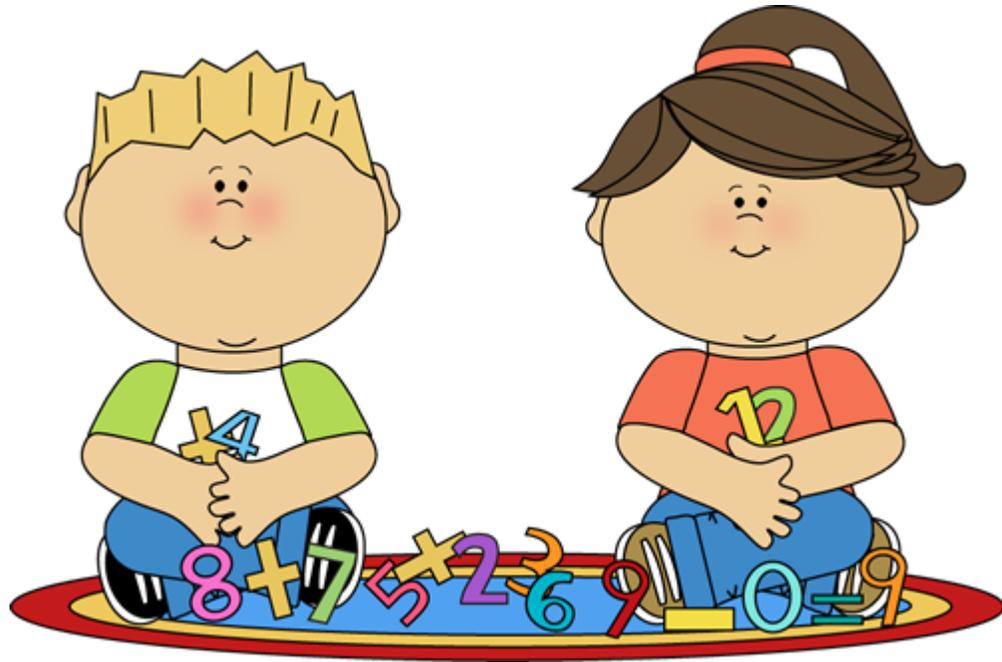


Sense of Belonging in Math



Note. These materials were produced for the WA STEM partnership coaching meeting on 2/21/18, 2/22/18, and 2/23/18.

Icebreaker



- 1 Form a group of three with people you don't know well.
- 2 Spend 5 minutes finding the three most interesting things that all members of your group have in common.
- 3 Introduce yourself to the large group and tell everyone your three things in common.

Learning Objectives

By the end of this session, you will be able to:

- Define sense of belonging
- Explain the importance of belonging for academic success in math
- Apply actionable strategies to promote belonging in math classrooms

Belonging: What Is It?

Feeling like an accepted, valued, and legitimate group member.



Belonging Is a Fundamental Need

The need for social connections is innate and universal.

*It is a **need**, not a want.*



Vs.



Exclusion Is Painful



Psychological consequences

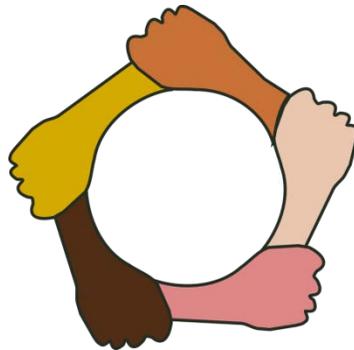
- Sadness, anger
- Decreased self-esteem
- Impaired self-regulation
- Poorer cognitive function

Physical consequences

- Brain science suggests social pain and physical pain are experienced in overlapping brain systems
- Loneliness poses the same health risks as smoking, drinking, and obesity

Belonging and Identity

I ♥ math



Belonging



Belonging and Identity

Belonging

- Perceived fit within a group or domain

Identity

- Importance placed on being a member of a group or domain





Belonging Brainstorm

Think about a time when you experienced a sense of belonging in a group. How did you know you belonged?

Think about a time when you didn't experience belonging in a group. What happened?

Think about a time you witnessed someone else struggle with belonging. What happened?

Students Seek Belonging

- The lives of children and youth are socially complex. They are constantly monitoring their belonging status.
- Sense of belonging particularly acute for:
 - ✓ Early adolescents
 - ✓ Children transitioning between schools and grades
 - ✓ Children with marginalized identities



Do I belong here?

Belonging in School: So What?



Decreased:

- Substance use
- Early sexual initiation
- Violence
- Suicidal ideation
- Disordered eating

Increased:

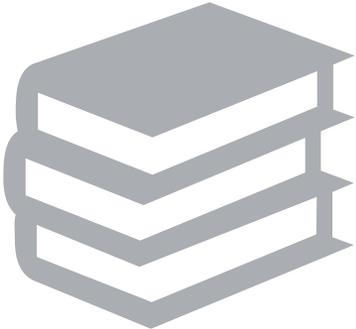
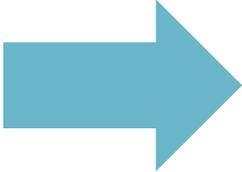
- Self-efficacy
- Motivation
- Attendance
- Persistence
- Achievement

