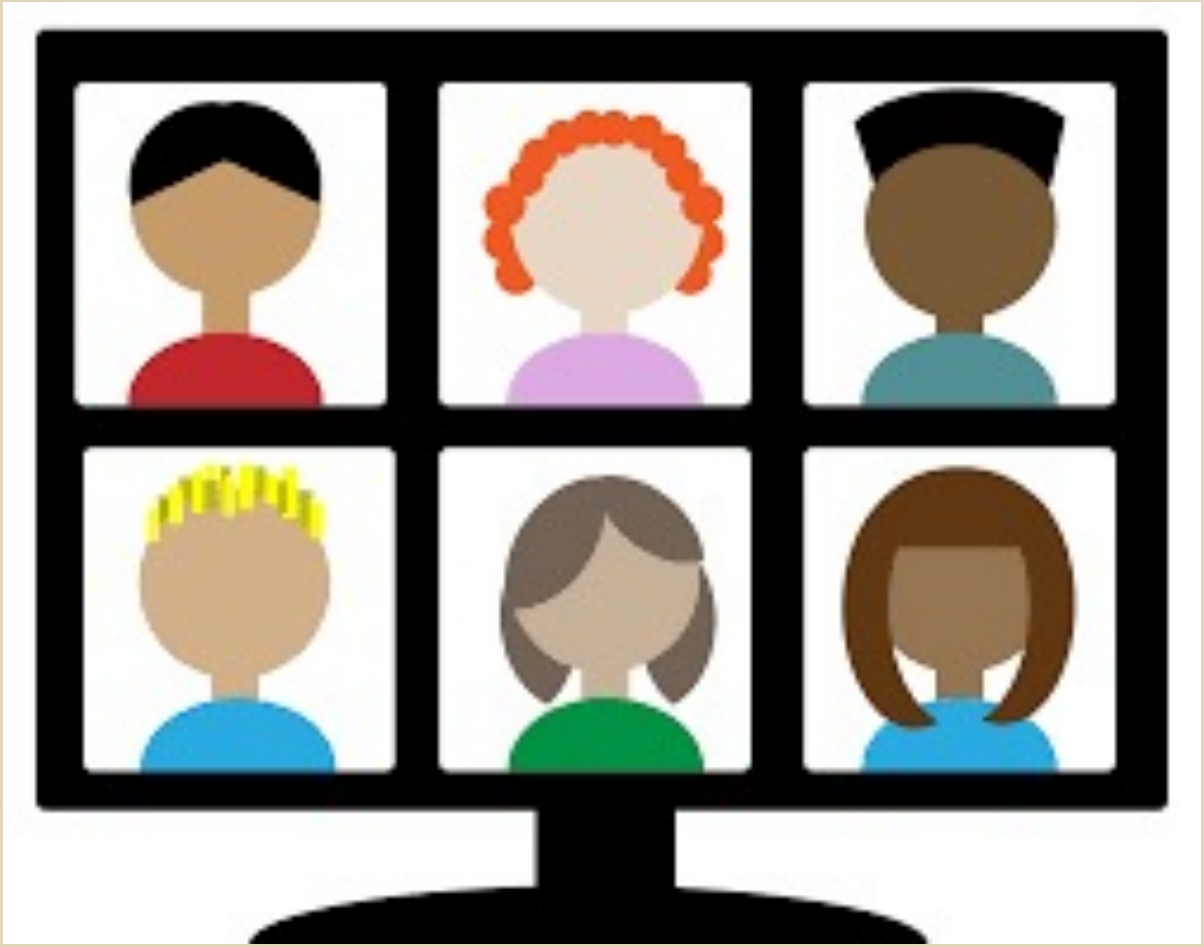
RESEARCH QUESTIONS

RQ1: What interactions in student-teacher relationships do students describe as positive or negative?

RQ2: How do those interactions motivate student help-seeking decisions after math learning challenges?

