

Low Numbers:  
Stereotype Threat  
and the Performance of Women  
and Minorities

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# The Minority-White Gap

**Prison:**  
**Blacks and Latinos vastly overrepresented**

**College**  
**Blacks 1/2 as likely to go; 2x as likely to drop out**

**High School:**  
**50% drop out rate; 2-4 year reading gap**

**K-12**  
**Lower standardized test scores and grades**

**Birth-Preschool**  
**Nearly equal ability test scores**

# Under-Performance of Women In Math & Science

**While outperforming men in all other areas of academia, women earn less than 25% of the degrees in Computer Science, Physics, and Engineering**

**College: women perform worse on standardized tests of mathematics but do well in their courses; far fewer choose math/ hard science majors**

**Middle School: Girls earn equally high grades but begin to lose confidence in math abilities; test score gap on standardized tests emerges**

**K-12: Girls Perform at or above the same level as boys on tests and in school; show less intrinsic interest in spatial tasks**

# Common Explanations for Group Differences

## 1. Lower innate intelligence

*--The Bell Curve*

*--Biological differences in math ability*

## 2. Poverty (lower skills and preparation)

## 3. Subculture that discourages academic success

“Acting White” “Acting Male”

# Larger Culture of Anti-Intellectualism



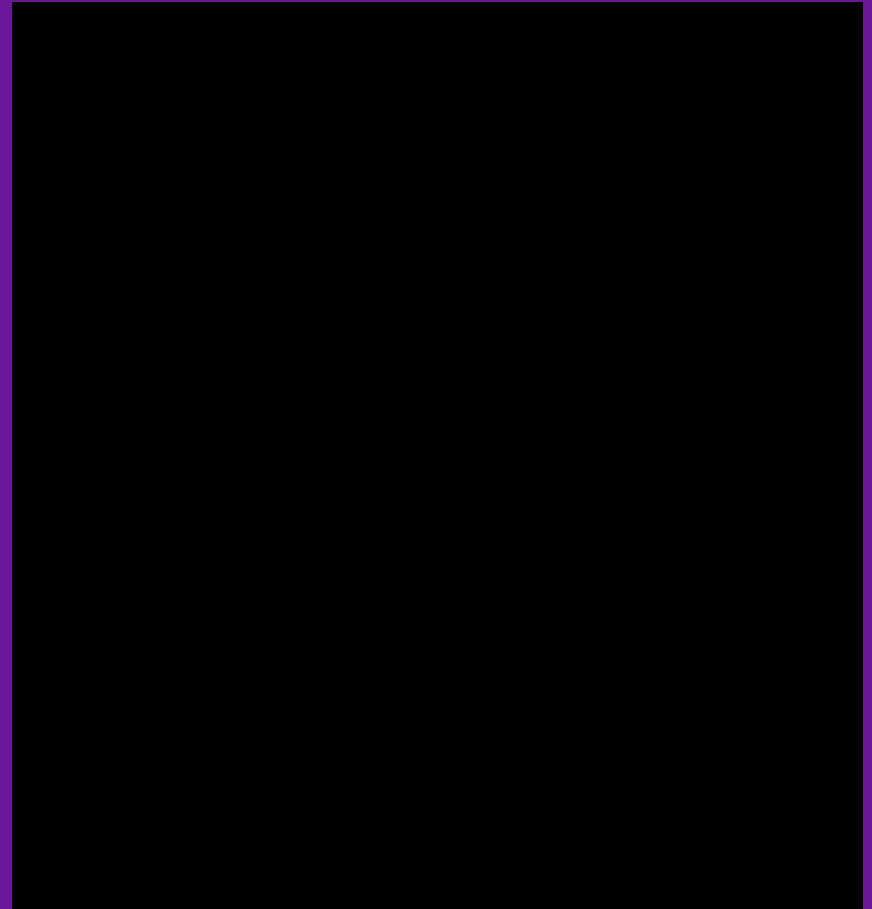
# Larger Culture of Anti-Intellectualism

**Recent polls indicate that 1 in 5 Americans:**

- Believes that the Sun revolves around Earth
- Can't locate the U.S. on a World Map
- Does NOT believe the Government is hiding evidence of space Aliens!

# Larger Culture of Anti-Intellectualism

- Recent polls indicate that a 5th of Americans can't locate the U.S. on a World Map.
- Why do you think this is?



All of the traditional explanations fall short of explaining the gap, even when combined; something else must be involved...



# Part One: Intelligence is Fragile

Operational Definition: Intelligence = IQ  
Scores, Performance in School, Verbal  
Fluency, etc.

“Human intelligence is among the most fragile things in nature. It doesn’t take much to distract it, suppress it, or even annihilate it.”

--Neil Postman

# The Fragility of Intelligence

## Some social factors:

- Interpersonal Intimidation (being smarter, funnier, etc with some people)
- Threatened Belongingness (Baumeister, 2002)
- Stereotype Threat/ Identity threat (Steele & Aronson, 1995)

# Identity Threat

Apprehension arising from the awareness of a negative stereotype or personal reputation in a situation where the stereotype or identity is relevant, and thus confirmable

– everyone experiences this in some form

# Examples of Identity Threat

- Jewish person in the Bible Belt
- African American Taking an IQ test
- Woman called upon in math class

# Stereotype Threat : No Explicit Bigotry Required



# Stereotype Threat

## Anecdotal Evidence

“When I talk in class, I feel as though I’m totally on stage, like everyone’s thinking, ‘oh what’s the Black girl going to say?’ But I don’t speak up in class much anymore, so I guess it’s not a big deal.”

—Stanford Undergraduate

# Stereotype Threat

## Anecdotal Evidence

“Group work was a nightmare. I could tell that no one thought my ideas were any good because I’m Latina.”

—NYU Undergraduate



# Stereotype Threat

## Anecdotal Evidence

“Everyone expects me to be good at math because I’m Asian, so I feel extra stupid because I’m not so good at math.”

—NYU Undergrad

“Conditional Stupidity”

# Conditional Stupidity: The Two Faces of Bush



# Smart Bush

## 1994 Debate with Anne Richards



“...This Bush was eloquent. He spoke quickly and easily. He rattled off complicated sentences and brought them to the right grammatical conclusions. He mishandled a word or two ("million" when he clearly meant "billion"; "stole" when he meant "sold"), but fewer than most people would in an hour's debate. More striking, he did not pause before forcing out big words, as he so often does now, or invent mangled new ones. " (James Fallows, 2004).

# Dumb Bush 2004



“They underestimated me”

--G.W. Bush, Nov 6, 2000

Estimate Bush's SAT Score

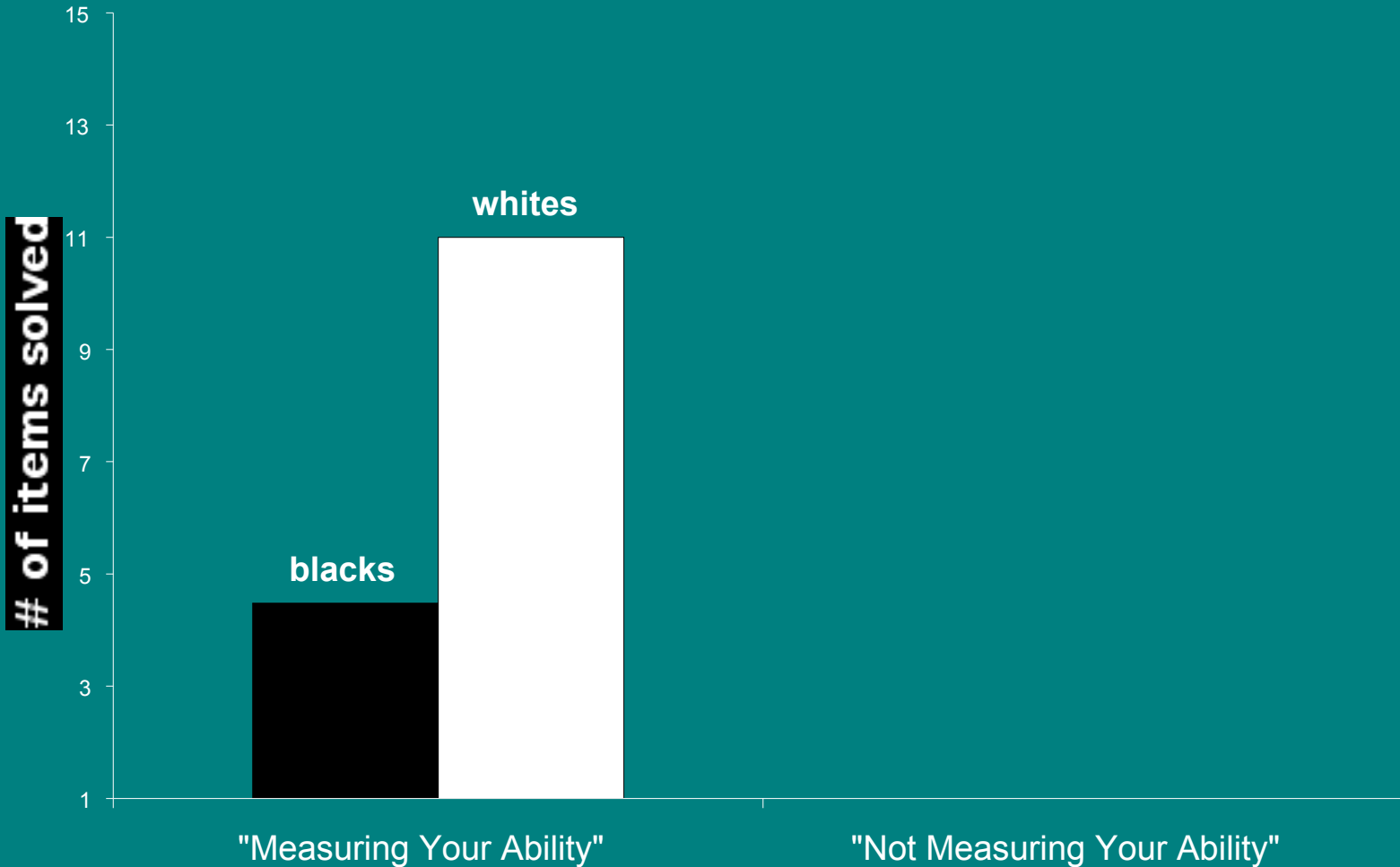
Average estimate = 1030 Bush's Actual Score = 1330

# Laboratory Experiment on Stereotype Threat

Steele & Aronson (1995). *Journal of Personality and Social Psychology*.

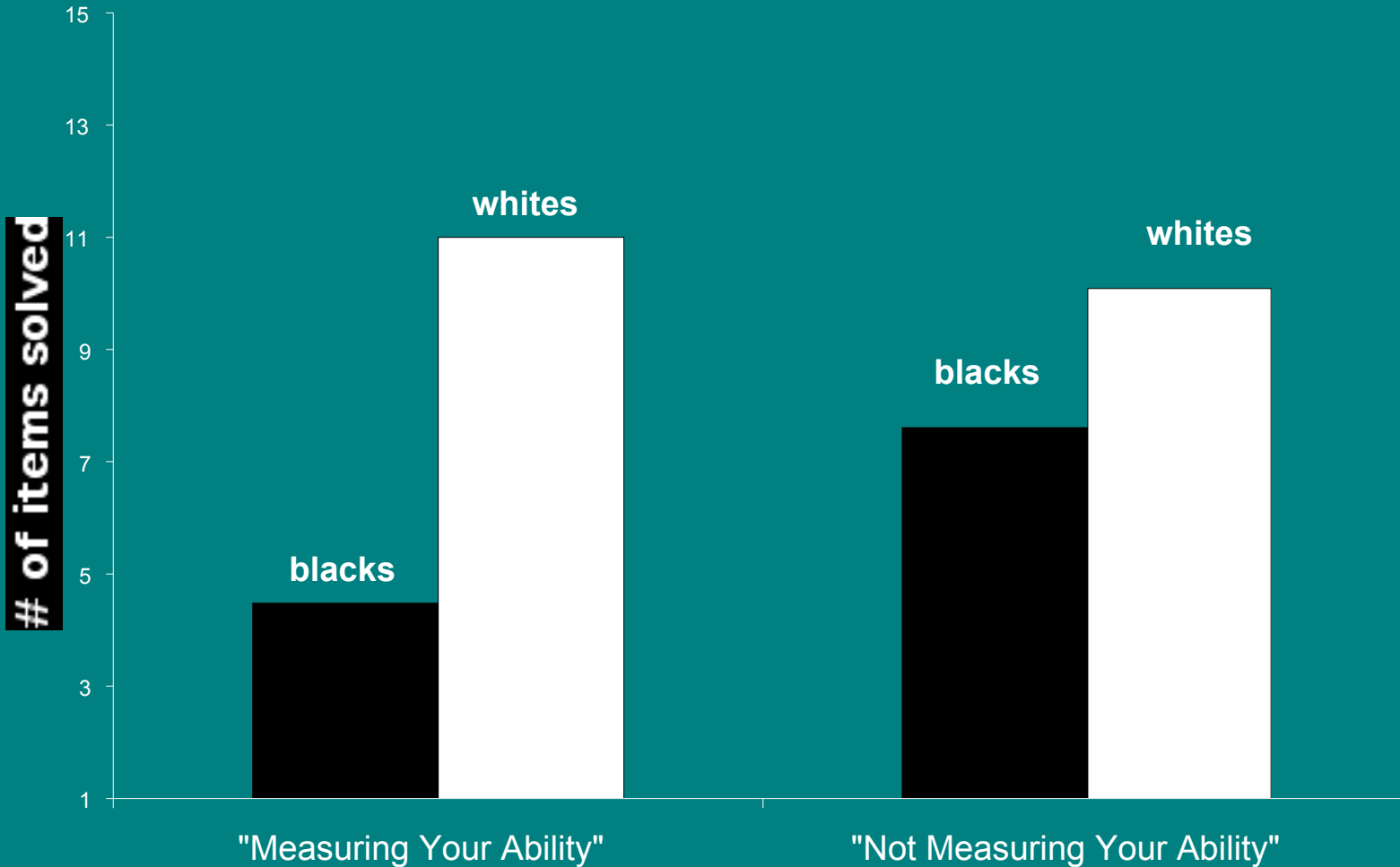
- Method: Reducing Evaluative Scrutiny
- Measure: Blacks' and Whites' Verbal GRE Performance

