Results of Our New Survey (Adapted Measure of Math Engagement)!

Drop-in meeting

Adapted Measure of Math Engagement Research Group,
March 14 **OR** 15

Child Trends

Search INSTITUTE

BLOOMINGTON Public Schools

McREL INTERNATIONAL

NSF National Science Foundation

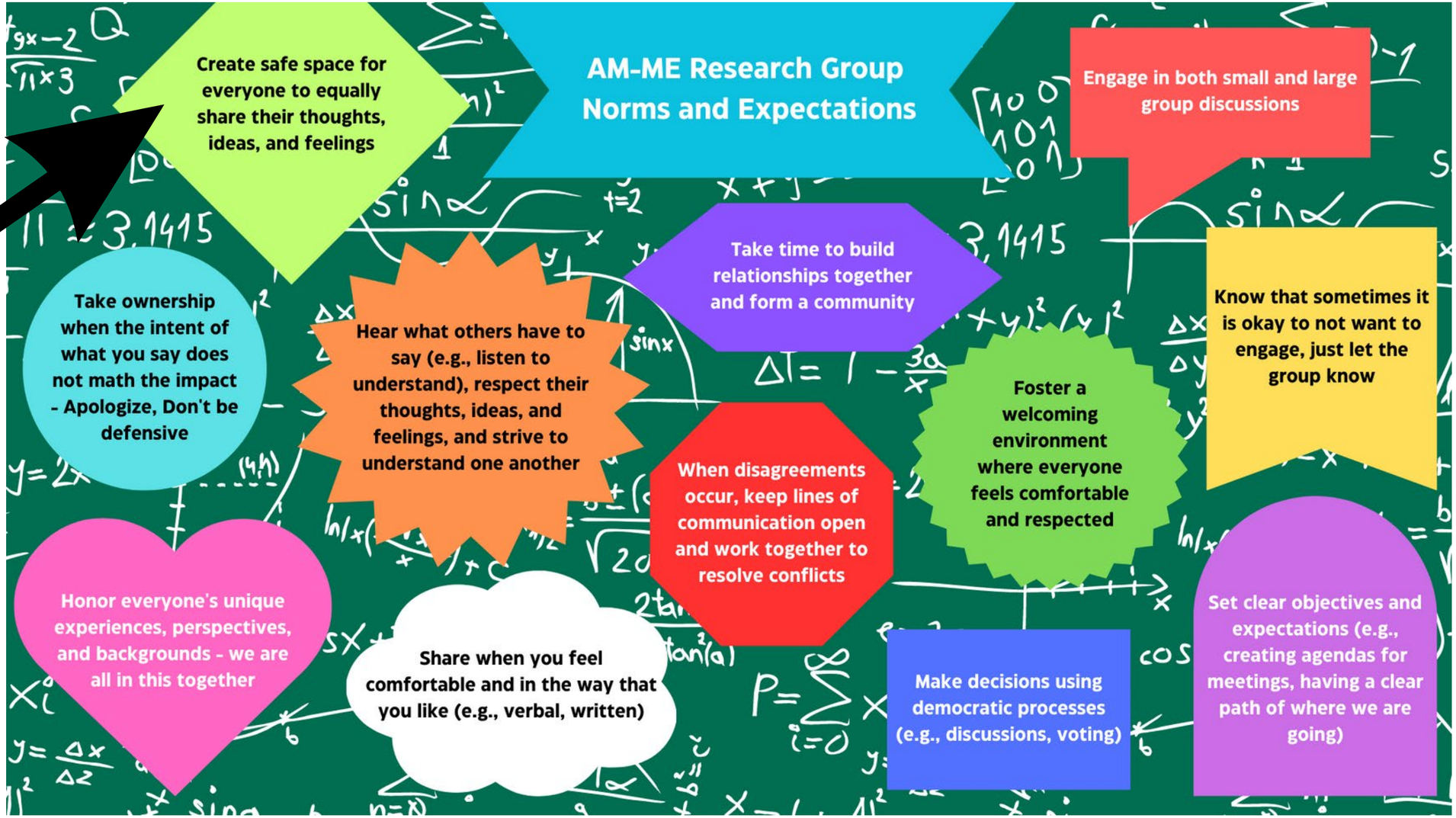
Formally Introducing Marisa Crowder!

