

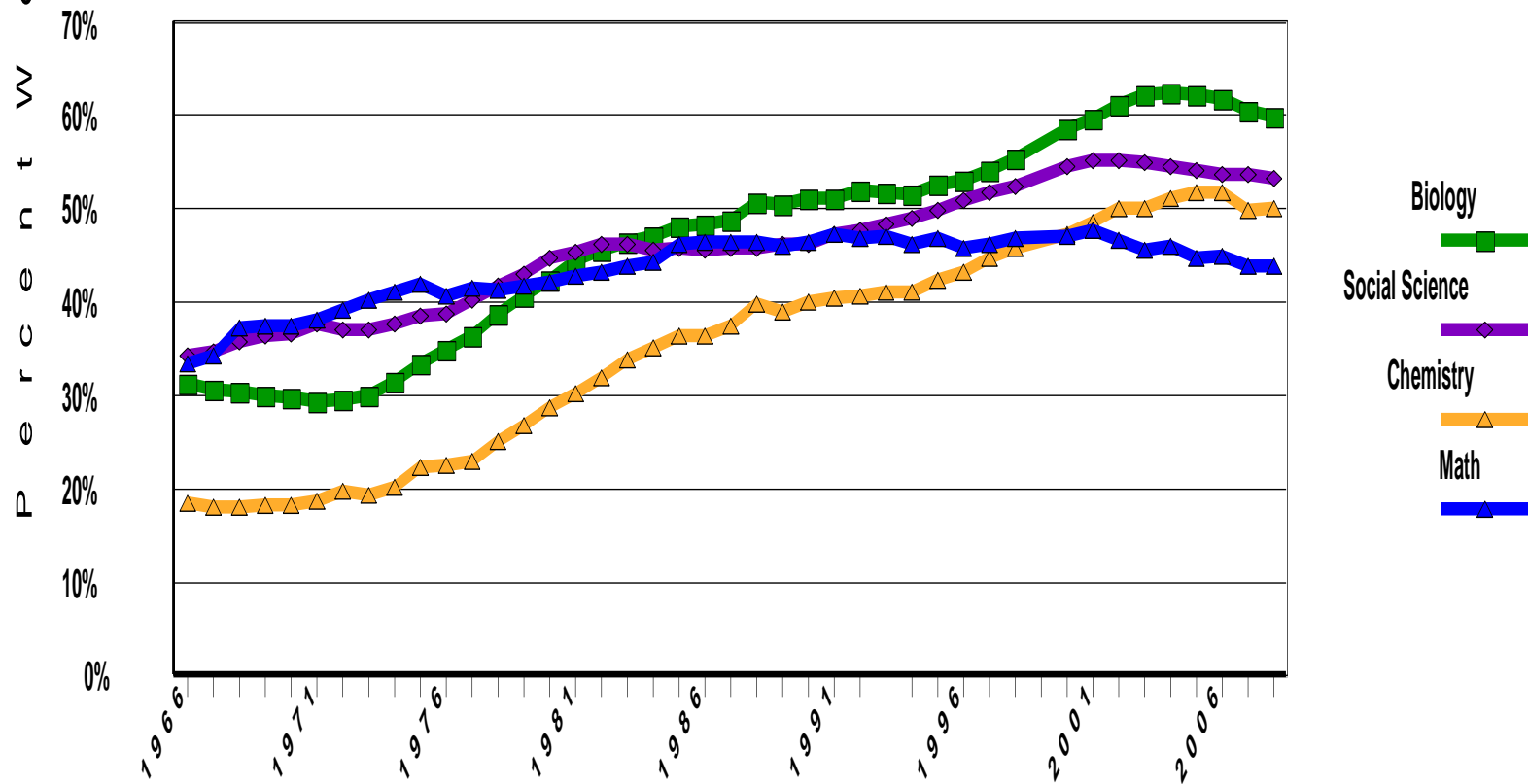
# Fostering Opportunities in STEMM Occupations by Reducing Implicit Bias

Jennifer Sheridan, PhD

July 23, 2013

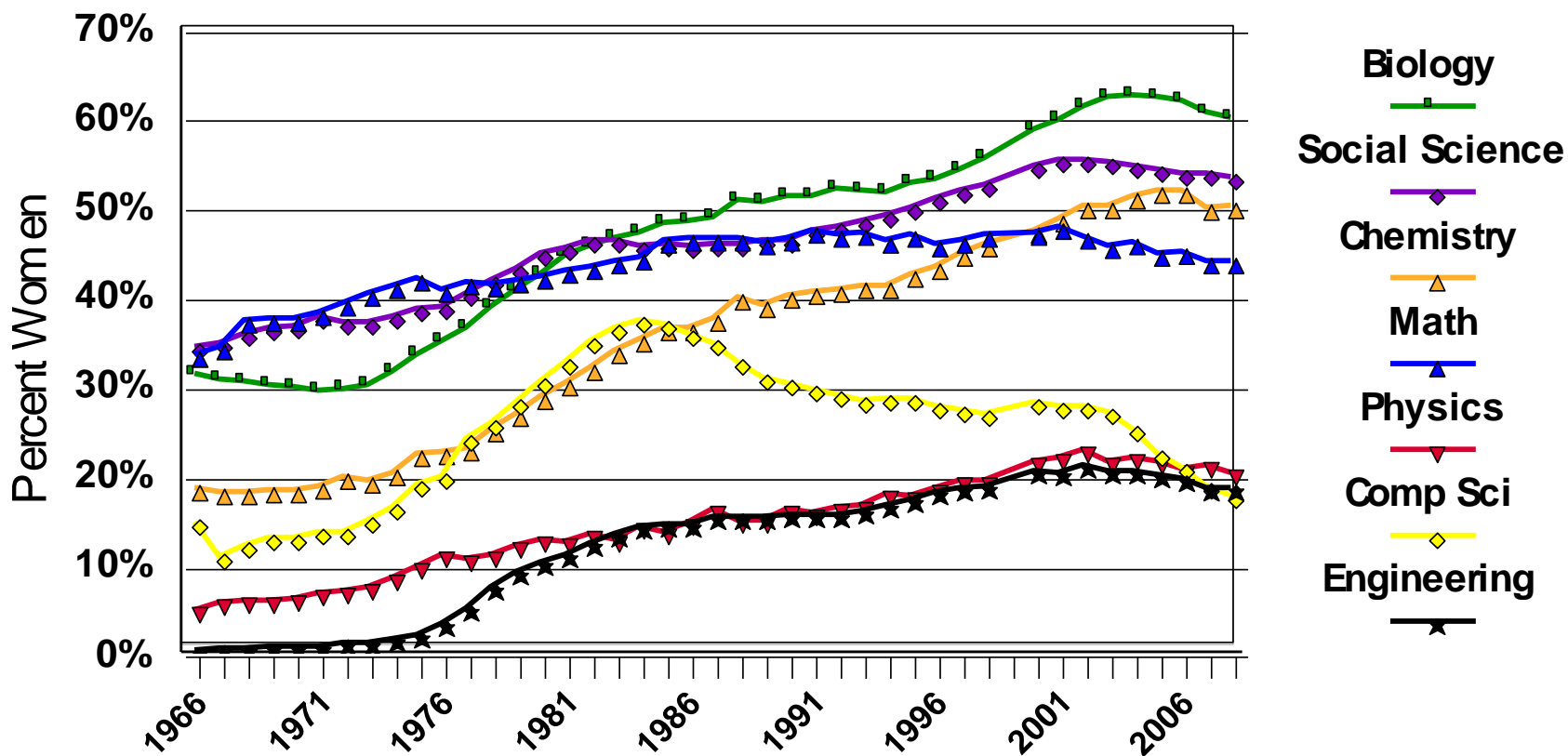
# Percent Women Bachelor's Degrees, Selected Fields

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?

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- 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



FOREVER 21



jcpenny

# Outline

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- 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

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

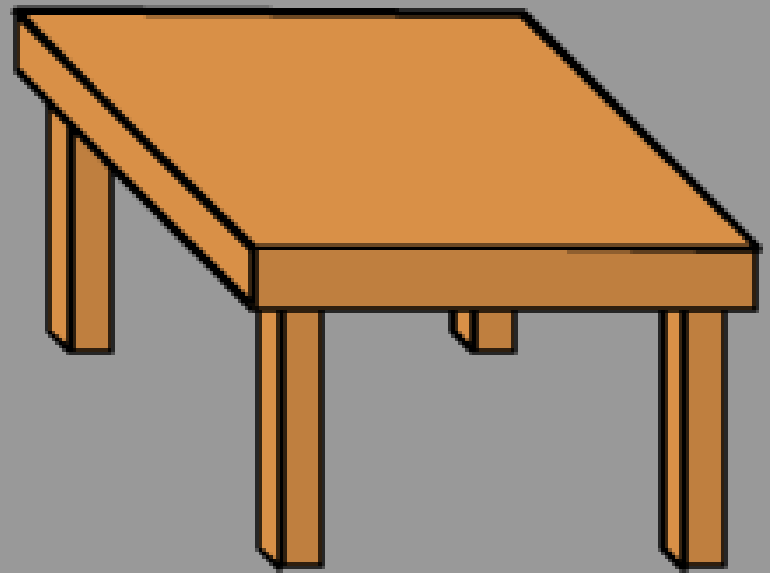
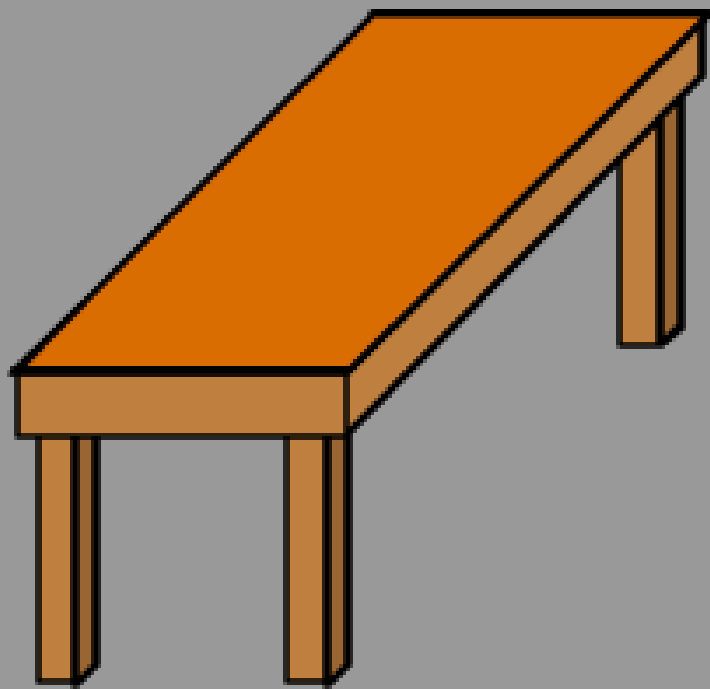
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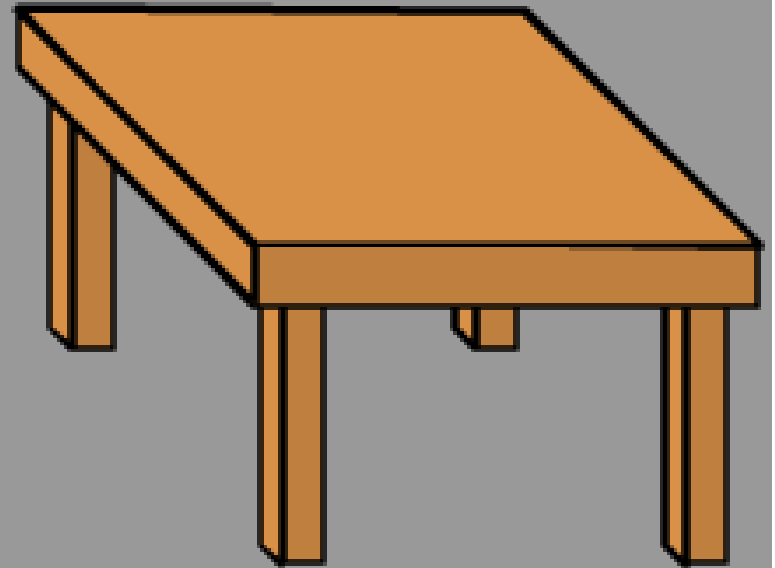
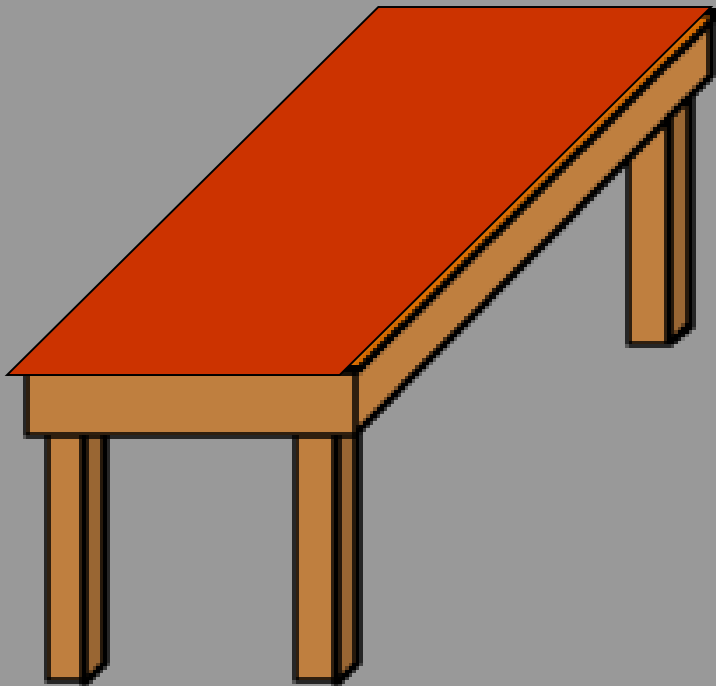
# Essential Process...

