Fostering Opportunities in STEMM Occupations by Reducing Implicit Bias

Jennifer Sheridan, PhD
July 23, 2013
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
Outline

• Existence of unconscious/implicit bias
• Effects on evaluators
• Effects on those undergoing evaluation
• What to do?
Existence of Unconscious/Implicit Bias
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

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Stroop Color Naming Task

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Stroop Color Naming Task

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Incompatible (interference) Trials
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Construction Worker Experiment
Measuring Unconscious Bias: Implicit Association Tests (IAT)
Implicit Association Test

Demonstration
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
IAT Effect

The larger the difference, the greater the bias in associating African Americans with “Bad” and European Americans with “Good”

IAT Effect: Incongruent – Congruent

IAT Effect:
Incongruent

Reaction time in ms

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Implicit Gender-Science Stereotypes

Male Respondents

Female Respondents

Source: Project Implicit

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Characteristics of Implicit Biases

1. Ordinary
   - Stem from our natural tendency to form associations to help organize our social worlds

2. Learned from culture
   - Reflect the “thumbprint of culture” on our minds

3. Pervasive
   - Prevalent among men and women, blacks and whites, young and old, etc.

4. Often conflict with consciously endorsed beliefs
   - Dissociation between implicit and explicit responses
Characteristics of Implicit Biases

5. Consequential

– Predict behavior better than (and often at odds with) explicit measures

– Constrain the opportunities of targets of implicit bias
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
Effects on Evaluators
Applications of Unconscious Bias

- Applications/CVs/Résumés
- Reference Letters
Résumés/Gender Context

• 127 Biology, Chemistry, and Physics faculty review application materials for position of “lab manager”
  – Recent BS degree with stated intention of applicant to go on to graduate school
  – High but slightly ambiguous competence
  – Applications randomly assigned name “John” or “Jennifer”
  – Rated on competence, hireability, mentoring, and starting salary

Moss-Racusin et al., 2012
Fig. 1. Competence, hireability, and mentoring by student (collapsed across faculty gender). All student gender differences ($P < 0.001$). Scales range from 1 to 7, with higher numbers reflecting the extent of each variable. Error bars represent SEs. $n_{\text{male student condition}} = 64$, $n_{\text{female student condition}} = 64$.

Fig. 2. Salary conferral by student gender condition (collapsed across faculty gender). The student gender difference is significant ($P < 0.01$). The scale ranges from $15,000$ to $50,000$. Error bars represent SEs. $n_{\text{male student condition}} = 63$, $n_{\text{female student condition}} = 64$. 

Moss-Racusin et al. 2012.
Résumés/Race Context

- Résumés of differing quality are randomly assigned white-sounding or African American-sounding names
  - Mailed in response to actual job ads in Chicago, Boston. Callbacks are measured.
    - White names are 50% more likely to be called back.
    - White names with high quality resume are 27% more likely to be called back (compared to whites with low quality), but Black names with high quality resume are only 8% more likely to be called back. (Less return to labor market experience for blacks.)
  - Neighborhood, job/employer characteristics not significant

Bertrand & Mullainathan 2004
Reference Letters/Gender Context

- 312 letters of recommendation for medical faculty hired at a large U.S. medical school
- Women’s letters compared to men’s more often:
  - Were shorter
  - Offered minimal assurance
  - Used gender terms
  - Contained doubt raisers
  - Used stereotypic adjectives
  - Used grindstone adjectives
  - Used fewer standout adjectives
  - Contained less scientific terminology

Trix and Psenka 2003
Top 3 semantic realms following the possessive for men and for women
Effects on Those Undergoing Evaluation
Stereotype Threat

Members of negatively stereotyped groups may underperform when reminded of their group membership.
## Multiple Examples of Stereotype Threat

<table>
<thead>
<tr>
<th>Category</th>
<th>Example</th>
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<tr>
<td>Females vs. males in math</td>
<td>e.g., Spencer et al. <em>J Exp Soc Psychol</em>, 1999</td>
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<tr>
<td>Women and leadership</td>
<td>e.g., Davies et al. <em>J Pers Soc Psychol</em>, 2005</td>
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<tr>
<td>Women and science</td>
<td><em>Good et al. J Soc Psychol</em>, 2010</td>
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</table>
Wow, you suck at math.

