Welcome
Holden Thorp
Provost and Executive Vice Chancellor for Academic Affairs
Endowed Professor in Medicine and Arts & Sciences

Plenary: Applying a Growth Mindset to Teaching
Gina Frey
Florence E. Moog Professor of STEM Education, Chemistry
Executive Director, The Teaching Center
Co-Director, CIRCLE
Applying a Growth Mindset to Teaching

Gina Frey
<table>
<thead>
<tr>
<th>#</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Mostly Agree</th>
<th>Mostly Disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ref: Rattan et al (2012)
## Theories of Intelligence Scale-Short Form

<table>
<thead>
<tr>
<th>#</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Mostly Agree</th>
<th>Mostly Disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>You have a certain amount of intelligence, and you cannot really do much to change it.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Your intelligence is something about you that you cannot change very much.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>To be honest, you cannot really change how intelligent you are.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>You can learn new things, but you cannot really change your basic intelligence.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ref: Rattan et al (2012)
Implicit Theories of Intelligence

Which concern an individual’s personal view about the nature of intelligence

- Individuals’ mindsets differ with regard to the assumed malleability of their intellectual abilities
- Degree of belief in malleability vary on a continuum from an incremental view to an entity view

"If you manage people or are a parent (which is a form of managing people), drop everything and read Mindset.”
—Guy Kawasaki, author of The Art of the Start

Mindset
THE NEW PSYCHOLOGY OF SUCCESS

HOW WE CAN LEARN TO FULFILL OUR POTENTIAL

* Parenting
* Business
* School
* Relationships

Carol S. Dweck, Ph.D.
Types of Mindsets about Intelligence

Fixed (Entity)
Intelligence is a fixed, innate quantity and cannot be changed.

Growth (Incremental)
Intelligence is malleable; can be changed and potentially increased.
## Characteristics of Limiting Mindsets

<table>
<thead>
<tr>
<th>Fixed (Entity) View</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcomes focused</td>
<td></td>
</tr>
<tr>
<td>Motivated by need to validate existing beliefs of self (High effort = Low ability)</td>
<td></td>
</tr>
<tr>
<td>Assesses performance relative to classmates</td>
<td></td>
</tr>
<tr>
<td>Confidence is fragile</td>
<td></td>
</tr>
<tr>
<td>Screens out negative feedback</td>
<td></td>
</tr>
<tr>
<td>Focuses on repairing self-esteem in response to failure (blames others)</td>
<td></td>
</tr>
</tbody>
</table>

Ref: Ravenscroft (2012)
## Characteristics of Limiting Mindsets

<table>
<thead>
<tr>
<th>Fixed (Entity) View</th>
<th>Growth (Incremental) View</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcomes focused</td>
<td>Process focused</td>
</tr>
<tr>
<td>Motivated by need to validate</td>
<td>Motivated by learning or developing one’s self (prefers challenges and stretch assignments)</td>
</tr>
<tr>
<td>existing beliefs of self (High effort = Low ability)</td>
<td></td>
</tr>
<tr>
<td>Assesses performance relative to</td>
<td>Assesses performance relative to material mastery</td>
</tr>
<tr>
<td>classmates</td>
<td></td>
</tr>
<tr>
<td>Confidence is fragile</td>
<td>Confidence is resilient</td>
</tr>
<tr>
<td>Screens out negative feedback</td>
<td>Seeks accurate (balanced) feedback</td>
</tr>
<tr>
<td>Focuses on repairing self-esteem in</td>
<td>Focuses on working harder in response to failure (takes responsibility)</td>
</tr>
<tr>
<td>response to failure (blames others)</td>
<td></td>
</tr>
</tbody>
</table>

Ref: Ravenscroft (2012)
Performance after Evaluation

- Study: 68 undergraduates (75%F) in a psychology course
- Procedure:
  - Took mindset survey
  - Task was a computer simulation as “manager” of a factory work group. Two training blocks and then experimental block
  - Received feedback on performance after each training block
  - Completed perception surveys and performance was evaluated

Ref: Tabernero and Wood (1999)
Results:
- In training blocks, growth mindsets
  - Had stronger self-efficacy
  - Were less dissatisfied with own performance
  - Set more challenging self-performance goals
- In experimental block, growth mindsets achieved a higher level of performance
Environmental Mindset affects Sense-of-Belonging to a Field

- Study: 1005 undergraduates (53% F) from highly selective university in NE US
- Procedure:
  - In calculus courses in a department, after each exam,
    - Completed “sense of belonging to Math” survey 3 times over the course of the semester (8-pt Likert scale)

Ref: Good et al. (2012)
Environmental Mindset affects Sense-of-Belonging to a Field

- **Results:**
  - For all students (male and female):
    - the more that students perceived a **fixed-mindset environment**, the lower their sense of belonging to the math field.
  - The more that women perceived a **growth-mindset environment**, the more they maintained a sense of belonging to the math field.
  - Even when they perceived the environment as highly gender-stereotypical.

Ref: Good et al (2012)
Impact of Instructor Feedback on Students

- 54 undergraduates
- Read scenario of a calculus class and instructor feedback to individual students after first exam
- Completed a perception survey
- 3 Types of feedback
  - Comfort-oriented (focused on student strengths)
  - Strategy-oriented (provided concrete suggestions to improve)
  - Control (contained two statements of care that were present in the other two types of feedback)

Ref: Rattan et al (2012)
Impact of Instructor Feedback on Students

**Results:**

- Feedback affected students’
  - Perceptions of instructors’ beliefs
  - Perceptions of Instructor’s expectations of them
  - Motivation and performance expectation and final grade

![Student Response to Feedback](image)
Key Insights about Mindsets

1. Student mindset affects student reaction and improvement in performance after evaluation.
3. Instructor feedback affects student behavior toward future exams/evaluations.
Scoring your Survey

- Numerical values:
  
  $SA = 1; A = 2, MA = 3, MD = 4, D = 5, SD = 6$

- Find Mean: sum up your questions and divide by 4

- Mean > 3.5, more of a Growth Mindset
  
  Mean < 3.5, more of a Fixed Mindset

- More detailed Mindset survey can be found at URL: 
  http://mindsetonline.com/testyourmindset/step1.php
What are some strategies to encourage or foster a growth mindset in our classes?

Rattan, Aneeta, Catherine Good, and Carol S. Dweck. "‘It's ok—Not everyone can be good at math”: Instructors with an entity theory comfort (and demotivate) students." *Journal of Experimental Social Psychology* 48.3 (2012): 731-737.