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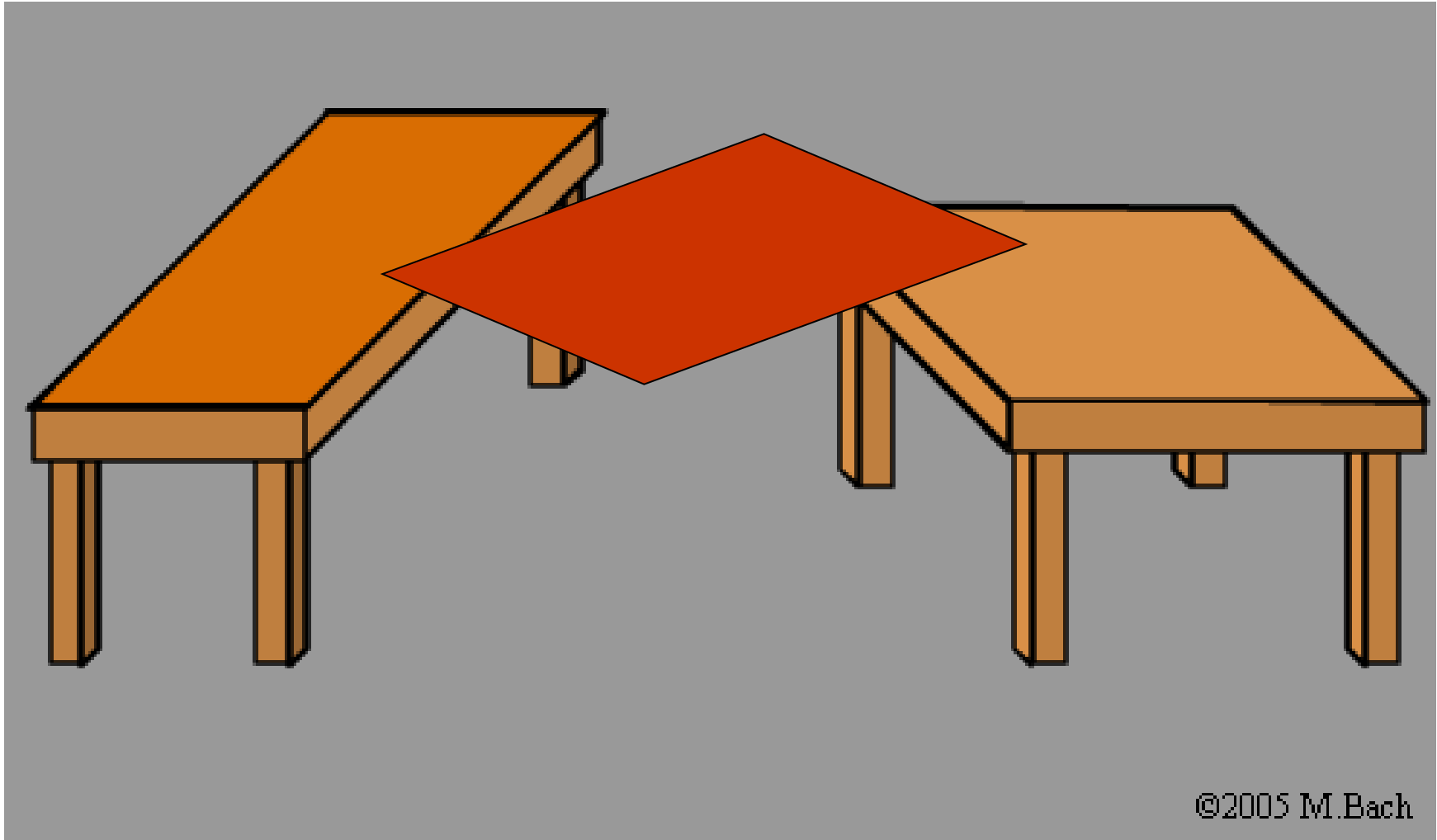
- Translation of the world outside to a mental experience inside
  - Guided by our experience and expectations
  - Affects our perceptions, judgments, and behavior
- This translation process is not infallible
  - A variety of *habits of mind*, born out of experience, can separate our experience from reality



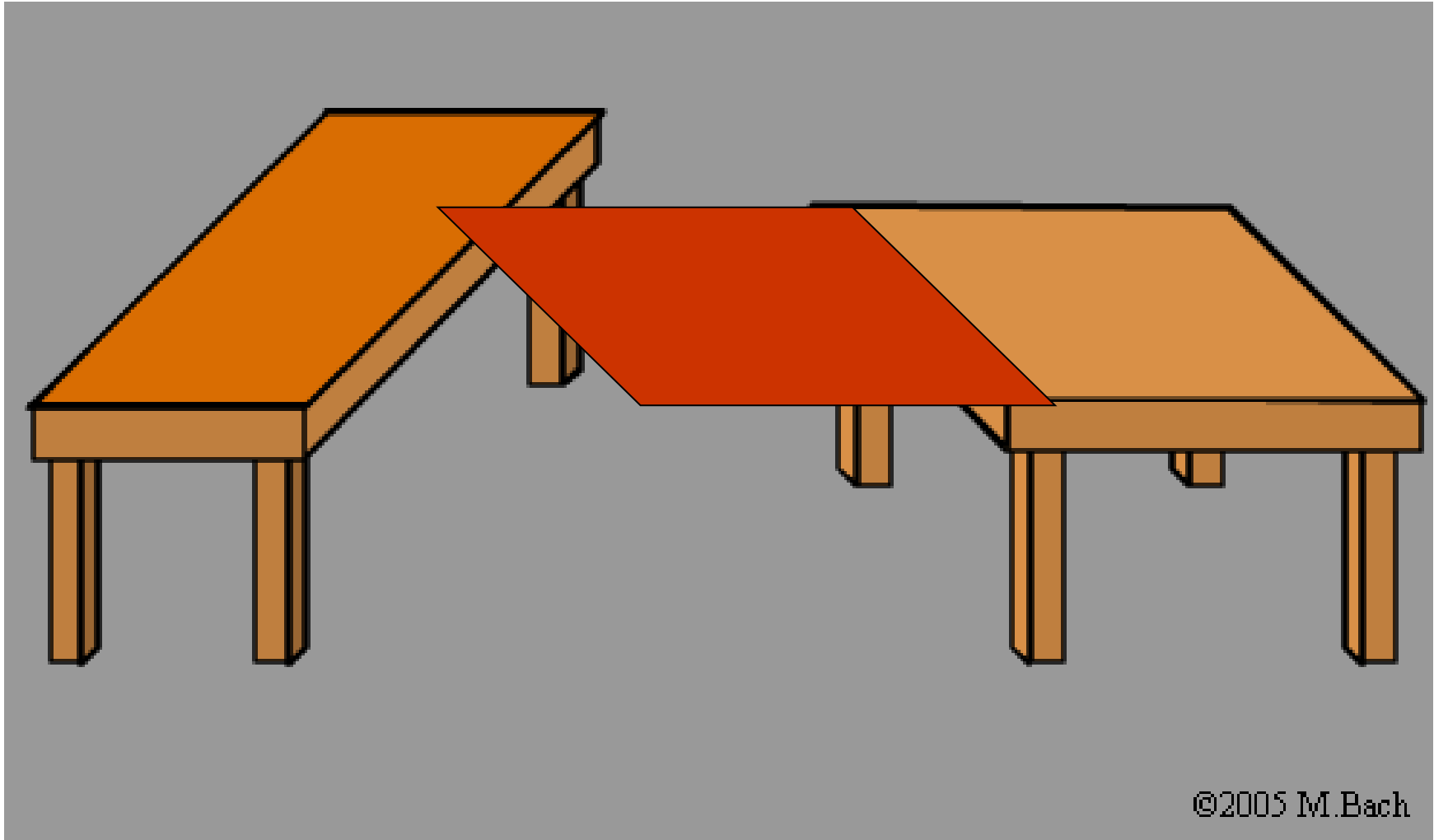
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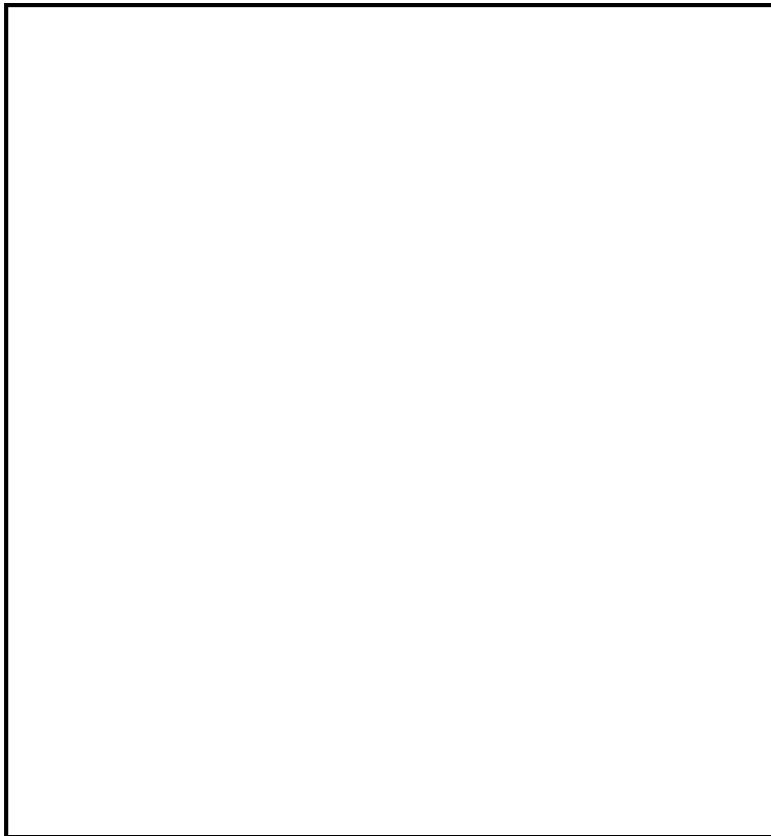
©2005 M. Bach