# Verbal Test Performance

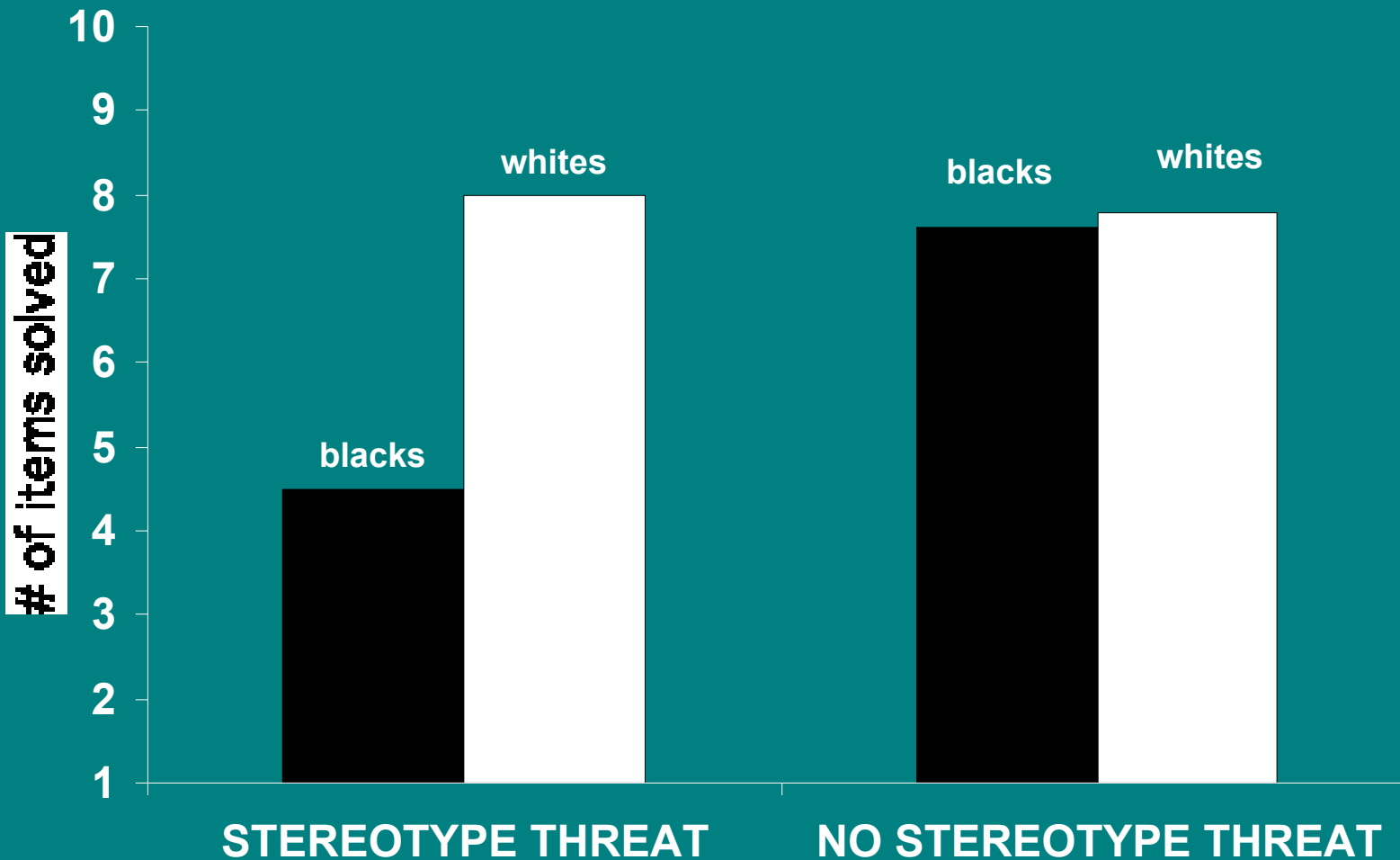




# Verbal Test Performance



# Verbal Test Performance Corrected for SAT



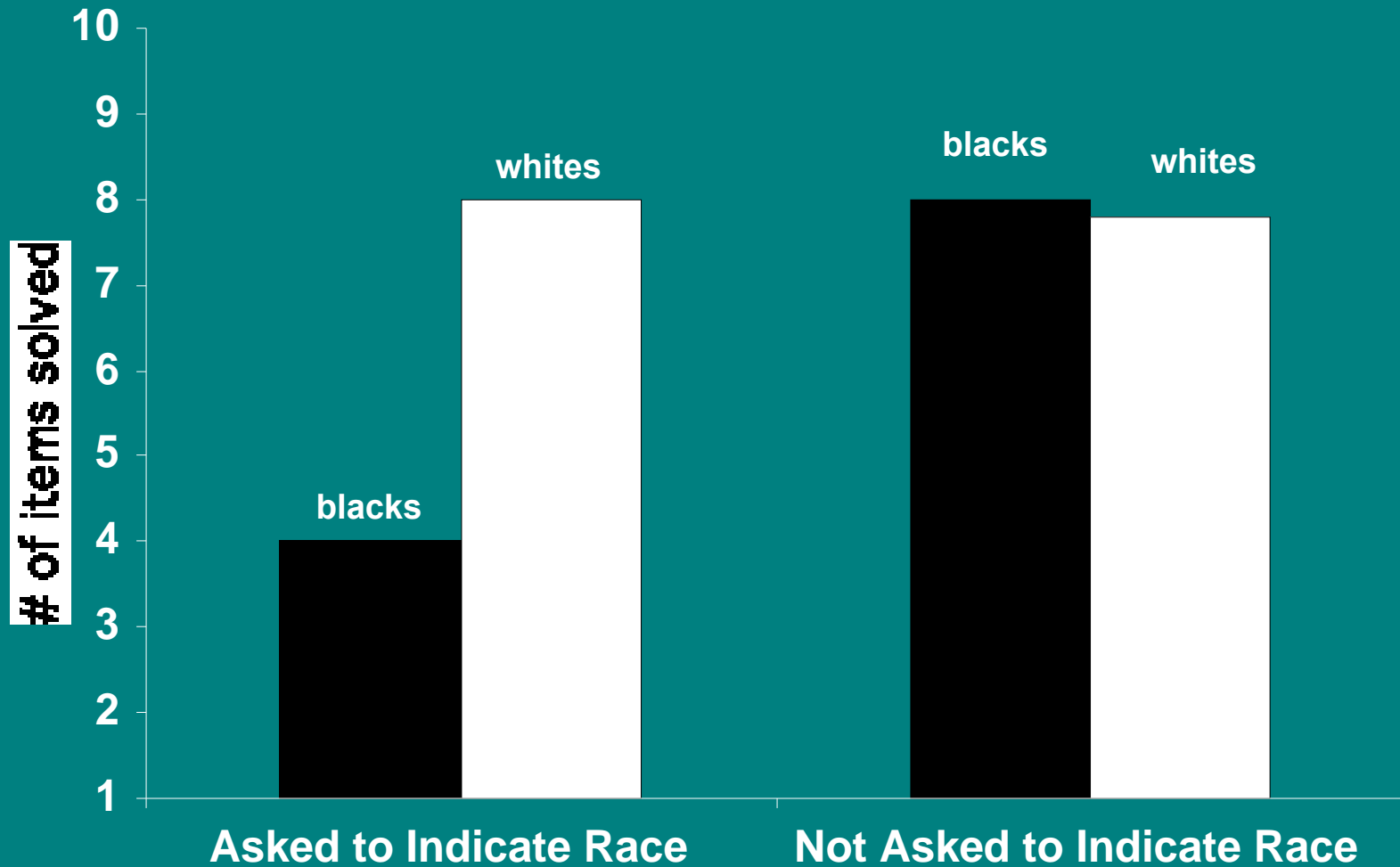
# Laboratory Experiment on Stereotype Threat

Steele & Aronson (1995)

Method: Inducing the Relevance of Race

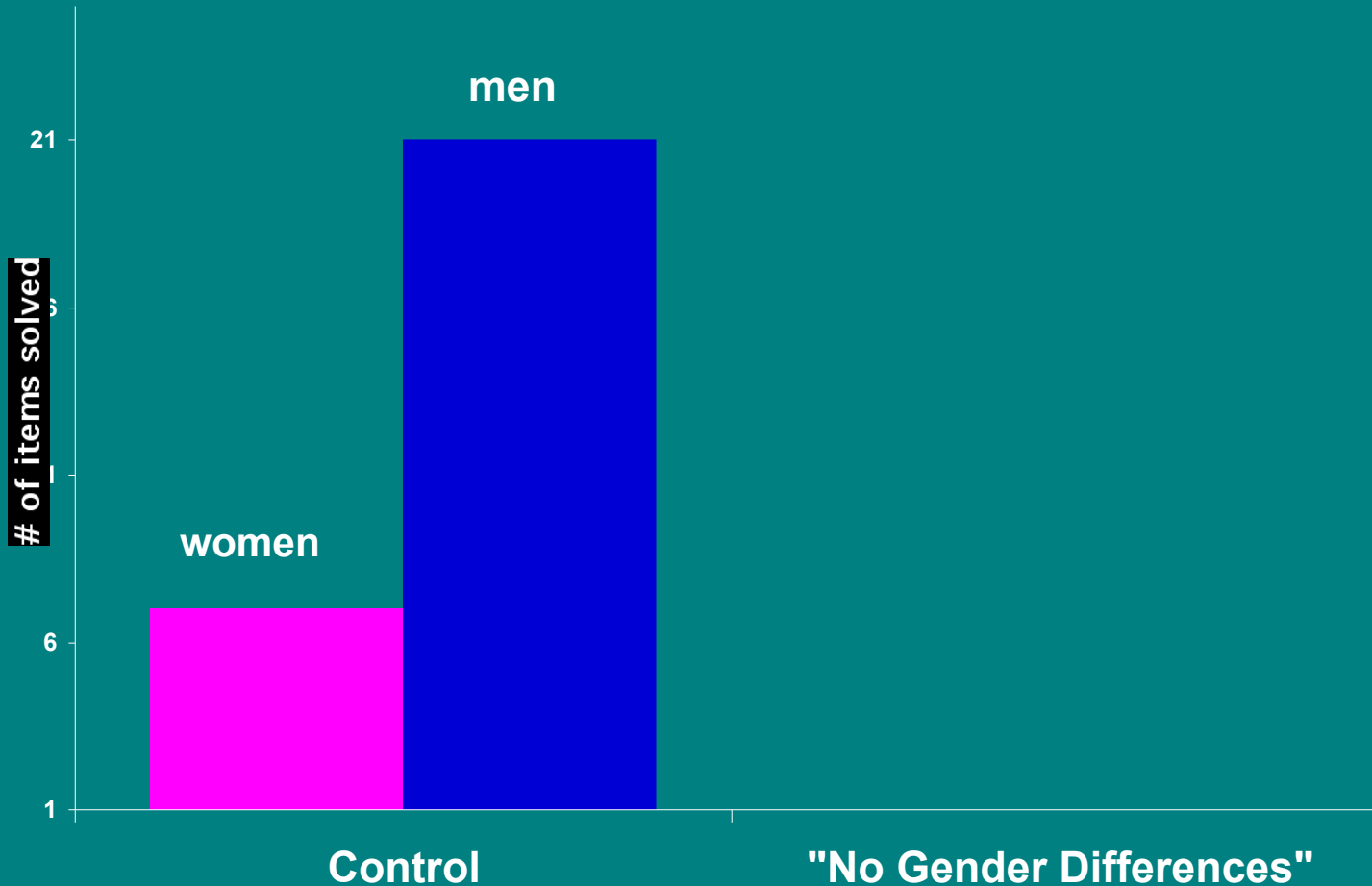
Measure: Blacks' and Whites' Verbal GRE Performance

