Productive Persistence & Grit

The Non-Cognitive Side of Developmental Education Reform

Ann Edwards, WestEd

How can we best support powerful learning and students' persistence and engagement?

1. Make curriculum productively challenging and relevant to students' lives

2. Employ instruction that promotes development of flexible expertise and engages students actively and collaboratively

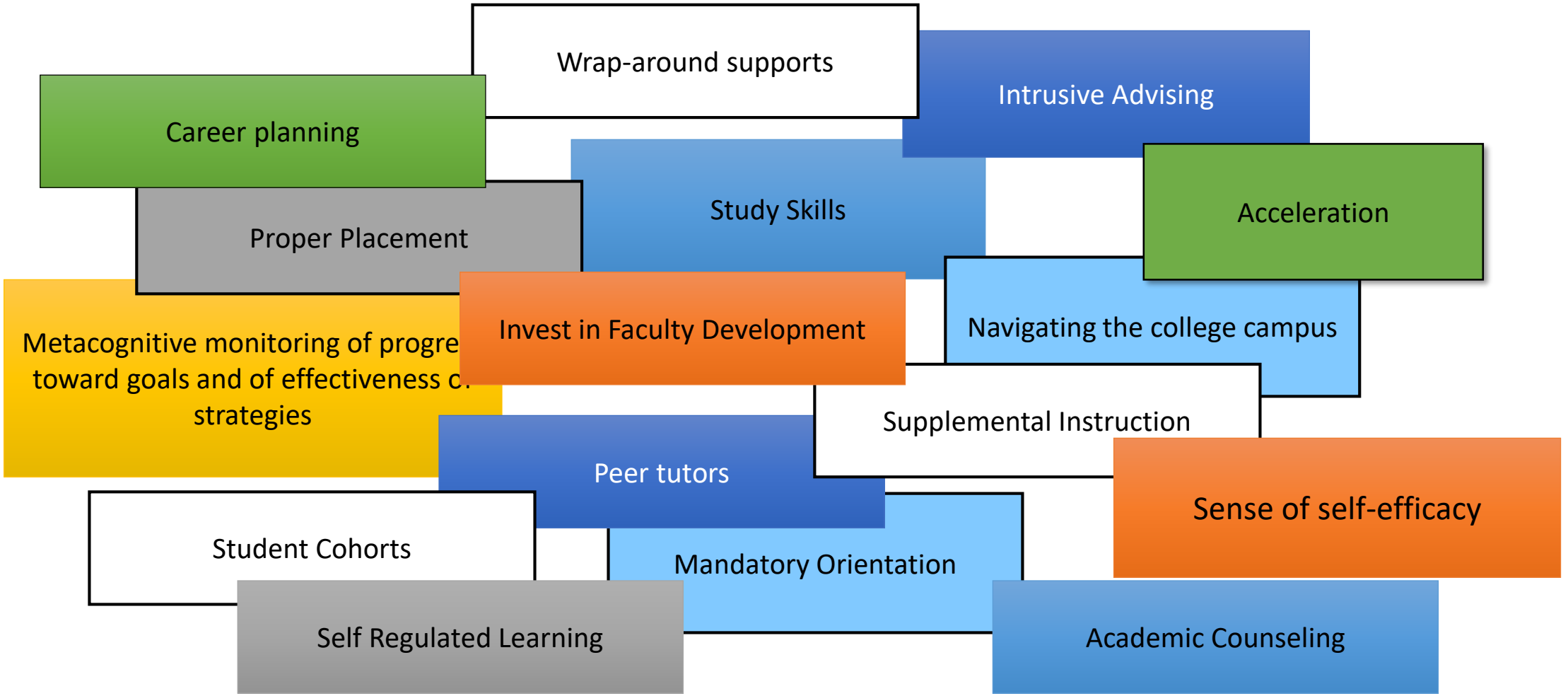
3. Integrate productive persistence directly into curriculum and pedagogy

“Unproductive” Persistence

1000 Students Placed into Elementary Algebra:

- 50% started college > 3 years ago
- 20% started college > 5 years ago
- 8% started college > 10 years ago
- 2.5% started college 20 years ago or more

"Solutionitis"
The Search for the Perfect "Widget"



The Student Perspective

When students are faced with a challenge and are struggling, what do they often say and do?

A student, upon completing a diagnostic assessment in a developmental math course:

I am embarrassed by how stupid I am and suddenly feeling very discouraged … I can't even tell which fraction is bigger than another, or where they should fall on the number line. I feel like crying.

Promising Ideas Exist

- In Research and Psychology

  Brief and inexpensive interventions with large and enduring effects from K-12 and 4-year settings.

- In the Field

  Effective faculty interventions exist but are not widely tested and shared.

Productive Persistence: Tenacity + Good Strategies

Aim: Students continue to put forth effort during challenges and when they do so they use effective strategies.

