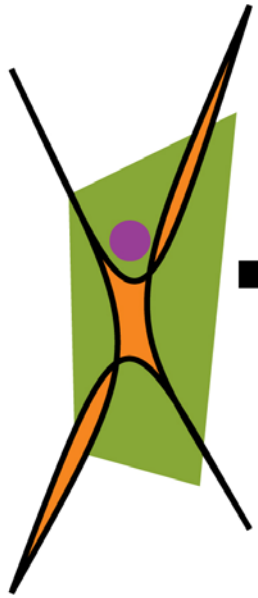


# Implicit Bias in Science: The Power of Automatic, Unintended Mindsets

Frederick L. Smyth  
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University of Virginia

STEM Equity Pipeline Webinar  
February 16, 2011



**fpi**

**full potential initiative**

**Brian Nosek & Fred Smyth**

**Funded by the National Science Foundation**

**REC-0634041**

**[fullpotentialinitiative.org](http://fullpotentialinitiative.org)**



# Who will you bet on?

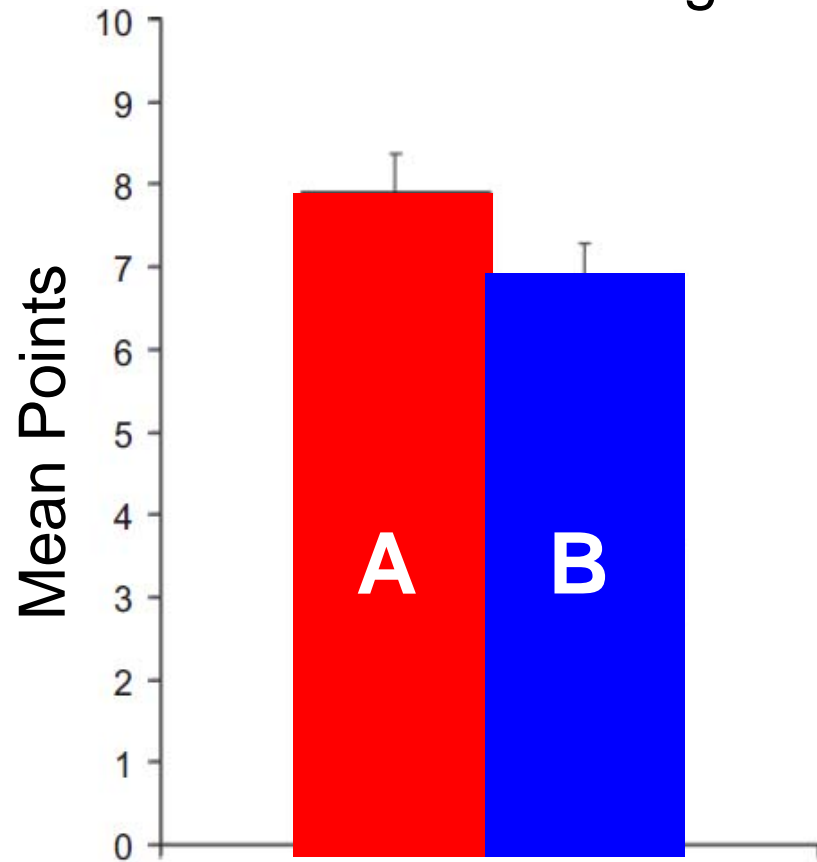


**A**

**B**

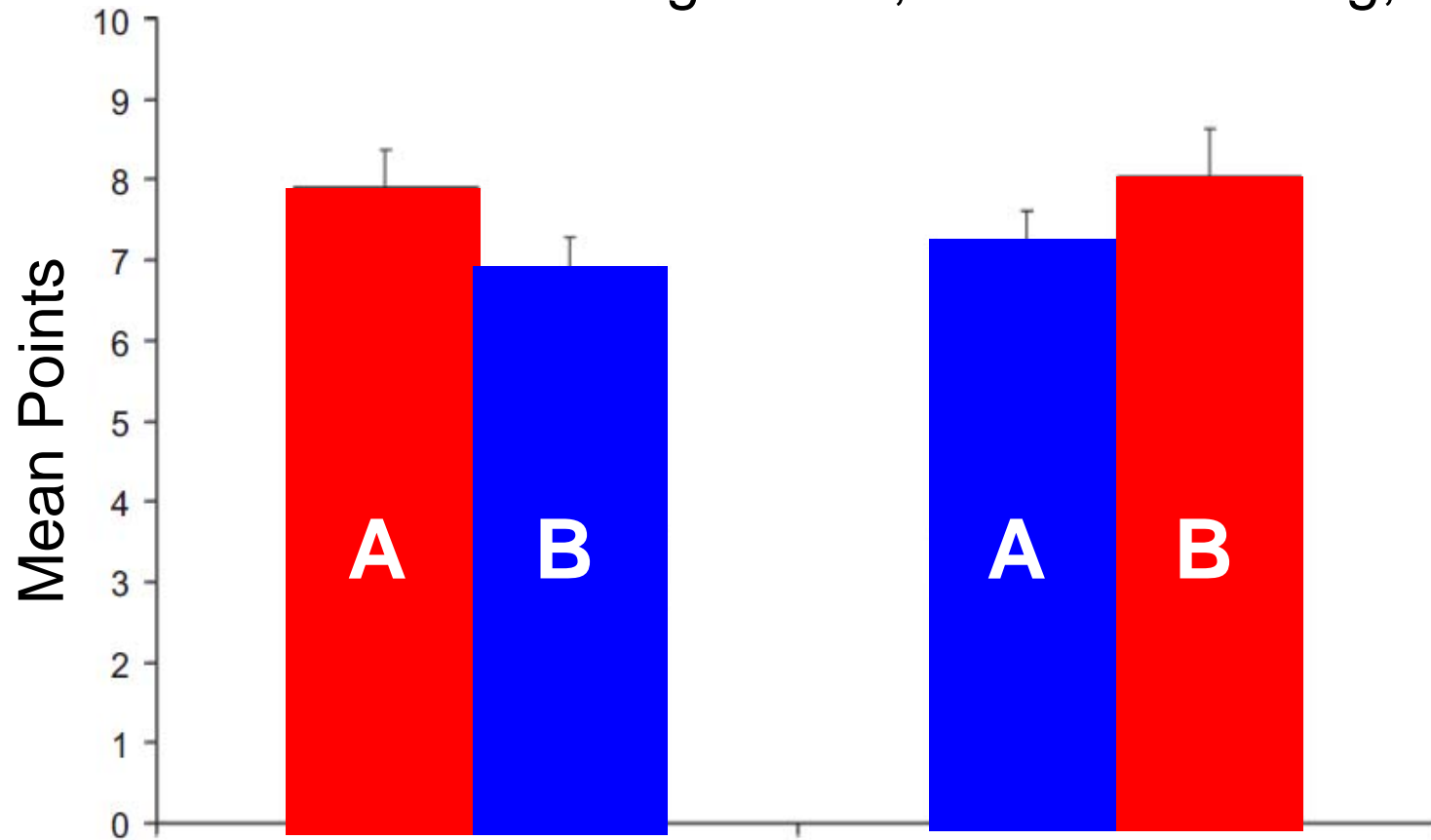
# Competitor A

Hagemann, Strauss & Leing, 2008



or B if he wears red.

Hagemann, Strauss & Leing, 2008

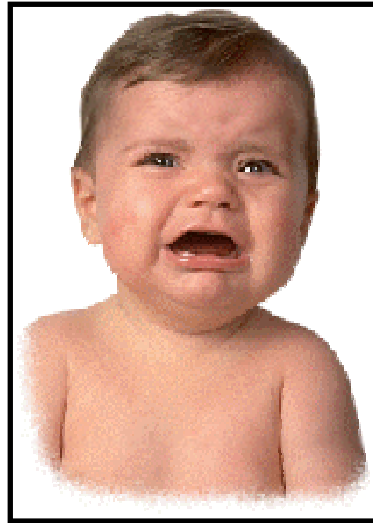


# Implicit Bias

- Beyond awareness and control
- 1970s early demonstrations
- Pervasive
- Livelihoods and lives

