Breaking the Bias Habit: Reducing the Impact of Implicit Assumptions on Student Outcomes

Jennifer Sheridan, Ph.D.
Executive & Research Director
Women in Science & Engineering Leadership Institute
Percent Women Bachelor's Degrees, Selected Fields

1966 - 2008

Source: National Science Foundation S&E Degrees
Percent Women Bachelor's Degrees, Selected Field
1966 - 2008

Source: National Science Foundation S&E Degrees
Why?

• Unconscious bias
• Tendency of our minds to evaluate individuals based on characteristics (real or imagined) of the group to which they belong
• Consequences for both the evaluator, and the person being evaluated
Wow, you suck at math.

Wow, girls suck at math.
ALLERGIC TO ALGEBRA

FOREVER 21

I'm too pretty to do homework so my brother has to do it for me

jcpenney
Three Central Ideas

1. Our minds are more than the sum of the conscious parts
   - Implicit processes

2. Unintended thoughts can contradict beliefs
   - Prejudice as a habitual response

3. Acting consistently with beliefs can require more than good intentions
   - Breaking the prejudice habit
Prejudice and Habits of Mind

Ordinary mental operations that serve us quite well in most circumstances can fail our intentions.
Essential Process...

• Translation of the world outside to a mental experience inside
  - Guided by our experience and expectations
  - Affects our perceptions, judgments, and behavior

• This translation process is not infallible
  - A variety of *habits of mind*, born out of experience, can separate our experience from reality
Stroop Color Naming Task

Compatible Trials
Stroop Color Naming Task

Compatible Trials

RED
Stroop Color Naming Task

Compatible Trials

RED
BLACK
Stroop Color Naming Task

Compatible Trials

RED
BLACK
BROWN
Stroop Color Naming Task

Compatible Trials

- RED
- BLACK
- BROWN
- GREEN
## Stroop Color Naming Task

### Compatible Trials

<table>
<thead>
<tr>
<th>RED</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLACK</td>
</tr>
<tr>
<td>BROWN</td>
</tr>
<tr>
<td>GREEN</td>
</tr>
<tr>
<td>YELLOW</td>
</tr>
</tbody>
</table>
Stroop Color Naming Task

Compatible Trials

- RED
- BLACK
- BROWN
- GREEN
- YELLOW
- BLUE
Stroop Color Naming Task

Compatible Trials

RED
BLACK
BROWN
GREEN
YELLOW
BLUE

Incompatible (interference) Trials
Stroop Color Naming Task

Compatible Trials

- RED
- BLACK
- BROWN
- GREEN
- YELLOW
- BLUE

Incompatible (interference) Trials

- RED
# Stroop Color Naming Task

## Compatible Trials

| RED | BLACK | BROWN | GREEN | YELLOW | BLUE |

## Incompatible (interference) Trials

| RED | BLACK |
Stroop Color Naming Task

Compatible Trials

- RED
- BLACK
- BROWN
- GREEN
- YELLOW
- BLUE

Incompatible (interference) Trials

- RED
- BLACK
- BROWN
Stroop Color Naming Task

Compatible Trials

- RED
- BLACK
- BROWN
- GREEN
- YELLOW
- BLUE

Incompatible (interference) Trials

- RED
- BLACK
- BROWN
- GREEN
## Stroop Color Naming Task

<table>
<thead>
<tr>
<th>Compatible Trials</th>
<th>Incompatible (interference) Trials</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RED</strong></td>
<td><strong>RED</strong></td>
</tr>
<tr>
<td><strong>BLACK</strong></td>
<td><strong>BLACK</strong></td>
</tr>
<tr>
<td><strong>BROWN</strong></td>
<td><strong>BROWN</strong></td>
</tr>
<tr>
<td><strong>GREEN</strong></td>
<td><strong>GREEN</strong></td>
</tr>
<tr>
<td><strong>YELLOW</strong></td>
<td><strong>RED</strong></td>
</tr>
<tr>
<td><strong>BLUE</strong></td>
<td><strong>BROWN</strong></td>
</tr>
<tr>
<td></td>
<td><strong>GREEN</strong></td>
</tr>
<tr>
<td></td>
<td><strong>YELLOW</strong></td>
</tr>
</tbody>
</table>
Stroop Color Naming Task

Compatible Trials

- RED
- BLACK
- BROWN
- GREEN
- YELLOW
- BLUE

Incompatible (interference) Trials

- RED
- BLACK
- BROWN
- GREEN
- YELLOW
- BLUE
Construction Worker Experiment
Measuring Unconscious Bias: Gender-and-Science IAT
Logic of the IAT