Growth Mindset	• Students believe they are capable of learning.
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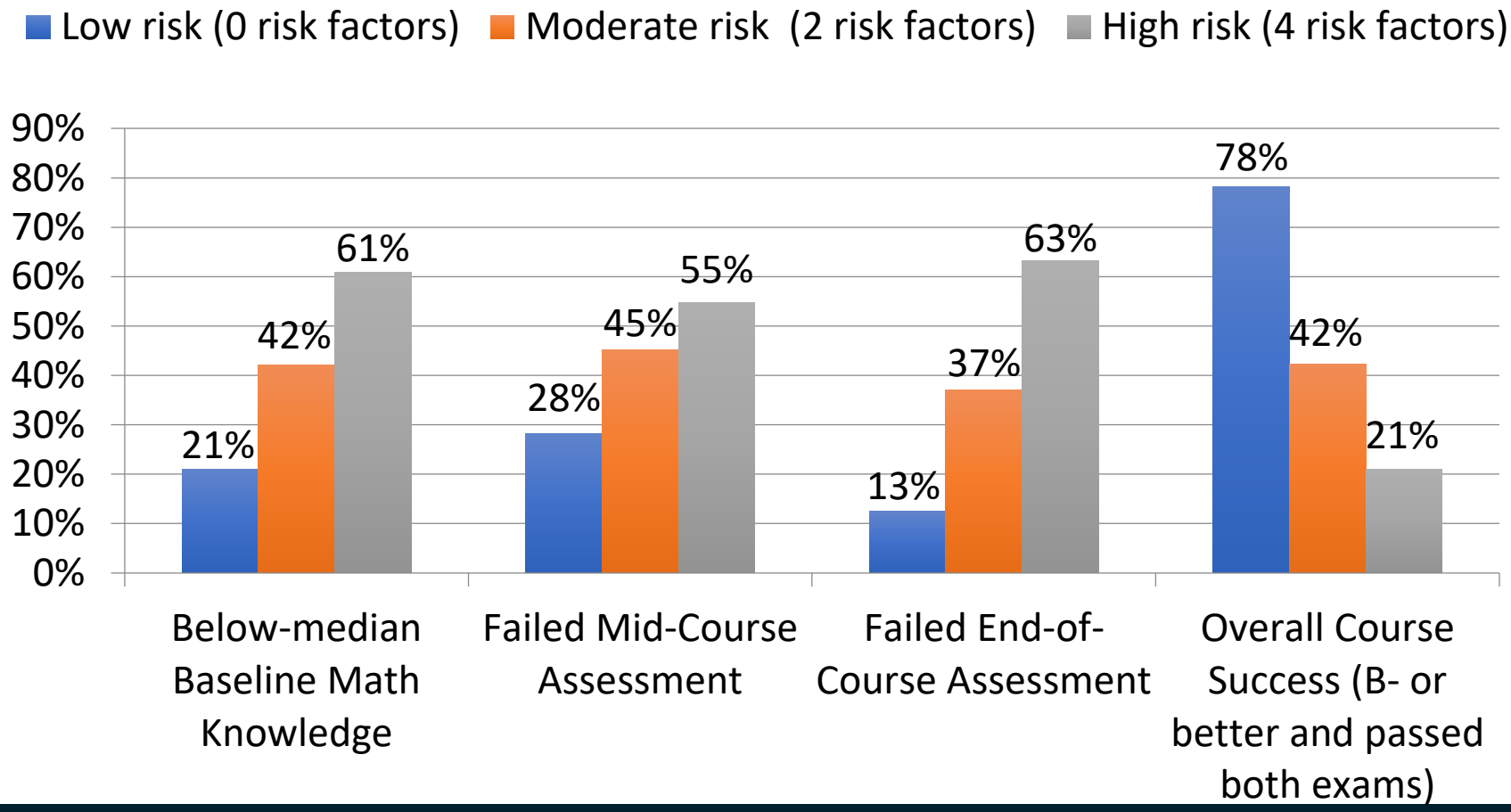
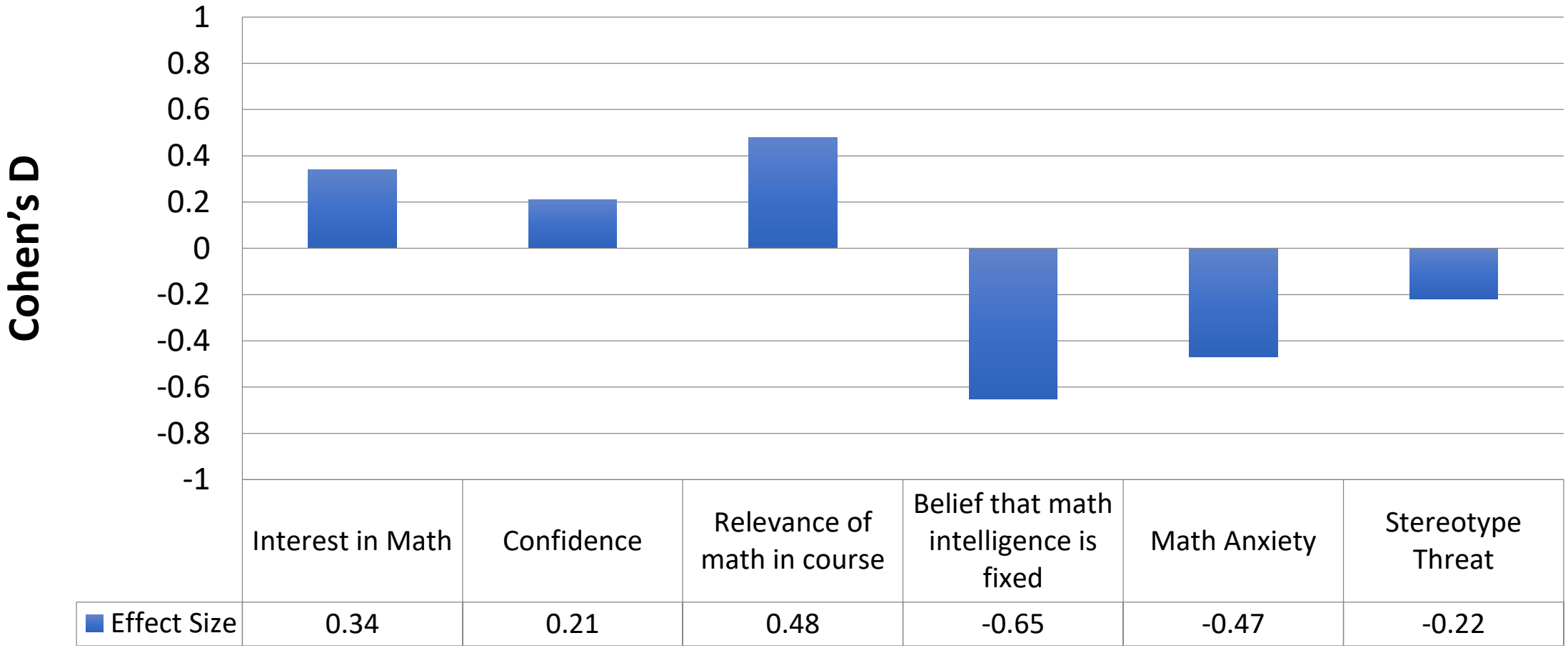
Support	• Faculty and college support students' skills and mindsets.

Do These Drivers Matter for College Students?

Dev math students categorized as "at risk" or not based on survey of the 4 drivers in week 1



Starting Strong: Can we change students' beliefs and attitudes in 3 weeks?



	Interest in Math	Confidence	Relevance of math in course	Belief that math intelligence is fixed	Math Anxiety	Stereotype Threat
Effect Size	0.34	0.21	0.48	-0.65	-0.47	-0.22