METHODS

- Participants
  - N = 25 undergraduate and graduate students and recent alumni (<2 years post-degree) of Eastern US unis
  - Affiliated with identity-based affinity groups/orgs
- Design
  - 8 focus group sessions via Zoom
  - Semi-structured interviews w/5 questions asked of all participants



PRIMARY INTERVIEW QUESTIONS

1. What challenges have you specifically had learning math that you think other people may not have had?
2. How did these challenges affect your sense of belonging in math classes, school, organizations?
3. How did you overcome these challenges to experience success?
4. How have your personal experiences influenced the way you faced new challenges while learning math?
5. What advice do you have for learners experiencing similar challenges?

DATA PREPARATION – DEDUCTIVE CODES

- Experiences and resource use
- Student self-perceptions
  - Motivation/Effort/Interest, Performance/Grades, Emotions, Confidence, Understanding math concepts
- School
  - Teacher relationships, Teacher methods/instruction, School environment
- People vs. materials as resources
- Positive and negative valence of experiences and resource use

DATA ANALYSES II – CODE MAPS

Code Co-Occurrence Frequency Maps

Codes talked about more frequently together form clusters

3 themes with self-efficacy closely clustered with positive valence

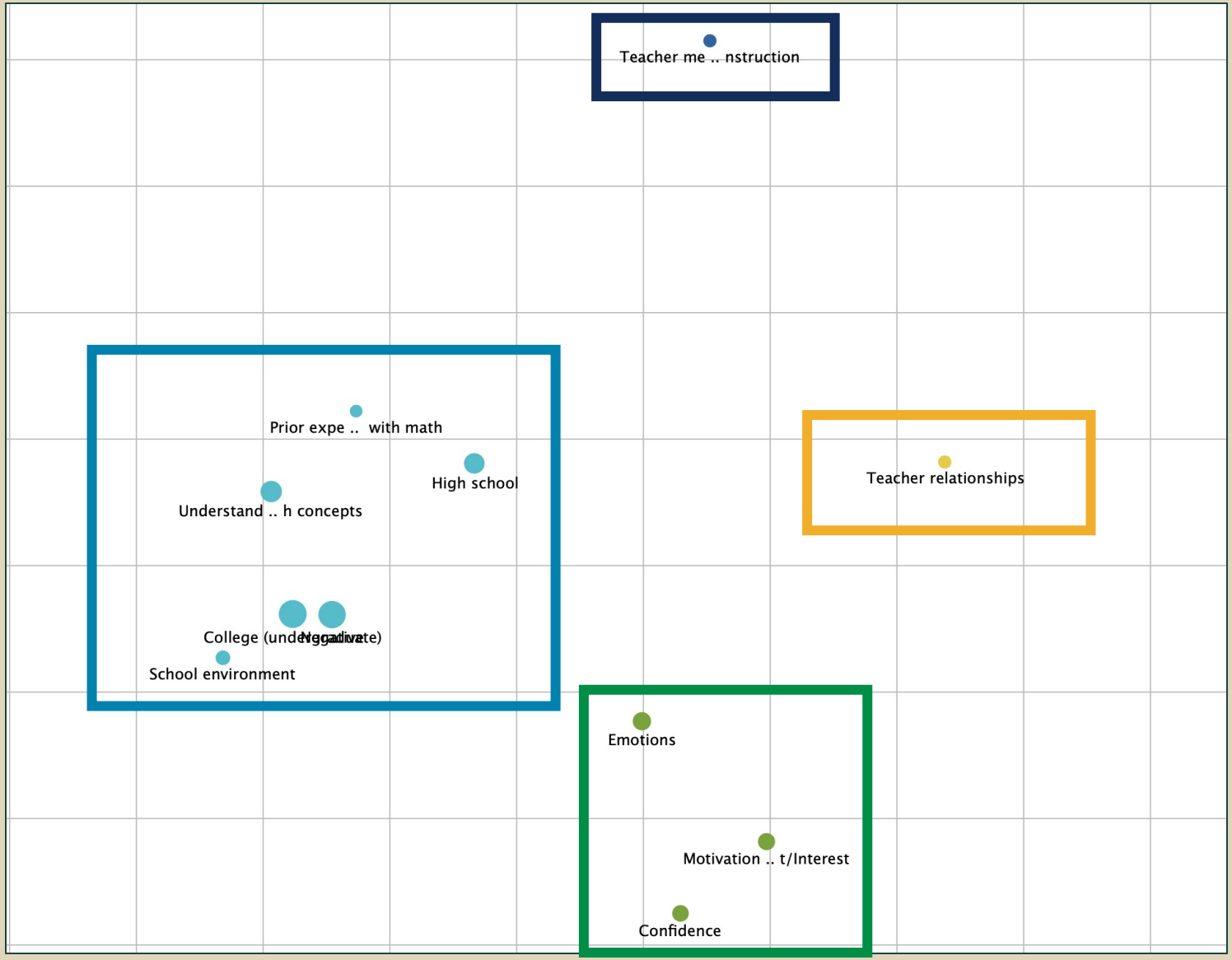
DATA ANALYSES II – CODE MAPS

4 themes emerged with negative valence code

Math learning context discussed most often

Self-efficacy clustered separately from teacher interaction codes

Teacher instruction and relationships discussed alone



DATA ANALYSES III – THEMATIC ANALYSIS: POSITIVE THEMES

Positive	Teacher influence on self-efficacy	Motivation/Effort/Interest (19)
		Performance/Grades (12)
		Emotions (11)
		Major/minor (11)
		Confidence (10)
		Teacher relationships (9)
	Instructional environment	College/undergraduate (14)
		High school (13)
		Teacher methods/instruction (7)
		School environment (6)
		Understanding math concepts (5)
	Interpersonal and structural support	Peer relationships (4)
		Support structures (4)
		Parental guidance (2)

DATA ANALYSES III – THEMATIC ANALYSIS: NEGATIVE THEMES

Negative	Math learning context	Understanding math concepts (37)
		College/undergraduate (37)
		High school (22)
		School environment (18)
		Prior experiences with math (13)
	Sense of self-efficacy	Emotions (23)
		Confidence (20)
		Motivation/Effort/Interest (12)
	Teacher methods/instruction	Teacher methods/instruction (14)
	Teacher relationships	Teacher relationships (13)