• IAT provides a measure of the strength of associations between mental categories such as “male and female” and attributes such as “science and humanities” disciplines

• Strength of association between each category and attribute is reflected in the time it takes to respond to the stimuli while trying to respond rapidly

• Trial Types
Congruent Trials

Say “LEFT” for Science
OR Men

Say “RIGHT” for Humanities
OR Women
Incongruent Trials

Say “LEFT” for

Science
OR
Women

Say “RIGHT” for

Humanities
OR
Men
Implicit Association Test

Demonstration
The larger the difference, the greater the bias in associating men with science and women with humanities.
Implicit Gender-Science Stereotypes

Male Respondents

Female Respondents

Implicit Science=Male / Arts=Female Stereotyping

Number of Respondents

Male Respondents

Female Respondents

70%

71%

11%

10%

100 - 50 -100

150 - 388

0

Number of Respondents
Shift in Conceptualization of Prejudice

**Old Framework** = Prejudice is bad so if I think or act with bias, I am a bad person

**New Framework** = Prejudiced thoughts and actions are habits that we all have and breaking these habits requires more than good intentions
How does this affect students?

• Parents/teachers/counselors steer women away from “male” jobs
• Students “choose” jobs that conform to their gender stereotypes
• Evaluators view credentials in ways that conform to gender expectations
Expectancy Bias

*Expecting* certain behaviors or characteristics in *individuals* based on *stereotypes* about the *social category* to which they belong.
Stereotypes about men?

Stereotypes about women?
Role Congruity/Incongruity

The fit (or lack of fit) between gender norms and workplace roles
Stereotypes about engineers?
Occupational *Role Congruity* for men

**Men**
- Strong
- Decisive
- Independent
- Don’t ask for directions
  - Logical
  - Lack emotions
- Love sports
- Good at math

**Women**
- Nurturing
  - Nice
- Supportive
  - Helpful
- Sympathetic
  - Verbal
  - Social
  - Creative

“Engineer”
Social Penalties for Violating Gender Norms

**Women**
- Strong
- Decisive
- Independent
- Don’t ask for directions
  - Logical
  - Lack emotions
  - Love sports
  - Good at math

**Men**
- Nurturing
- Nice
- Supportive
- Helpful
- Sympathetic
- Verbal
- Social
- Creative
Stereotype Threat

Members of negatively stereotyped groups may underperform when reminded of their group membership.
Classroom Environments

Stereotypical room

Cheryan, Plaut, Davies & Steele, Journal of Personality & Social Psychology, 2009

Images used with permission of Dr. Sapna Cheryan
Classroom Environments

Non-stereotypical room

Cheryan, Plaut, Davies & Steele, *Journal of Personality & Social Psychology, 2009*

Images used with permission of Dr. Sapna Cheryan
Environment influences women’s interest in CS

Chervan, Plaut, Davies & Steele, *Journal of Personality & Social Psychology*, 2009

Images used with permission of Dr. Sapna Chervan
Environment influences women’s interest in CS

Interaction: $F(1, 35) = 10.22, p < .01$


Images used with permission of Dr. Sapna Cheryan
<table>
<thead>
<tr>
<th>Image Condition</th>
<th>Female</th>
<th>Male</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stereotypic</td>
<td>7.42 (SD = 3.35)</td>
<td>9.00 (SD = 2.18)</td>
<td>7.86 (SD = 3.11)</td>
</tr>
<tr>
<td></td>
<td>n = 18</td>
<td>n = 7</td>
<td>n = 25</td>
</tr>
<tr>
<td>Counter-Stereotypic</td>
<td>9.38 (SD = 1.88)</td>
<td>7.70 (SD = 1.72)</td>
<td>8.73 (SD = 1.97)</td>
</tr>
<tr>
<td></td>
<td>n = 16</td>
<td>n = 10</td>
<td>n = 26</td>
</tr>
<tr>
<td>Mixed Gender</td>
<td>8.37 (SD = 3.30)</td>
<td>8.25 (SD = 3.20)</td>
<td>8.31 (SD = 3.19)</td>
</tr>
<tr>
<td></td>
<td>n = 15</td>
<td>n = 12</td>
<td>n = 27</td>
</tr>
<tr>
<td>Total</td>
<td>8.35 (SD = 2.99)</td>
<td>8.24 (SD = 2.50)</td>
<td>8.31 (SD = 2.80)</td>
</tr>
<tr>
<td></td>
<td>n = 49</td>
<td>n = 29</td>
<td>n = 78</td>
</tr>
</tbody>
</table>

Note. Comprehension scores are out of a possible high score of 12.
Strategies to Reduce the Influence of Implicit Bias
Bias within these constructs is malleable...