Wow, girls suck at math.
Women are less likely to select a leadership role when gender stereotype is primed.


Neutral ad: NS
Stereotypic ad: p<.01
Neutral vs. stereotypic ad:

• Leader p<.05
• Problem solver p<.05
Classroom Environments

Stereotypical room

Star Trek poster

Sci Fi books

Coke cans

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

Images used with permission of Dr. Sapna Cheryan
Classroom Environments

Non-stereotypical room

- Nature poster
- Neutral books
- Water bottles
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

Interest in computer science (standardized)

Stereotypical
Nonstereotypical
Environment

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


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What to Do?
Breaking the Bias Habit
Reducing Bias in Evaluations: Individual Behaviors

Know what factors increase vulnerability to unconscious bias

- Believing oneself to be objective and unbiased
- Believing oneself to be colorblind or gender blind
- Having insufficient or ambiguous information
- Being busy and under time pressure
- Multi-tasking
- Being stressed, tired, and/or hungry
Reducing Bias in Evaluations

What Not to Do:

• Suppress bias and assumptions from one’s mind (or try to)

• Rely solely on a presumably “objective” ranking or rating system to reduce bias

Strategies That DO NOT Work

• Stereotype Suppression


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

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

- Recognize when you have stereotypic thoughts, and recognize stereotypic portrayals in society. For example,
  - Women faculty are less interested in leadership opportunities
  - Portrayal of females as poor at math or males as unable to do housework

- Label the characterization as stereotypical
  - e.g., Role incongruity, Prescriptive gender norms

- Identify precipitating factors
  - e.g., Priming with gender-congruent information

- Challenge the fairness of the portrayal and replace it with a non-stereotypic response. For example,
  - I know many successful women leaders
  - I know that training and experience rather than gender are the main determinants of leader competence
  - Research does not support a gender difference in math performance once we control for the number of math courses taken
2. Counter-Stereotype Imaging

✓ 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
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 program developer

- Obtain more information on specific qualifications, past experiences, etc. before making a decision
  - e.g., Heilman study reviewed in Module 2.

- Practice making situational attributions rather than dispositional attributions
  - e.g., If a woman cries, consider a situational explanation (maybe a loved one died) rather than a dispositional explanation (e.g., she’s emotional)
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
    - Be viewed as less committed to your career than colleagues with similar training and effort
    - Not be offered opportunities because of assumptions about family responsibilities
5. Increasing Opportunities for Contact

Seek out opportunities for greater interaction with counter-stereotypic women

- *e.g.*, Meet with women in high authority positions to discuss research endeavors, ideas, and visions
- *e.g.*, When compiling membership for key committees or speaker lists, ensure that women (from diverse groups) are represented
Before Training | Post Training (4 weeks) | Post Training (8 weeks)

- Training
- Control

IAT Magnitude

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Before Training | Post Training (4 weeks) | Post Training (8 weeks)

- **Training**
- **Control**

IAT Magnitude
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
Reducing Bias in Evaluations: Organizational Behaviors

What to do:

• Diversify the evaluation committee
  • Social tuning/increased motivation to respond w/o bias
  • Counterstereotype imaging

• Hold each member of the evaluation committee responsible for conducting equitable evaluations

• Critical Mass – increase proportion of women and minorities in the pool

• Develop and prioritize criteria prior to evaluating applicants
Reducing Bias in Evaluations

What to do (cont.):

• Spend sufficient time and attention on evaluating each application

• Focus on each applicant as an individual and evaluate their entire
  application package – information minimizes bias

• Use inclusion rather than exclusion decision-making processes

• Stop periodically to evaluate your criteria and their application

• Accountability - Be able to defend every decision
  ▪ **Competence:** Biernat and Fuegen, *Journal of Social Issues*, 2001