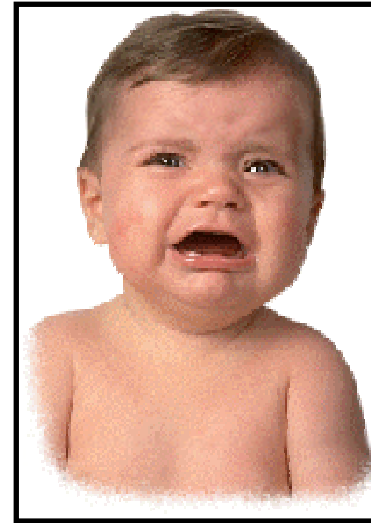
# Feelings

**Debbie**



**“Afraid”**

**Danny**



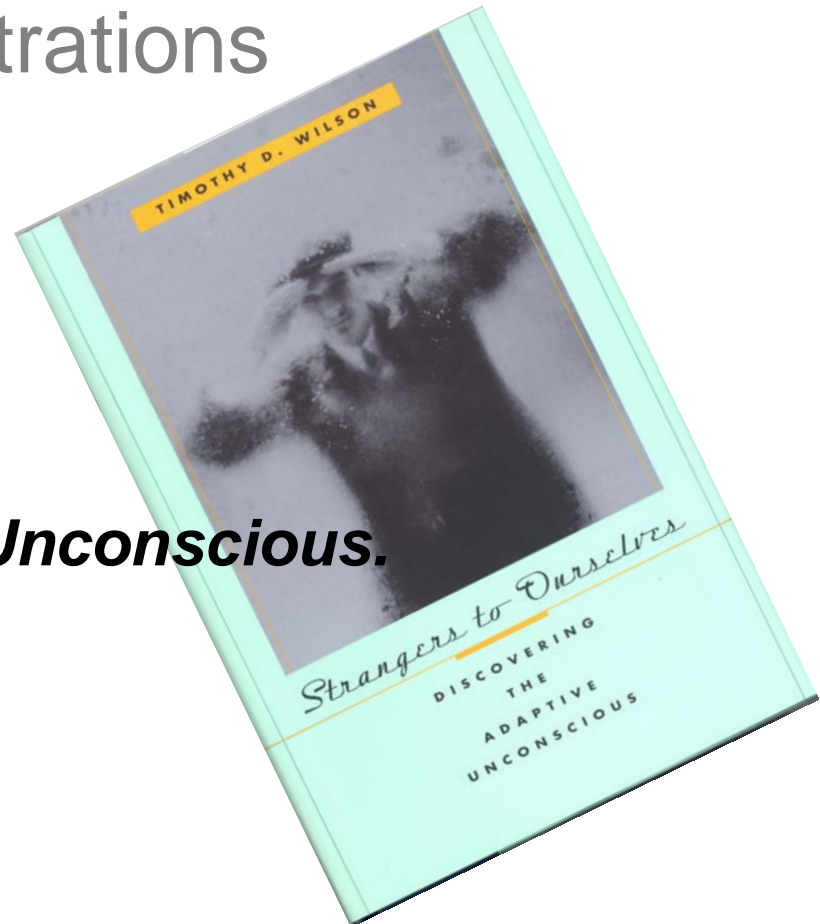
**“Angry”**

Condry & Condry, 1976

# Implicit Bias

- Beyond awareness and control
- 1970s early demonstrations
- Pervasive

***Strangers to Ourselves:  
Discovering the Adaptive Unconscious.***  
**Timothy Wilson**  
**University of Virginia**

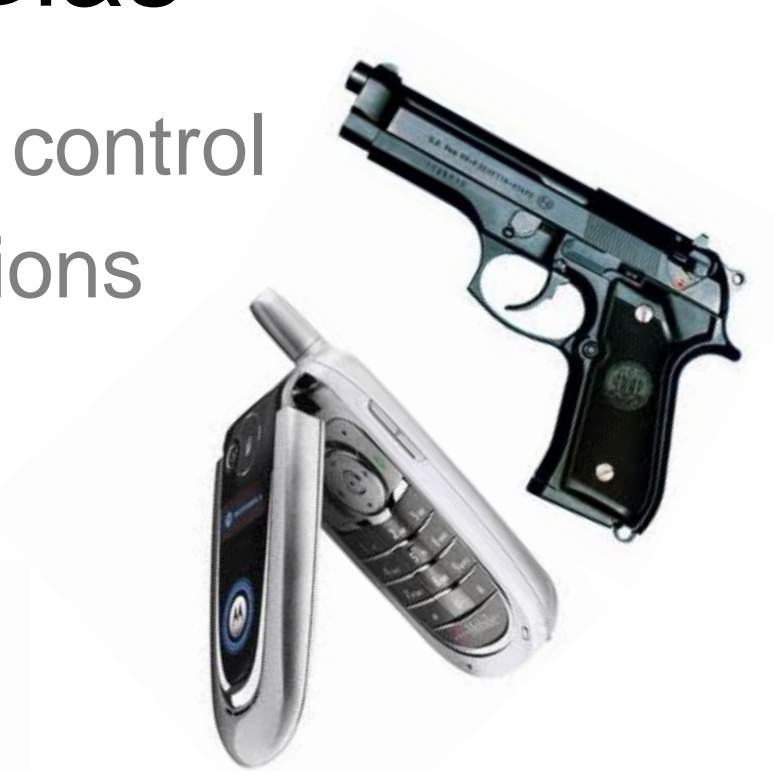


# Implicit Bias

- Beyond awareness and control
- 1970s early demonstrations
- Pervasive
- Livelihoods and lives



Goldin & Rouse, 2000

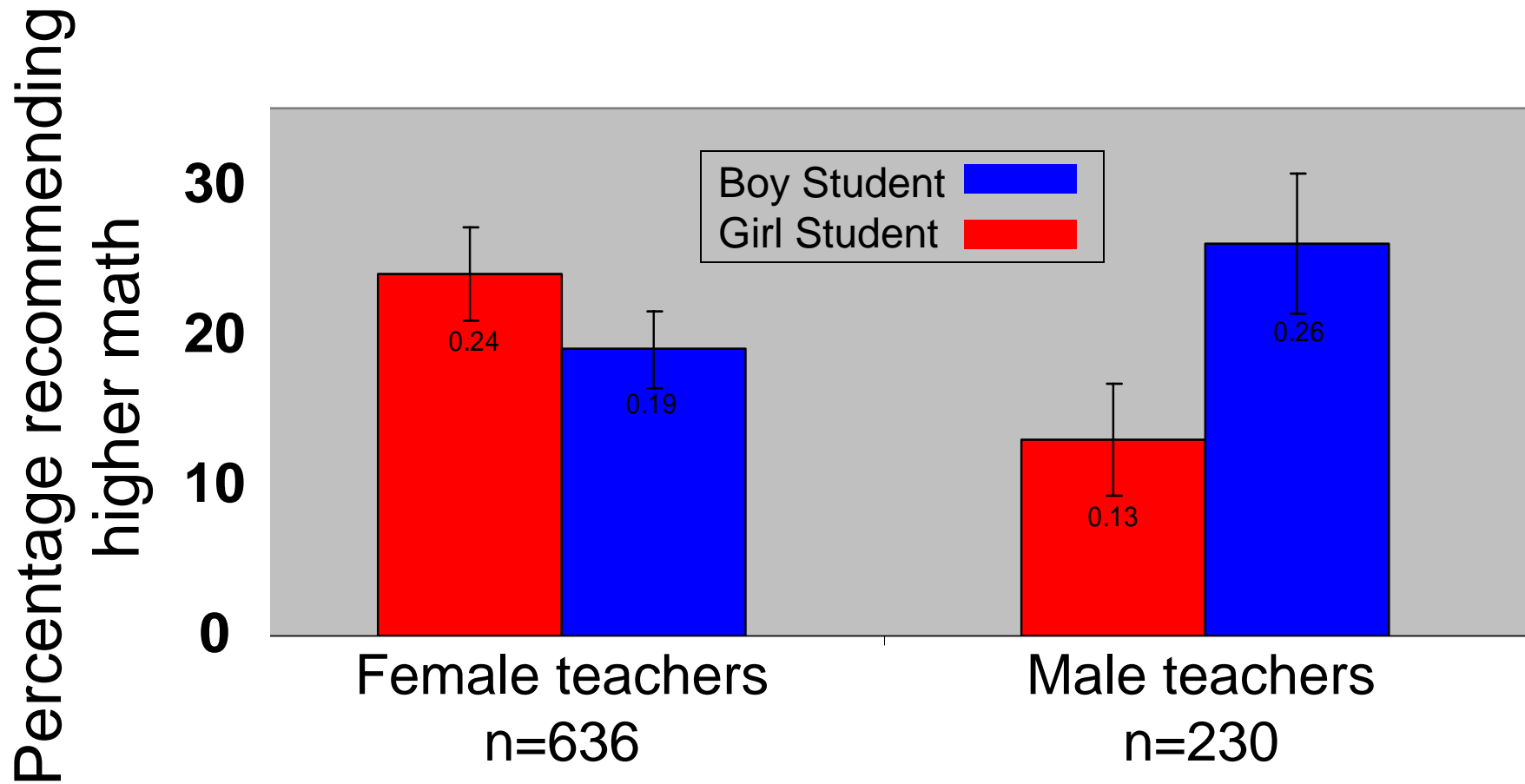


Payne, 2006

# Take Home about Implicit Associations

- 1) Humility (we all have 'em)
- 2) Related to STEM outcomes
- 3) Measurable
- 4) Changeable

# Teachers' math placement decisions



Smyth, Hawkins & Nosek, 2009

# Measuring Implicit Associations (individually)

# Implicit Association Test (IAT)



Green Bay or Pittsburgh?

