Mindsets:
Helping Students To Fulfill Their Potential

California Algebra Forum IV
San Jose, CA
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Learner or Non-learner?

“I don’t divide the world into the weak and the strong, or the successes and the failures… I divide the world into the learners and non-learners.”

-- Benjamin Barber
You don’t see unmotivated babies!
Yet many of the things we do to help and to motivate our students make them into non-learners.
T A L E N T
NORTH WEST
THE SEARCH IS ON!
How do we make sure our students remain learners?
Mindsets Matter

**Fixed Mindset:** Intelligence is a fixed trait

**Growth Mindset:** Intelligence is a malleable quality; a potential that can be developed
Mindsets Matter

• Which mindset is correct?
• Do people hold the same mindset in different areas?
• Can mindsets be changed?
Brain Plasticity
Mindsets Matter

- Which mindset is correct?
- Do students hold the same mindset in different areas?
- Can mindsets be changed?
How Do Mindsets Work?

The Mindset Rules
Mindset Rule #1

Fixed Mindset:
LOOK SMART AT ALL COSTS

Growth Mindset:
LEARN AT ALL COSTS
Transition to 7th Grade

• Followed hundreds of students across difficult transition
• Measured their mindsets
• Measured their attitudes toward learning
• Monitored their grades in math for two years
Moser et al., 2011

Fixed Mind-Set

Growth Mind-Set

150–550 ms

0 μV

13.75 μV
Achievement in Junior HS
Blackwell, Dweck, & Trzesniewski (2007)

Math Grades

Entering Academic Year | Fall Year 1 | Spring Year 1 | Fall Year 2 | Spring Year 2
--- | --- | --- | --- | ---
growth mindset | fixed mindset

Graph showing the comparison between fixed and growth mindset on Math Grades from entering academic year to spring year 2.
Pre-Medical Students
Grant & Dweck, 2003
Organic Chemistry Grades
Learners and Non-Learners in Action

Mangels, Butterfield, Lamb, Good & Dweck, 2006
Paying Attention to Learning

**Ability-Relevant Feedback**

- Question: “What is the capital of Australia?”
- Person types answer
- * or *
- Correct answer

- 1.5 s
- 1 s
- 1.5 s
- 2 s

**Learning-Relevant Feedback**
Mindset Rule #2

Fixed Mindset: 
IT SHOULD COME NATURALLY

Growth Mindset: 
WORK HARD, EFFORT IS KEY
Trying is the first step towards failure.
Mindset Rule #2

Fixed Mindset:
IT SHOULD COME NATURALLY

Growth Mindset:
WORK HARD, EFFORT IS KEY
Do Geniuses Work--
Or Does it Just Come Naturally?

MARIE CURIE
Mindset Rule #3
IN THE FACE OF SETBACKS…

Fixed Mindset: It’s about me
HIDE MISTAKES
CONCEAL DEFICIENCIES

Growth Mindset: It’s about learning
CAPITALIZE ON MISTAKES
CONFRONT DEFICIENCIES
After Setback

Fixed Mindset:

“I’d spend less time on this subject from now on.”

“I would try not to take this subject ever again.”

“I would try to cheat on the next test.”

Growth Mindset:

“I would work harder in this class from now on.”

“I would spend more time studying for the tests.”

Blackwell, Trzesniewski and Dweck, 2007
Fixed Mindset provides no recipe for recovering from failures:

- Giving up, retreating to comfort zone
- Blaming others
- Trying to feel superior
How Are Mindsets Transmitted?

Our language tells students what we believe and what we value

Messages About What is Valued

• Genius talk
• What is praised and rewarded
• Can create an atmosphere of judgments vs. development
Praise Kids
Non-Verbal IQ Test

Standard Progressive Matrices (Raven, 1976)
Messages About What We Value

- **Intelligence Praise:** “Wow, that’s a really good score. You must be smart at this.”

- **Effort (Process) Praise:** “Wow, that’s a really good score. You must have tried really hard.”

- **Control Group:** “Wow, that’s a really good score.”
Intelligence vs. Effort Praise

- Mindset: Fixed vs. Growth
- Goals: Looking smart vs. Learning

After Difficult Trial:
- Confidence/ Enjoyment/ Performance
Lying

Students who misrepresented their scores

Intelligence
Control
Effort

Type of Praise Given
What to Praise

• Effort, struggle, persistence despite setbacks, but not just effort…
• Strategies, choices
• Choosing difficult tasks
• Learning, improving
Yesterday’s Praise:

- Look, you got an A without really working. You’re really good at math!

- You did that so quickly and easily. That’s impressive!
Tomorrow

• You got an A without working. An A is nice, but you must not be learning much.

• You did that so quickly and easily. I’m sorry I wasted your time. Let’s do something you can learn from.
Teachers’ Practices in Math

![Preferred Pedagogical Practices Diagram]

- **Comfort for Low Ability**
  - Study 2 (Theories Manipulated)
  - Study 3 (Theories Measured)

- **Unhelpful Strategies**
  - Study 2 (Theories Manipulated)
  - Study 3 (Theories Measured)

- **Preferred Practices**
  - Entity
  - Incremental

Stars indicate significant differences.
...yet
The Power of Yet

• I’m not good at ______…
• I can’t do ______…
• I tried but it didn’t work…
Changing Mindsets
A Mindset Workshop

- **Control Group:** 8 sessions of great study skills.

- **Growth Mindset Group:** 8 sessions of study skills + the growth mindset.
You Can Grow Your Intelligence
New Research Shows the Brain Can Be Developed Like a Muscle

Many people think of the brain as a mystery. They don’t know much about intelligence and how it works. When they do think about what intelligence is, many people believe that a person is born either smart, average, or dumb—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. And 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 the 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 muscles do when they exercise.

Inside the cortex of the brain 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.
The brain is a network of cells (neurons)
The cells communicate through chemical messages
The messages signal other neurons whether to fire or not
Math Grades
(Blackwell, Trzesniewski, & Dweck)
Percent Showing Increased Motivation

Control: 9
Growth: 27
Effects of Intervention on Math Standardized Test Score

(Good, Aronson, & Inzlicht, 2003)
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STEM Dropout: Control vs. Growth Mindset
5 Computer Modules
Teachers’ Guide

www.brainology.us
The Brainology approach
In Brainology, students meet Chris and Dahlia
Guided by the Brain Orb, they take on a series of quests to understand how their brains work.
They visit the Brain Lab
Where Dr. Cerebrus shows them how the brain works
and develops by growing new connections when you learn.
They learn new brain-based study strategies
use the online *Brain Book* to look up information
write reflections in their online e-journal.
At the end of the program, they earn the *BrainMaster* certificate.
Have you changed your mind about anything?

• My favorite thing from Brainology is the neurons part … I always picture them when I’m in school

• Yes … I imagine neurons making connections in my brain and I feel like I am learning something.
Summary

A **growth mindset** allows students to:

- Embrace learning and growth
- Understand the role of effort in creating talent
- Maintain confidence and effectiveness in the face of challenges and setbacks

...and it can be taught.
Thank you!

www.brainology.us/mindset