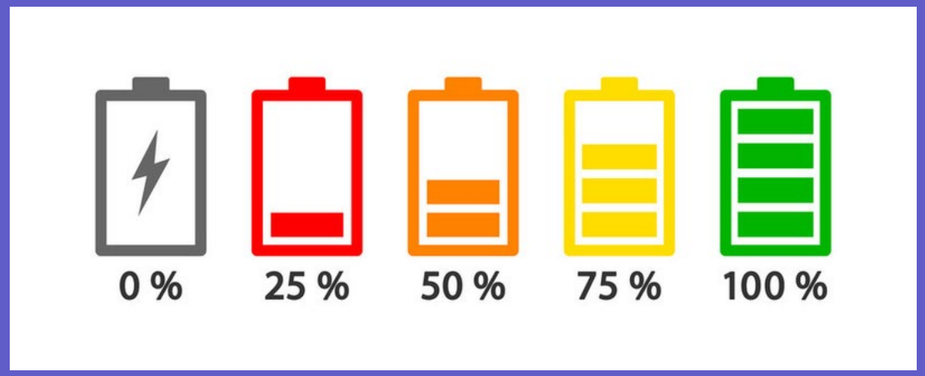
- Senior Researcher, McREL International
- Lead of the quantitative team for this project.
- Will be with us in person on March 18!

Agenda & objectives

- Team building
- Overview of the initial survey findings!
- Large group discussion: Get to know a factor
- Preview what we will do on March 18

Group Norms


AM-ME Research Group
Norms and Expectations
Create safe space for everyone to equally share their thoughts, ideas, and feelings
Engage in both small and large group discussions
Take time to build relationships together and form a community
Take ownership when the intent of what you say does not math the impact - Apologize, Don't be defensive
Hear what others have to say (e.g., listen to understand), respect their thoughts, ideas, and feelings, and strive to understand one another
Know that sometimes it is okay to not want to engage, just let the group know
When disagreements occur, keep lines of communication open and work together to resolve conflicts
Foster a welcoming environment where everyone feels comfortable and respected
Honor everyone's unique experiences, perspectives, and backgrounds - we are all in this together
Share when you feel comfortable and in the way that you like (e.g., verbal, written)
Make decisions using democratic processes (e.g., discussions, voting)
Set clear objectives and expectations (e.g., creating agendas for meetings, having a clear path of where we are going)



On the scale of 0 -100% battery life, how are you doing?

Please also share:

- What is your favorite donut flavor and why?

Adapted Measure of Math Engagement (AM-ME) Version 1

Back to Agenda Page

How did we collect data?

Who did we talk to? How did we talk to them? What did we ask?

How did we analyze data?

What did the process look like?

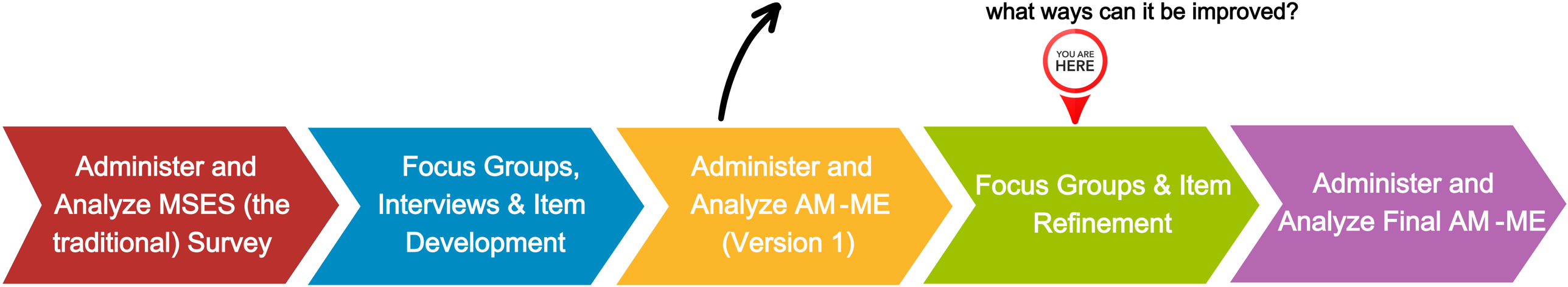
What did we find?