Goodenow (1993);
Osterman (2000)

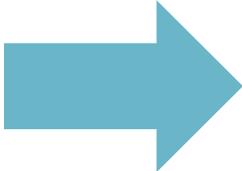
Students' Mindsets Influence Behaviors and Achievement



Academic
Mindset



Academic
Behaviors



Academic
Outcomes

Adapted from Farrington (2013)

Growth Mindset Is an Academic Mindset

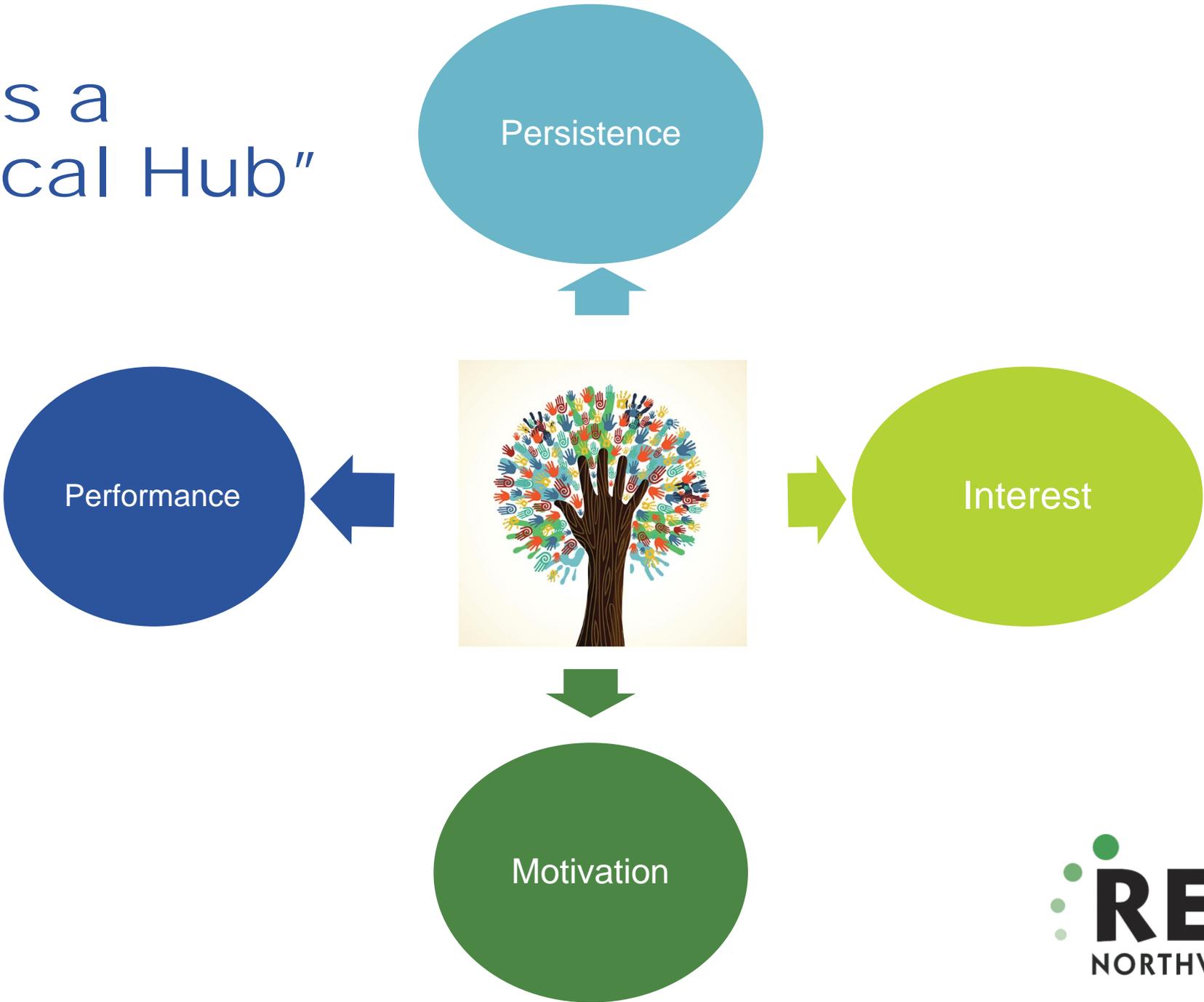


Farrington's Four Key Academic Mindsets:

- 1. I belong in this community**
2. I can succeed at this
3. My ability and my competence grow with my effort
4. This work has value for me

This Is Sense of Belonging

Belonging as a "Psychological Hub"