Greenwald, McGhee & Schwarz, 1998

**Steelers**

**Packers**

**Left**



**Right**

**Training Phase 1**

**Steelers**

**Packers**

**Left**



**Right**

**Training Phase 1**

**Good**

**Bad**

**Left**

**Right**



**Training Phase 2**

**Good**

**Bad**

**Left**

**Right**



**Training Phase 2**

**Steelers**

**Good**

**Left**



**Packers**

**Bad**

**Right**

**Test Phase 1**

**Steelers**

**Good**

**Left**



**Packers**

**Bad**

**Right**

**Test Phase 1**

**Packers**

**Steelers**

**Left**

**Right**

**Retraining**



**Packers**

**Good**

**Left**

**Steelers**

**Bad**

**Right**

**Test Phase 2**

# Which sorting is easier?

**Steelers**

**Packers**

**Good**

**Bad**



**Steelers fans**

**Packers**

**Steelers**

**Good**

**Bad**



**Packers fans**

# Project Implicit®



## Demonstration

The demonstration site for the Implicit Association Test. Click this button to learn more about implicit associations and try out some sample tasks. Or, go directly to our featured task: [Fat-Thin IAT](#).

## Research

The research site for Project Implicit. Click this button to participate in on-going research measuring implicit associations for a variety of topics.



[implicit.harvard.edu/implicit/](http://implicit.harvard.edu/implicit/)