Questions that students rated themselves highest on. Questions that students rated themselves lowest on.

How did we collect the data?

The AM-ME Journey

To what extent does the AM -ME reflect qualitative data so far? In what ways can it be improved?



Does the AM-ME accurately and clearly capture Black and Latino students' experiences with math engagement?

The AM-ME (Version 1)

- The first version of the AM-ME was developed to reflect our understanding of Black and Latino students' math engagement based on qualitative data gathered from focus groups and interviews.

- It included 70 survey questions that were designed to capture the "6 buckets" of math engagement:
  - Visible engagement (for example, completes work)
  - Classroom culture (for example, teacher-student relationships)
  - Feelings (for example, feels judged)
  - Connections to the outside world (for example, feels math is relevant)
  - Outside the classroom (for example, sibling support)
  - Systemic factors (for example, family obligations)

- Response options: strongly disagree -- disagree -- agree -- strongly agree.

- Takes approximately 10 minutes to complete.

How was the survey administered?

- It was administered by Bloomington Public School's Research, Evaluation, and Assessment Office via Google Forms in February 2024.

- **To keep the survey within ~10 minutes, each student received 1 of 6 randomized versions of the survey.**

- Students were able to take during or outside of school.
  - All middle and high school students in Bloomington Public Schools were invited to take the survey.

- Students who took the survey will receive a $10 electronic gift card ASAP.

Participants

School	Black students	Latino students	Other students (mostly White)	School Total (response rate)
Middle School #1	107	78	384	569 (80%)
Middle School #2	74	55	413	542 (66%)
Middle School #3	138	216	133	487 (71%)
High School #1	79	60	541	680 (39%)
High School #2	106	193	122	421 (22%)
Total	**506**	**605**	**1601**	

How did we analyze the data?

How did we analyze the data?

In our analysis of the survey data so far, we have examined two questions:

1. **How many factors, or “buckets,” emerged based on student responses?**
    - Based on what is called, “exploratory factor analysis.”

2. **Do survey questions capture high and low levels of student engagement?**
    - Based on what is called, “Rasch analysis.”

We are transitioning from “buckets” to “factors”

What is an Exploratory Factor Analysis?

- An exploratory factor analysis is a statistical approach that can be used to examine the relationship among responses to survey questions to identify a set of summary factors.
  - This helps create subscales within a survey that has a large number of questions.

- For example:
  - I like to try new recipes.
  - I consider myself a dog person.
  - I think people should donate to pet shelters.
  - Cooking makes me happy.
  - I love my pet.
  - I enjoy making meals for others.