# Verbal Test Performance



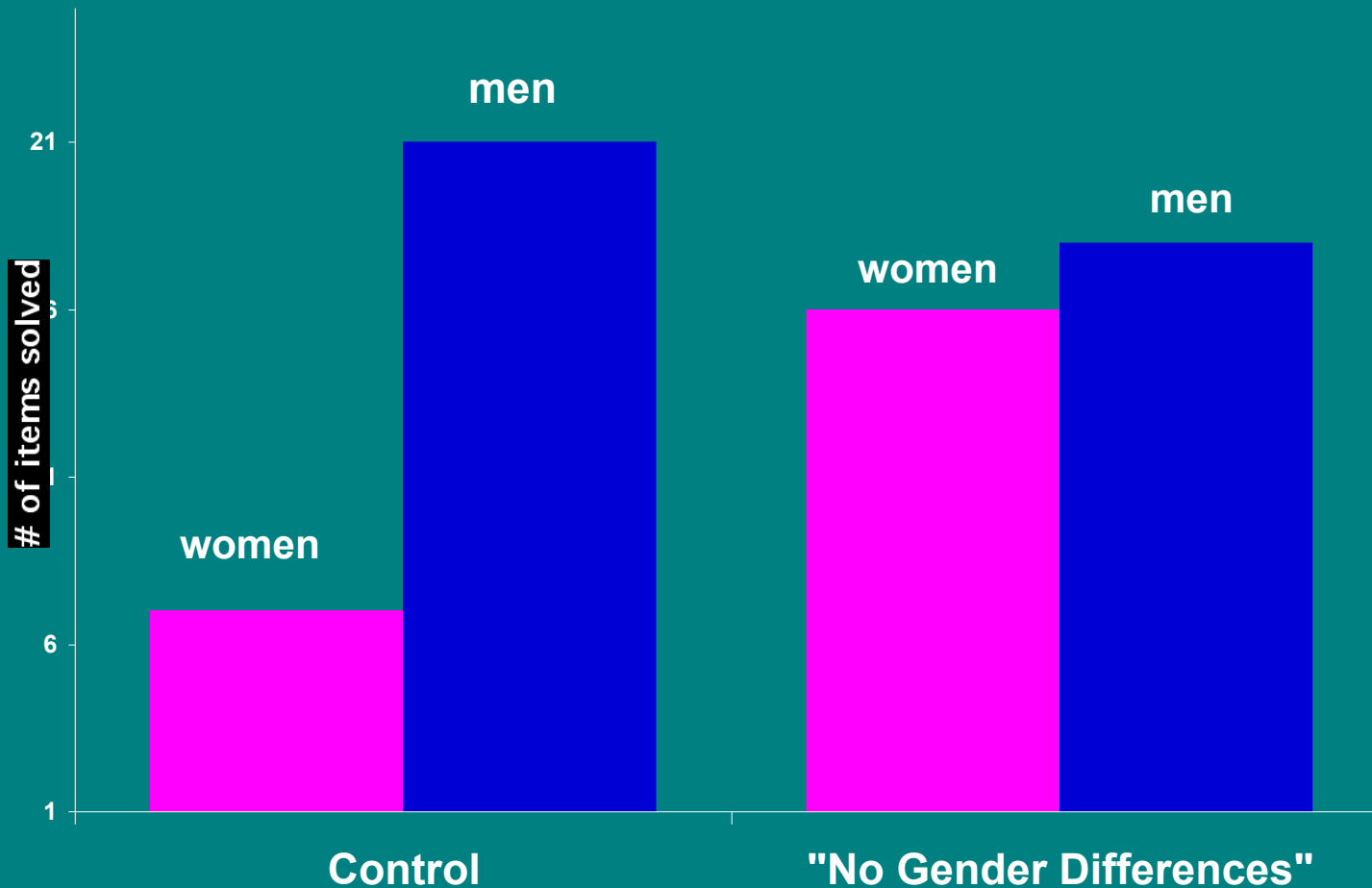
# Math Test Performance Of College Men and Women

(Spencer, Steele & Quinn, 1999)



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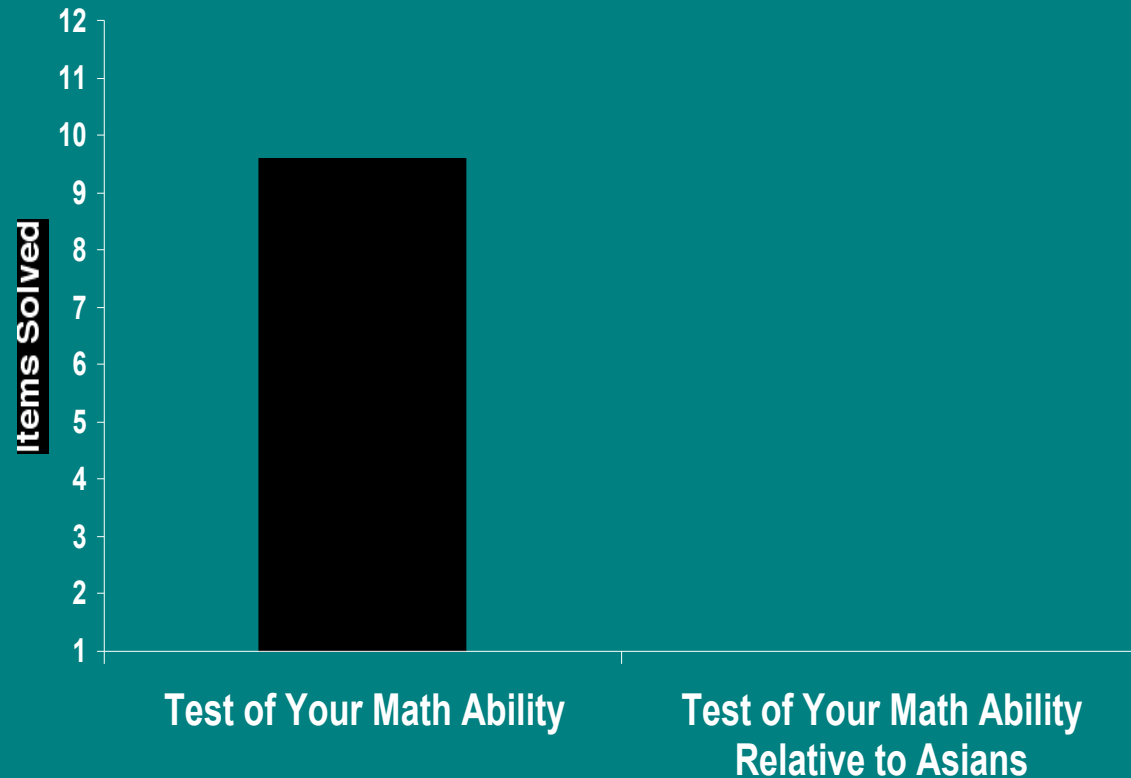


# Additional Studies Finding Performance Effects

- Latinos taking verbal tests
- Elderly taking short-term memory tests
- Low SES Students taking verbal tests
- Blacks and Miniature Golf
- Women taking tests of Political Knowledge, Driving, Chess
- White males taking tests of social sensitivity
- White Males Taking Math Tests

# When White Men Can't Do Math

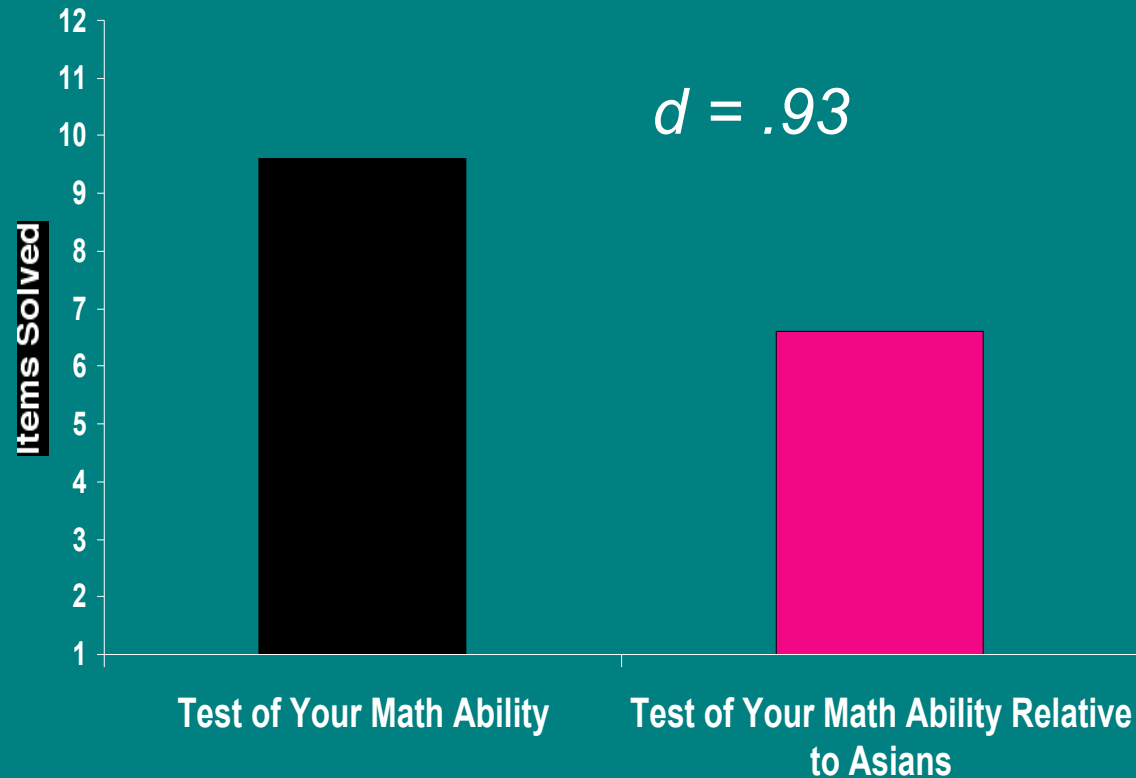
Aronson, et al., (1999). *Journal of Experimental Social Psychology*.





# When White Men Can't Do Math

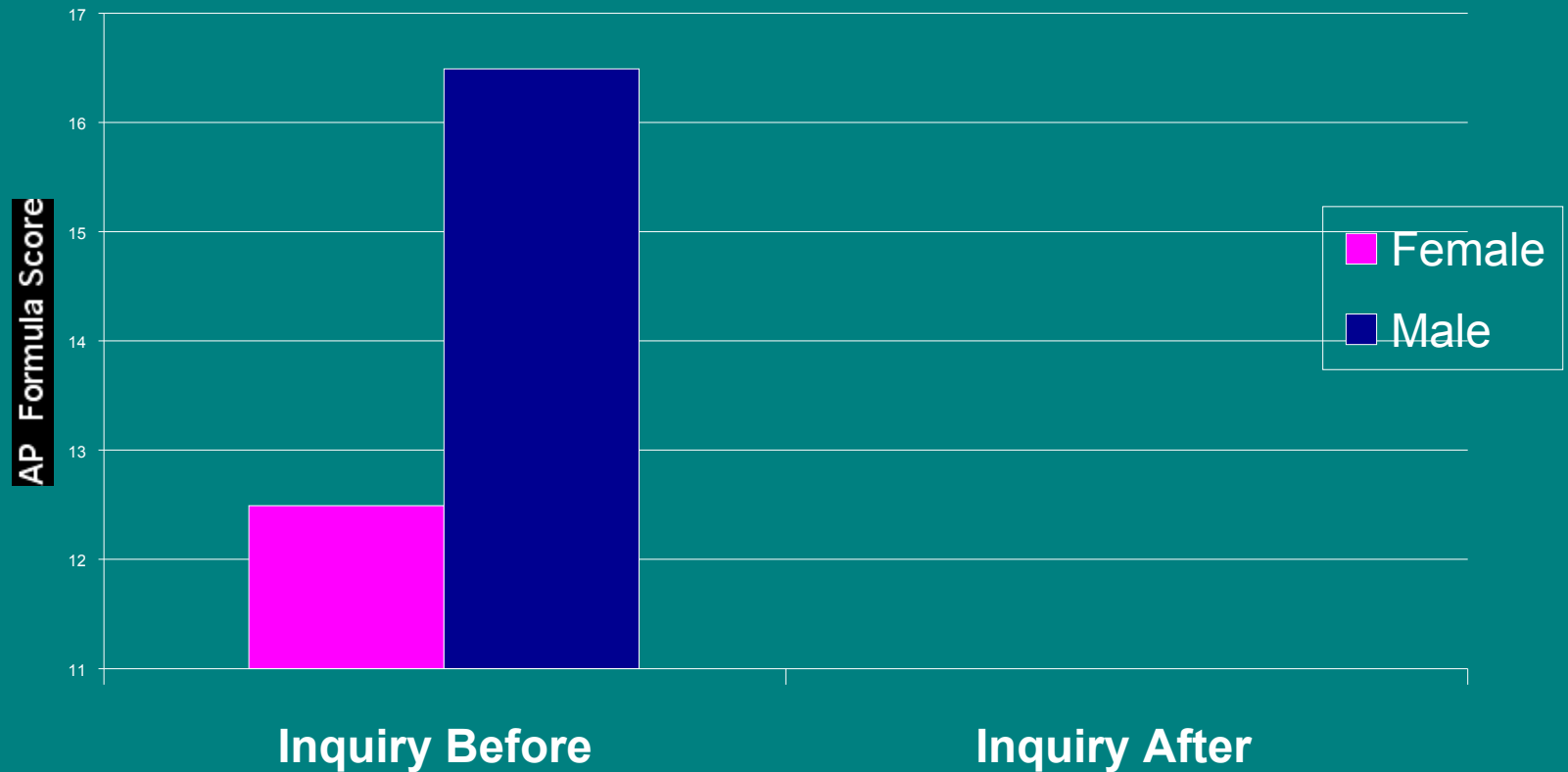
Aronson, et al., (1999). *Journal of Experimental Social Psychology*.