# Gender-Science on Project Implicit

**Male**

**Easier for 10%**

**Female**

or

or

**Liberal Arts**

**Science**

**No Difference for 20%**

**Female**

**Easier for 70%**

**Male**

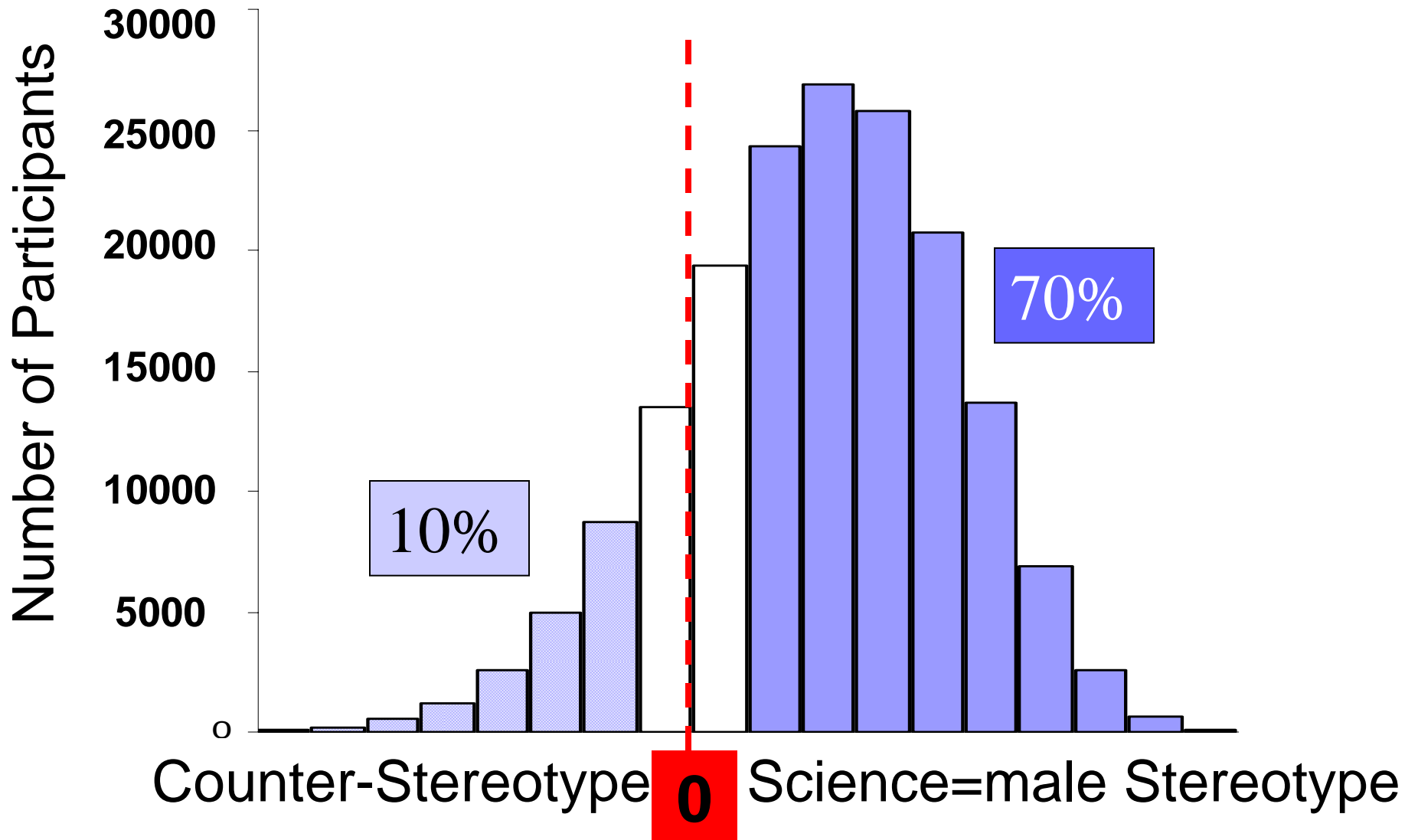
or

or

**Liberal Arts**

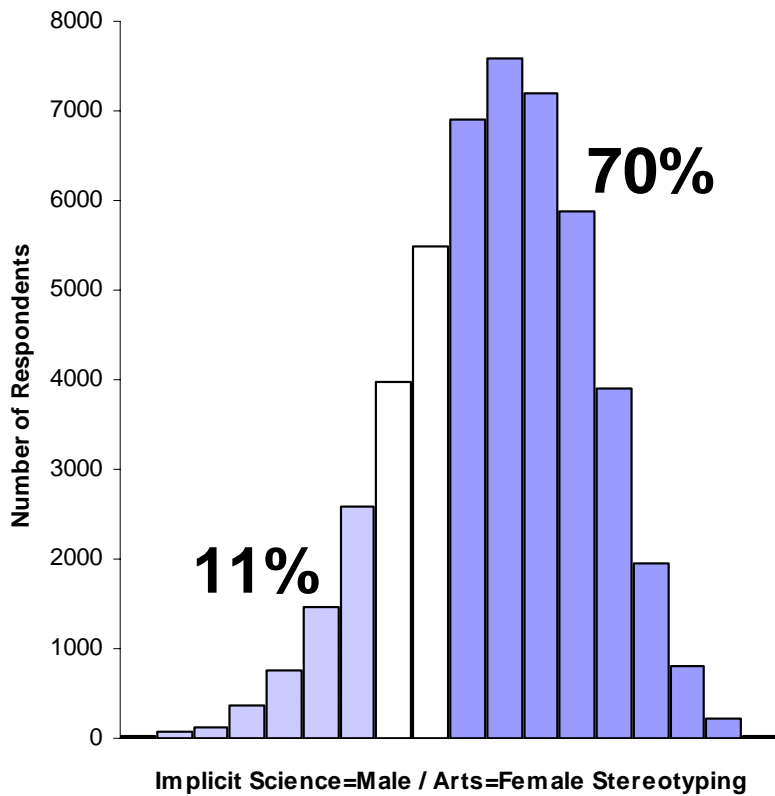