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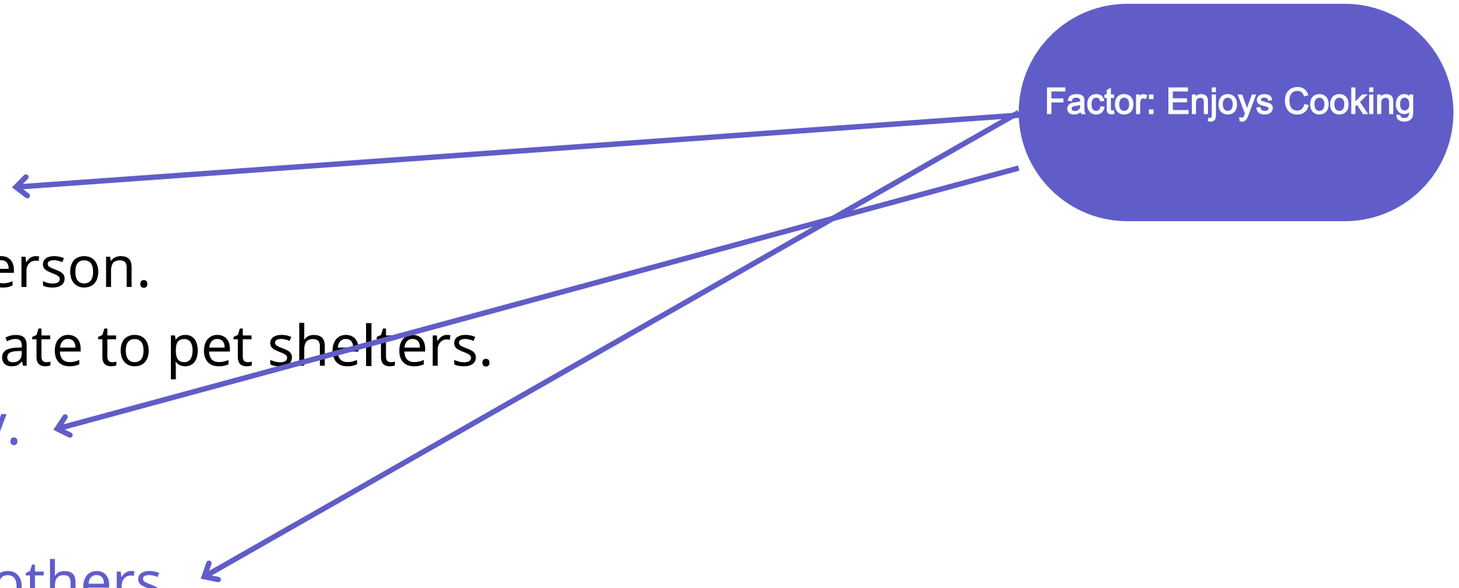

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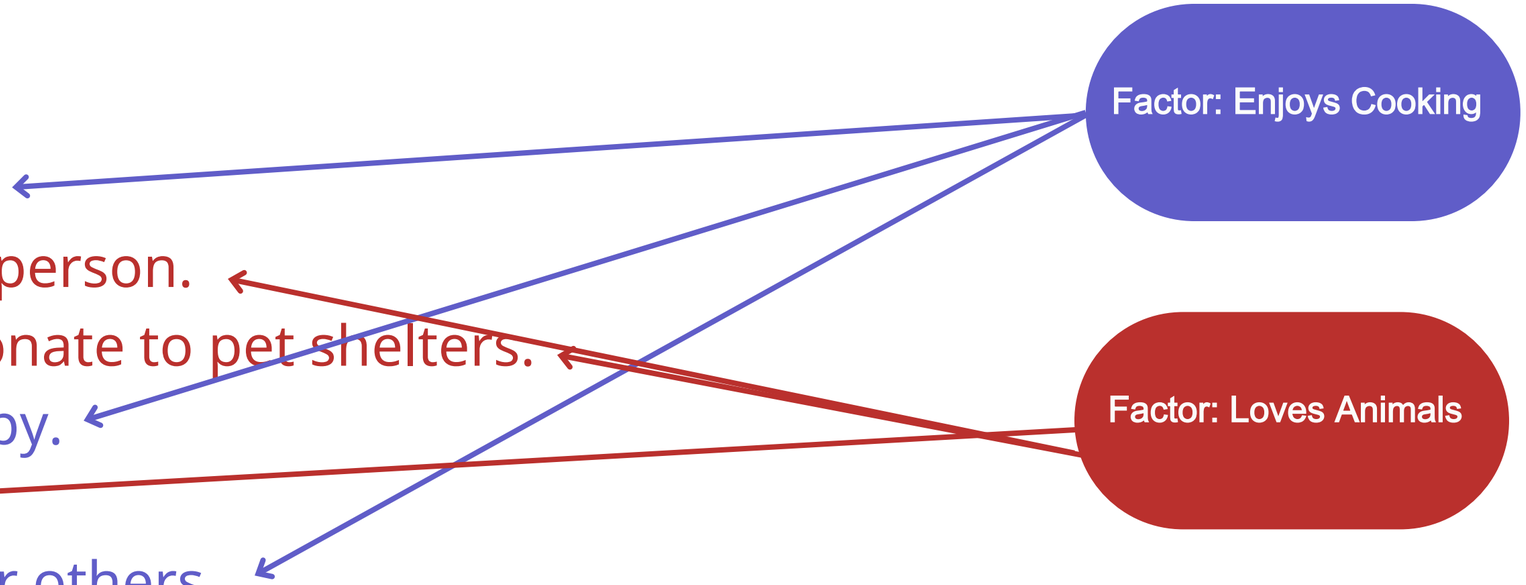