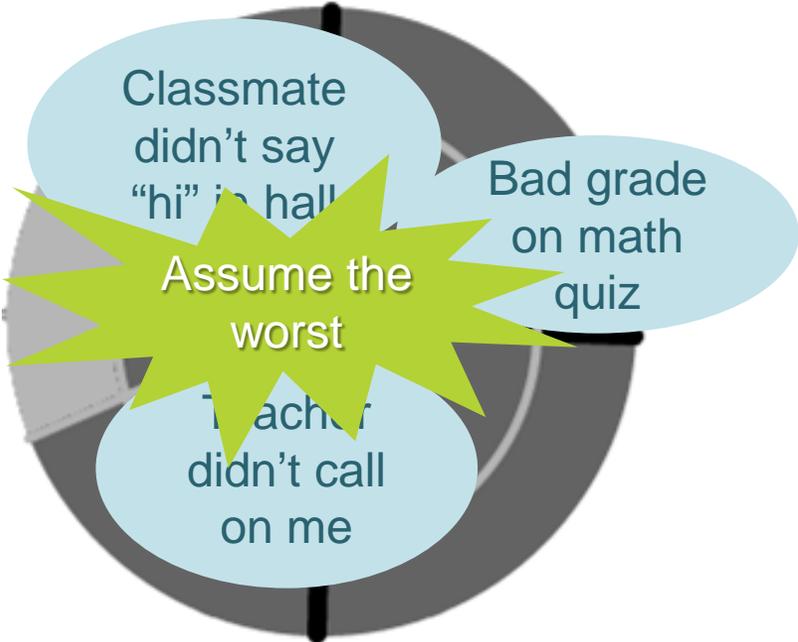


Lack of Belonging Saps Concentration and Focus

Do I belong here?

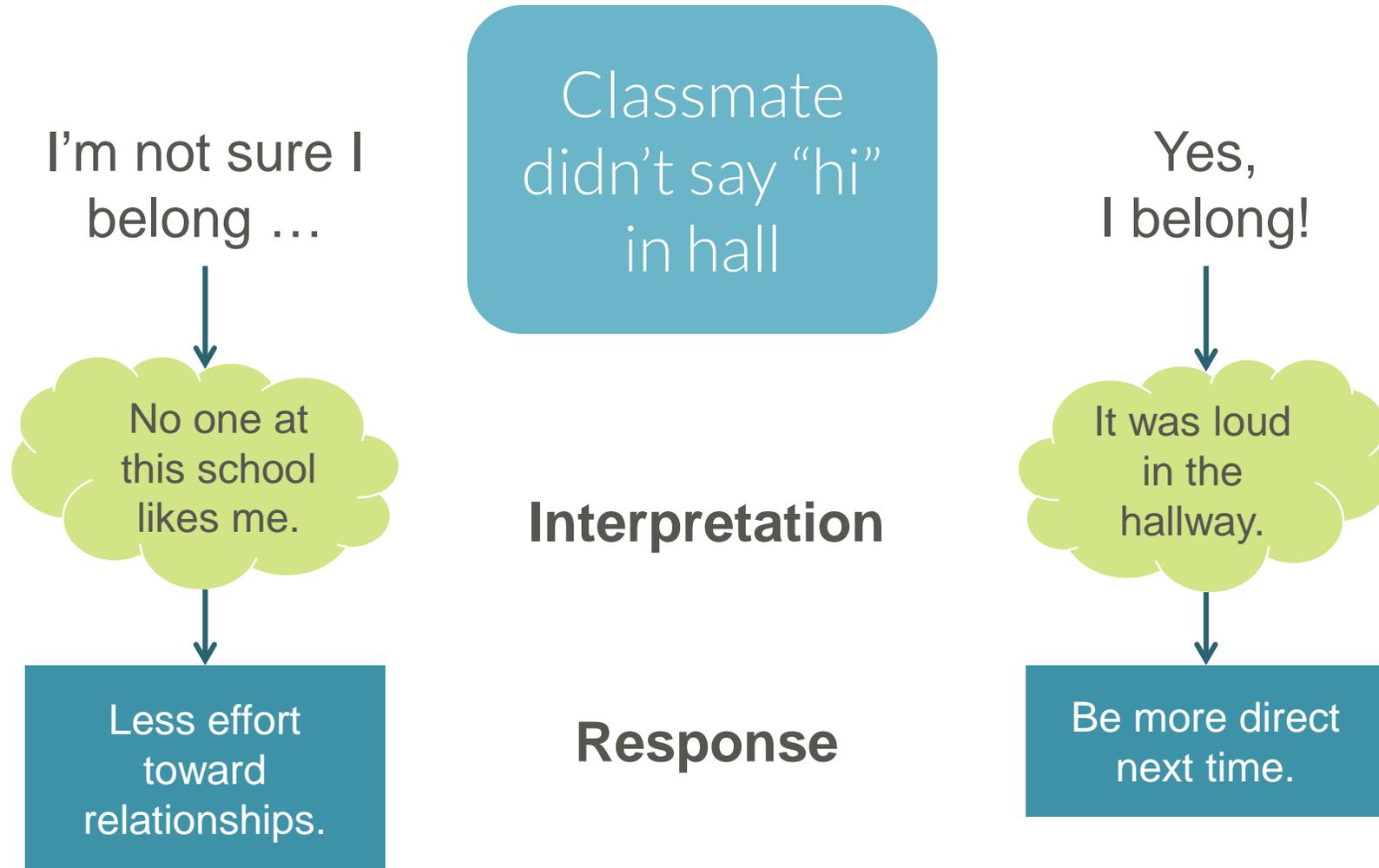
I'm not sure ...