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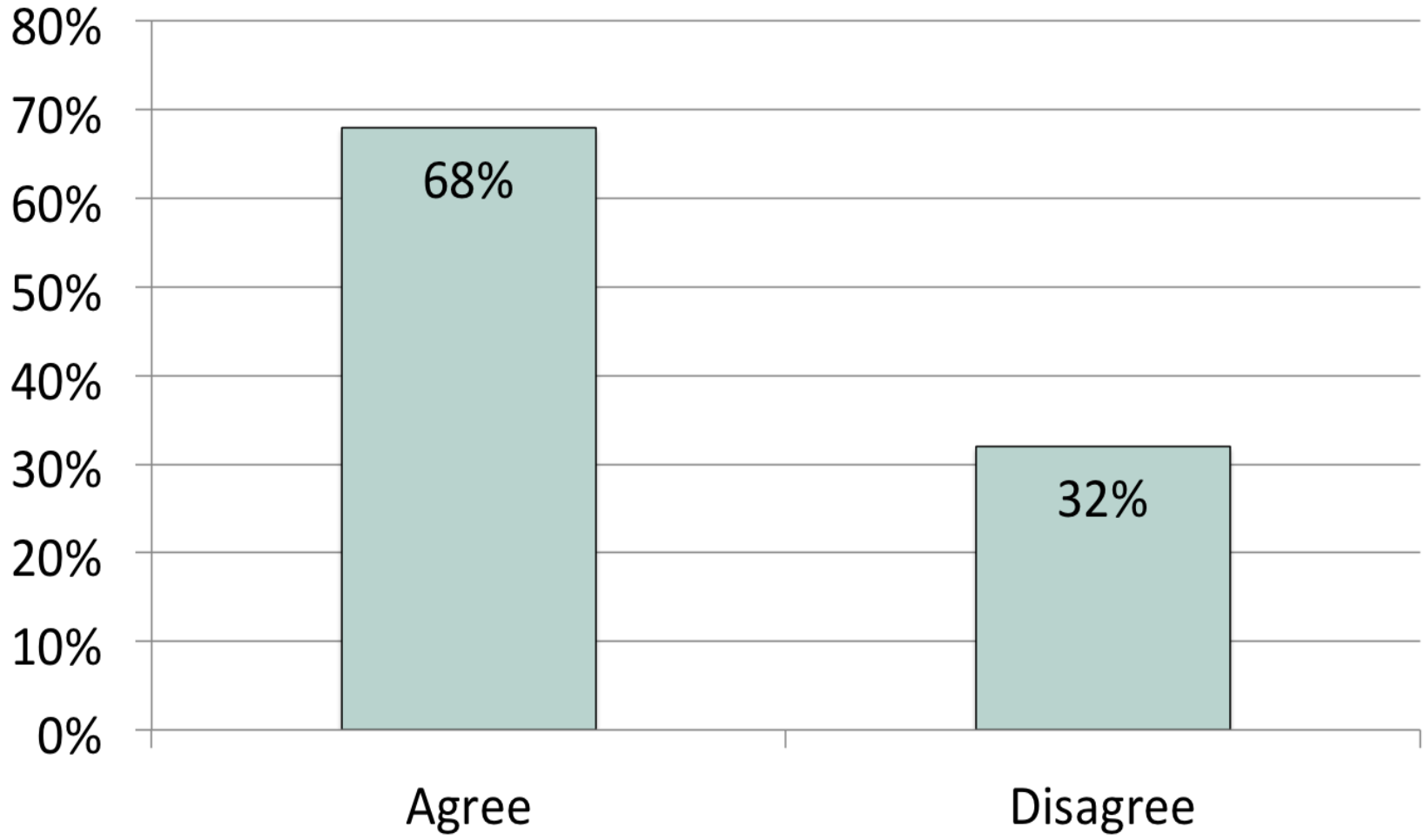
"Being a 'math person' or not is something about you that you really can't change. Some people are good at math and other people aren't."

Students believe they are capable of learning.



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Mindsets about Ability

Fixed Mindset (intelligence is fixed)

- "If I have to try hard, I'm clearly not smart."
- There is no point in trying if one is not a "natural."
- If you're "dumb", you have to rely on "luck."

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Mindsets about Ability

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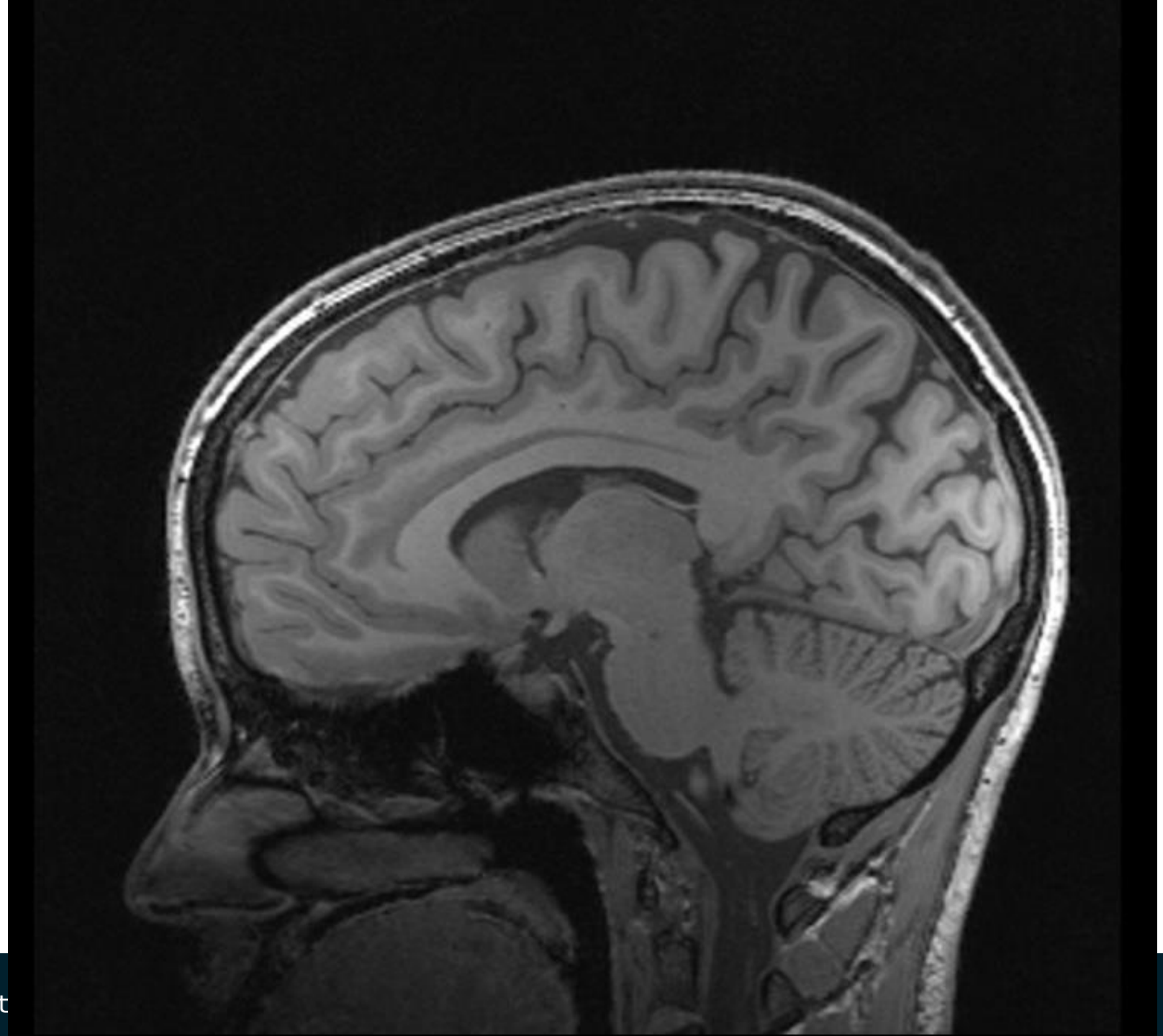
Growth Mindset (intelligence is malleable)

- "Trying harder makes you smarter."
- Obstacles can be overcome through effort, help from others, and use of improved strategy
- Note: It's NOT just about effort. Also strategy and help.



Students believe they are capable of learning.