**Science**

# Gender-Science on Project Implicit

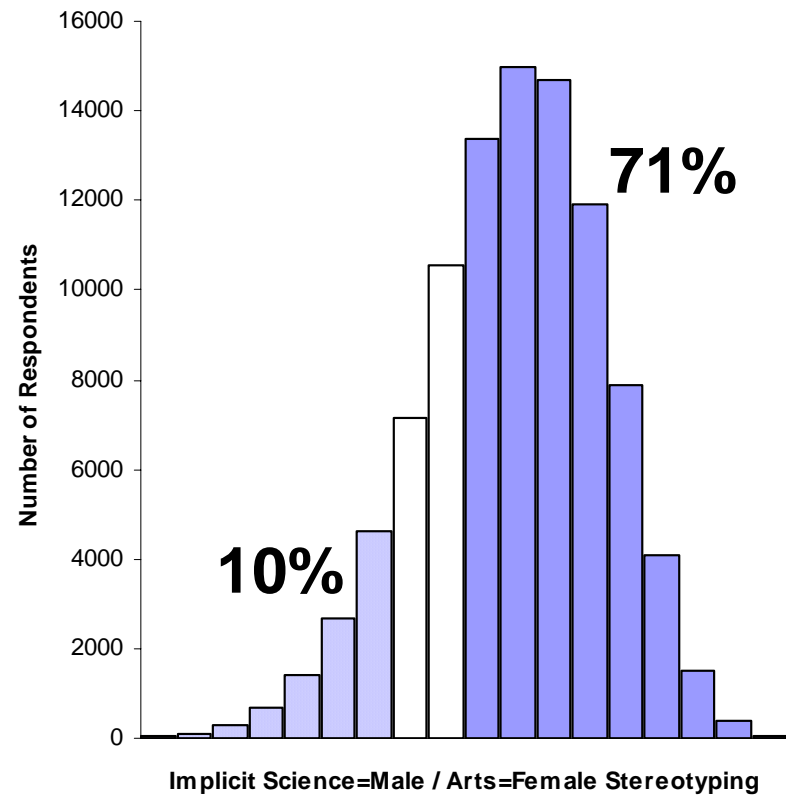


# Same for Men and Women?

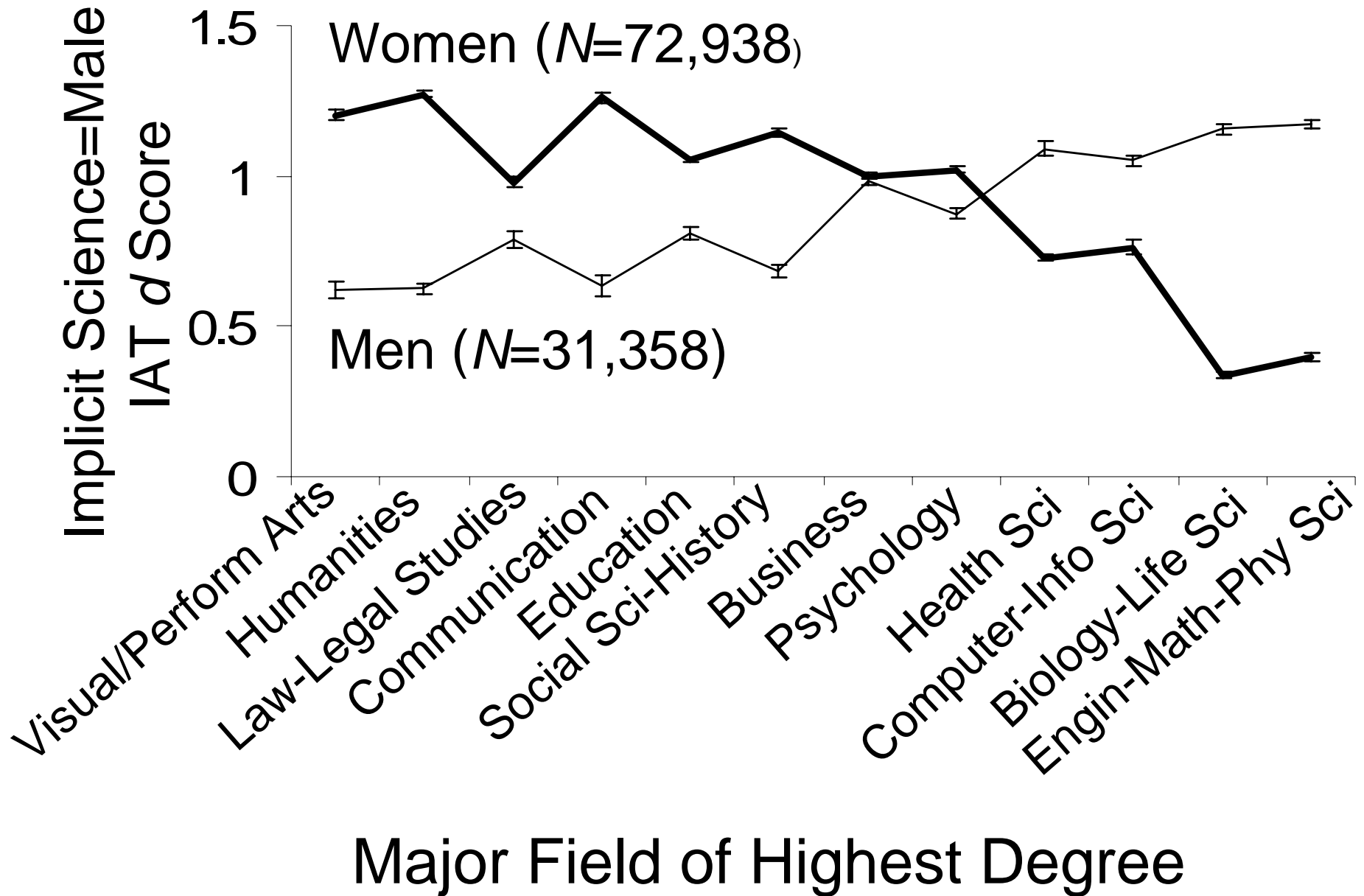
## Male Respondents



## Female Respondents



# Academic Identity Matters



Smyth, Greenwald & Nosek, 2010

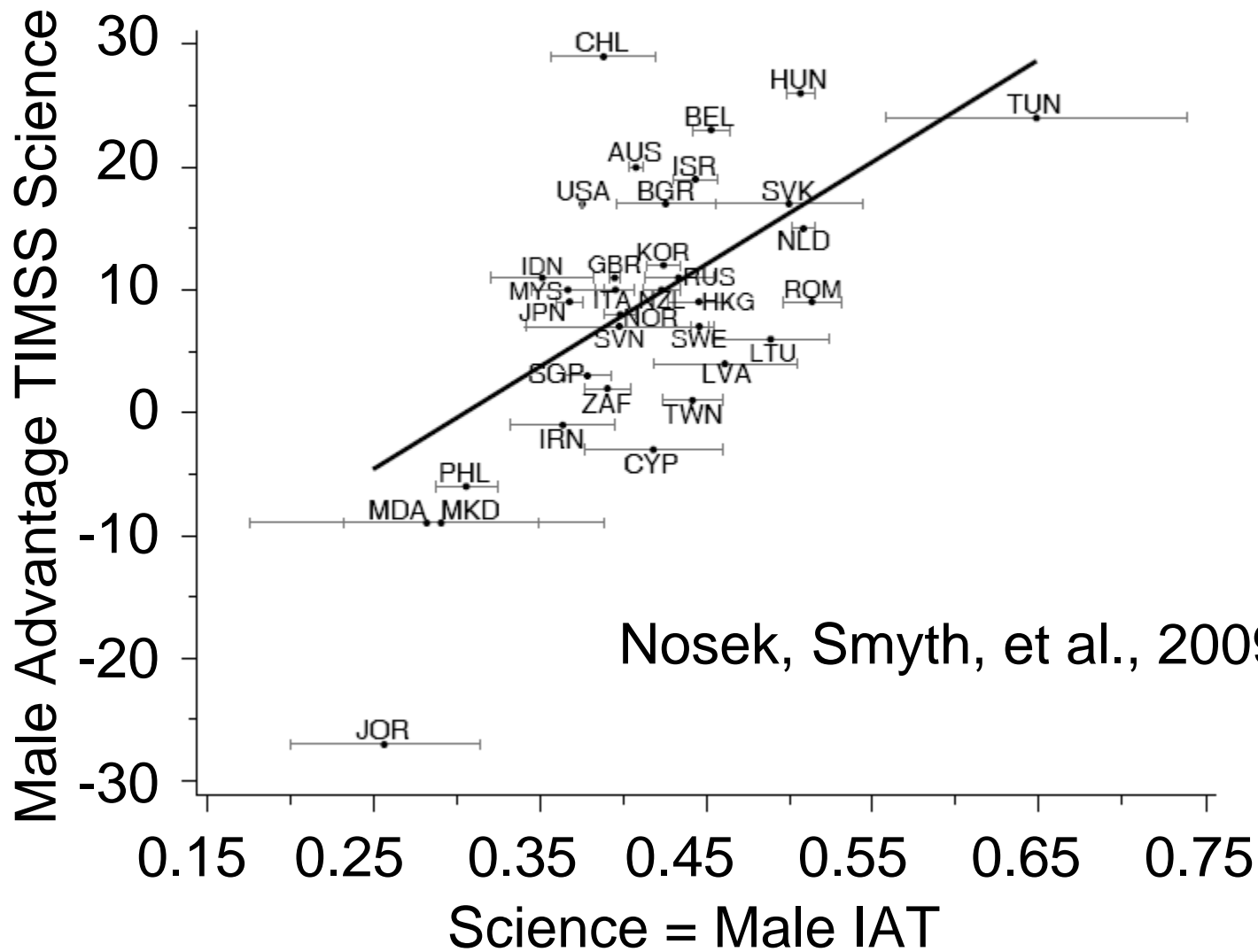