# Stroop Color Naming Task

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## 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

RED

BLACK

BROWN

GREEN

YELLOW

# Stroop Color Naming Task

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## Compatible Trials

RED

BLACK

BROWN

GREEN

YELLOW

BLUE

# Stroop Color Naming Task

---

Compatible Trials

RED

BLACK

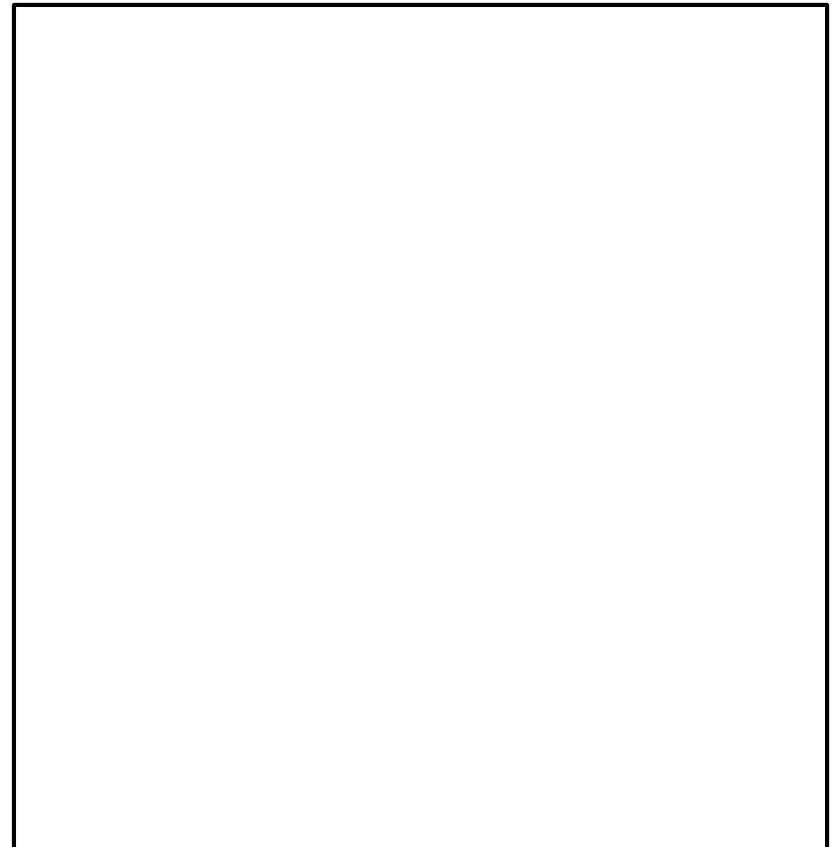
BROWN

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

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BLACK

BROWN

GREEN

YELLOW

BLUE

## Incompatible (interference) Trials

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BLACK

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BLACK

BROWN

GREEN

YELLOW

BLUE

## Incompatible (interference) Trials

RED

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BROWN

GREEN

# Stroop Color Naming Task

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## Compatible Trials

RED

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GREEN

YELLOW

BLUE

## Incompatible (interference) Trials

RED

BLACK

BROWN

GREEN

YELLOW

# 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: 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

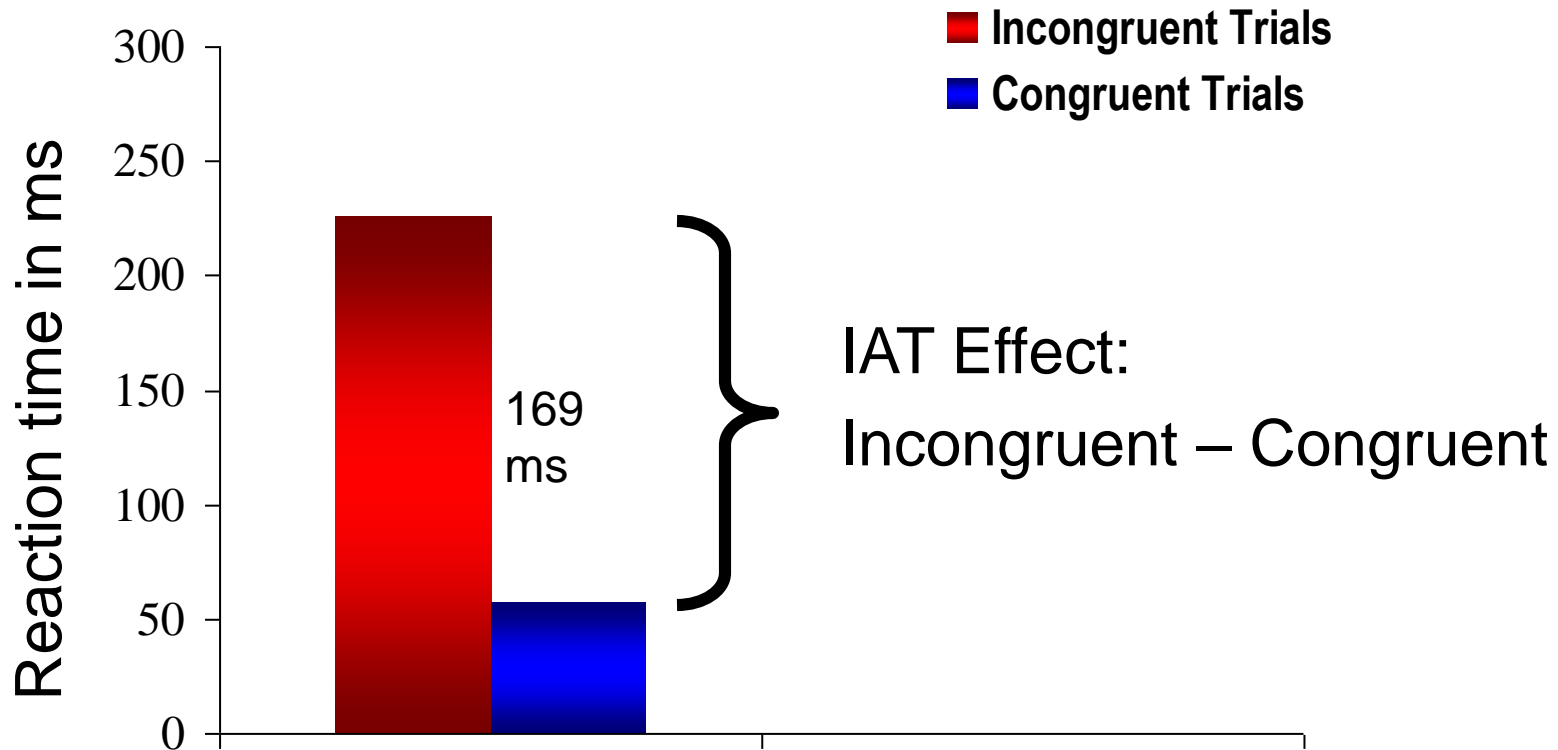
**Humanities**

**OR**

**Men**



# IAT Effect

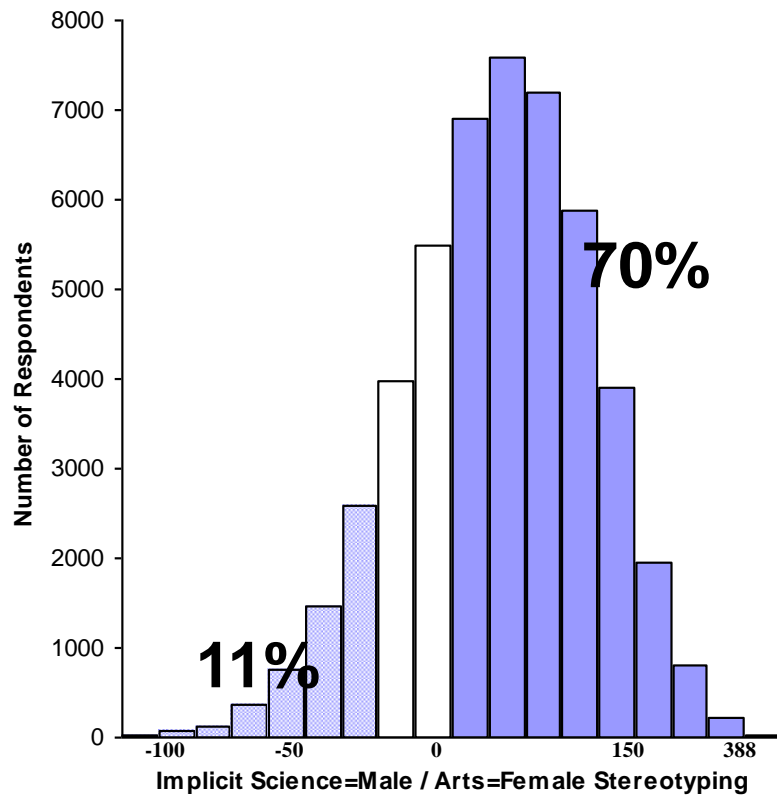


The larger the difference, the greater the bias in associating African Americans with “Bad” and European Americans with “Good”