What did we find?

How Many Factors Emerged in the Data?

- Student responses reflect an **8-factor** structure.
- 10 of the 70 survey questions were not placed into a factor.

Factor 1:Good feelings in math class*

- I am treated as if I am able to do math.
- I am treated fairly.
- I am treated with the same amount of respect as others.
- I can be myself.
- I feel safe.
- I have other students I can turn to for help in my math class.

**Just a note that this is not the final name, we will rename them all in May!*

Factor 2: My math teacher*

- I like my math teacher.
- My math teacher answers my questions.
- My math teacher encourages me to do my best.
- My math teacher helps me complete my work.
- My math teacher helps me understand how I can get better at math.
- My math teacher is nice.
- My math teacher is patient.
- My math teacher lets me decide how I want to learn.
- My math teacher provides clear instructions on how to complete work.
- My math teacher shows examples of how to complete work.
- My math teacher shows me that I matter to them.
- My math teacher uses a variety of activities to help me learn.

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Factor 3: Barriers (the opposite of) math engagement*

- I do other things when I am supposed to be paying attention.
- I feel hungry when I get to math class.
- I feel tired when I get to math class.
- I have too much math homework to complete in a week.
- My after-school commitments make it hard to find time to work on math.
- My teacher lectures through most of the math class.
- It is too disruptive for me to learn.

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Factor 4: In class engagement*

- I answer questions that my teacher asks.
- I check my work to make sure it is right.
- I complete work that is assigned.
- I listen to what the teacher says.
- I stay focused during group work time.
- I stay focused during individual work time.
- I stay focused when new math skills are being taught.
- I think about different ways to solve a problem.
- I try to learn the new math skills being taught.
- I try to understand how other students solve math problems.
- I try to understand my mistakes when I get something wrong.
- I understand what I am learning in math.
- If I don't understand, I give up right away. (reversed)
- When I'm given time to complete work in class, I use it.
- I try to help other students who are struggling.

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Factor 5: **Support for math engagement***

- People in my life: Help me with math.
- People in my life: Motivate me to do well in math.
- People in my life: Praise me for my math grades.
- People in my life: Support me in math.
- People in my life: Talk to me about how things are going in my math class.
- People in my life: Tell me how important doing well in math will be for my future.
- People in my life: Tell me that I can do math.

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Factor 6: Wanting to and having the resources to understand math*

- I feel successful when I solve hard math problems.
- I feel successful when I understand math.
- I have study sheets and notes to help me learn math.
- I want to understand what we are learning in class.

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Factor 7: **Math and me***

- I see myself as someone who can be successful at math.
- Others see me as someone who can be successful at math.

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Factor 8: Math in everyday lives*

- I attend an afterschool program where I get help with math.
- Learning math matters to my everyday life.
- There are multiple adults in my math classroom to help me learn.
- I look forward to math class.
- I think about how learning math can help me go to college.
- I use online tools (for example, YouTube, Khan Academy) to help me learn math.

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Questions about the factors?