FINDINGS I – STUDENT-TEACHER INTERACTION VALENCE (RQ1)

"...[my math teacher] had recommended me for honors geometry and… she recognized that it took me longer to understand what was happening. … [B]ut if I was willing to put in the work, she believed that I could do it. … **it was nice to have someone that believed that I could do it. [which] kind of forced me to work harder and then appreciate it later."** – Tia (Black, female)

Theme: Teacher influence on self-efficacy (positive)

FINDINGS I – STUDENT-TEACHER INTERACTION VALENCE (RQ1)

"[I]t was almost like [the teacher] was teaching for the students that had a strong math background… and he expected everyone [to] just to catch up… **I think the disappointing thing for me in that experience comes from him just outright denying the fact that he was teaching to that level, and it was really discouraging for me to think that I was trying to do the right thing and trying to learn this material that I knew I was struggling with, and I was outright being denied the opportunity to be able to catch up to that level.**" – Lucia (Latina, female)

Theme: Teacher relationships (negative)

FINDINGS III – POST-INTERACTION STUDENT BEHAVIOR (RQ2)

"Mostly, people that influenced my path in STEM [are] pretty much… teachers in my high school… Cause before that… **I don't even know what I was going to do… or if I [would even] go to college at all. [Teachers] influenced me to apply, and not just that, but pursue the path I'm on**, which is chemical engineering, and I've enjoyed it ever since. And I still consider them mentors…" – Joe (no demographic information)

Theme: Teacher influence on self-efficacy (positive)

FINDINGS III – POST-INTERACTION STUDENT BEHAVIOR (RQ2)

"[I]t's algebra, but still something I heavily struggled with and still struggle with, I'll say. She looked me in the face and just said, "I don't think I have the ability to teach you what you should already know by now." **A week later, I withdrew from her class. It was just so discouraging to think that I'm so far behind at a point that I can't be helped. … I can't even go to the professor.**" – Drew (no demographic information)

Theme: Teacher relationships (negative)

SUMMARY AND DISCUSSION

- Student-teacher interactions impact student perceptions and help-seeking decisions

CONCLUSION AND FUTURE WORK

- Student-teacher interactions may impact trust
- What teacher behaviors cue help-seeking trustworthiness to students?
- Trust interventions might boost academic integration and success

THANK YOU, EVERYONE!!