# Educational Testing Service Field Study:

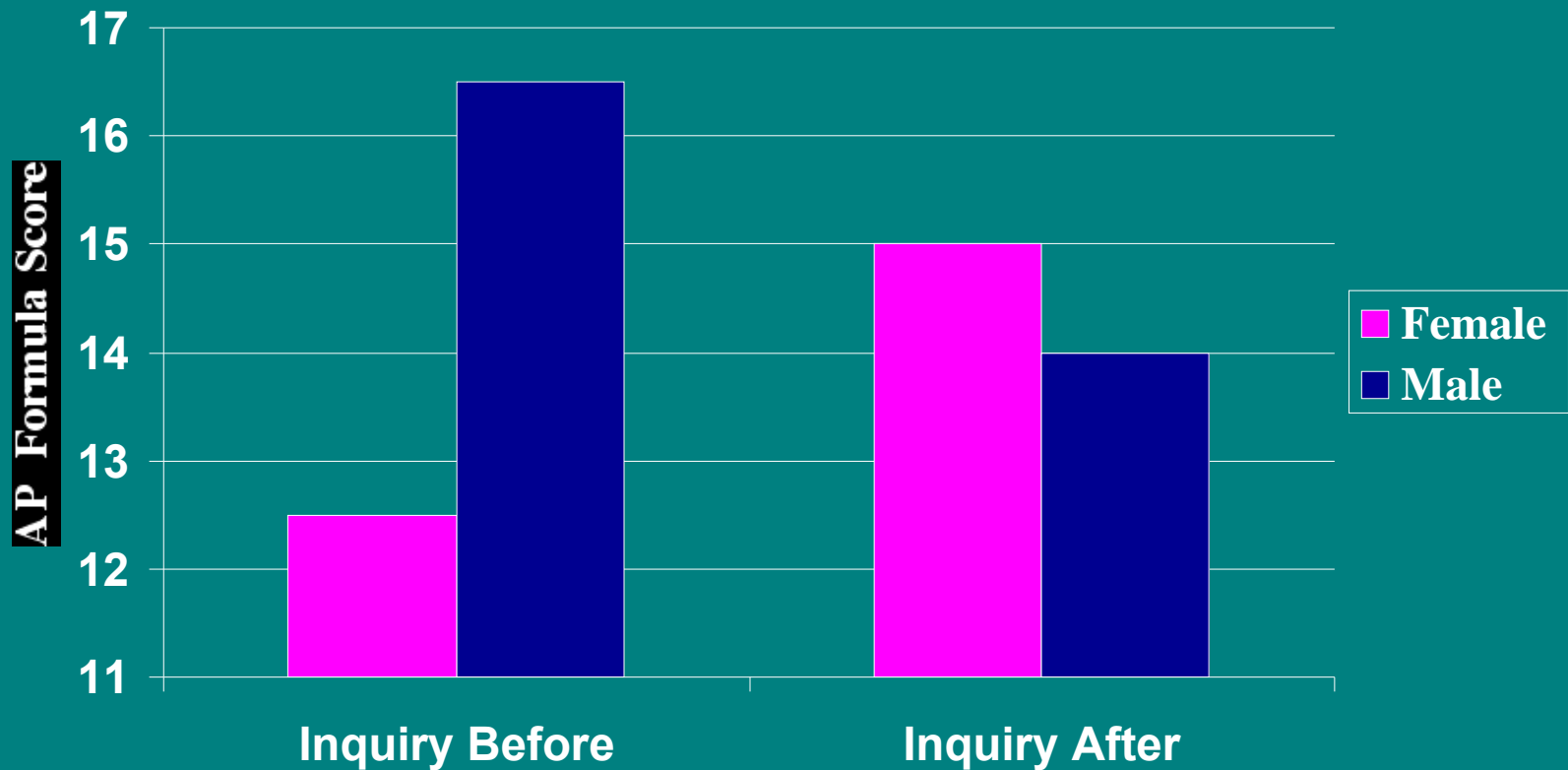
Asking About Gender before or  
After Before Taking AP

# ETS Field Study: Asking Gender Before Taking AP Calculus Test Hurts Girls



(Stricker, 2002). *Journal of Applied Social Psychology*.

# Educational Testing Service Study: Asking Gender Before AP Calculus Test Hurts Girls, Helps Boys



# Danaher and Crandall (2008)

## Reanalysis of ETS Study

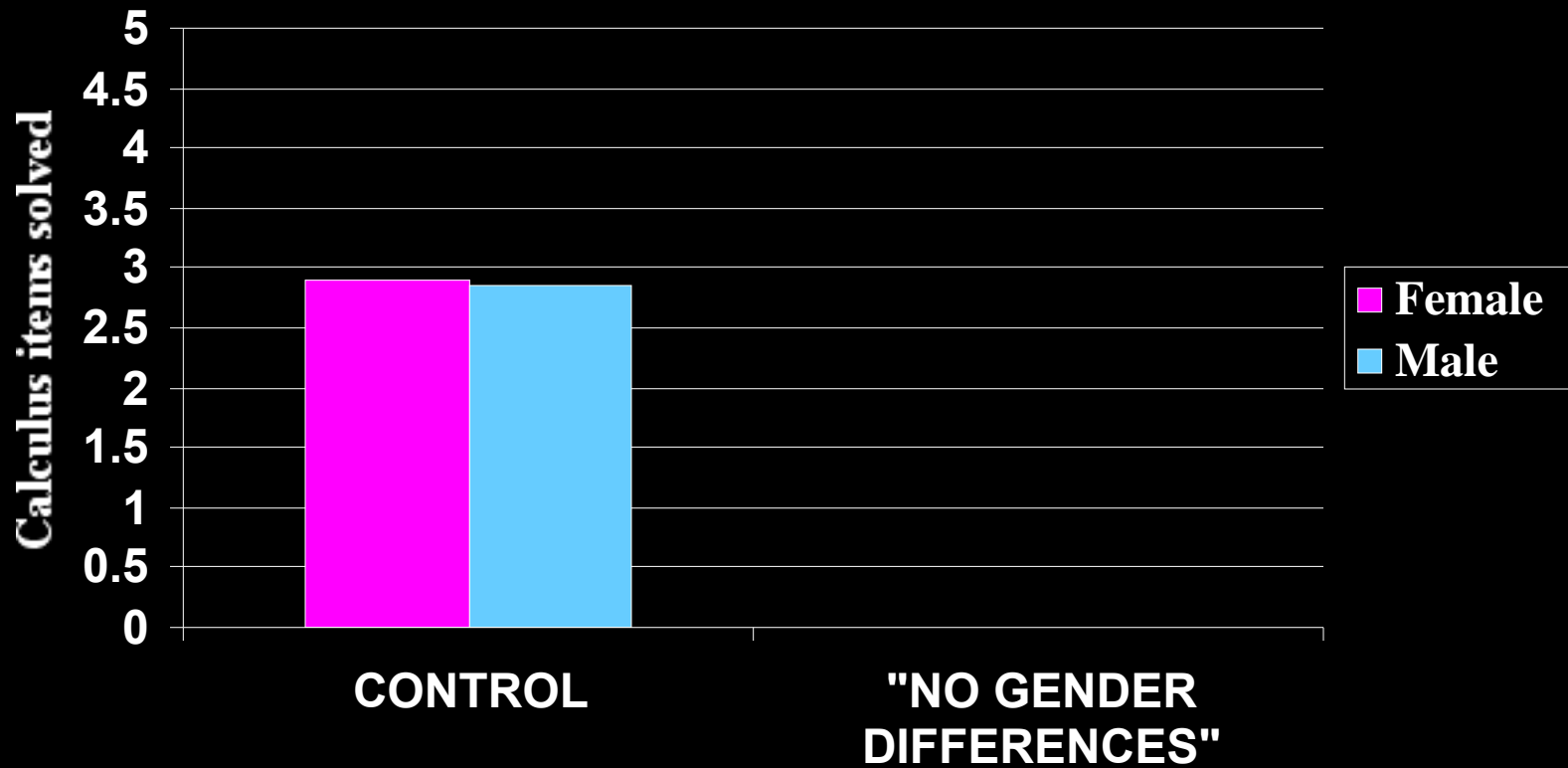
“Women benefited substantially on the calculus test when demographics were asked after testing rather than before. This simple, small, and inexpensive change could increase U.S. women receiving AP Calculus AB credit by more than 4,300 every year.”

# Field Experiment: Women in the Science Pipeline

Highest Level Calculus Students

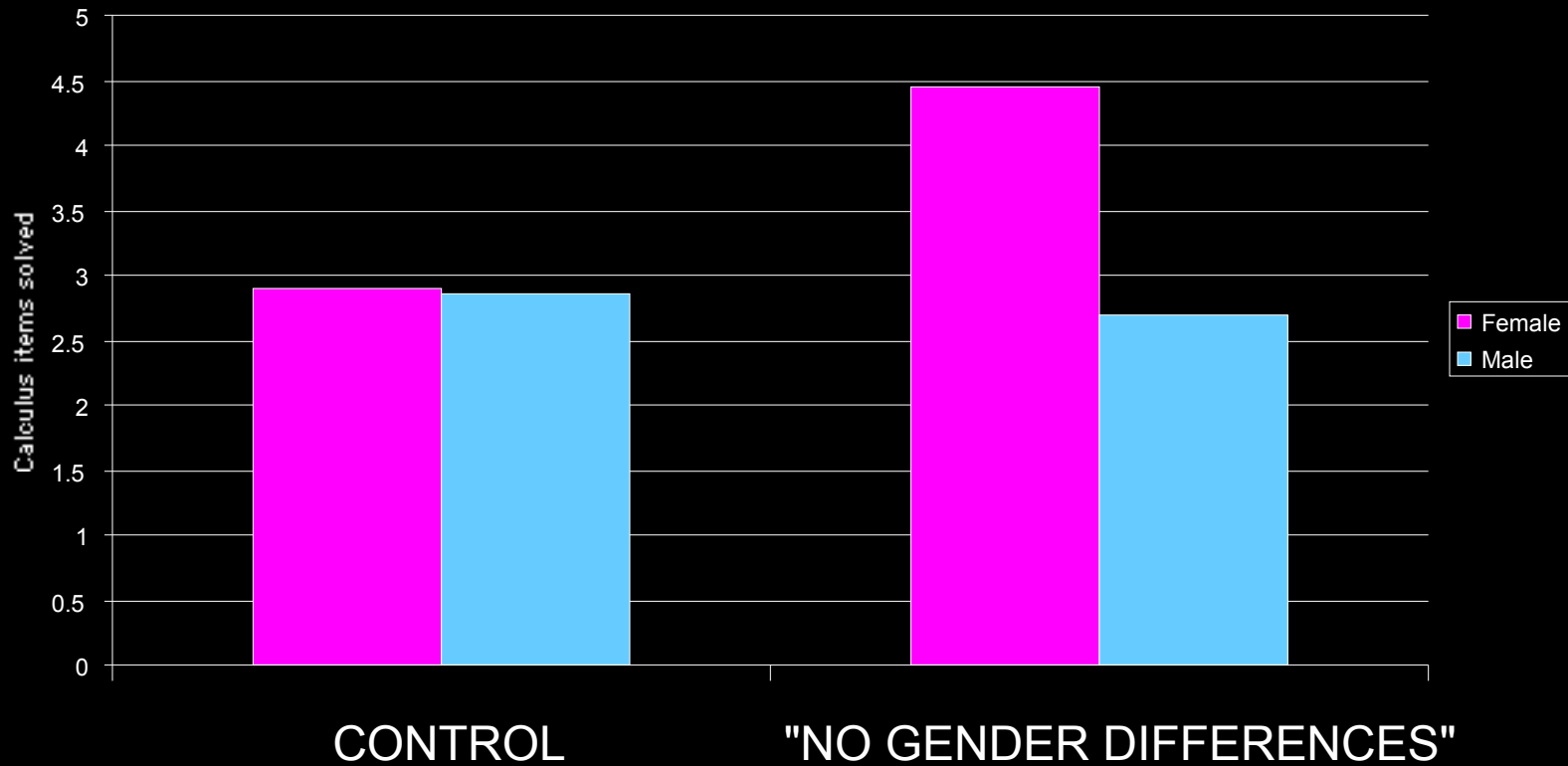
# Field Study: Women in the Science Pipeline

## Highest Level College Calculus Students



# Field Study: Women in the Science Pipeline

Advanced Level Women Outperform Advanced Men in Calculus When Threat Reduced





# General Conclusions from 300 Studies

One need not believe the stereotype is true to feel the pressure to disprove it, but believing appears to increase ST

ST can affect even those students with lots of ability and lots of confidence in their abilities, from any group, in any setting

Stereotype threat can arise as a function of grouping alone, integrated groups trigger it.