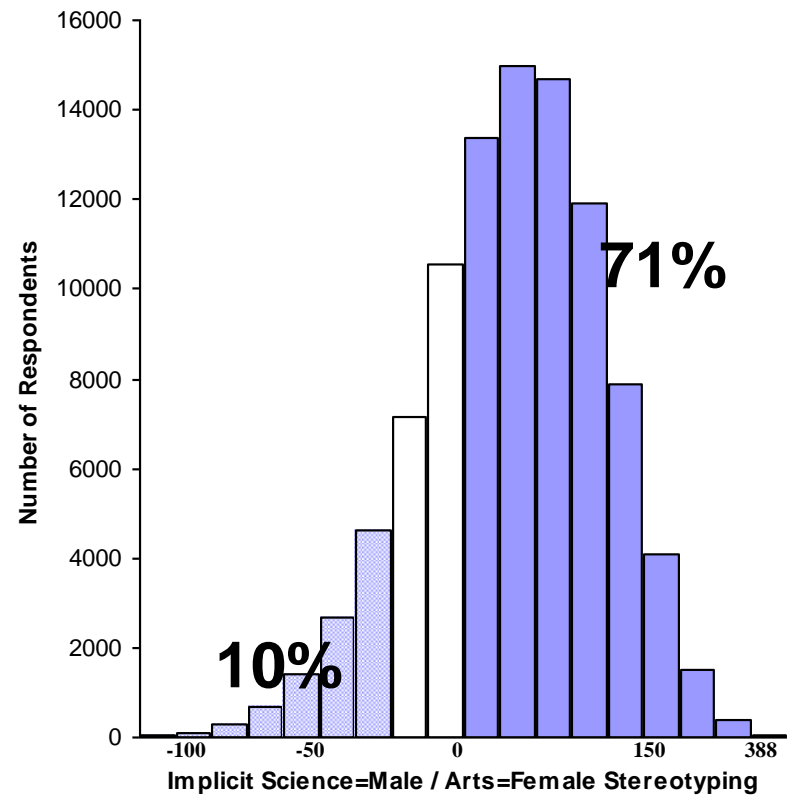
# Implicit Gender-Science Stereotypes

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## Male Respondents



## Female Respondents



Source: Project Implicit

# Characteristics of Implicit Biases

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## 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

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## 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

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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

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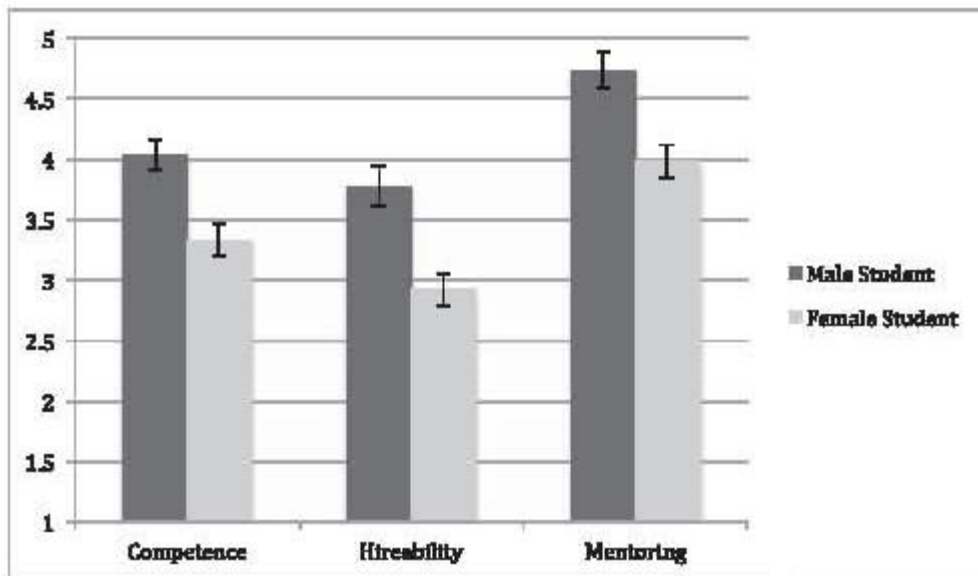
- Applications/CVs/Résumés
- Reference Letters

# Résumés/Gender Context

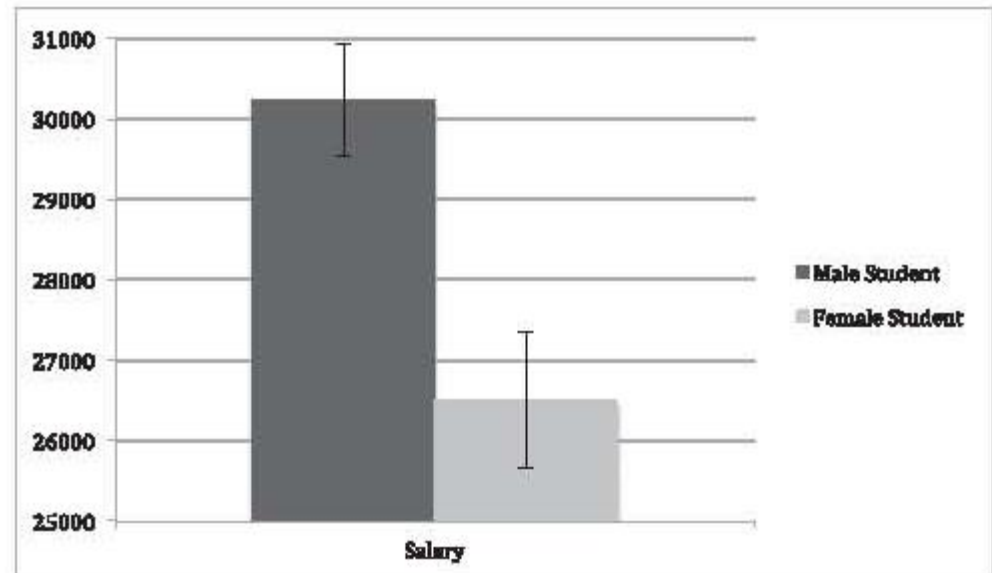
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- 127 Biology, Chemistry, and Physics faculty review application materials for position of “lab manager”
  - Recent BS degree with stated intention of applicant to go on to graduate school
  - High but slightly ambiguous competence
  - Applications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





**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 representing 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.  $n_{\text{male student condition}} = 63$ ,  $n_{\text{female student condition}} = 64$ .

# 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

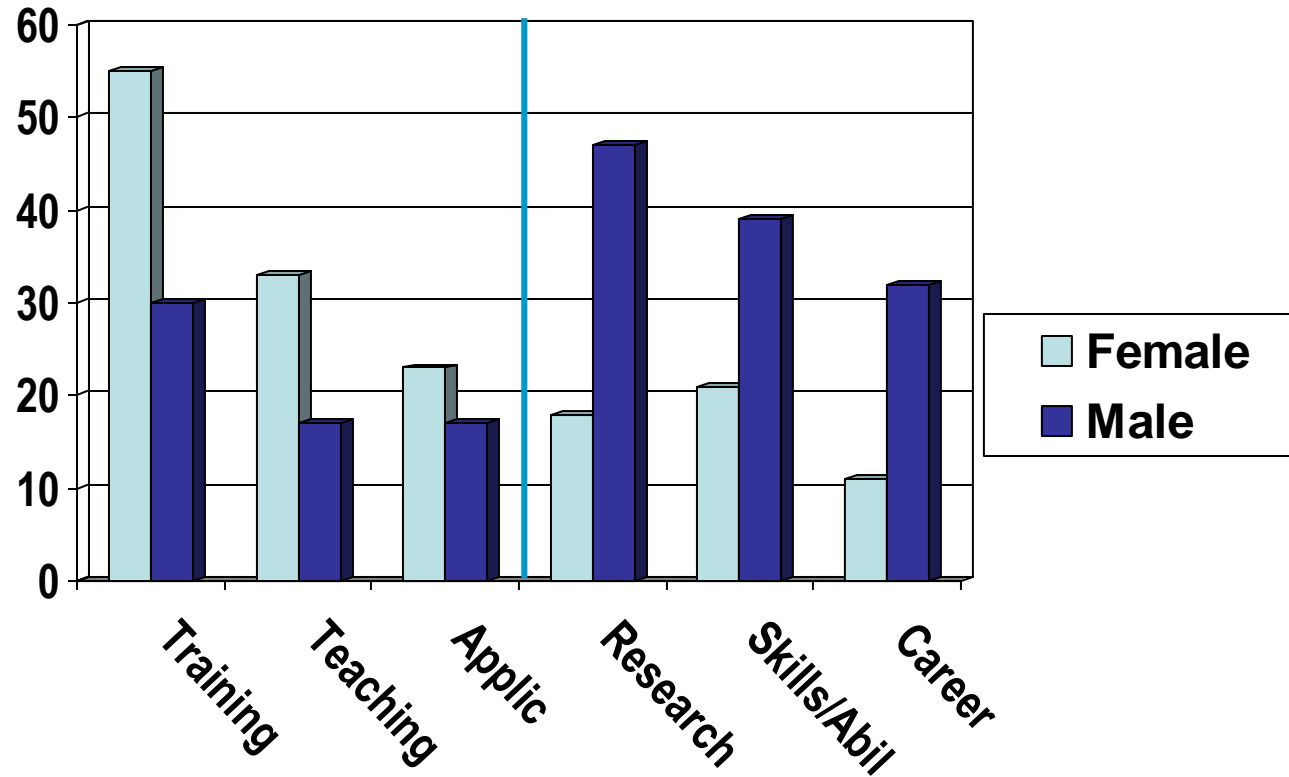
# Reference Letters/Gender Context

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- 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*

# Top 3 semantic realms following the possessive for men and for women

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Effects on Those Undergoing Evaluation

# Stereotype Threat

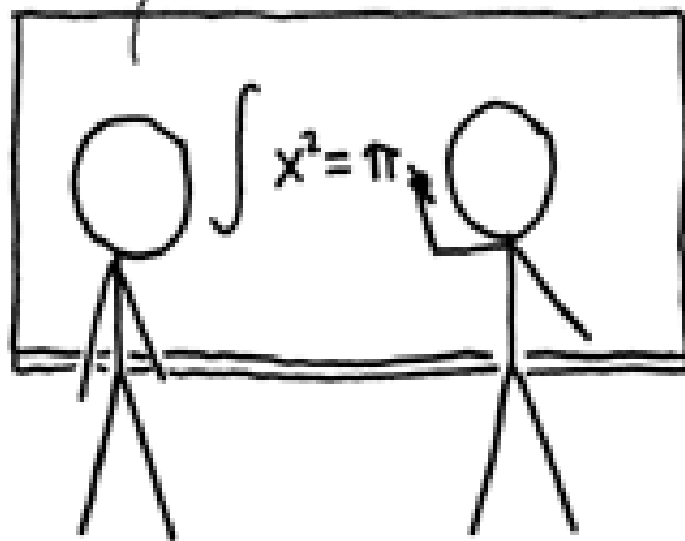
Members of negatively stereotyped groups may underperform when reminded of their group membership

# Multiple Examples of Stereotype Threat

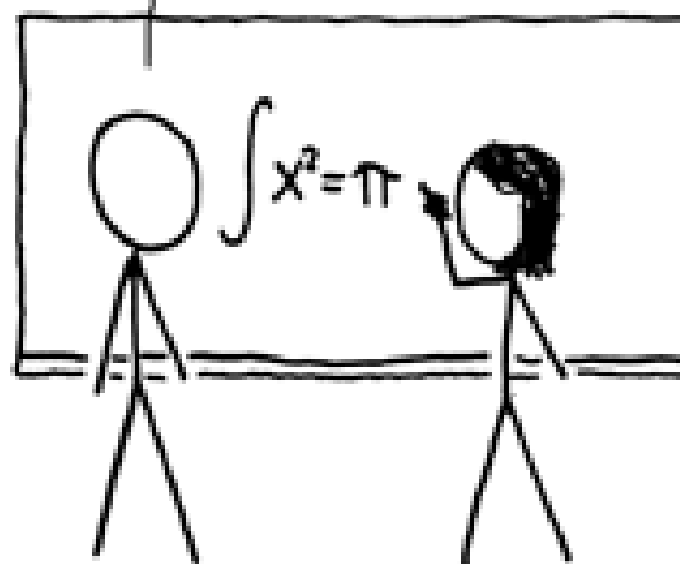
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Females vs. males in math	e.g., Spencer et al. <i>J Exp Soc Psychol</i> , 1999
White men vs. Asian men in math	e.g., Aronson & Lustina. <i>J Exp Soc Psychol</i> , 1999
White men vs. African American men in sports	e.g., Stone J. <i>Pers Soc Psychol Bull</i> , 2002
Women and leadership	e.g., Davies et al. <i>J Pers Soc Psychol</i> , 2005
Women and science	Good et al. <i>J Soc Psychol</i> , 2010

WOW, YOU  
SUCK AT MATH.