You Can Grow Your Brain

New Research Shows the Brain Can Be Developed Like a Muscle

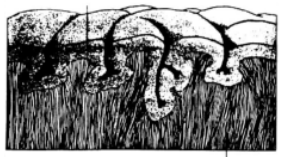
By: Lisa S. Blackwell and David S. Yeager

Many people think of the brain as a mystery. We don't often think about what intelligence is or how it works. And when you do think about what intelligence is, you might think that a person is born either smart, average, or dumb—either a "math person" or not—and stays that way for life.

But new research shows that the brain is more like a muscle—it changes and gets stronger when you use it. Scientists have been able to show just how the brain grows and gets stronger when you learn.

Everyone knows that when you lift weights, your muscles get bigger and you get stronger. A person who can't lift 20 pounds when they start exercising can get strong enough to lift 100 pounds after working out for a long time. That's because muscles become larger and stronger with exercise. And when you stop exercising, the muscles shrink and you get weaker. That's why people say "Use it or lose it!"

But most people don't know that when they practice and learn new things, parts of their brain change and get larger, a lot like the muscles do. This is true even for adults. So it's not true that some people are stuck being "not smart" or "not math people." You can improve your abilities a lot, as long as you practice and use good strategies.



Inside the outside layer of the brain—called the cortex—are billions of tiny nerve cells, called neurons. The nerve cells have branches connecting them to other cells in a complicated network. Communication between these brain cells is what allows us to think and solve problems.

HEALTH & SCIENCE News You Can Use

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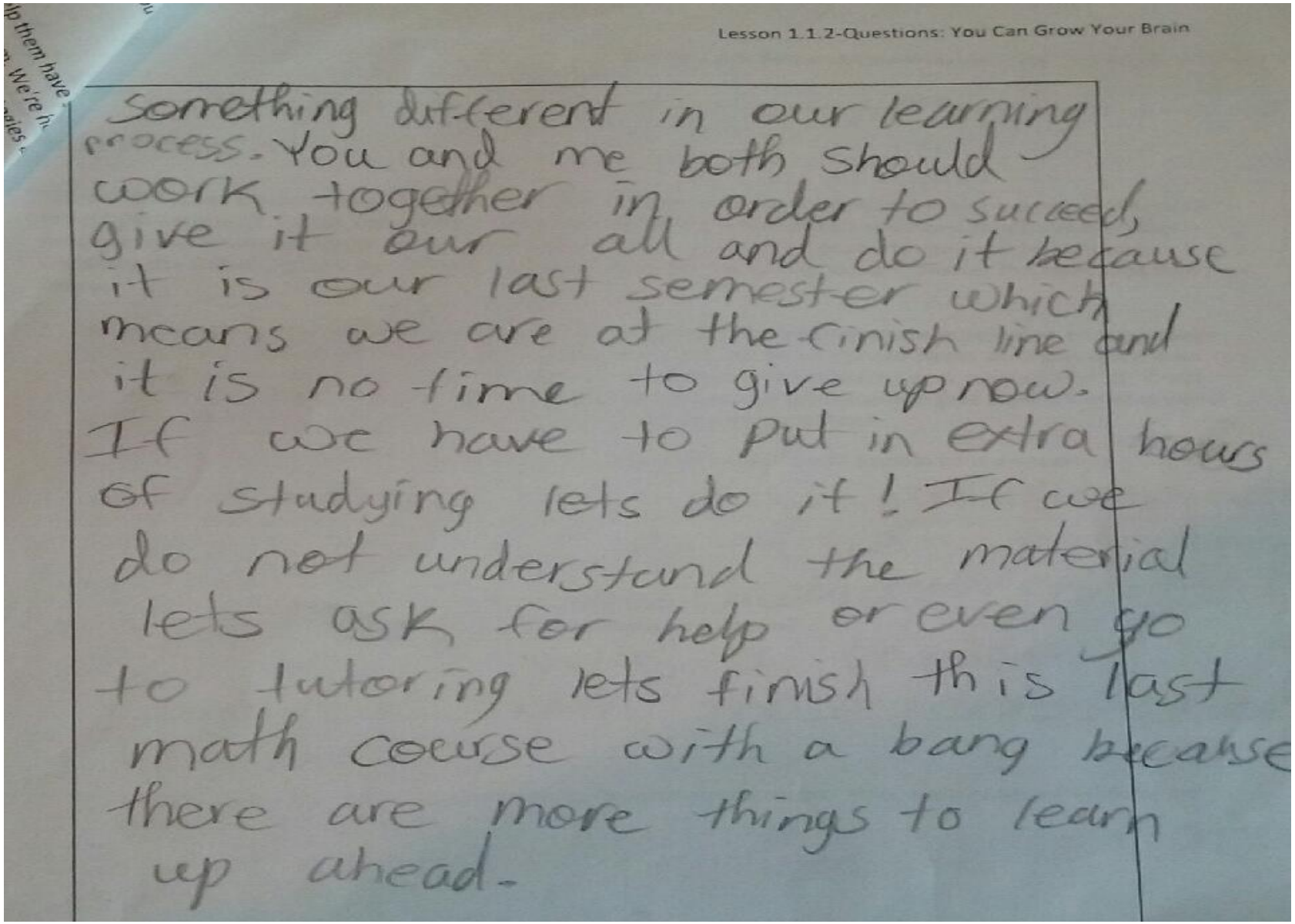
"Most people don't know that when they practice and learn new things, parts of ***their brain change*** and get larger, a lot like the ***muscles*** do. This is true **even for adults**. So it's not true that some people are stuck being "not smart" or "not math people." ***You can improve*** your abilities a lot, as long as you ***practice*** and ***use good strategies***."