Under performance mediated by stress and anxiety, reduced working memory capacity, and reduced self-regulation capacity.

Stereotype threat influences GPA as well as immediate performance; Massey & Fischer found 9% of GPA gap

# Stereotype Vulnerability: Risk Factors for Underperformance

- Acceptance of the stereotype as maybe true
- Expectations of prejudice
- Belief that tests are biased against minorities;  
mistrust
- High levels of academic engagement--Caring

**Chronic Stereotype  
Vulnerability Can lead to  
Lower Ability**

# From Vulnerability to Inability

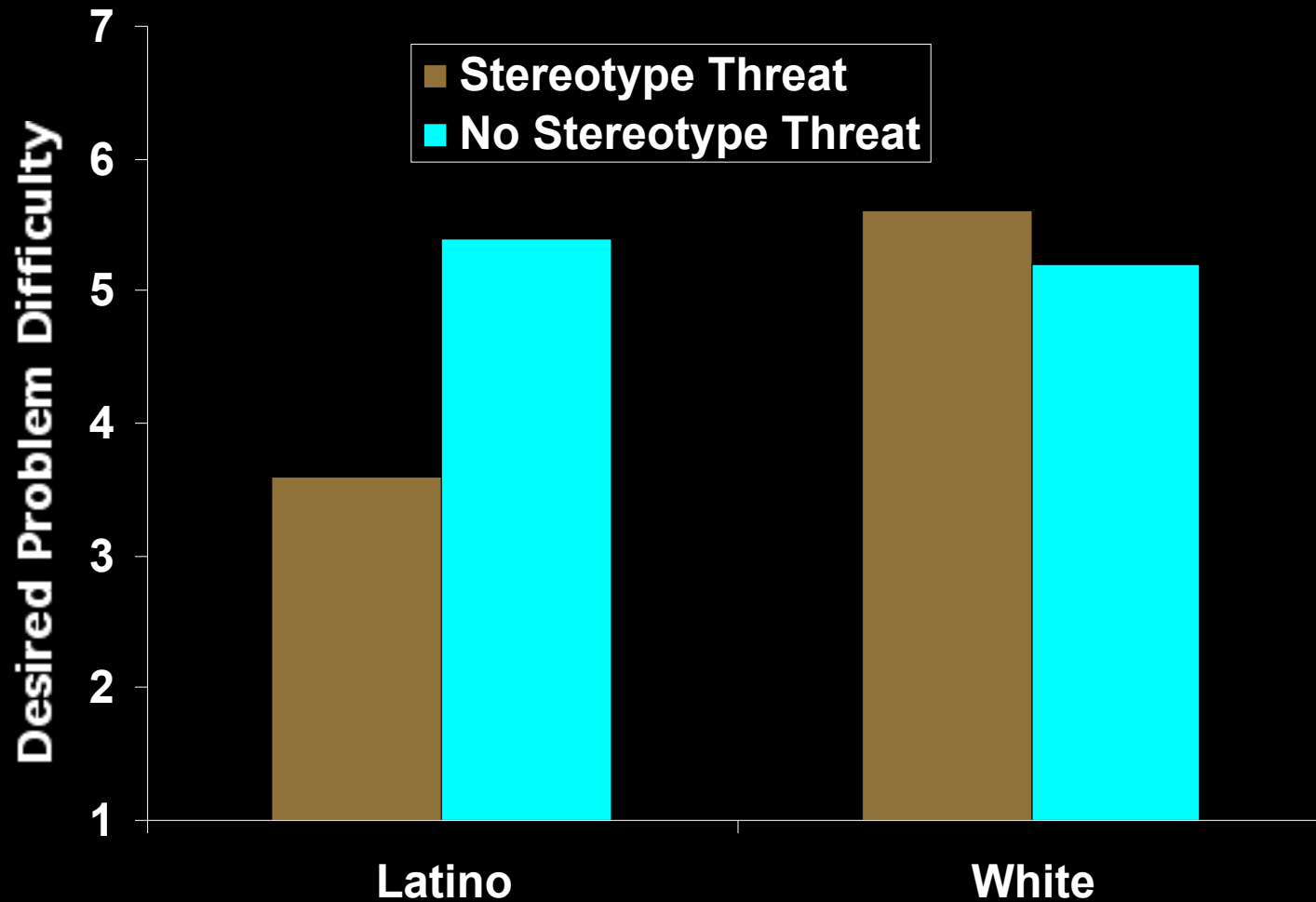
**"No circle is more vicious than the one having to do with intelligence. Children who may be only a little behind their peers to begin with tend to avoid those things that could have made them a little smarter. As a result they fall further and further behind. Meanwhile the kids who started out a little ahead are doing push-ups with their brains."**

**Judith Rich Harris**

# Chronic Stereotype Vulnerability Can lead to Lower Ability

- Avoidance of Challenge/practice
- Academic Self-concept/Ambiguity
- Disidentification/Disengagement
- Lower Ability

# Challenge Avoidance



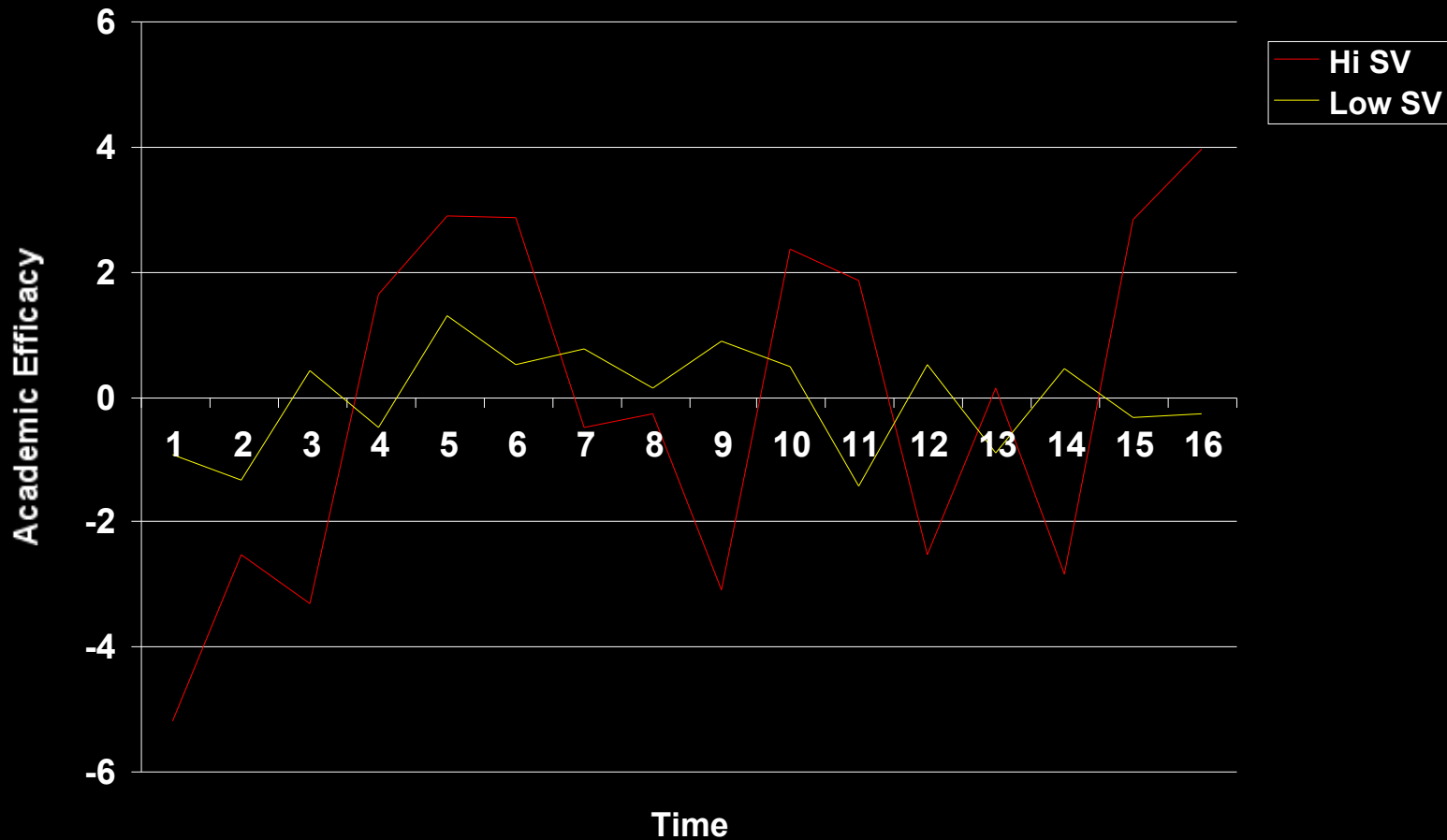
# Stereotype Vulnerability and Academic Self-Concept Instability

Aronson & Inzlicht (2004). *Psychological Science*.

Students who are vulnerable to stereotype threat often fluctuate greatly in their Academic self-confidence.

# Academic efficacy over time for typical high or low SV college student

Aronson & Inzlicht (2004). *Psychological Science*.

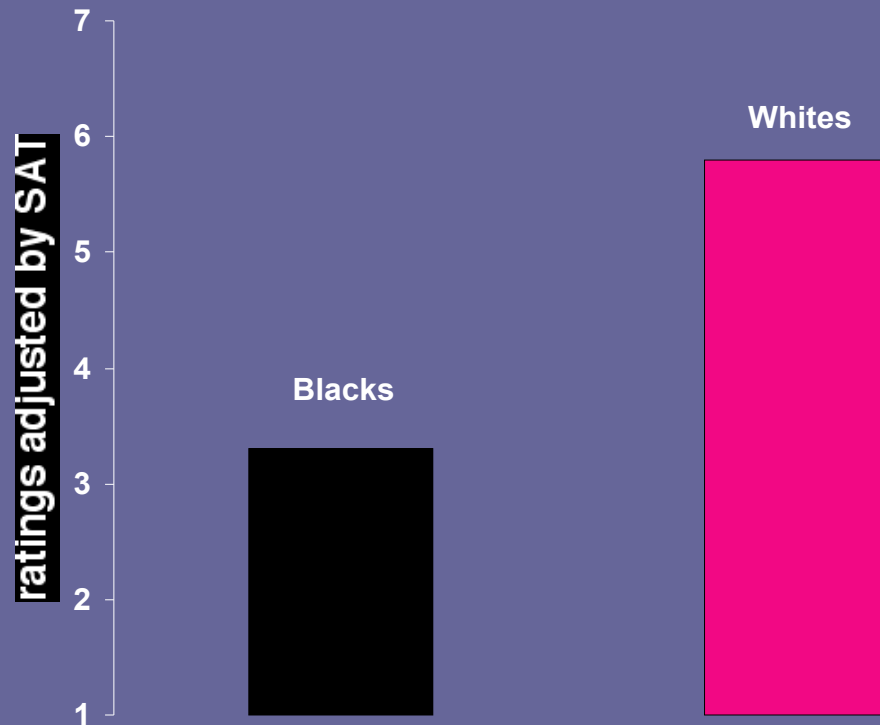




# Disidentification Among College Students

Stanford University Survey:

“Considering all the things that matter to you, how much do you care about academics?”



Aronson, Fried & Good (2002). *Journal of Experimental Social Psychology*.