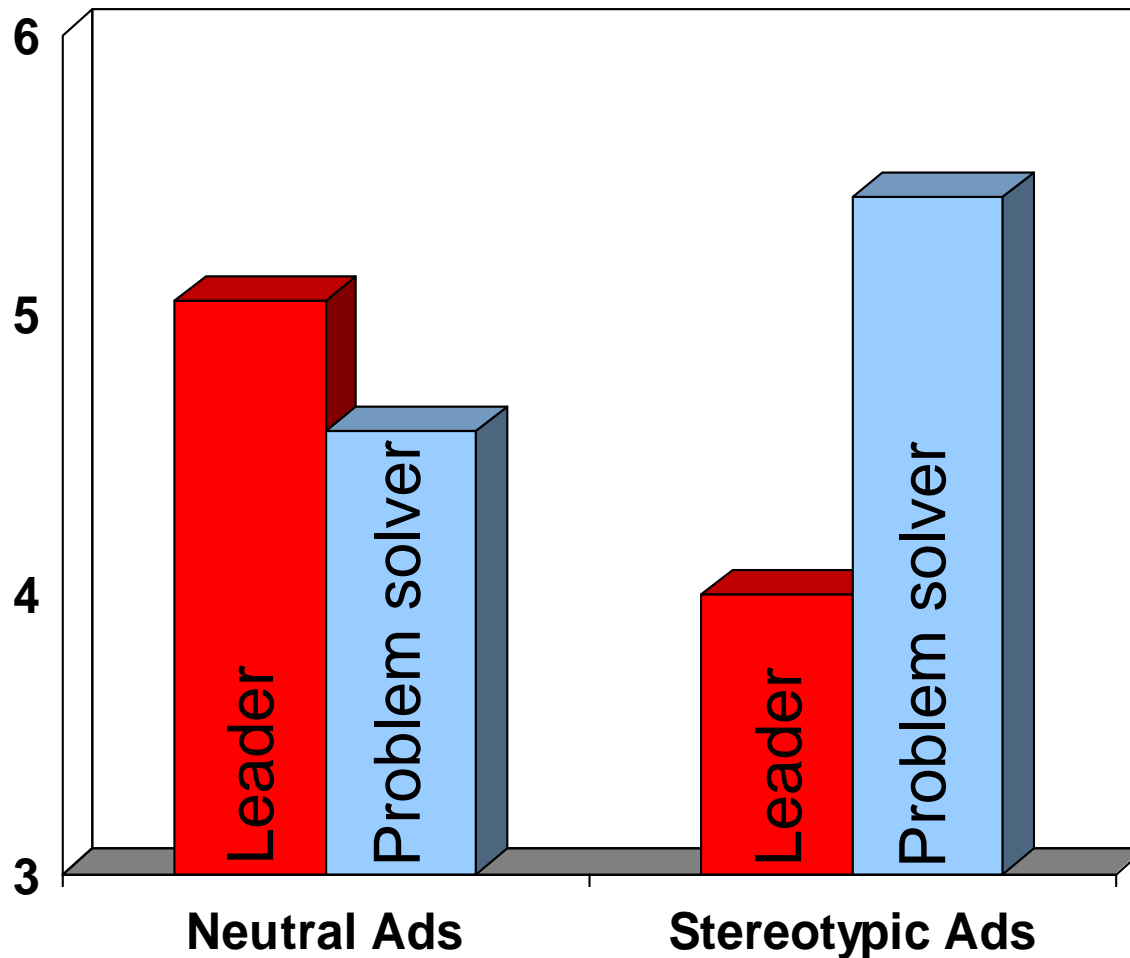
WOW, GIRLS  
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# Women are less likely to select a leadership role when gender stereotype is primed

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Neutral ad: NS

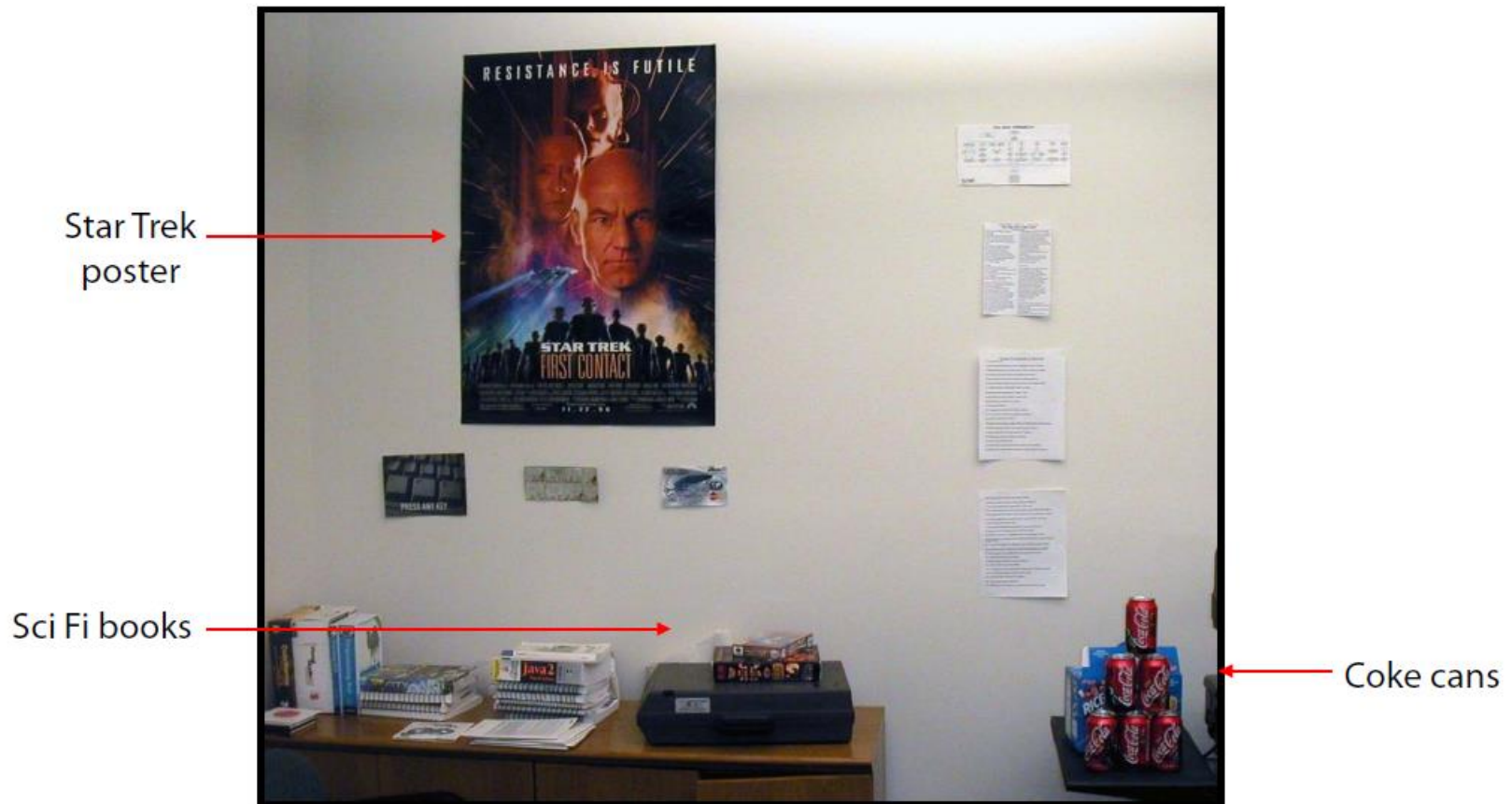
Stereotypic ad:  $p < .01$

Neutral vs. stereotypic ad:

- Leader  $p < .05$
- Problem solver  $p < .05$

# Classroom Environments

Stereotypical room



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

Images used with permission of Dr. Sapna Cheryan

# Classroom Environments

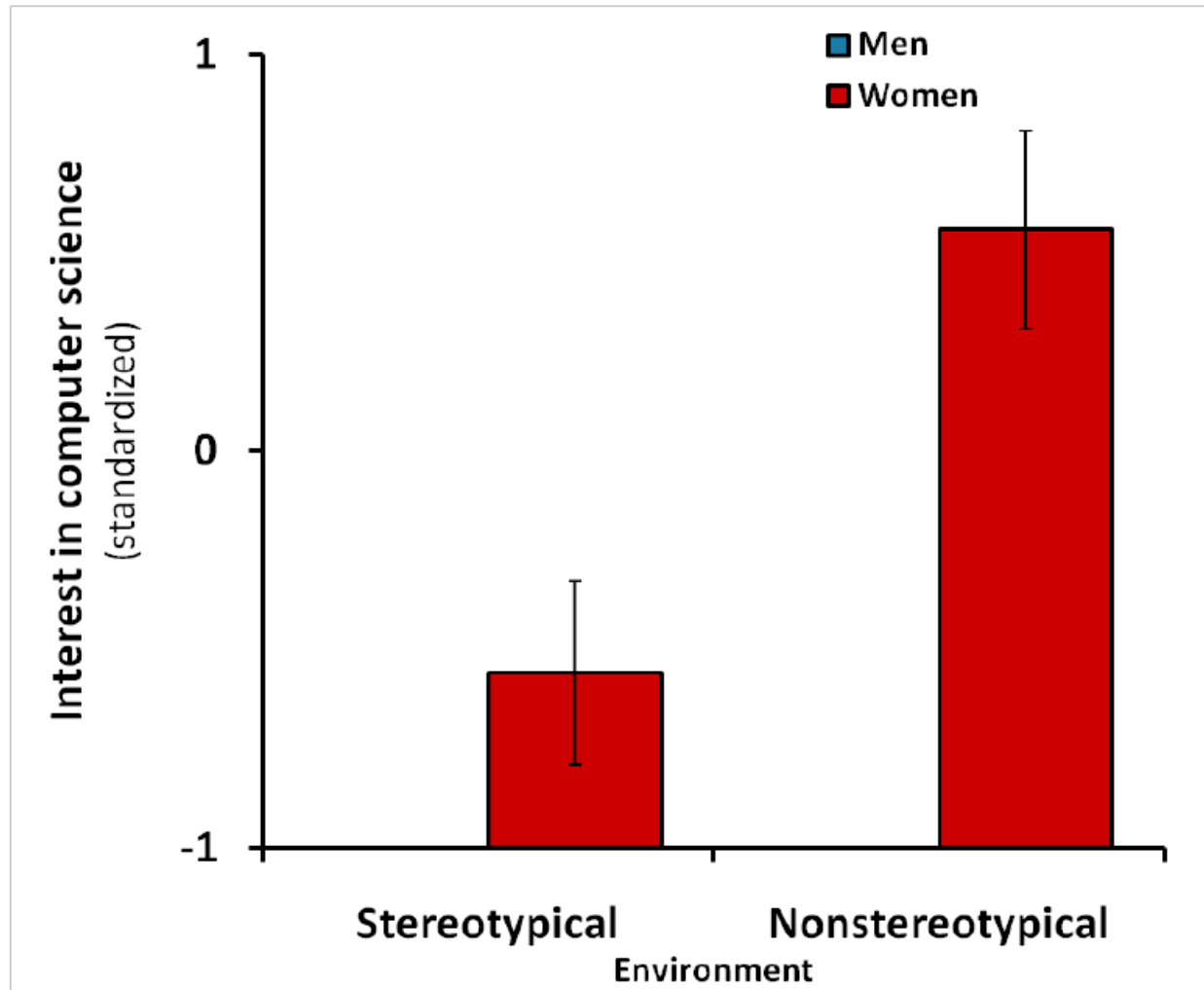
Non-stereotypical room



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

Images used with permission of Dr. Sapna Cheryan

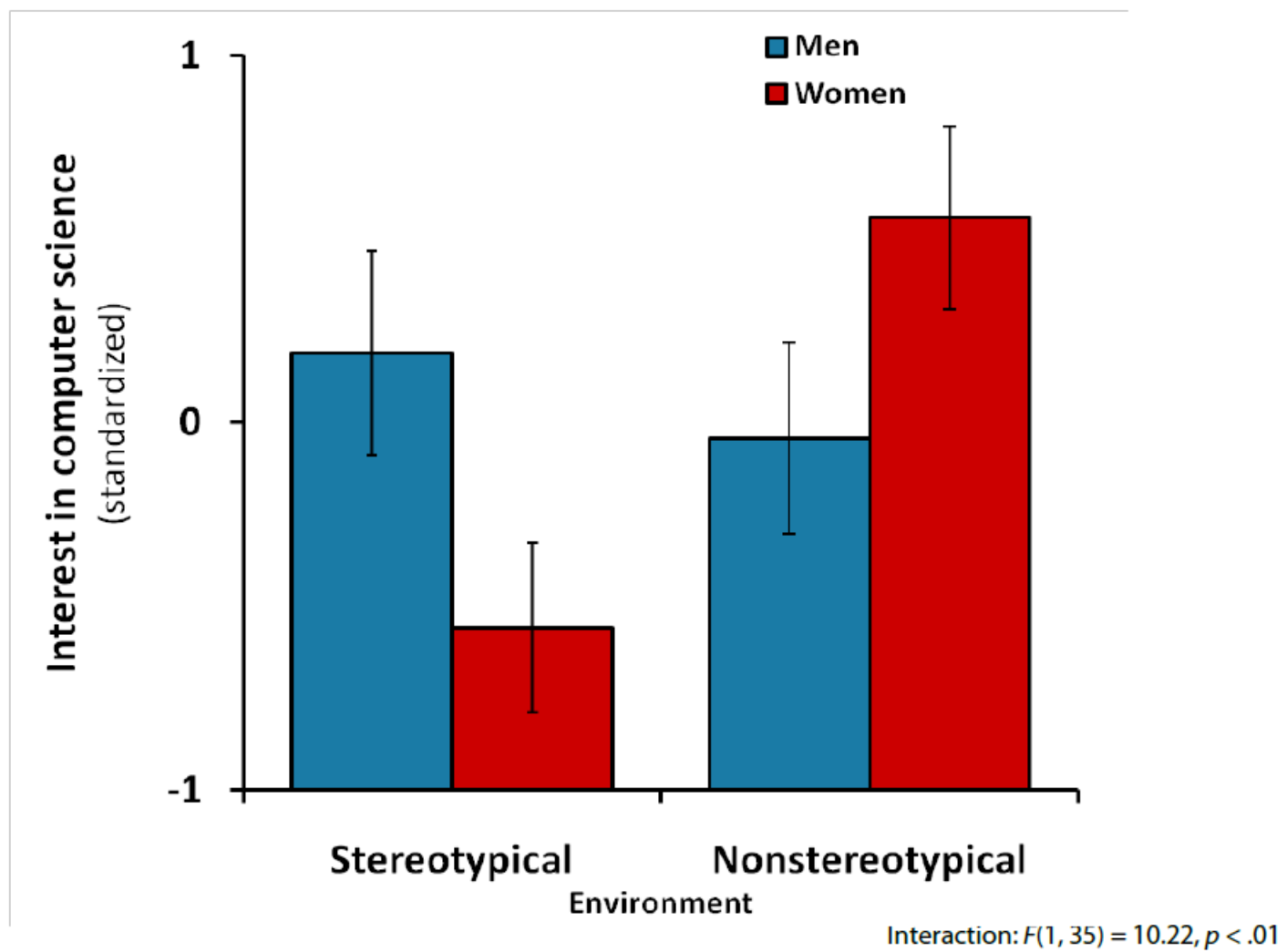
# Environment influences women's interest in CS



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



What to Do?  
Breaking the Bias Habit

# Reducing Bias in Evaluations: Individual Behaviors

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## 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

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## 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

[Wennarås & Wold. Nepotism and Sexism in Peer Review. \*Nature\* 1997.](#)



# Strategies That DO NOT Work

---

- **Stereotype Suppression**

(e.g., Galinsky & Moskowitz. *J Pers Soc Psychol* 2000;  
Monteith et al. *Pers Soc Psychol Rev* 1998)

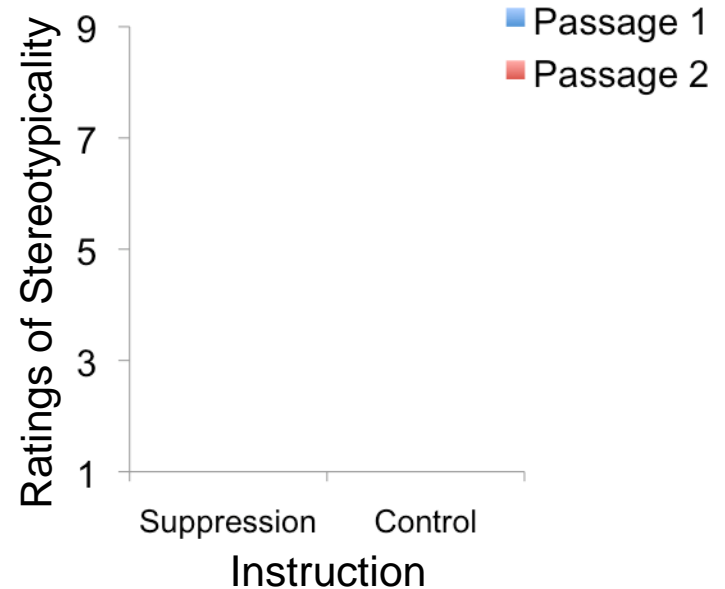
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(i.e., gender or race “blind”)

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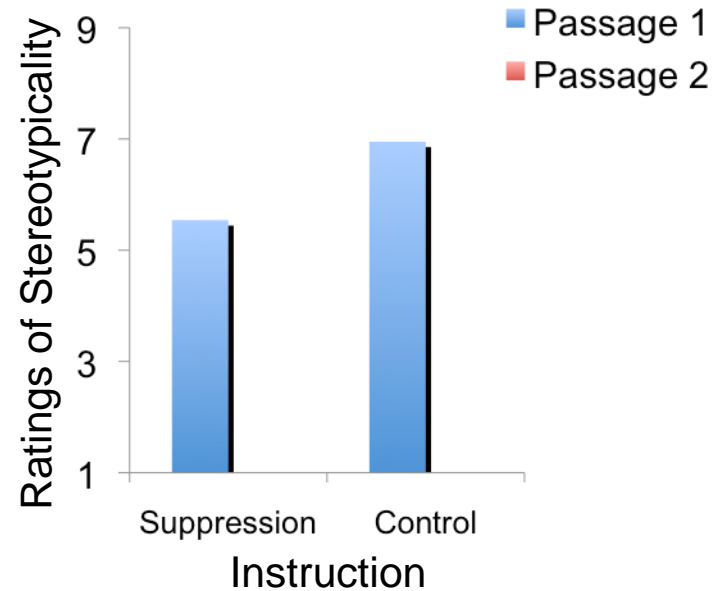


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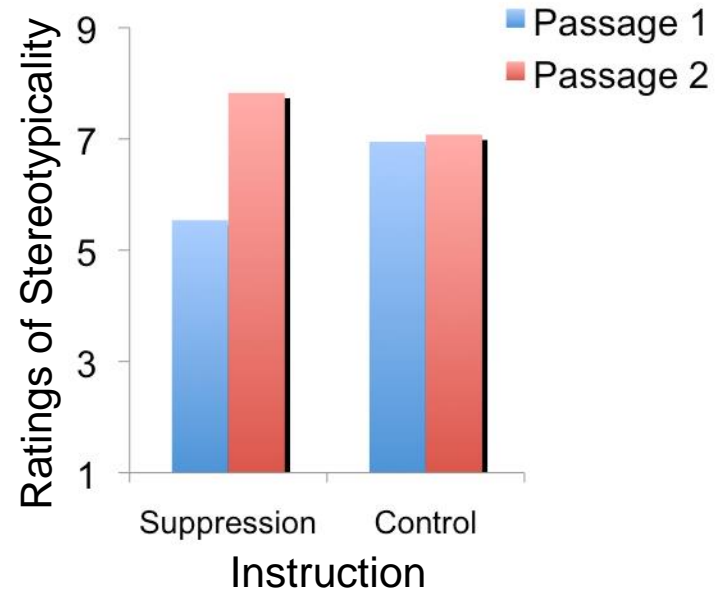


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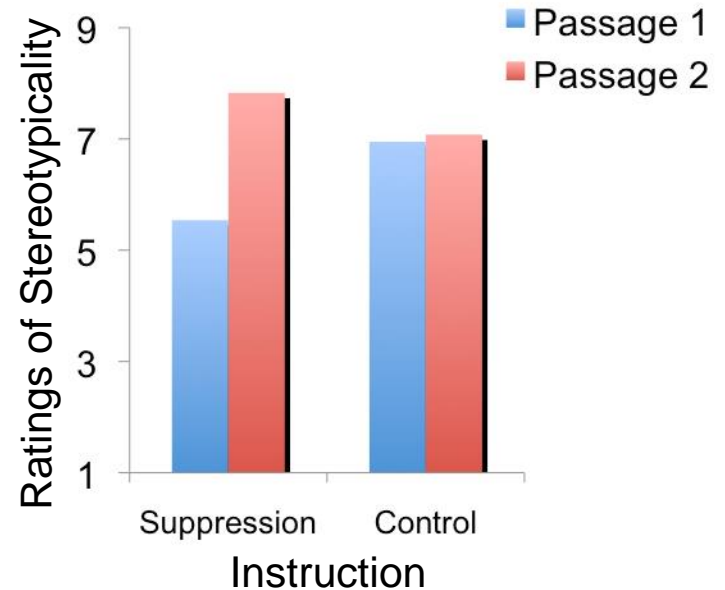