More vigilant



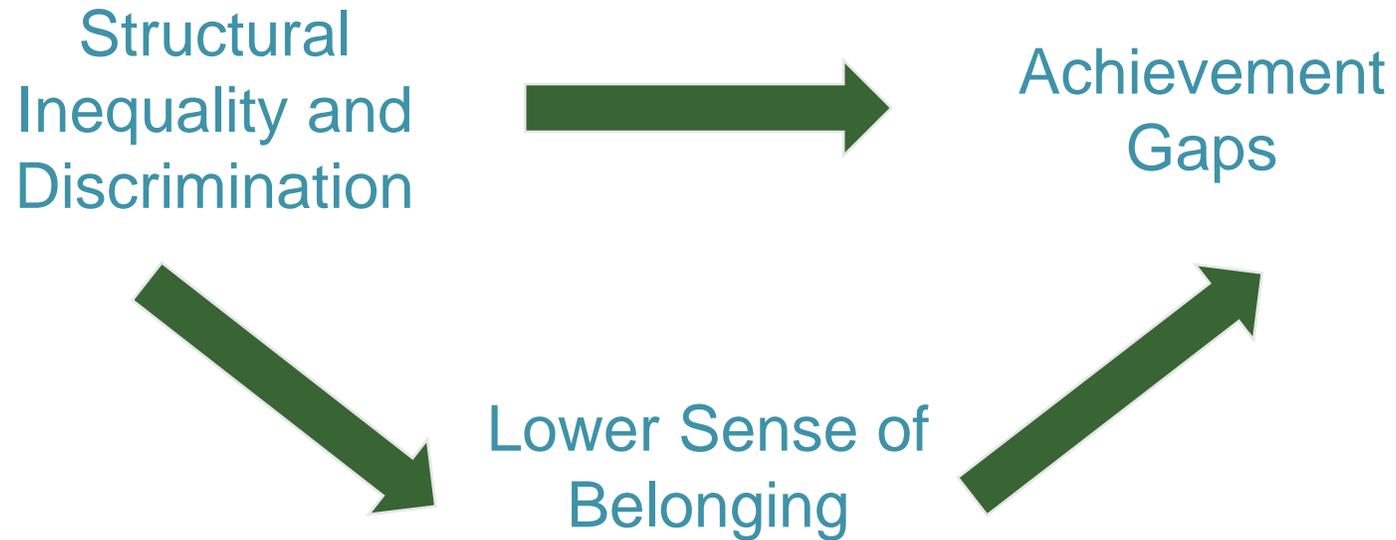
Walton & Cohen (2007)

Do I Fit in Socially?