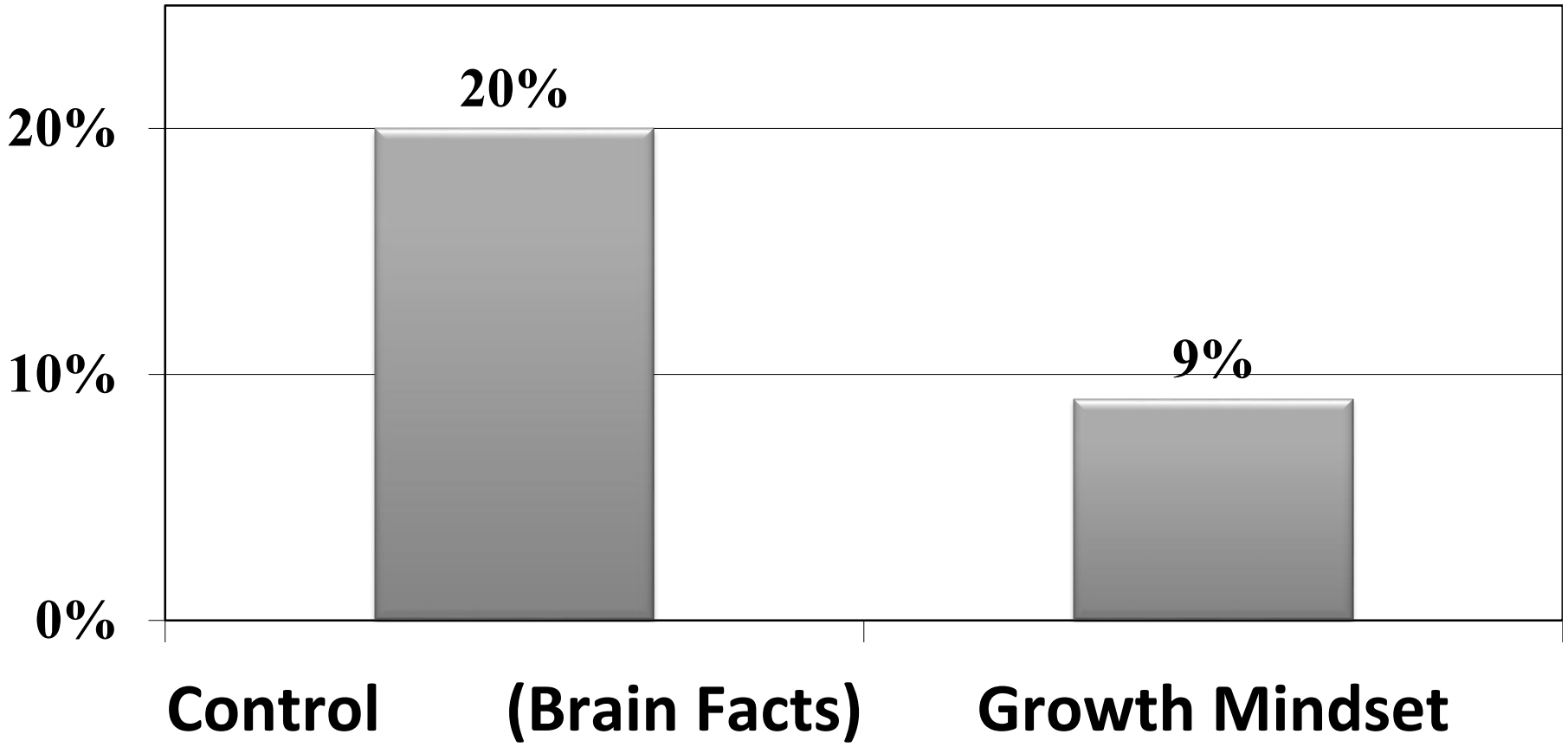
A letter to a future student


Lesson 1.1.2-Questions: You Can Grow Your Brain

something different in our learning process. You and me both should work together in order to succeed, give it our all and do it because it is our last semester which means we are at the finish line and it is no time to give up now. If we have to put in extra hours of studying lets do it! If we do not understand the material lets ask for help or even go to tutoring lets finish this last math course with a bang because there are more things to learn up ahead.

Students believe they are capable of learning.

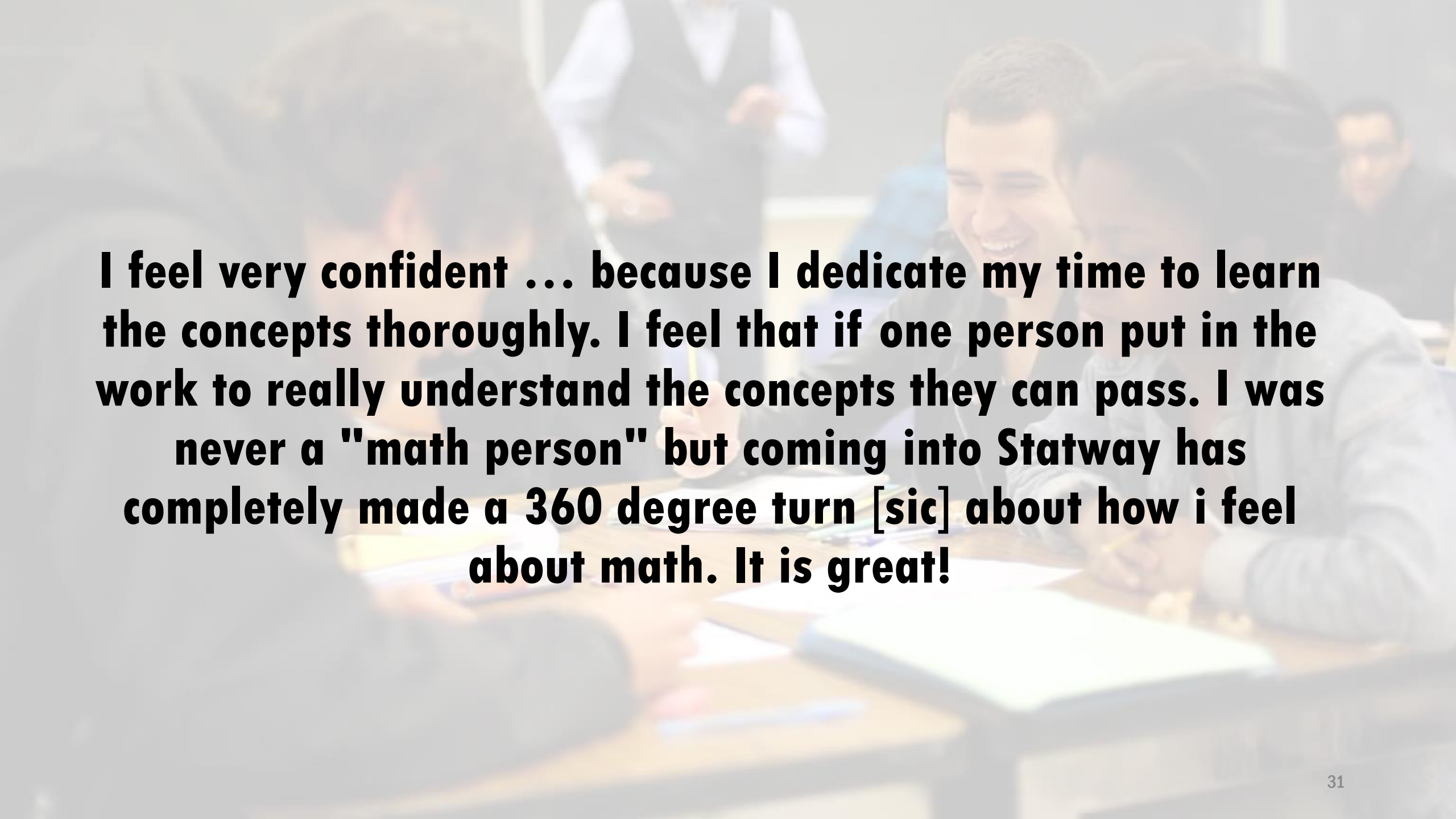
Course Dropout in Developmental Math



51% decrease
~40 minutes
$0

In collaboration with:
Greg Walton,
Dave Paunesku,
Carol Dweck,
Carissa Romero,
Roberta Carew,
& www.perts.net

N = 288, Z = 2.87, p = .004



I feel very confident … because I dedicate my time to learn the concepts thoroughly. I feel that if one person put in the work to really understand the concepts they can pass. I was never a "math person" but coming into Statway has completely made a 360 degree turn [sic] about how i feel about math. It is great!