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- Rebound effects



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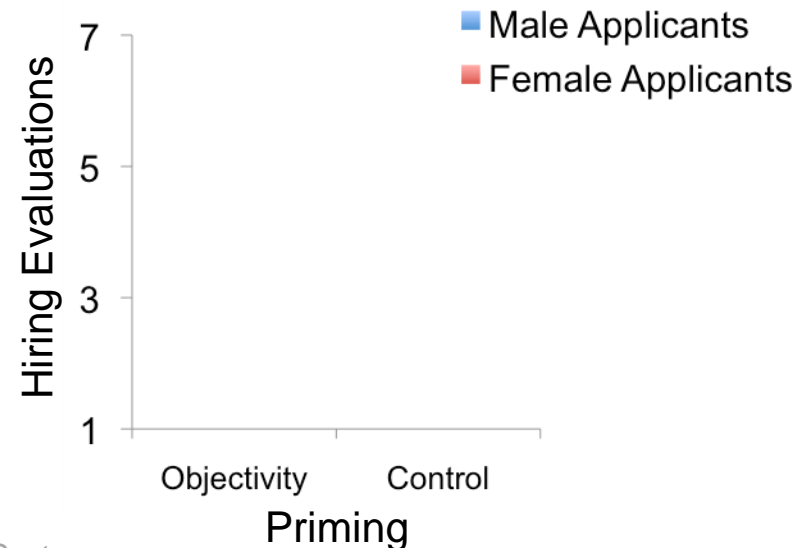
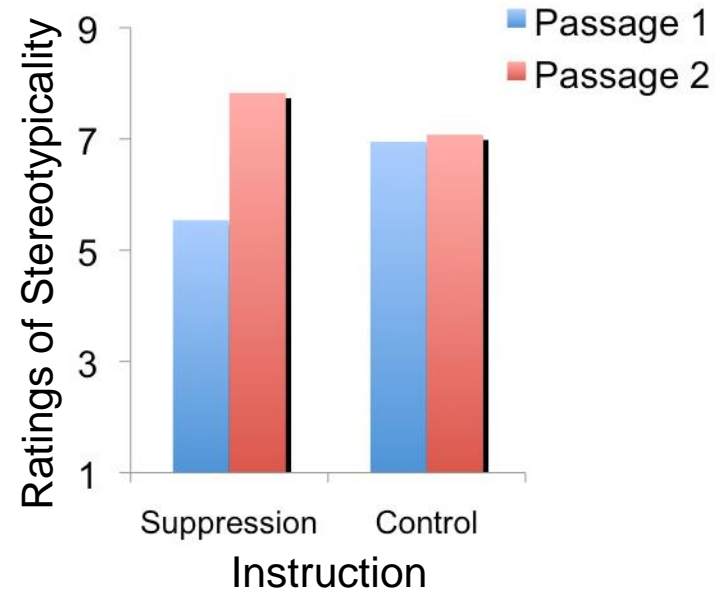
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- **Belief in personal objectivity**

(Uhlmann & Cohen. *Organ Behav Hum Decis Process* 2007)

- Leads to biased evaluations of women



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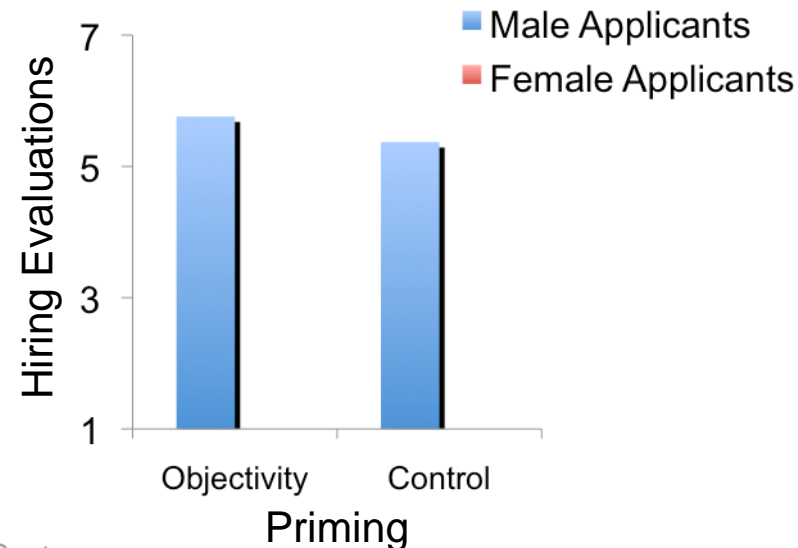
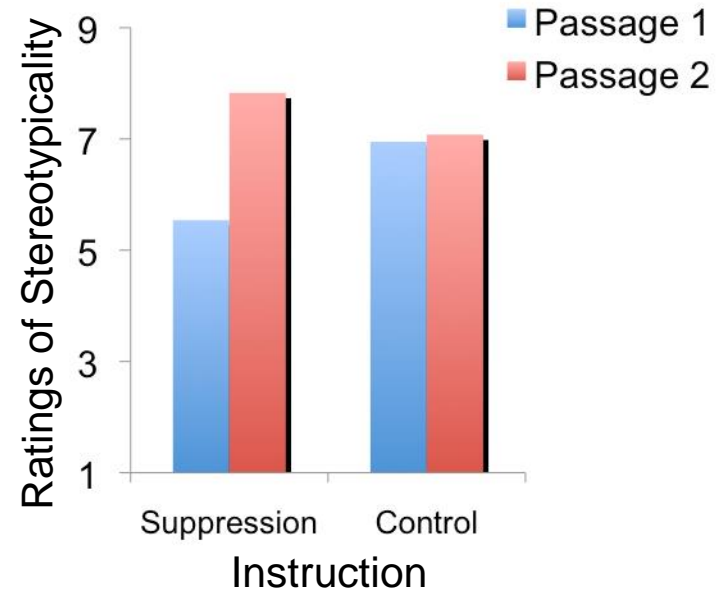
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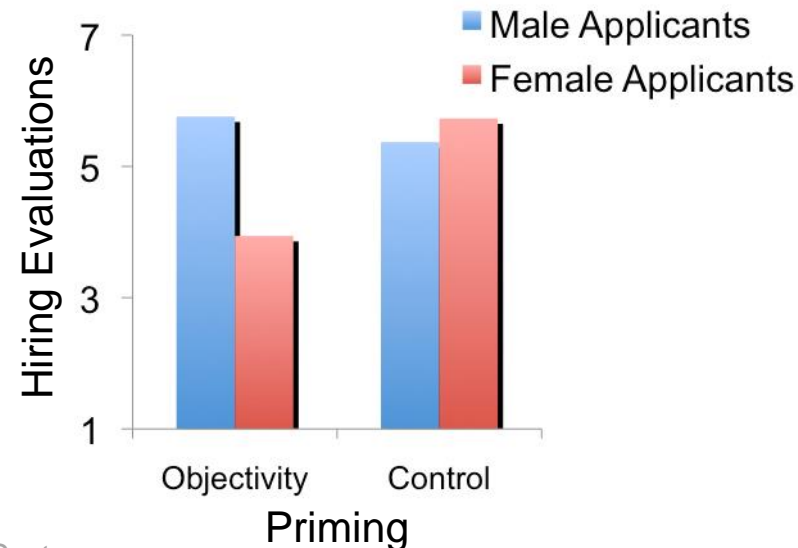
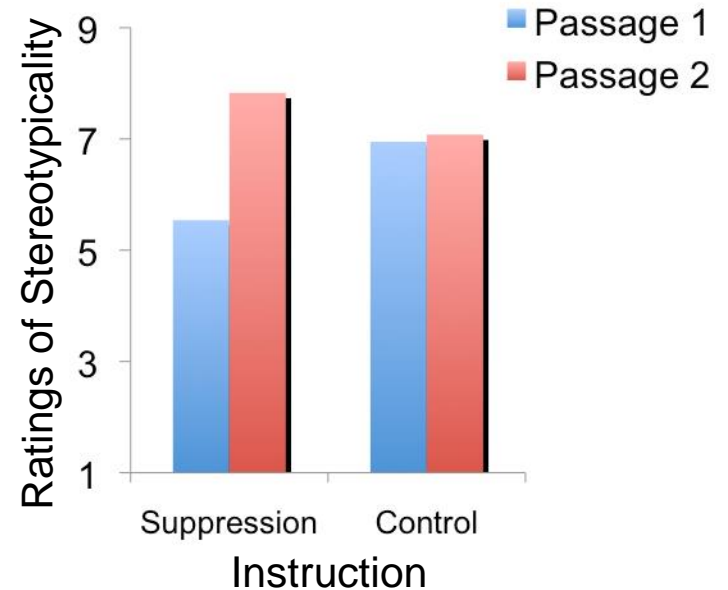
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# 1. Stereotype Replacement

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- ✓ 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

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- ✓ 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

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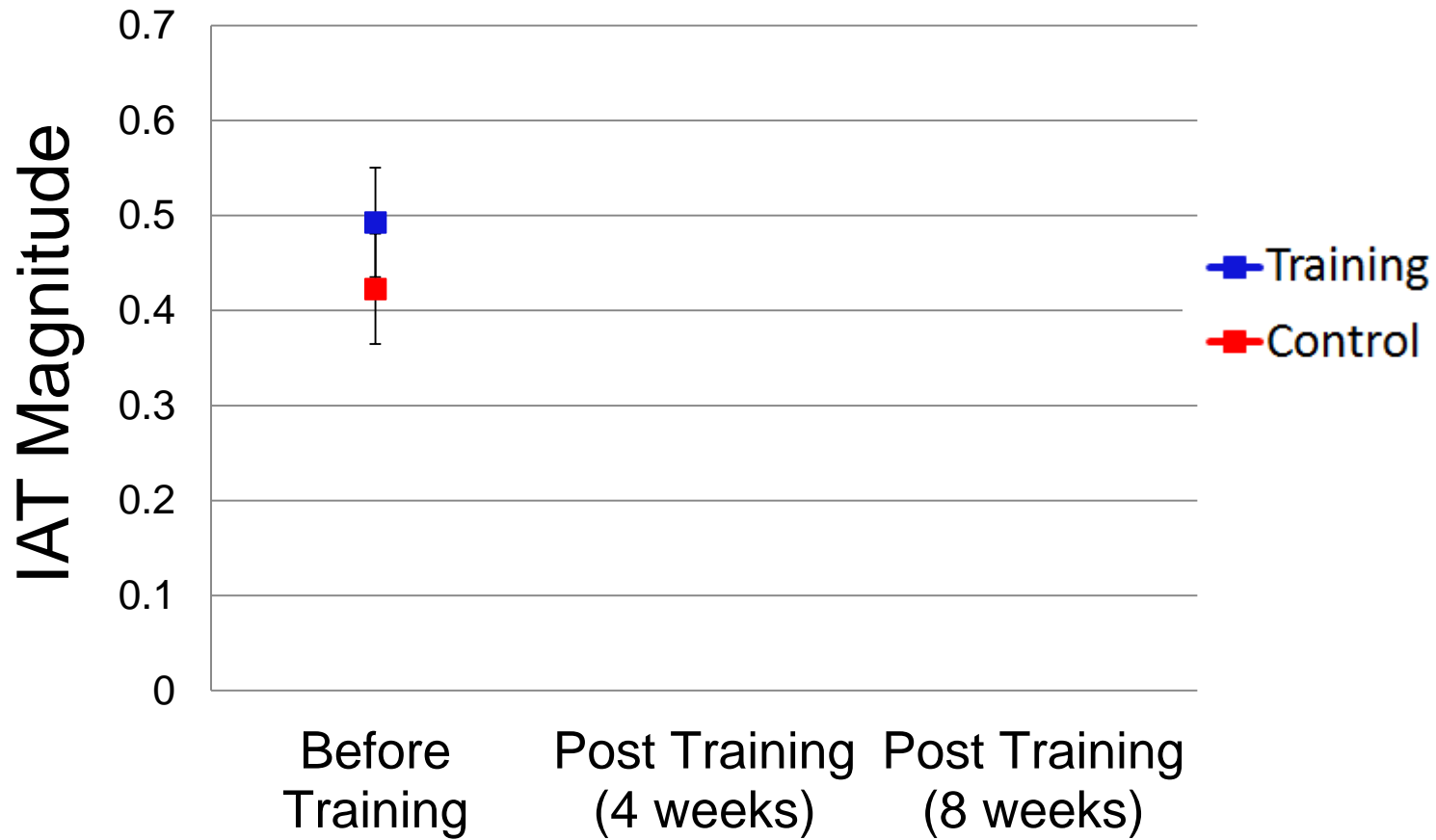
- ✓ Adopt the perspective (in the first person) of a member of the stigmatized group
  - *For example, imagine what it would be like to...*
    - *Have your abilities called into question*
    - *Be viewed as less committed to your career than colleagues with similar training and effort*
    - *Not be offered opportunities because of assumptions about family responsibilities*