# Environment Matters

# International Variation



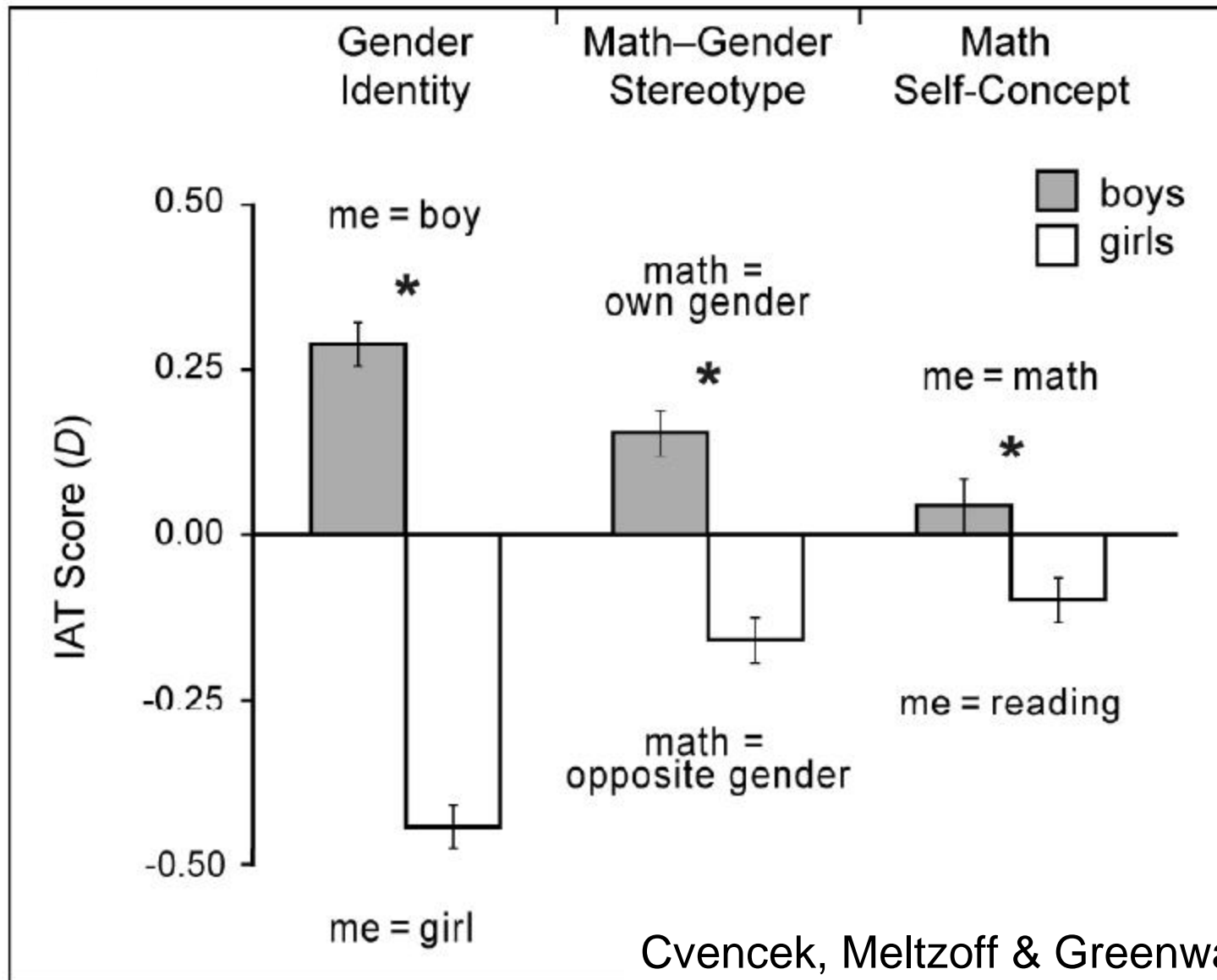
Nosek, Smyth, et al., 2009, *PNAS*

Greater 8th-grade Boys' Advantage correlated with greater country-level implicit bias,  $r = .60$



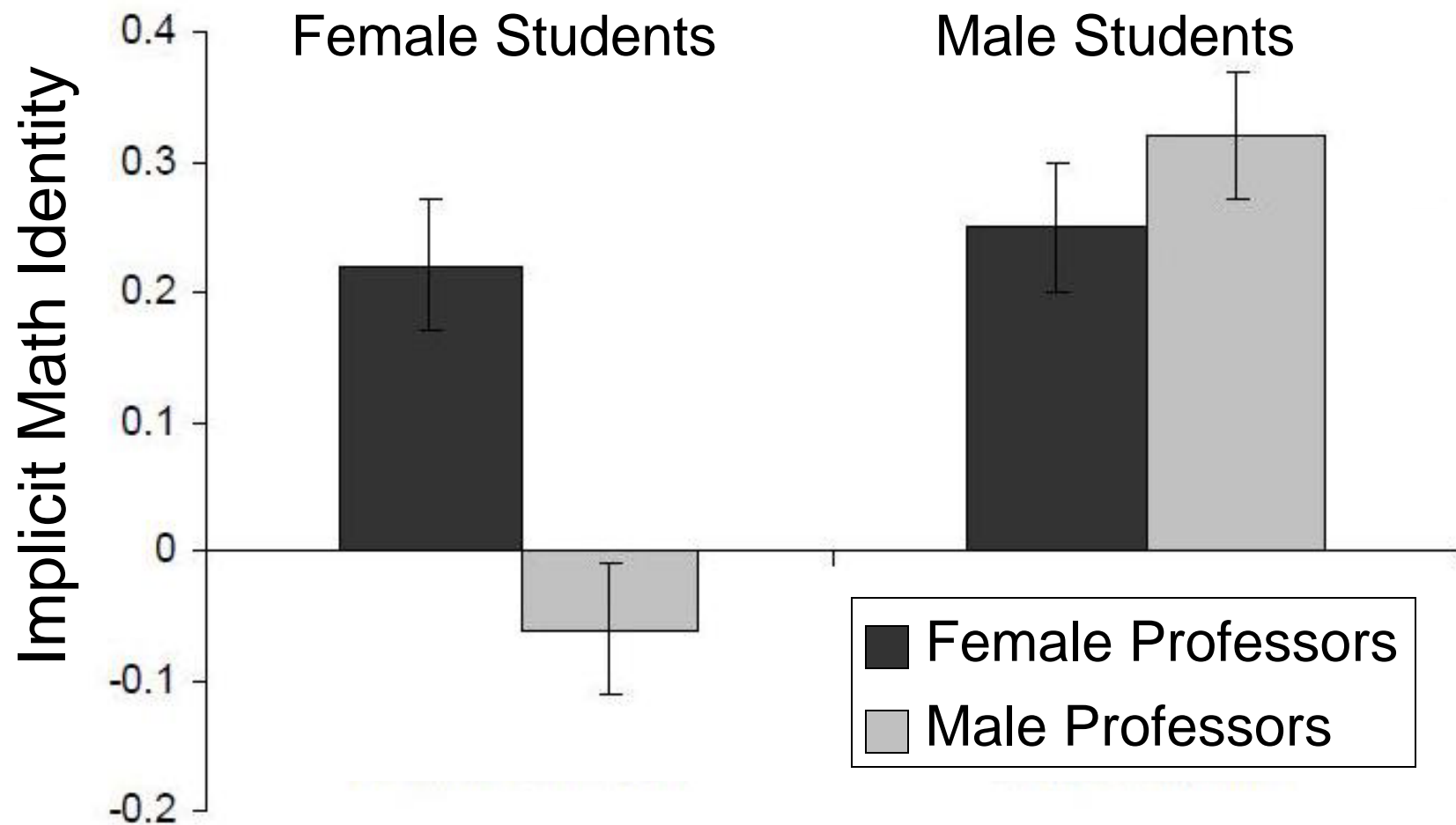
Nosek, Smyth, et al., 2009, *PNAS*

# Elementary School



Cvencek, Meltzoff & Greenwald 2010

# Professor's Gender affects Calculus Students' Implicit Math Self-Concept



Stout, Dasgupta et al., 2010

# Stereotype Inoculation Model

“Inoculation” by contact with successful female role models bolsters STEM self-concept, attitude, self-efficacy and goals.