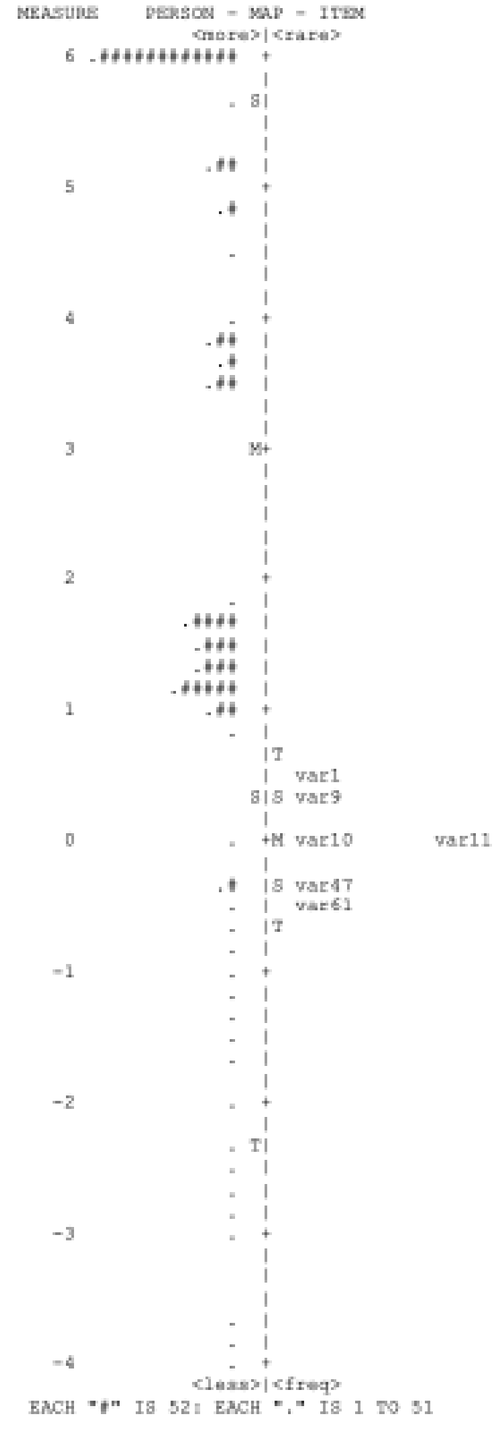
What is Rasch Analysis?

- Rasch Analysis is a technique that allows us to examine survey question-level information, such as whether an item is easy or hard for students.