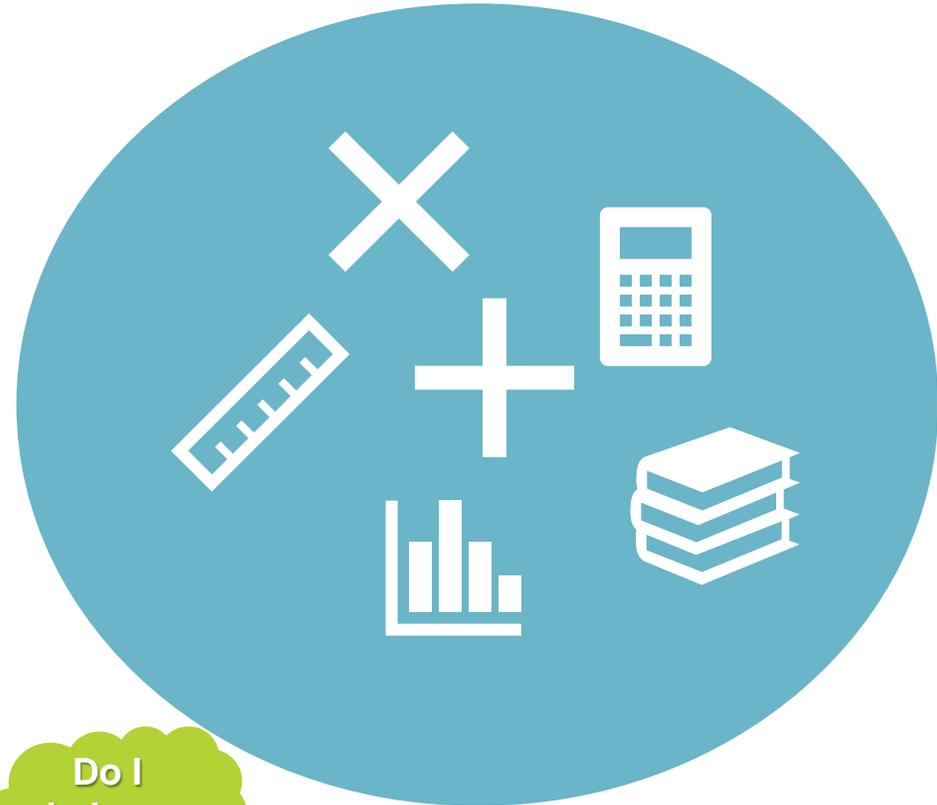
Belonging and Equity

Addressing achievement gaps and other inequitable life outcomes

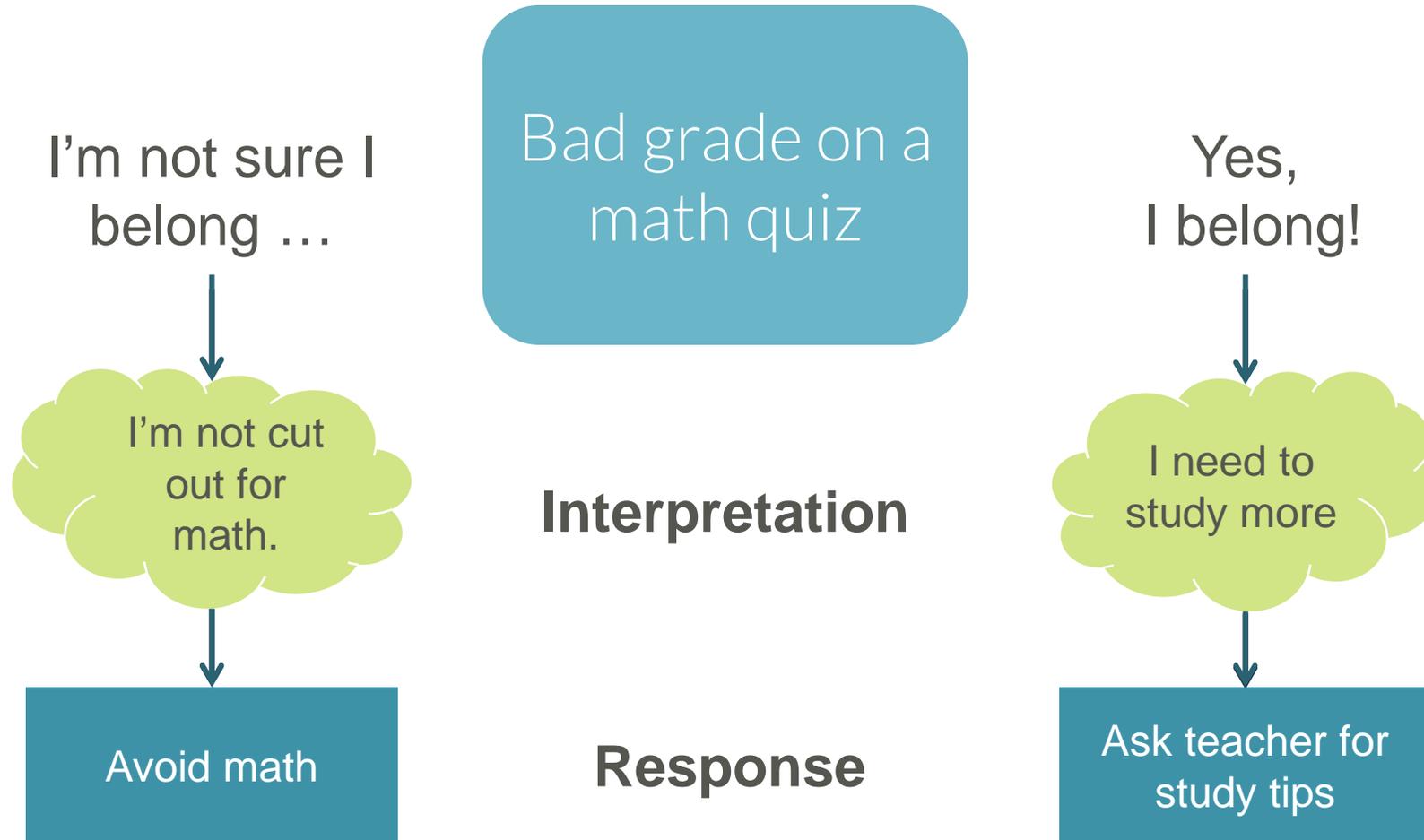


“In the meantime”