Stout, Dasgupta et al., 2010

# Costs of Implicit Bias?

# Costs of Implicit Bias?

*Jenny went home to cook dinner...*

1-Egalitarian to 5-Sexist

*...for her husband.*

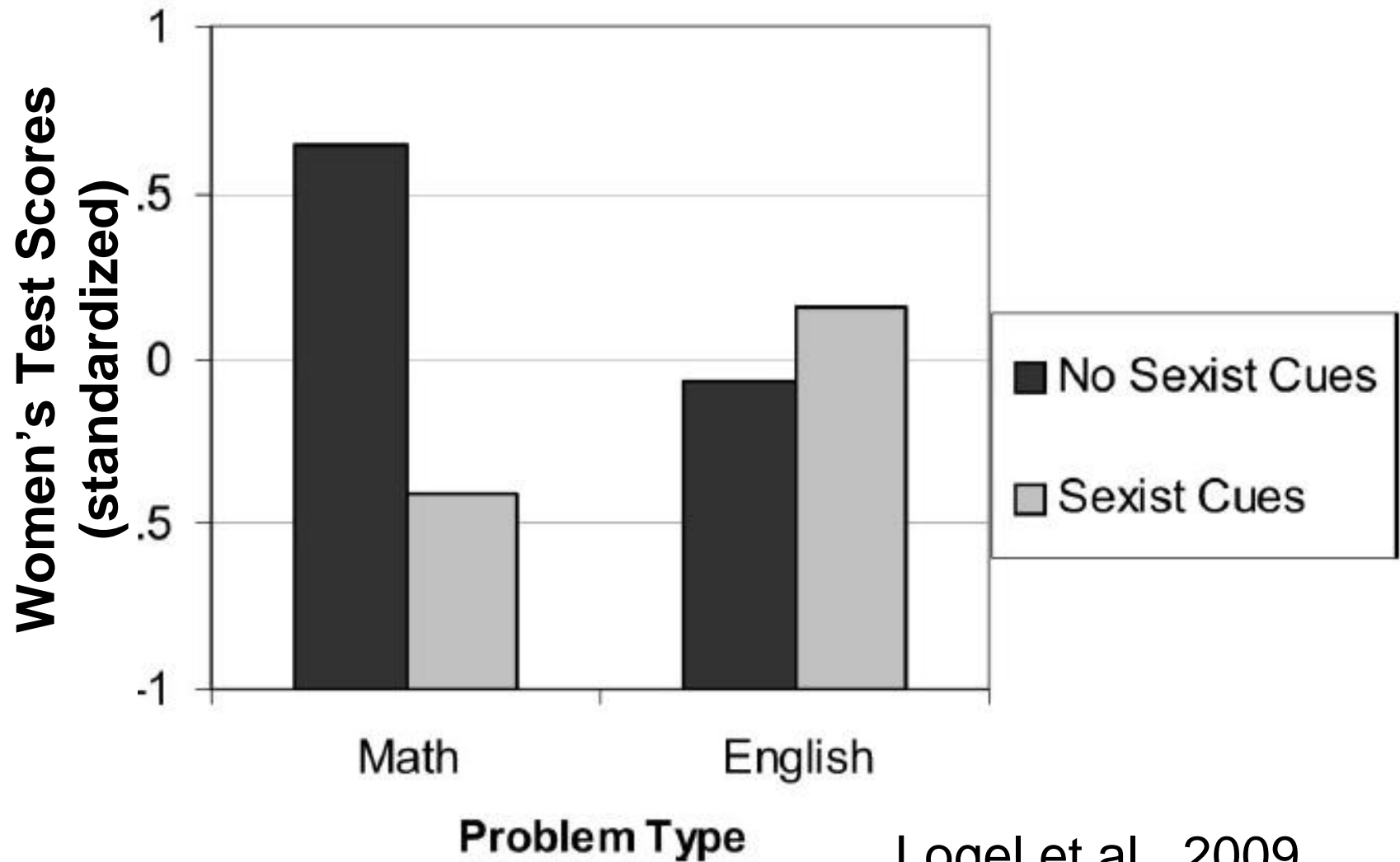
*...naked.*

*...because Tim cooked dinner last night.*

*...after work.*

Logel et al., 2009

# Costs of Implicit Bias?



Logel et al., 2009

# What to do?

- 1) Education, measurement and evaluation.
- 2) More research! Collaboration!
- 3) “Re-doing” more than undoing.
- 4) Promote “mind-is-muscle” mindset.

# Restructure decision-making process



Goldin & Rouse, 2000

# Protect against known biases



Hagemann, Strauss & Leiting, 2008

# Promote Mind-is-Muscle Mindset

## Carol Dweck

- *Why do beliefs about intelligence influence learning success?*
- *Is math a gift? Beliefs that put females at risk.*
- *Mindset.* (Random House, 2006)

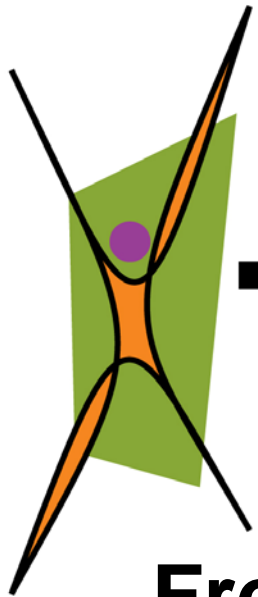
# Lawrence Summers & Implicit Bias

“...any of us who think that we can for ourselves judge whether we are biased or not are probably making a serious mistake.

So we all need to think about what we can learn from data about our own unconscious biases and think structurally about what to do about those biases.”

National Symposium for the Advancement of Women in Science, April 7, 2005

# Thank you!



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