<table>
<thead>
<tr>
<th>Construct</th>
<th>Intervention</th>
<th>Example of study</th>
</tr>
</thead>
<tbody>
<tr>
<td>↓Expectancy bias and promote role congruity</td>
<td>Be specific about what a job or task requires, rather than use generalizations or make assumptions</td>
<td>Heilman ME. <em>Organ Behav Hum Perf.</em> 33(2):174-86, 1984.</td>
</tr>
<tr>
<td>↓Effect of stereotype priming</td>
<td>Stating that “there is no gender difference in ability to perform this task” eliminated impact of priming</td>
<td>Davies, Spencer &amp; Steele. <em>J Pers Soc Psych.</em> 88:276-287, 2005.</td>
</tr>
</tbody>
</table>
Strategies That DO NOT Work

• Stereotype Suppression
  – Banish stereotypes from one’s mind (i.e., gender or race “blind”)
Strategies That DO NOT Work

- **Stereotype Suppression**
  

  - Banish stereotypes from one’s mind (i.e., gender or race “blind”)
  - Macrae et al (1994, Experiment 2)
    
Strategies That DO NOT Work

- **Stereotype Suppression**
  
  
  – Banish stereotypes from one’s mind (i.e., gender or race “blind”)
  
  – Macrae et al (1994, Experiment 2)  
**Strategies That DO NOT Work**

- **Stereotype Suppression**
  
  
  - Banish stereotypes from one’s mind (i.e., gender or race “blind”)
  
  - Macrae et al (1994, Experiment 2)  
    
Strategies That DO NOT Work

• Stereotype Suppression
  – Banish stereotypes from one’s mind (i.e., gender or race “blind”)
  – Rebound effects
  - Banish stereotypes from one’s mind (i.e., gender or race “blind”)
  - Rebound effects

• **Belief in personal objectivity** (Uhlmann & Cohen. *Organ Behav Hum Decis Process* 2007)
  - Leads to biased evaluations of women
Strategies That DO NOT Work

  - Banish stereotypes from one’s mind (i.e., gender or race “blind”)
  - Rebound effects

• **Belief in personal objectivity**  (Uhlmann & Cohen. *Organ Behav Hum Decis Process* 2007)
  - Leads to biased evaluations of women
Strategies That DO NOT Work

• Stereotype Suppression (e.g.,
  – Banish stereotypes from one’s mind (i.e., gender or race “blind”)
  – Rebound effects

• Belief in personal objectivity
  – Leads to biased evaluations of women
1. Stereotype Replacement

✓ Recognize when you have stereotypic thoughts, and recognize stereotypic portrayals in society. For example,
  
  - Women students are less interested in engineering than in social studies
  - Portrayal of females as poor at math or males as unable to do housework

✓ Challenge the fairness of the portrayal and replace it with a non-stereotypic response. For example,
  
  - I know many successful women engineers
  - Research does not support a gender difference in math performance once we control for the number of math courses taken
Help regulate your response by imagining a counter-stereotype woman in detail

- *e.g., Imagine an astronaut, engineer, CEO who is also a woman OR specific positive counter-stereotypical individuals you know*
"Science is the New Pink"

"Be My Lab Partner"

"Sassy Scientist"

"Real Women are Real Smart"
3. Individuating (instead of generalizing)

✓ Avoid making a snap decision based on a stereotype
  - *e.g.*, Make gender less salient than being a scientist, physician, or engineer

✓ Obtain more information on specific qualifications, past experiences, etc. before making a decision

✓ Practice making situational attributions rather than dispositional attributions
  - *e.g.*, If a woman does poorly on an exam, consider a situational explanation (maybe she didn’t get enough sleep) rather than a dispositional explanation (e.g., she’s terrible at math)
4. Perspective-Taking

✓ Adopt the perspective (in the first person) of a member of the stigmatized group

- For example, imagine what it would be like to...
  - Have your abilities called into question
  - Not be offered opportunities because of assumptions about what fields you will like
5. Increasing Opportunities for Contact

✔ Seek out opportunities for greater interaction with counter-stereotypic women

- *e.g.*, Ensure *guest teachers or speakers brought into the department are diverse*
Breaking the Prejudice Habit

• Not necessarily easy

• With effort (awareness, motivation, and a sustained commitment), prejudice is a habit that can be broken
  – Can expect that you may slip up
  – Stay committed

• Strategies we provided are powerful tools to combat implicit biases
  – Implicit responses can be brought into line with explicit beliefs