How can you create a classroom culture that supports a growth mindset?

Students believe they are capable of learning.

Everyday Phrases — The what

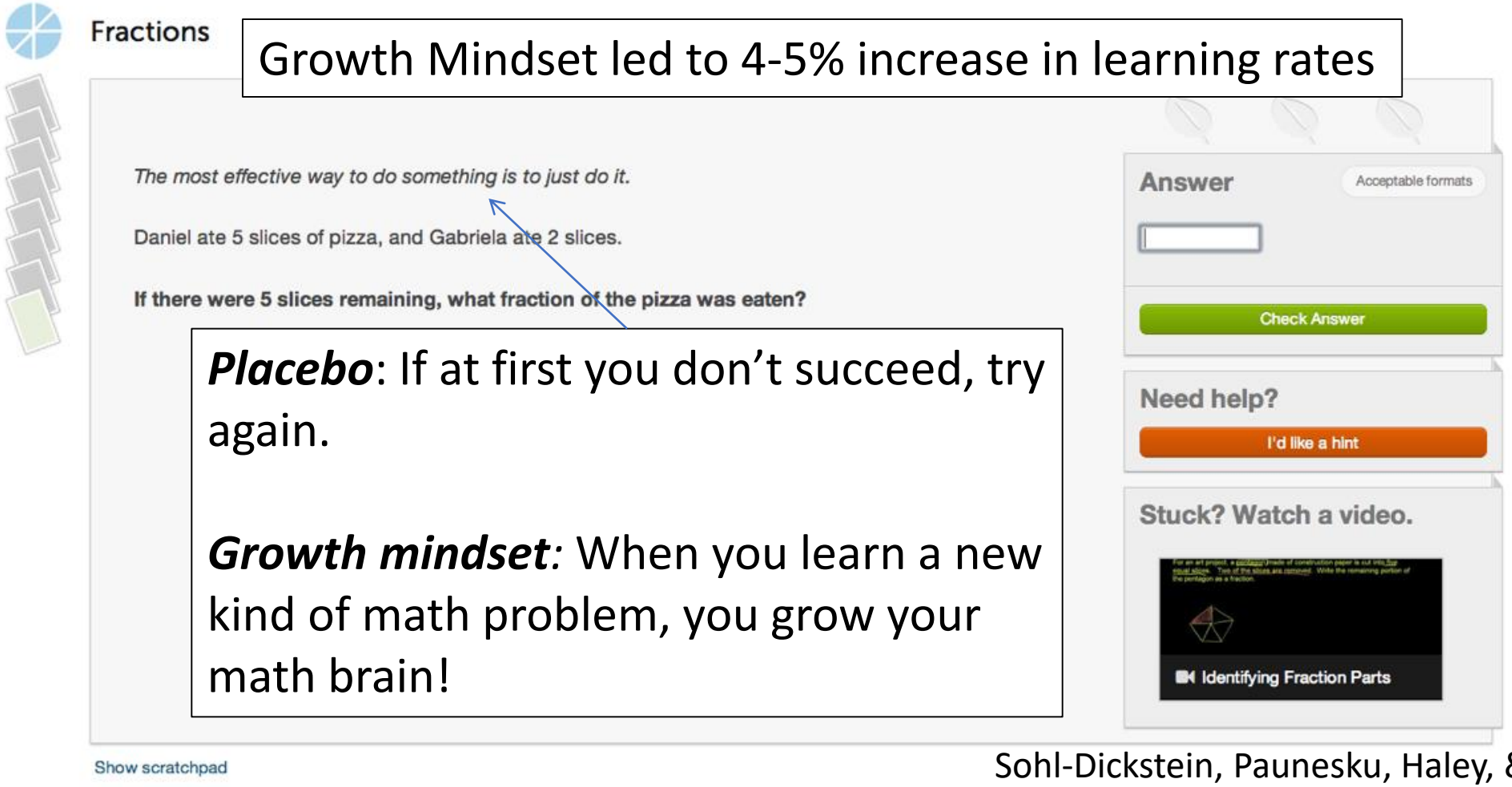
- Overall goal: Emphasize the **process** of learning

  We want to create in students a mindset in which the *process*—the thing students can most readily control—is the most relevant part of being a good student. Natural ability should be seen as irrelevant.

- The process is made up of:
  - Sustained **Effort**
  - Good **Strategies**
  - Seeking **Help**

Students believe they are capable of learning.

Khan Academy Growth Mindset Phrases Study



Sohl-Dickstein, Pauneskу, Haley, & Williams (in prep).

N ~ 265,000

Students believe they are capable of learning.

Everyday Phrases - Examples

Encouragement after difficulty

> "Struggling is part of learning – it doesn't mean you can't get it. Your brain is making connections that are not yet strong."

instead of

> "You would have done better had you tried harder."

Students believe they are capable of learning.

Everyday Phrases - Examples

Critical Feedback

"We have high standards in this class. I wouldn't hold you to them if I didn't think you could do it. Let's set aside time to review your writing together."

instead of

"I really like your ideas. Most of the writing didn't make sense. But I can see you were passionate."

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Belonging Uncertainty (Walton & Cohen, 2007)

Students feel socially tied to peers, faculty, and the course.

- People may commonly question their belonging in new social and academic settings
  - Especially when they are targeted by stigma and negative stereotypes (Goffman, 1963; Cohen & Steele, Steele, 1997; Steele, Spencer, & Aronson, 2002)
- This uncertainty makes the meaning of negative social events more ambiguous (Crocker et al, 1991; Cohen, Steele, & Ross, 1999)
  - After each negative event, they have to ask: "Do I belong here or don't I?"

Students feel socially tied to peers, faculty, and the course.

Interviews with Students

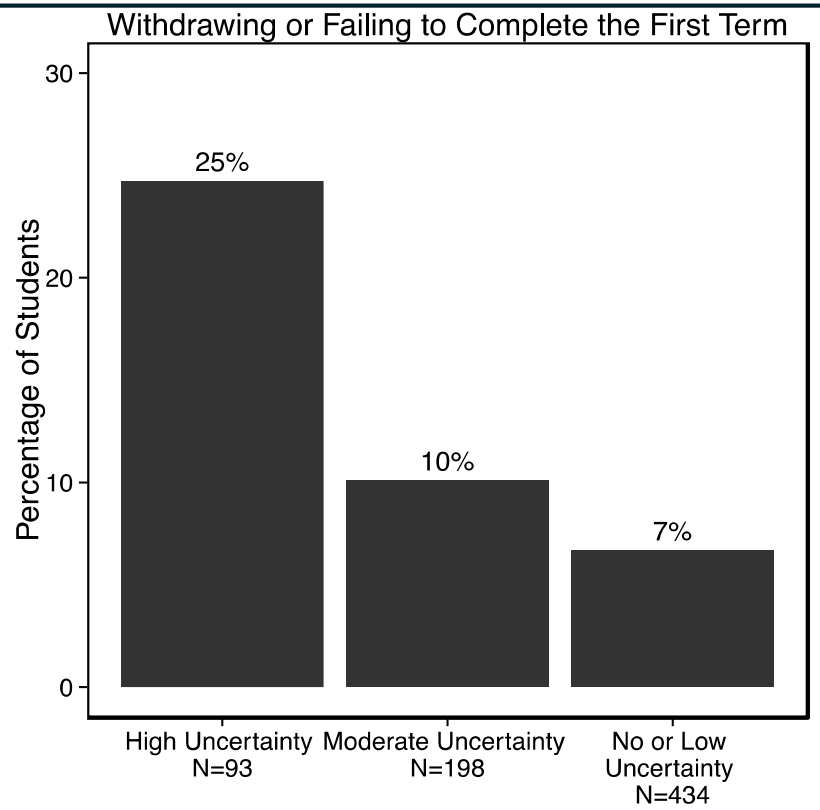
- "I'm embarrassed to be at community college because high school teachers said I would end up at community college because I'm lazy"