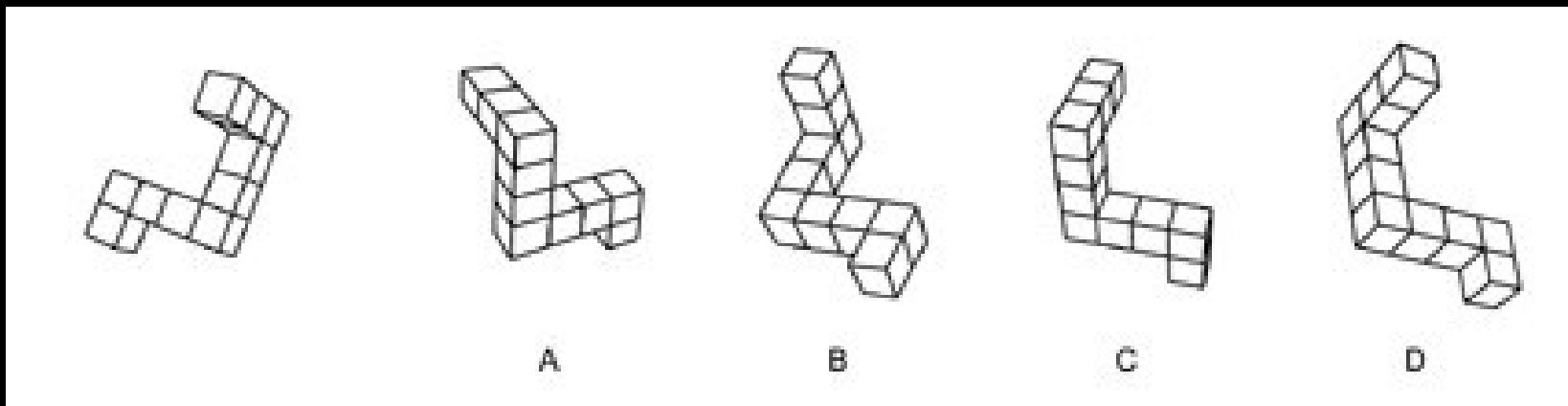
Part Two:

Reducing Threat  
Mindset Matters

# Biological Differences in Spatial Ability

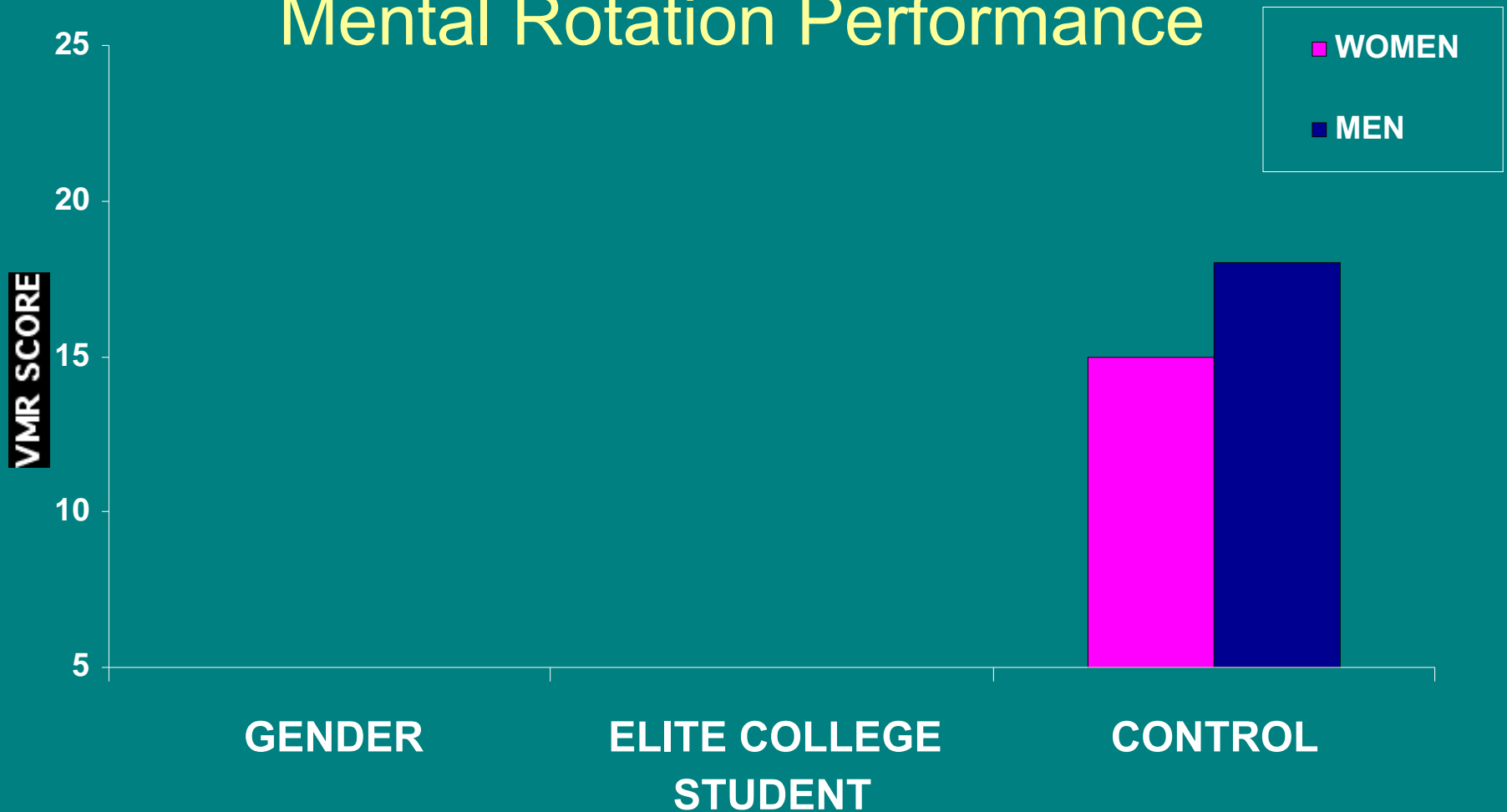
- Largest sex differences: Spatial Ability
- May account for most of the math test score gap
- Testosterone?

# Vandenberg Mental Rotation Task

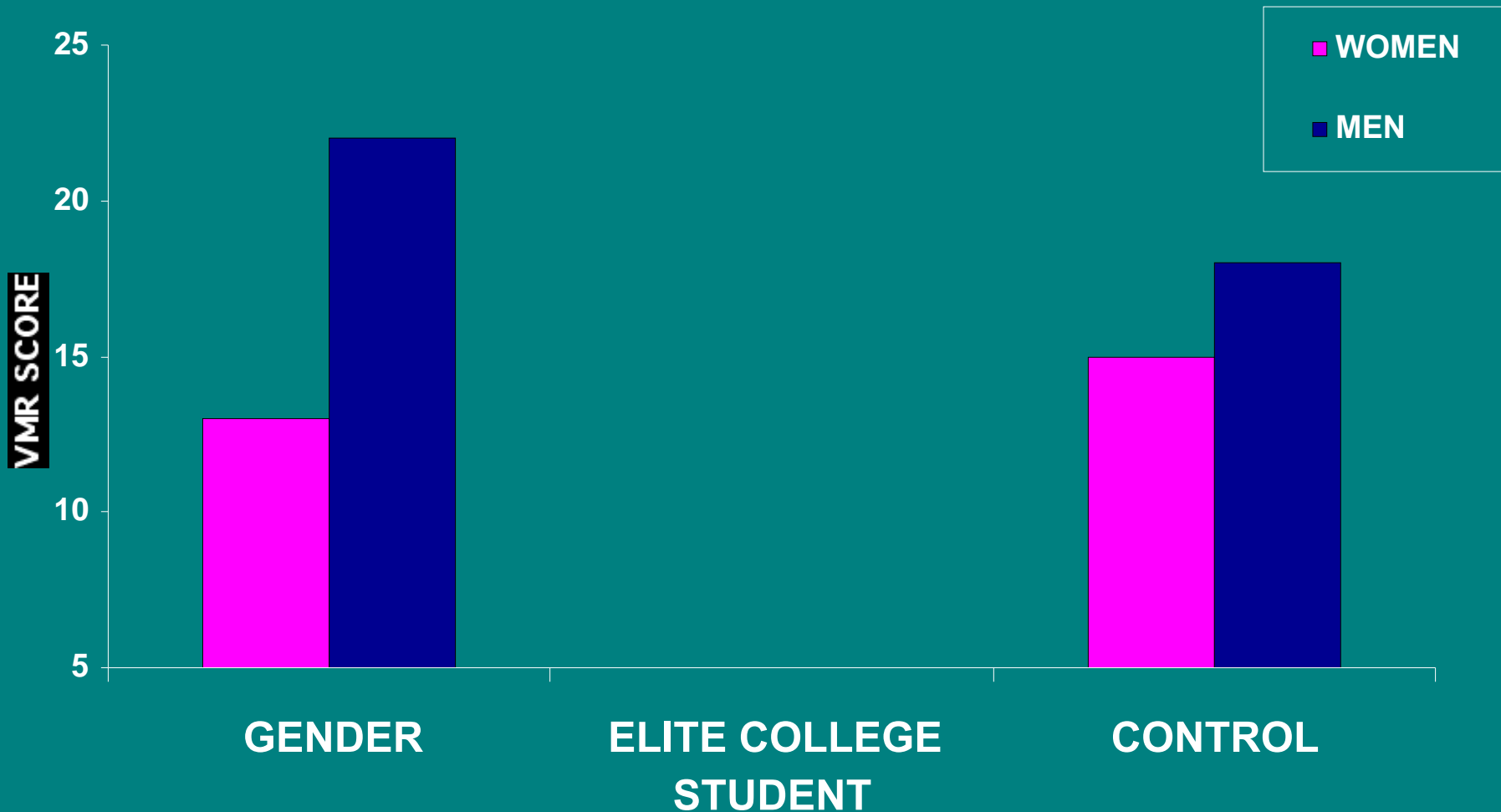


A meta-analysis containing 286 data sets and 100,000 subjects found a highly significant male advantage for mental rotation; this pattern remains stable across age and has not decreased in recent years.

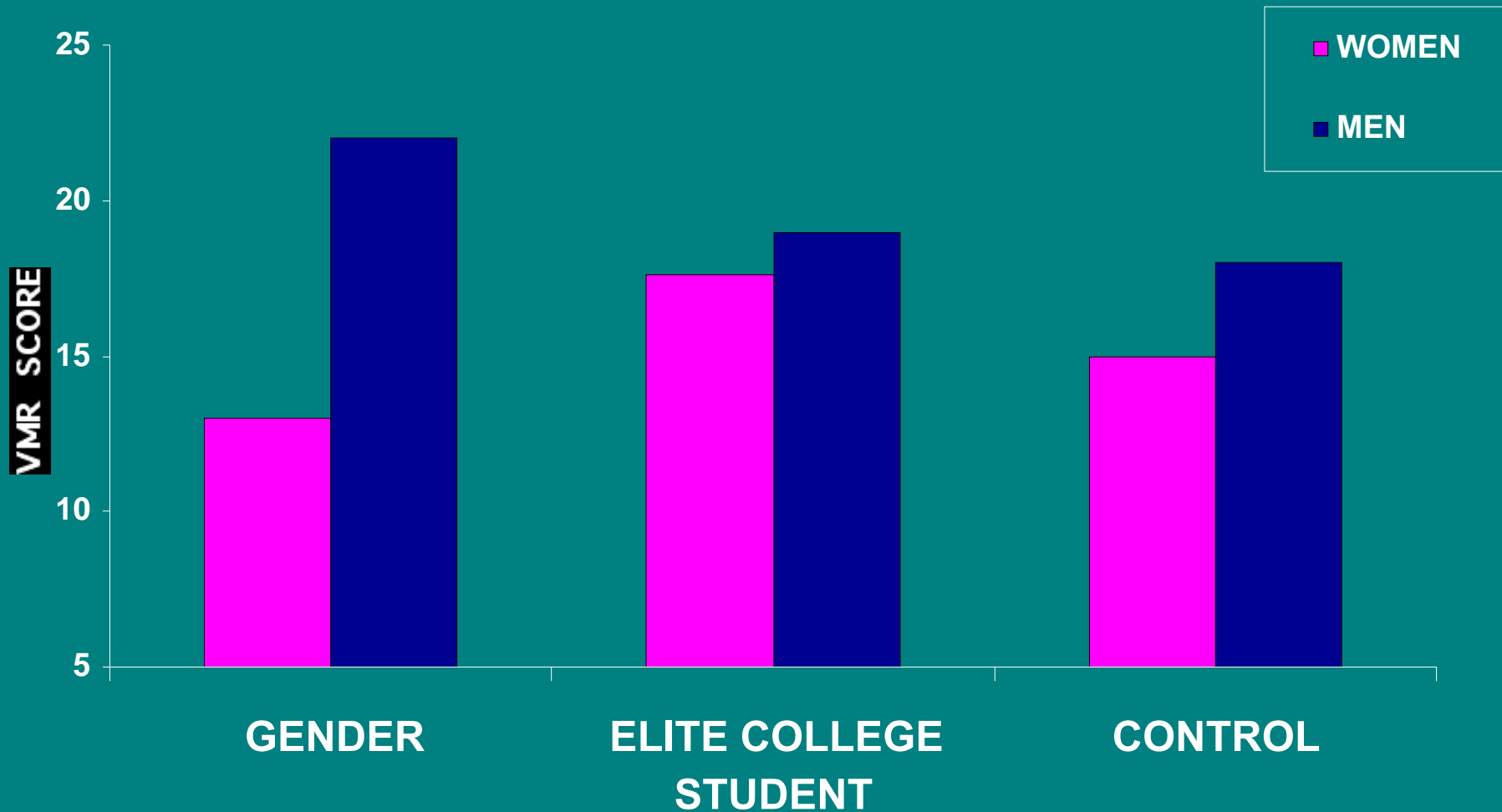
# Identity Salience Influences Women's Mental Rotation Performance



# Identity Salience Influences Women's Mental Rotation Performance



# Identity Salience Influences Mental Rotation Performance



# Reducing Stereotype Threat: The role of conceptions of intelligence

“The mind is much more like a muscle than we’ve ever realized... it needs to get cognitive exercise. It’s not some piece of clay on which you put an indelible mark.”