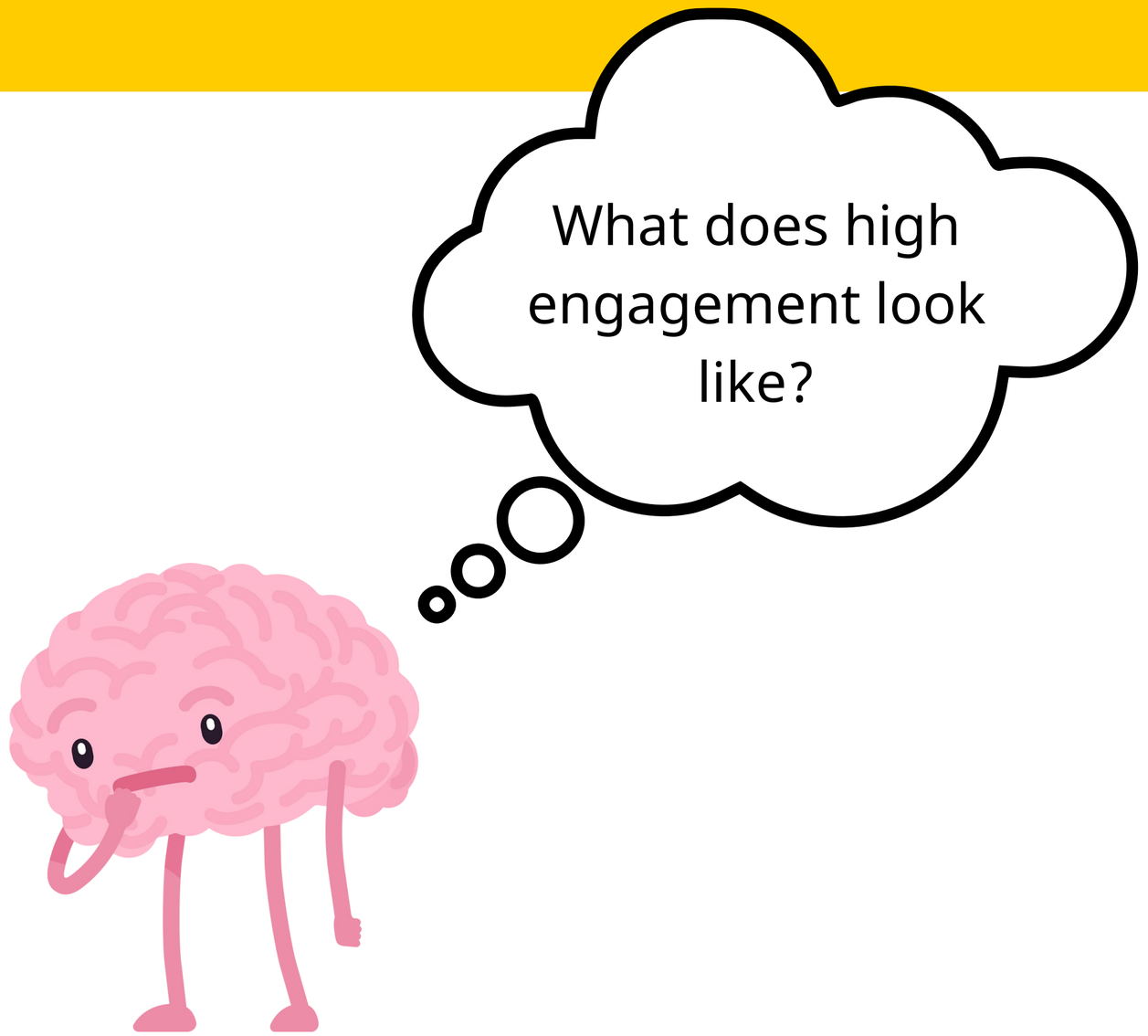
- For example, when thinking about math knowledge:
  - 2+2
  - 2 x 2
  - 2 / 2
  - 2 + (2 x 2)

What did we find?

How well did survey questions target levels of student engagement?



Planning for the Future



To what extent do survey questions' placement vary by race/ethnicity?

- **Differential Item Functioning (DIF):** At equal levels of engagement, are some survey questions easier to agree to than others for certain groups?
  - Example: Questions about certain sports, weather events, or pop culture references can be interpreted differently.

- We examined whether Differential Item Functioning exists between Black, Hispanic, and Other students.

- 13 of the 70 items were flagged for Differential Item Functioning.

How to interpret Differential Item Functioning

- Among students at the same level of "**Good feelings in math class** " (which is factor 1).

- The placement of the survey question, "**I can be myself** " differs by between Black and "Other" students.

- Students who identified as Black were more likely to agree to the survey question than students who identified in the "Other" category.