- "I don't have any friends here. In between classes, I sit in my car and see everyone talking to others and I wonder: how did everyone else make friends?"

- " I felt that if I stopped coming no one would even notice."

"How often, if ever, do you wonder: Maybe I don't belong here?'"

Students feel socially tied to peers, faculty, and the course.



(a) Course Withdrawal ($\chi^2(1)\, p < 0.001$)

Figure 26: Belonging uncertainty after four weeks. High uncertainty: response = 1 or 2; moderate uncertainty: response = 3; no or low uncertainty: response = 4 or 5.

Students feel socially tied to peers, faculty, and the course.

Trust

- Trust is a “cognitive leap”
  (Bryk et al., 2002; Cohen et al., 1999; Gambetta, 1988)
  - An assumption that another party’s intentions are good
  - An expectation that one will be dealt with fairly

- Trust frames the meaning of ambiguous interpersonal treatment
  (Asch, 2007)

Building community and trust from Day 1: Starting Strong Package

Students feel socially tied to peers, faculty, and the course.

Anishinaabeg's Seven Grandfather Teachings

A multi-pronged approach to promoting sense of belonging

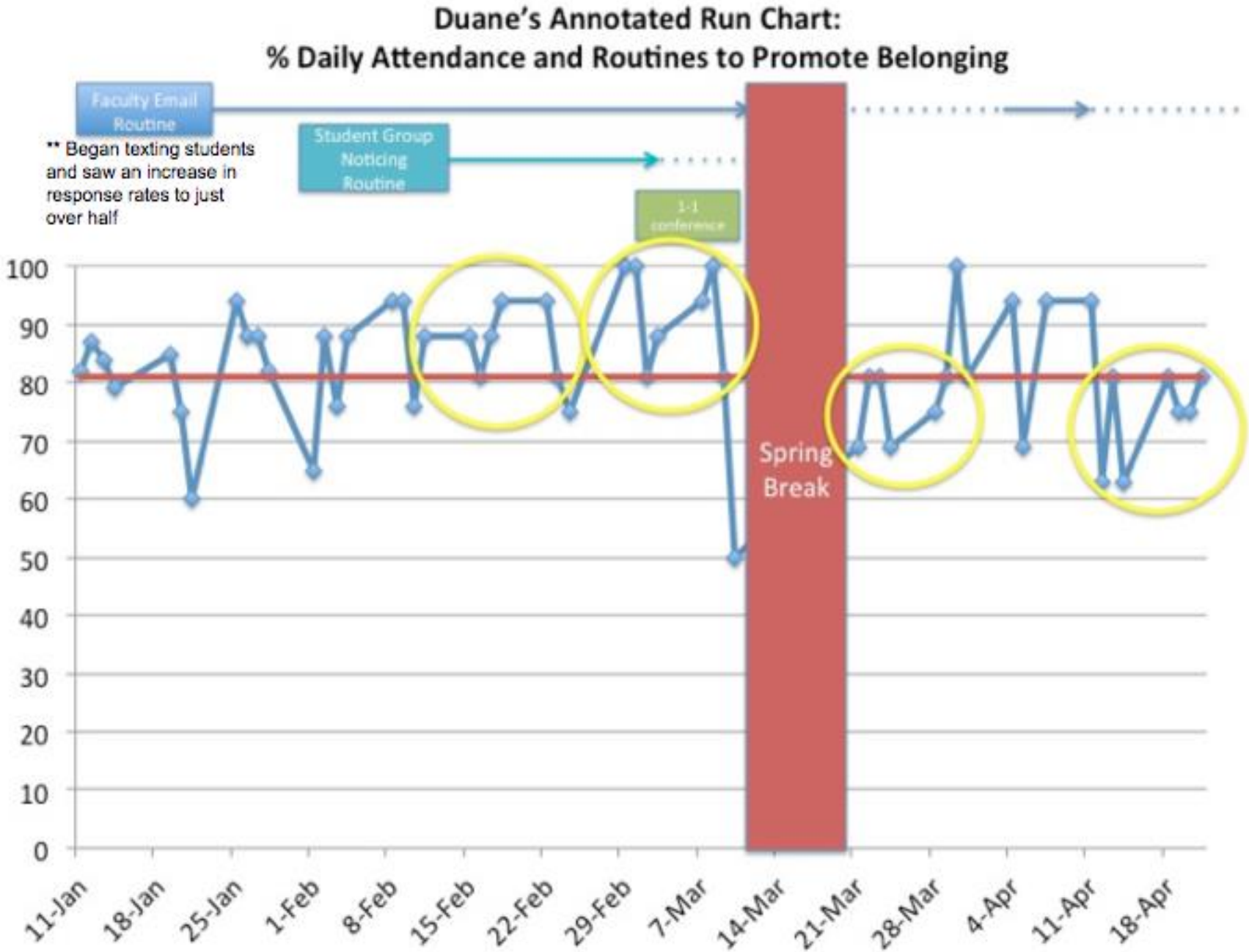
Students feel socially tied to peers, faculty, and the course.

- Contract activity
- Faculty Email Routine: Absences

  Regular email communication routines from faculty to absent students
- Student Group Noticing Routine

  Phase 1, student teams are formed and they exchange contact information. Phase 2, students contact absent students to relay information and encourage the missing students to attend the next class.

Students feel socially tied to peers, faculty, and the course.