James Flynn, intelligence expert, 2007



# Intelligence and How to Get It

WHY  
SCHOOLS  
AND  
CULTURE  
COUNT



RICHARD  
NISBETT

# Experiment

Aronson (in preparation)

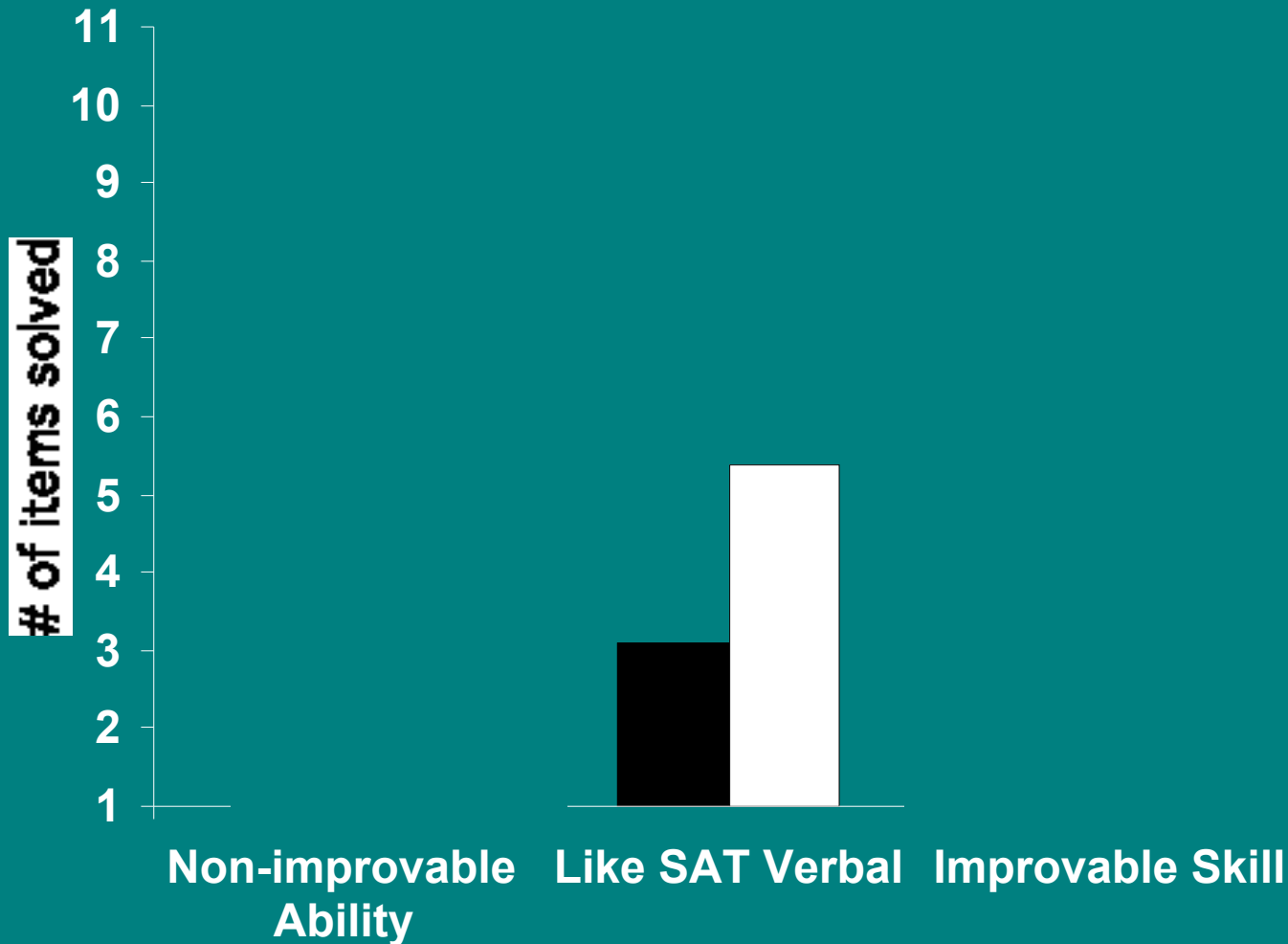
Question:

What if you were led to believe ability is malleable? Would it reduce effects of stereotype threat?

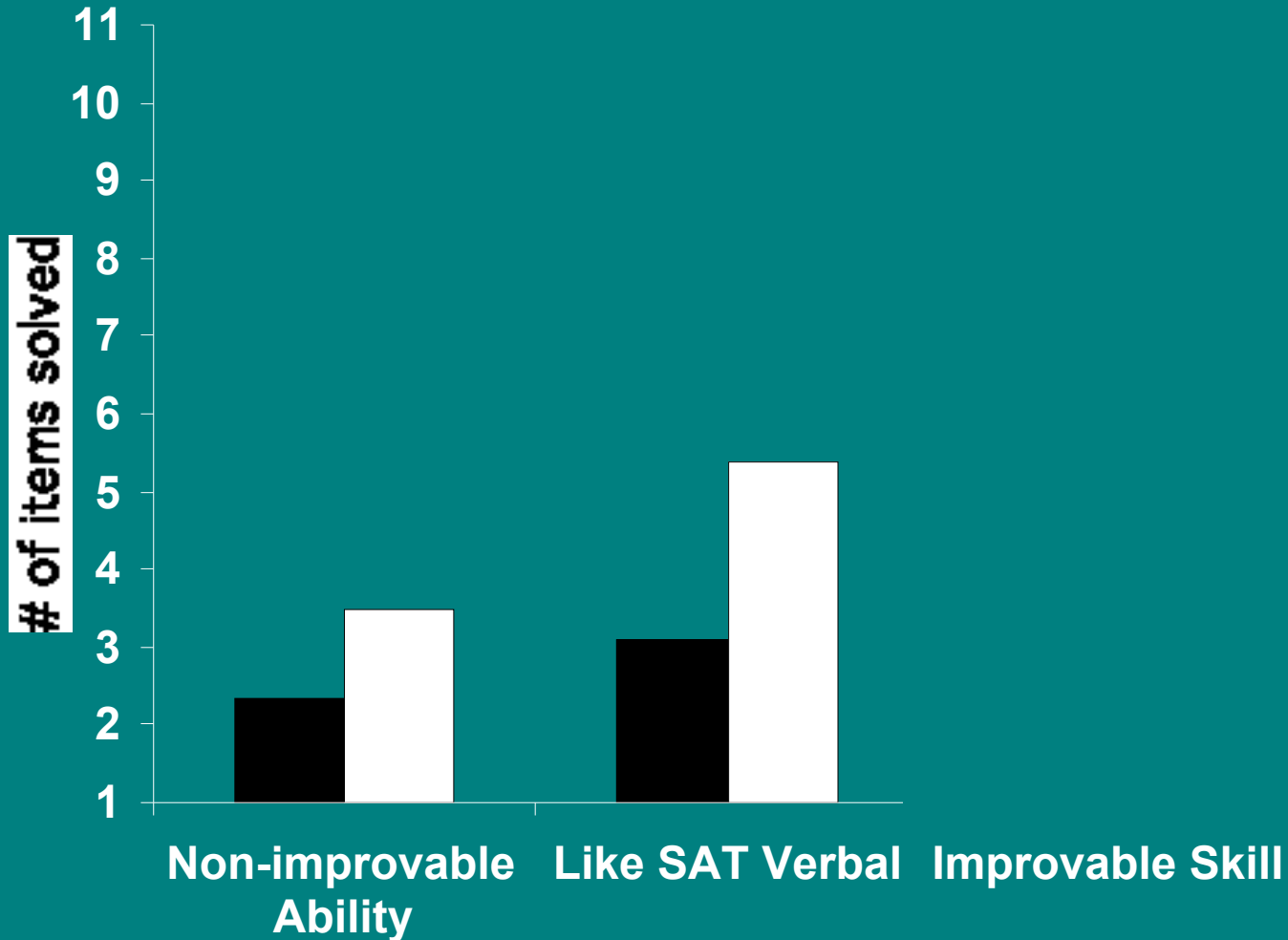
Method: Framing test as a measure of a fixed or a malleable ability

Measure: Blacks' and Whites' Test Performance

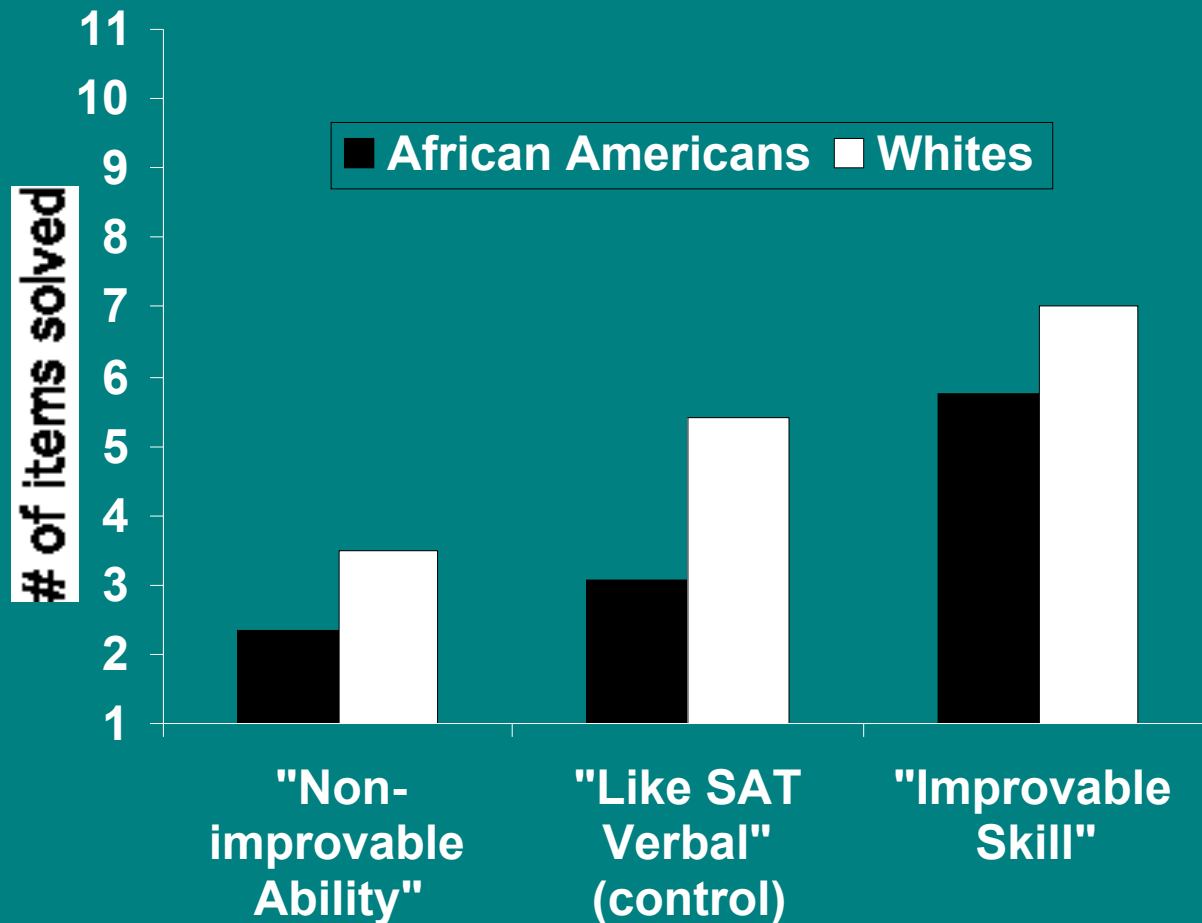
# Conceptions of Ability and Test Performance



# Conceptions of Ability and Test Performance



# Conceptions of Ability and Test Performance



# Reducing the effects of Stereotype Threat In the real world: Shaping implicit theories

Question: Can getting people to believe in expandable intelligence reduce effects of stereotype threat on GPA?

Method: Attitude change

Measure: End of year GPA

# Year End Follow-Up:

## GPA



Aronson, Fried & Good (2002). *Journal of Experimental Social Psychology*.

# Reducing Stereotype Threat in Middle School: A field Intervention

Question: Can psychological intervention raise test scores of minority students?