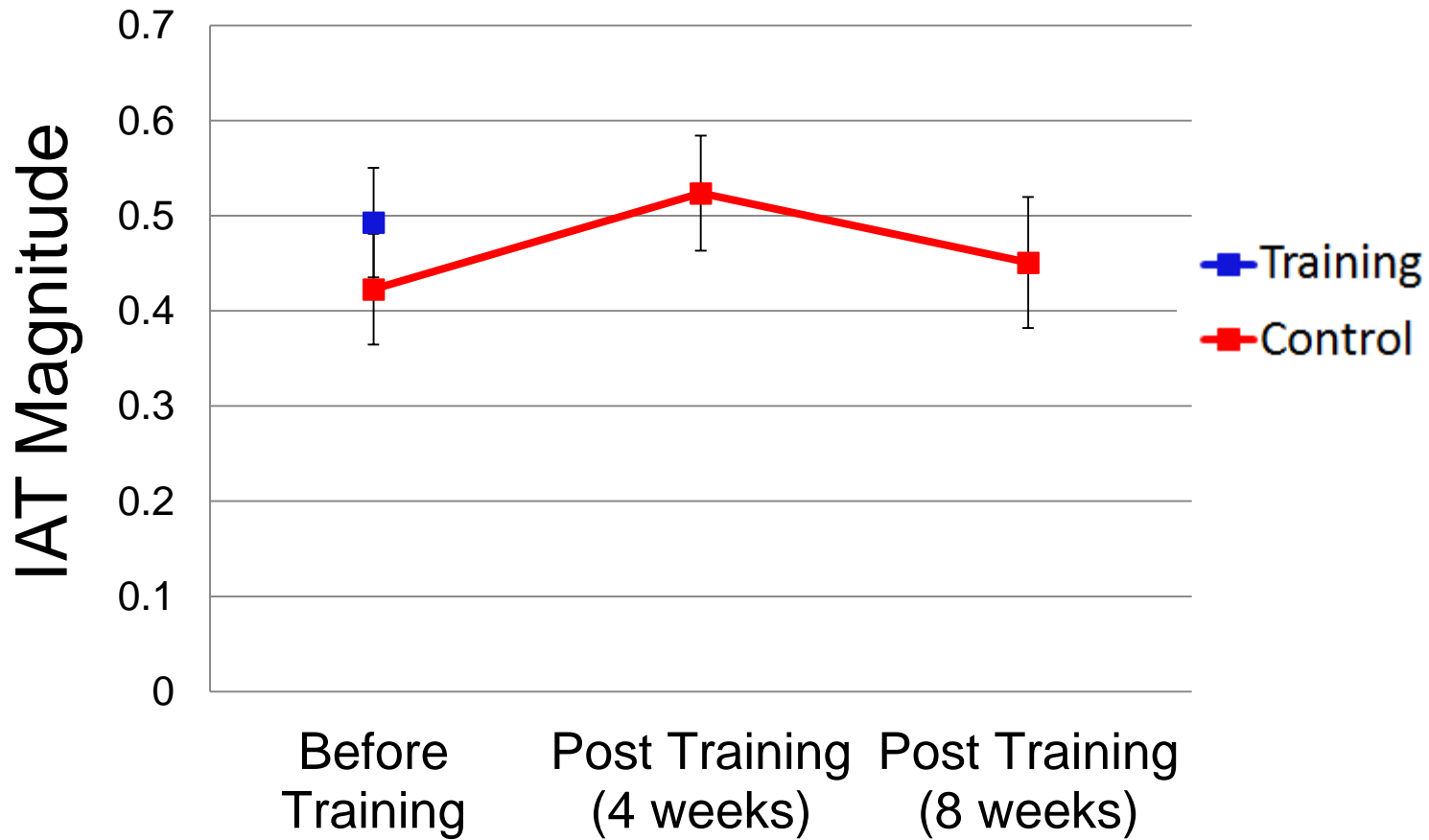
# 5. Increasing Opportunities for Contact

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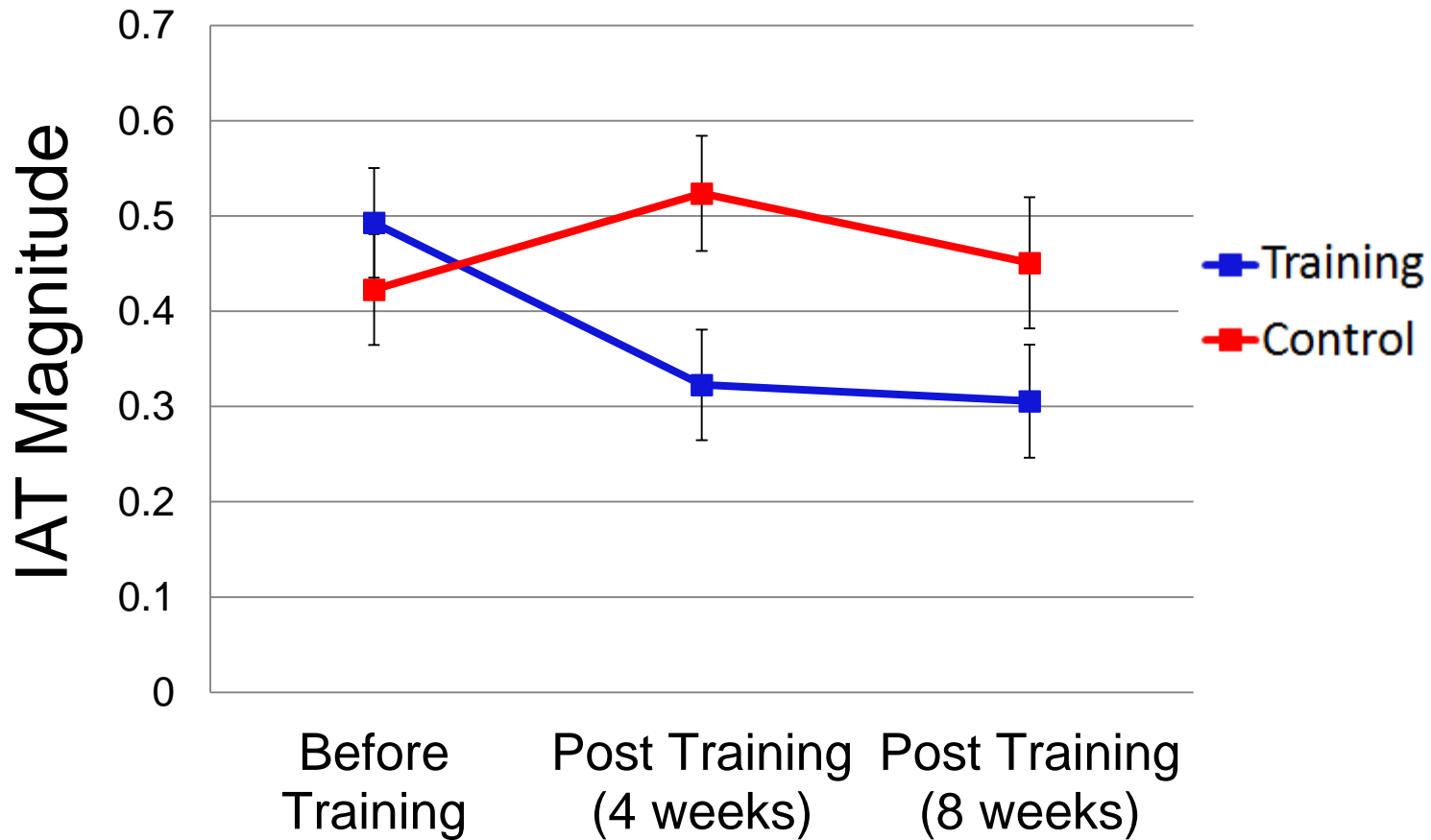
- ✓ Seek out opportunities for greater interaction with counter-stereotypic women
  - *e.g., Meet with women in high authority positions to discuss research endeavors, ideas, and visions*
  - *e.g., When compiling membership for key committees or speaker lists, ensure that women (from diverse groups) are represented*











# Breaking the Prejudice Habit

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- 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

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## What to do:

- Diversify the evaluation committee
  - Social tuning/increased motivation to respond w/o bias  
*Lowery, Hardin, and Sinclair. J. Personality and Social Psychology 2001.*
  - Counterstereotype imaging  
*Blair, Ma, and Lenton. J. Personality and Social Psychology 2001.*  
*Dasgupta and Greenwald. Journal of Personality and Social Psychology 2001.*
- Hold each member of the evaluation committee responsible for conducting equitable evaluations  
*Dobbs and Crano. Social Psychology Quarterly 2001.*  
*Foschi. Social Psychology Quarterly 1996.*
- Critical Mass – increase proportion of women and minorities in the pool  
*Heilman, Organizational Behavior and Human Performance 1980.*  
*van Ommeren et al. Psychological Reports 2005.*
- Develop and prioritize criteria prior to evaluating applicants  
*Uhlmann and Cohen. Psychological Science 2005.*

# Reducing Bias in Evaluations

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## What to do (cont.):

- Spend sufficient time and attention on evaluating each application  
*Martell. Applied Social Psychology 1991.*
- Focus on each applicant as an individual and evaluate their entire application package – information minimizes bias  
*Heilman. Organizational Behavior & Human Performance 1984.*  
*Tosi and Einbender. Academy of Management Journal 1985.*  
*Brauer and Er-rafiy. Journal of Experimental Social Psychology 2013.*
- Use inclusion rather than exclusion decision-making processes  
*Hugenberg et al. J. Personality and Social Psychology 2006.*
- 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*
  - **Equity:** *Dobbs and Crano, Personality and Social Psychology Bulletin, 2001*  
*Foschi, Social Psychology Quarterly, 1996*