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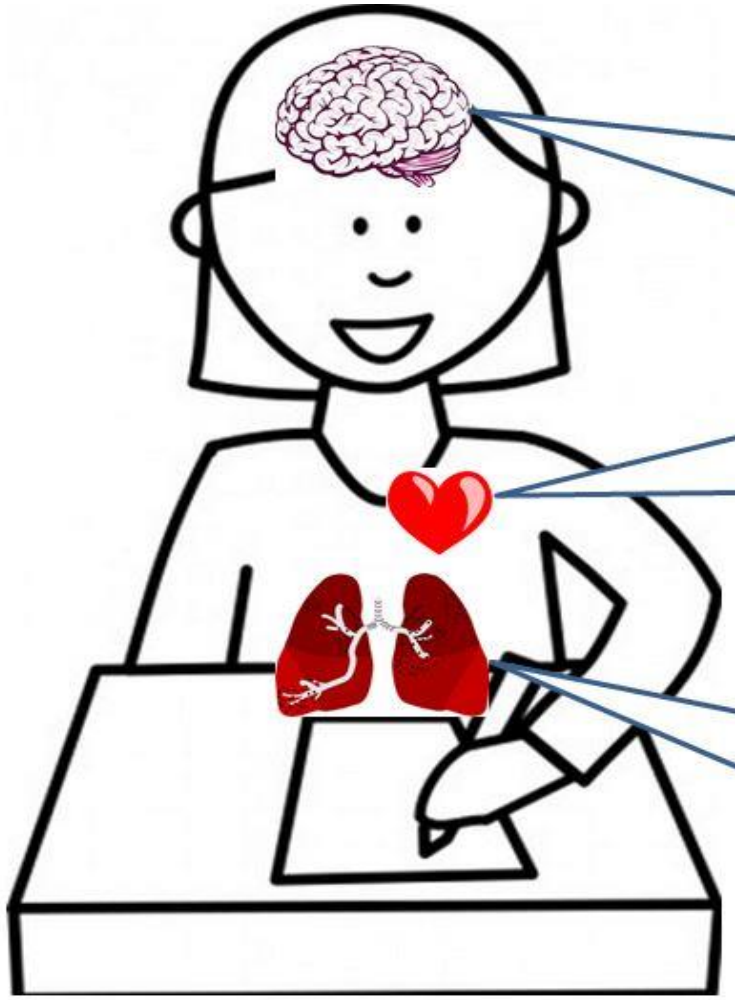
Emotional Regulation Strategies: Including Stress Reappraisal



Stress releases chemicals that help you think more quickly & solve problems better.

Maybe you've even heard of one of these chemicals before: Adrenaline.

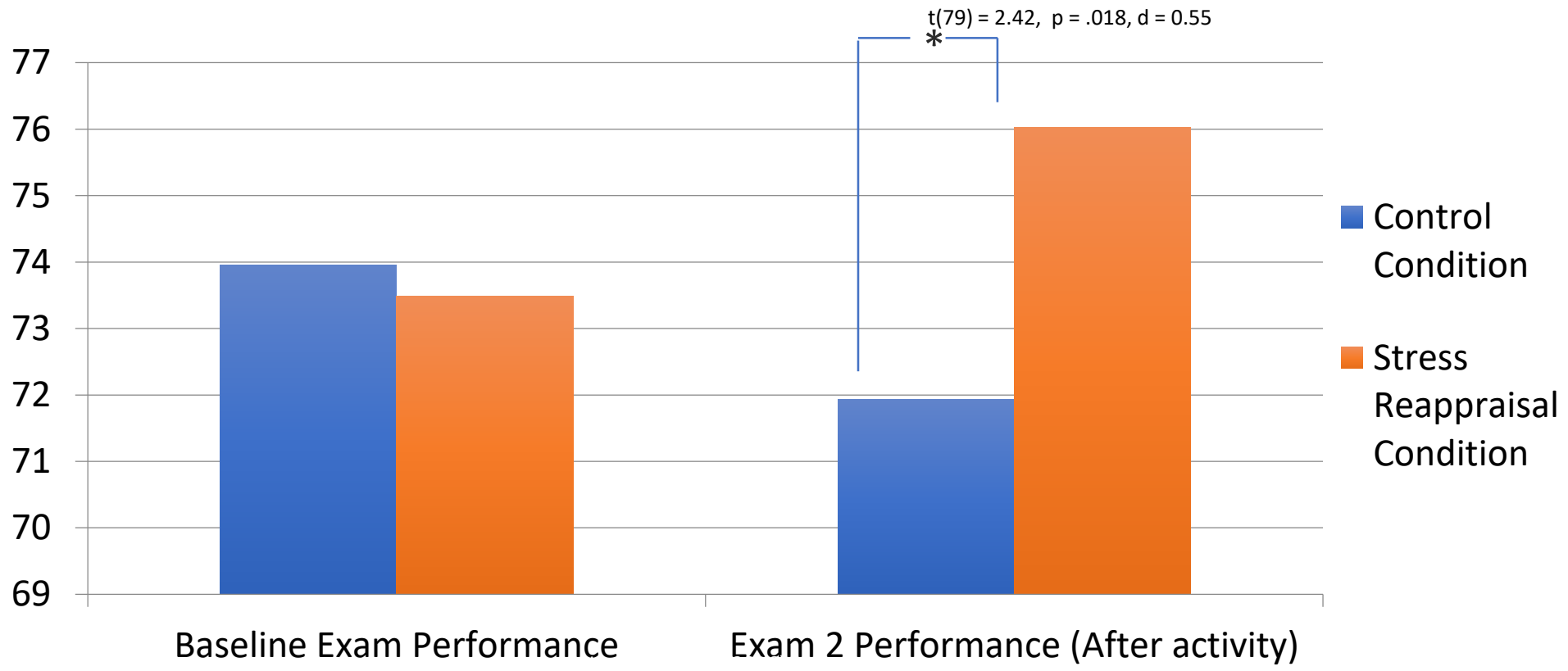
Stress increases your heart rate so it can deliver fuel to your brain to help you think.

Your heart sends oxygen to fuel your brain.

Stress speeds up your breathing. You might even feel short of breath.

This is okay because it means your body has lots of oxygen to help you do well.

Impact of Stress Reappraisal Activity for Quantwa Students



Skills, Habits, and Know-How

- Many students often study long hours, but continue to fail because they are using ineffective strategies
- Shallow learning strategies, like highlighting or rereading, should not be the only strategies used by students
- Deeper learning strategies that involve metacognition lead to longer retention of information (Dunlosky et al, 2013)
- Self regulated learners go through a four stage cycle (Zimmerman, 2011):
    - Information gathering about the task at hand
    - Goal setting and planning
    - Enacting
    - Adaptation

Routines to Promote Metacognition

Intro Tickets

- What is one thing you feel confident in?
- What is one thing you still have questions about?

Exit Tickets

- end of class
- end of a lesson or module

"Great activity. Simple, doesn't take much time and reveals surprising info."

"Students come to class ready with their questions."

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Effective faculty professional development for instructional improvement

Sustained

Flexible and responsive

Designed for collaboration

Grounded in real teaching

Job-embedded

Theory related to practice

The Bottom Line

- Productive Persistence significantly increases student performance and **transforms students' conception of themselves as learners**
- **More effective when embedded within a course** itself than in a separate 'student success' course
- The interventions themselves are relatively simple, short, and low cost, but they **require faculty to take on a new role**
- **Faculty professional development is essential**
- **ROI is huge** - faculty extend this to ALL their courses and engage their peers in other disciplines

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Questions

- What are you already doing to support faculty professional learning about productive persistence on your campus?
- What else would you like to do? What's one new thing you can do this semester?
- What challenges do you face implementing productive persistence? What are some strategies to overcome them?