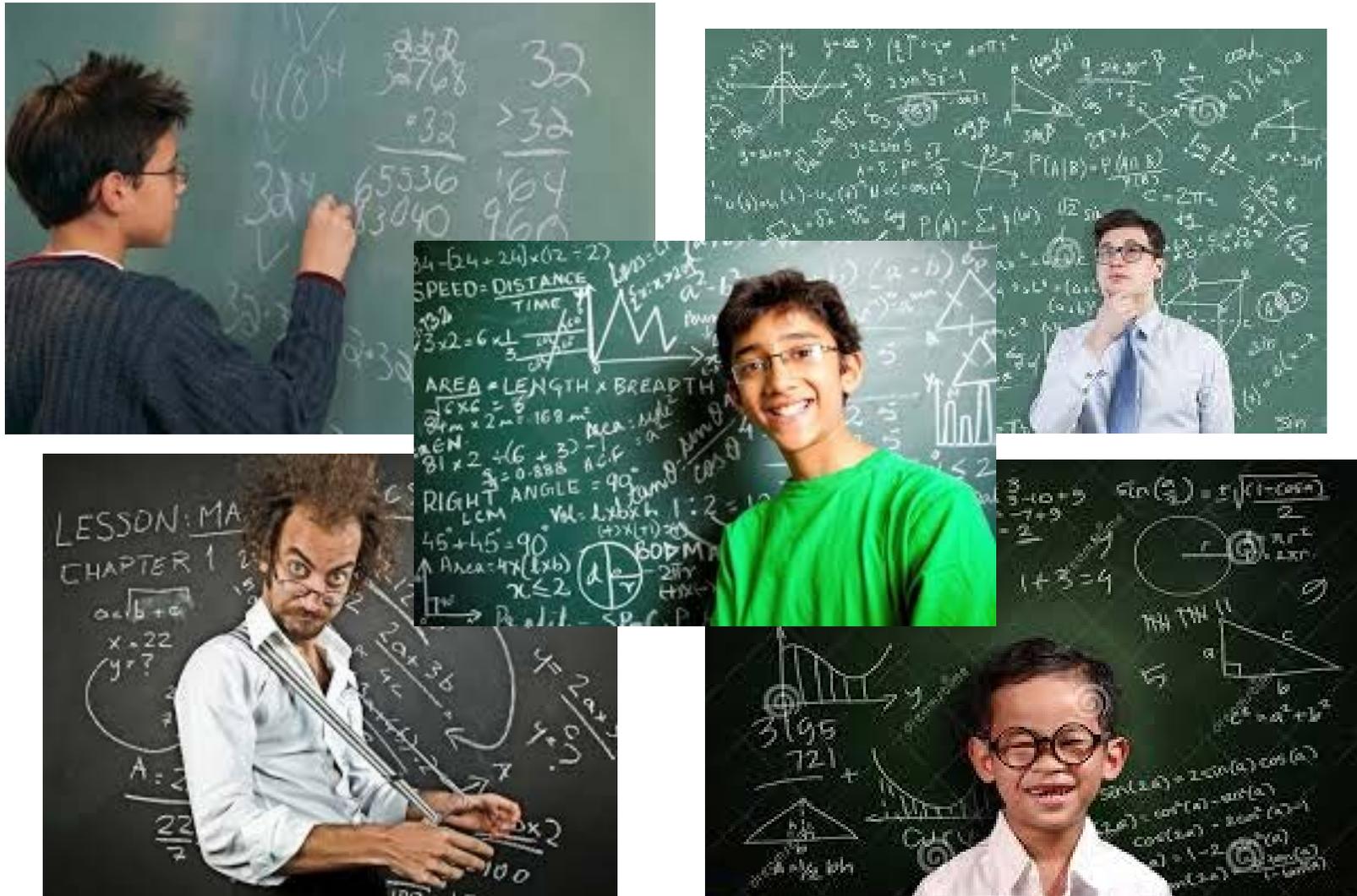
Belonging Is Multidimensional



Do I Fit in Intellectually?



Who Belongs in Math?



First five images from Google Image search for “math genius.”

Math Stereotypes

- Stereotypes about race and gender can act as barriers that prevent girls and students of color from developing interests in STEM.
- “Stereotype threat” is when someone underperforms because of a negative stereotype about how they *should* perform.
- Math anxiety and stereotype threat likely share a common mechanism: working memory.
- Both math anxiety and stereotype threat start early. Children can form automatic associations that affect performance before they even consciously endorse stereotypes.



Girls and Math

“Boys do not pursue mathematical activities at a higher rate than girls do because they are better at math. They do so, at least partially, because they *think* they are better.”

—Shelley Correll,
Stanford Sociologist

What's Inside a Stereotype?

Example: gender stereotype

May represent multiple, intertwined stereotypes (e.g., *cultural fit* and *ability*)

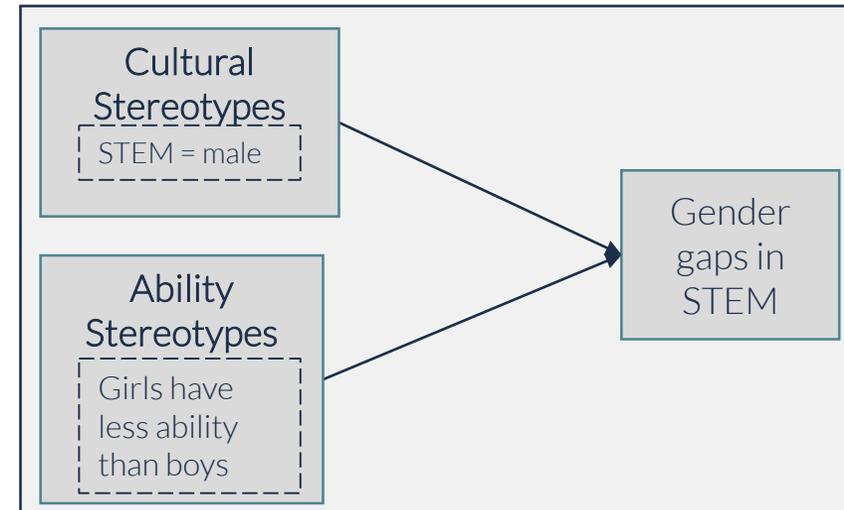


Figure adapted from Cheryan, Master, & Meltzoff (2015)

Counteracting stereotypes can increase interest in STEM among girls and students of color by increasing their confidence and making them feel like they belong in math.