Method: mentoring study; attitude change

Conditions:

- Malleability of intelligence

- Role Models: senior students who stress the normality of early difficulty

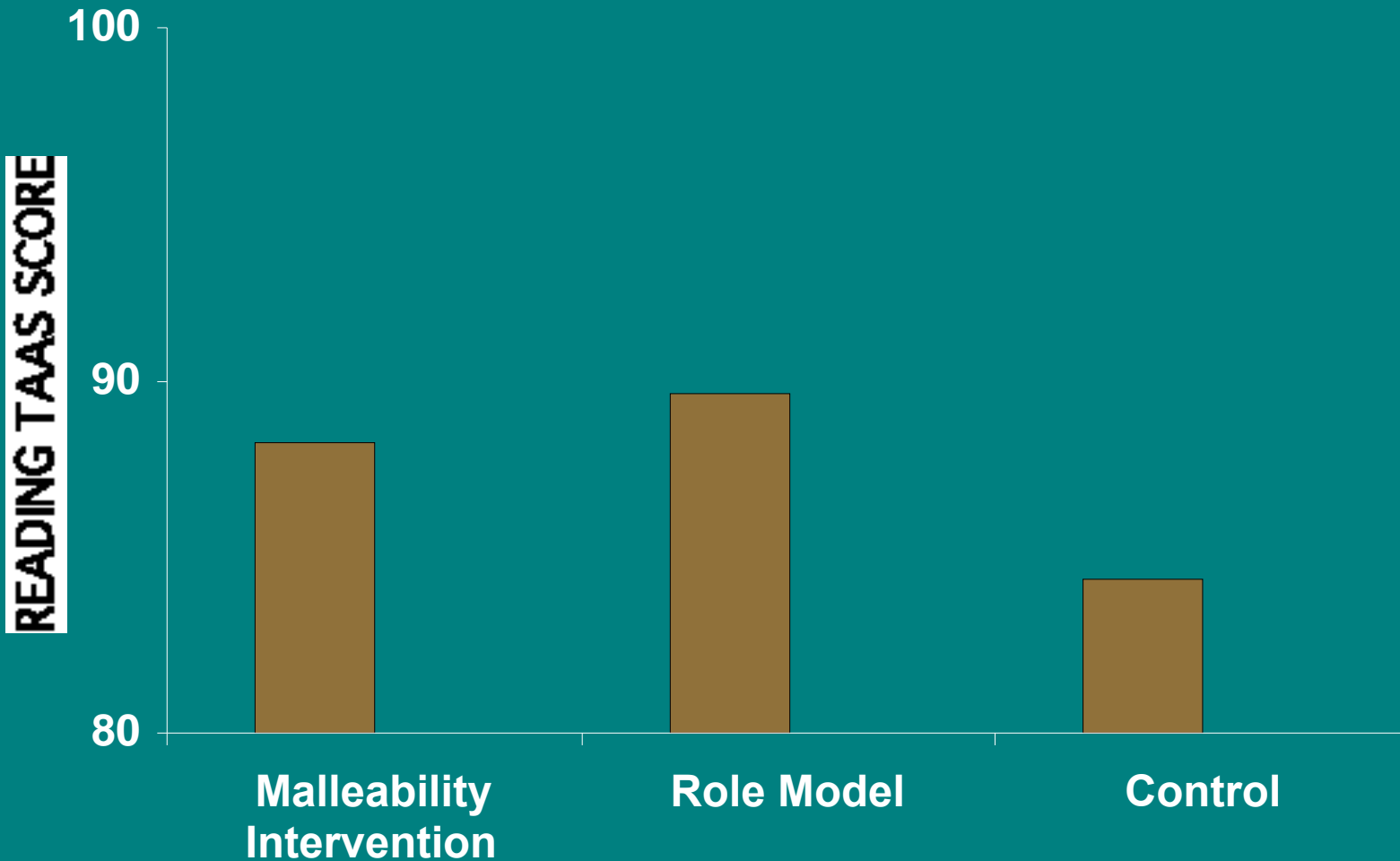
- Control (drug abuse message)

Measure: Texas Assessment of Academic Skills (TAAS)

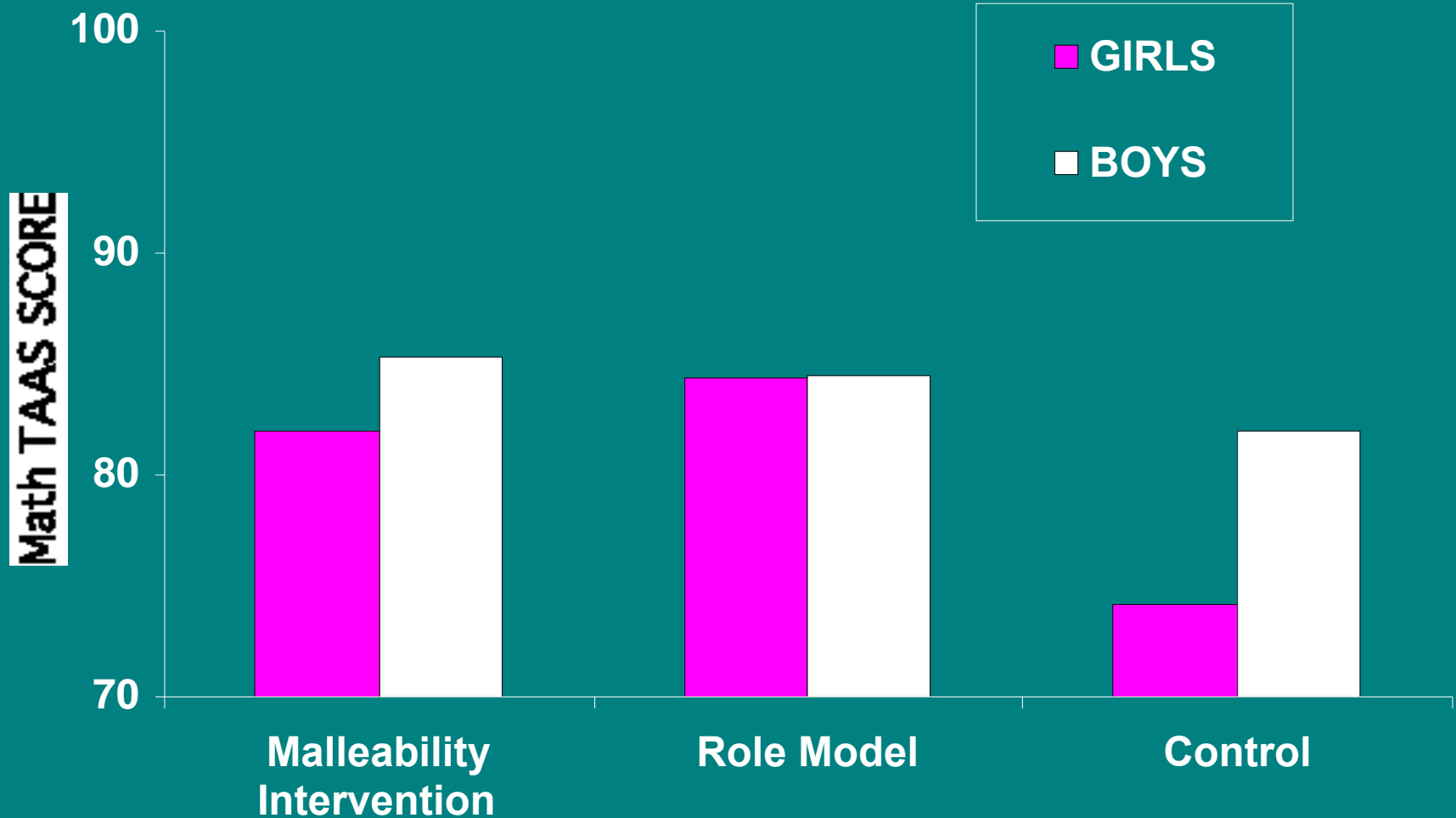


# 7th Grade Reading TAAS--Latinos

Good, Aronson & Inzlicht (2003) *Journal of Applied Developmental Psychology*.



# 7th Grade Girls' Math TAAS



# Reducing Stereotype Threat: The role of awareness

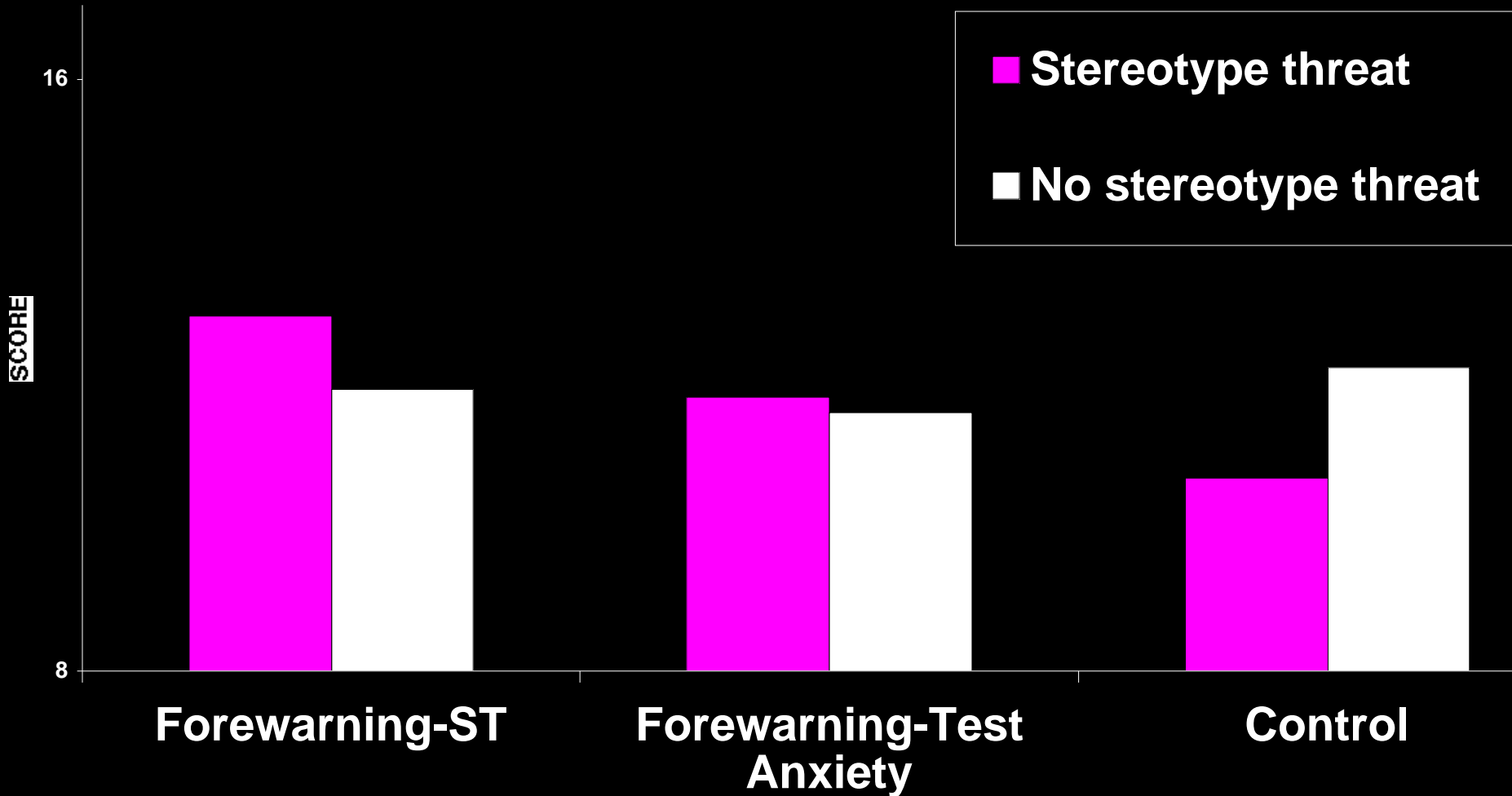
Question:

Can understanding Stereotype threat reduce its effects?

Method: Forewarning about ST or Test Anxiety

Measure: Blacks' Test Performance a week later

# African American's GRE Performance



# Reducing Effects of Stereotype Threat: Strategies

De-emphasize ability; emphasize effort, persistence

Stress the malleability of intelligence

Exposure to Role Models

Awareness of the external difficulties: Normalizing struggle

Groupwork that employs interdependence

# Conclusion

Human intelligence, motivation, and academic self-concept is more fragile and malleable than traditionally thought. People's performance and motivation can rise and fall depending on the situations and relationships they are in, and the mindsets they adopt.

Thank You!

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"By nature emplanted, for nurture  
to enlarge"

Richard Mulcaster, 1581

First Headmaster of Merchant Taylors' School in London



# Message of this Research

- Educators have a good deal of power to shape the threat level of the environment; they can stress the fact that serious intellectual work can be difficult but that intellectual growth occurs with engagement and effort; that people gain competence. This is often not apparent to students.
- Further studies show that when people perceive an environment where people believe this, an otherwise threatening environment becomes less so, students report more belonging, and this mediates higher grades and engagement.