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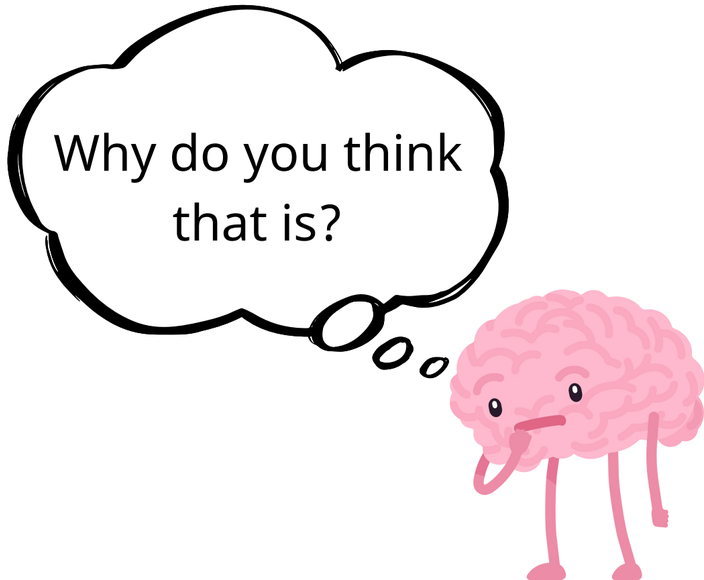
- The placement of the survey question, "**I can be myself** " differs by between Black and "Other" students.

- Students who identified as Black were more likely to agree to the survey question than students who identified in the "Other" category.



Questions about how items functioned differently?

Get to know a factor!
(March 14)

Factor 1: Good feelings in math class

- For the next 25 minutes, we will:
  - Review the "**Good feelings in math class**" factor.
  - Discuss the survey questions that make up this factor. What do they tell us about students' math engagement (particularly for Black and Latino students)?
  - Brainstorm focus group questions that will help us create survey questions that:
    - Are more difficult for students to agree to (higher levels of "good feelings").
    - If needed, get at ideas to more "fully" capture the concept (i.e., is there anything missing?)
    - Help us understand why students respond to the survey questions differently.

- You will need: **Factor 1 (Good Feelings) Handout**

Group Discussion: Reviewing Survey Questions

- For the next 15 minutes:
  - Discuss the questions that make up the "**Good feelings in math class**" factor. How do they capture math engagement (particularly for Black and Latino students)?
  - Brainstorm focus group questions that will help create survey questions that:
    - Are more difficult for students to agree to (higher levels of "good feelings").
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- Things to consider:
  - Who will be the most likely to know what higher levels of "**Good feelings in math class**" looks like?
    - In other words, who should we ask?

Group Discussion: Understanding How Survey Questions “Worked Differently”

- For the next 5 minutes:
  - Review the survey questions flagged with Differential Item Functioning (i.e., they work differently for Black, Latino, and Other students).
  - Brainstorm focus group questions that will help us make questions clearer and more specific so that students respond to them more similarly.

- Things to consider:
  - Who will be the most likely to understand why survey questions are interpreted differently?
    - In other words, who should we ask?

Get to know a factor!
(March 15)

Factor 6: Wanting to and having the resources to understand math

- For the next 25 minutes, we will:
  - Review the "**Wanting to and having the resources to understand math** " factor.
  - Discuss the questions that make up this factor. What do they tell us about students' math engagement (particularly for Black and Latino students)?
  - Brainstorm focus group questions that will help us create survey questions that:
    - Are more difficult for students to agree to (higher levels of "wanting to and having resources").
    - If needed, get at ideas to more "fully" capture the concept (i.e., is there anything missing?)
    - Help us understand why students respond to the survey questions differently.

- You will need: **Factor 6 (Resources) Handout**

Group Discussion: Reviewing Survey Questions

- For the next 15 minutes:
  - Discuss the questions that make up the “Wanting to and having the resources to understand math” factor. How do they capture math engagement (particularly for Black and Latino students)?
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  - Brainstorm focus group questions that will help us make questions clearer and more specific so that students respond to them more similarly.

- Things to consider:
  - Who will be the most likely to understand why survey questions are interpreted differently?
    - In other words, who should we ask?
  - What questions can we ask to get a better understanding of students’ experiences related to the survey questions?

Closing

Exit Ticket

Let us know what you liked and what you hope is changed for the next meeting.

Next Meeting *(in person!)*

- March 18 (Monday), 3:30-5:30 pm.
- Let Diane know if you need transportation!

Stay Connected

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Learn more about the Adapted Measure of Math Engagement at https://www.childtrends.org/project/adapted-measure-of-math-engagement.