BREAK

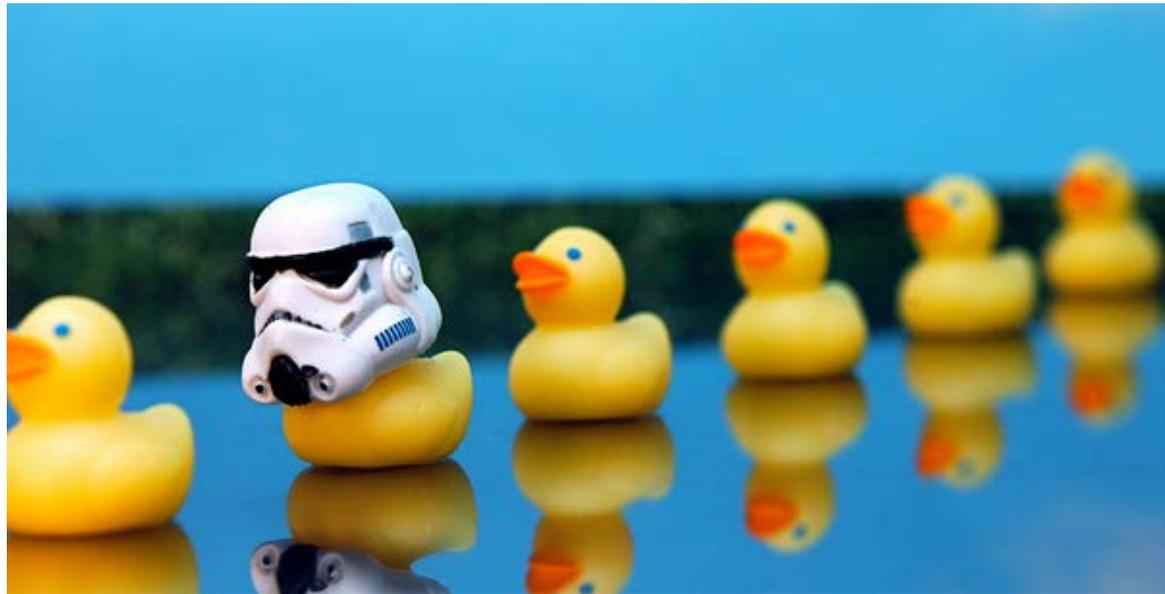


General Classroom Strategies to Promote Belonging

- Create a welcoming, inclusive classroom culture.
 - Work on eye contact, using students' names, and pronouncing names correctly.
 - Be sure the classroom environment doesn't inadvertently signal that only some students belong.
- Build relationships
 - Teacher-student
 - Student-peers
 - Teacher-family

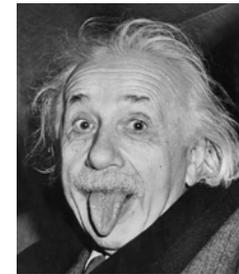


Strategies to Promote
Belonging in Math
Normalizing Uncertainty
Group Membership



Normalizing Uncertainty: It's OK to Struggle

Anyone can be an
engineer or a scientist ...
but can I?



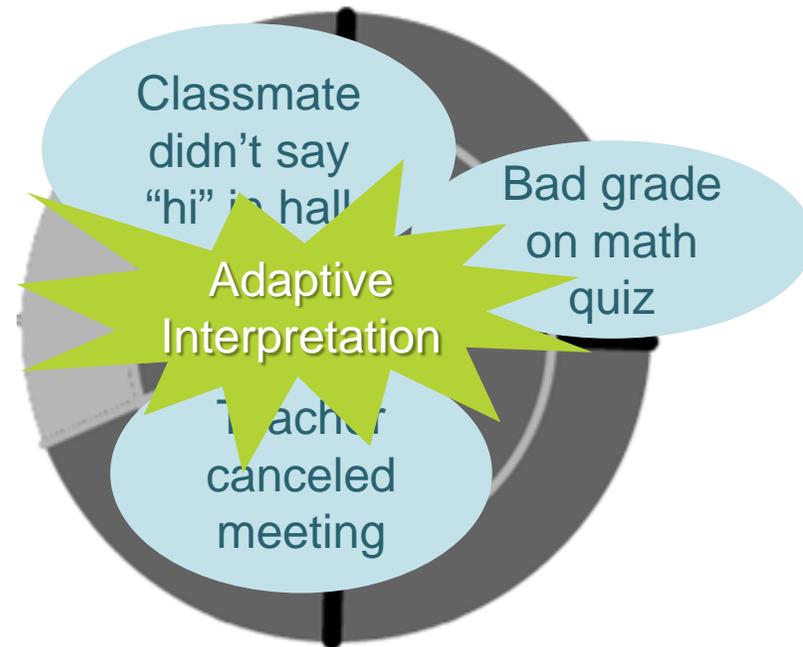
Well, I guess even
EINSTEIN struggled
with math!

How “Struggle Stories” Work

Uncertainty
about belonging



More vigilant



Normalizing Uncertainty Intervention

Help students frame setbacks and anxieties about belonging as **common** and **transitory** instead of proof that they don't belong.



I've been there, too.
It gets better.

Normalizing Uncertainty Intervention

Reflective reading and writing exercise:

Part 1: Students hear first-person stories from more advanced students that convey that it's **typical to worry** about belonging and **normal to struggle** in school (regardless of race, gender, or other background characteristics), and that over time these concerns fade.

Authenticity is important!

Normalizing Uncertainty Intervention

Reflective reading and writing exercise:

Part 2: Saying-is-believing: Writing exercises give students the opportunity to internalize the message.

Strategies to Promote Belonging in Math

Normalizing Uncertainty

Group Membership



Group Membership



Group Membership

“You’re part of
the sun group!”



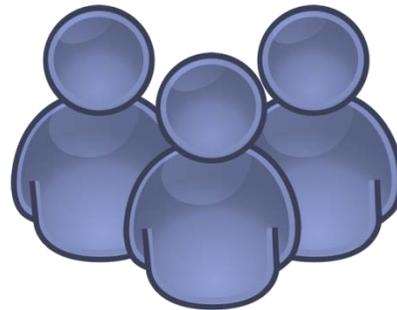
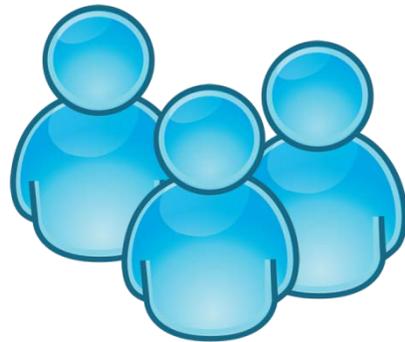
“The blue group
does puzzles”

“You’re the
green one”

Individual condition

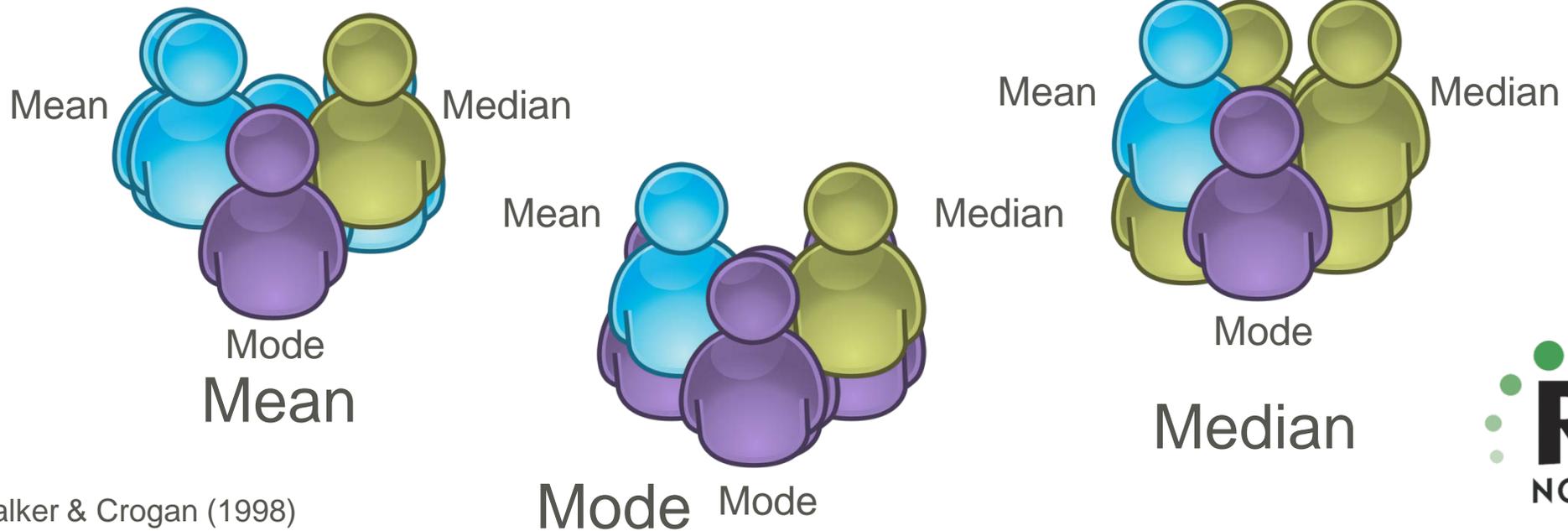
Make Math Collaborative: The Jigsaw Classroom

Method of organizing classroom lessons in a way that fosters relationships. Group members depend on each other and must interact to complete the lesson.



How-To: Jigsaw Classroom

1. Divide students into “expert” groups. Each expert group learns extensively about one component of the lesson.
2. Next, students regroup into “home” groups. Each home group includes one expert on each different component of the lesson.
3. Each expert is in charge of explaining his or her expert topic to the rest of the home group.



A Note of Caution



- Because children are sensitive to social cues, group membership must be used carefully
- Associating groups with activities may increase motivation, but associating groups with an underlying or *fixed* ability at those activities may decrease motivation
- Take care to express that you value each group's contributions equally



Small-Group Activity: Teacher Guides Review

Take each of the two handouts provided and discuss among your table group:

What do you like about the intervention?

What might you have to adapt to make it useful?

What questions do you have about the intervention?



Reflection

What stood out for you, increased your knowledge, or changed your thinking during this session?

What is one thing you learned or discussed today that you will take back and apply to your work with teachers and/or your classroom?

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