

What Keeps People Away?



koalogist.tumblr.com

The Impact of Stereotypes and Stereotype Threat

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Reasons few girls and women pursue computing

Stereotypes

- Reduce confidence and interest

- Affect Educational policies

 - Lack of information/misconceptions

 - Allow choices influenced by stereotypes

Stereotypes: Generalized Beliefs

- Valuable mental shortcuts for quick decisions
- Combine cultural and real-life knowledge
- Associated with the members of a social group
- Superficial, easily-observed characteristics can lead us to draw inferences about traits we cannot immediately observe

Interests Likely reactions

Tendency to violence

Intelligence Life goals Upbringing

Affiliations Voting preferences Trustworthiness

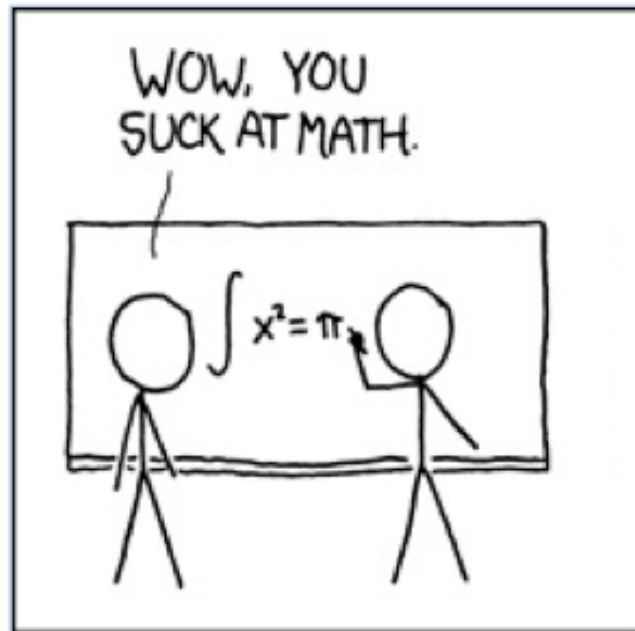
Stereotypes Are Good ...

Mental shortcuts for generalizing knowledge to other situations



And Stereotypes Are Bad ...

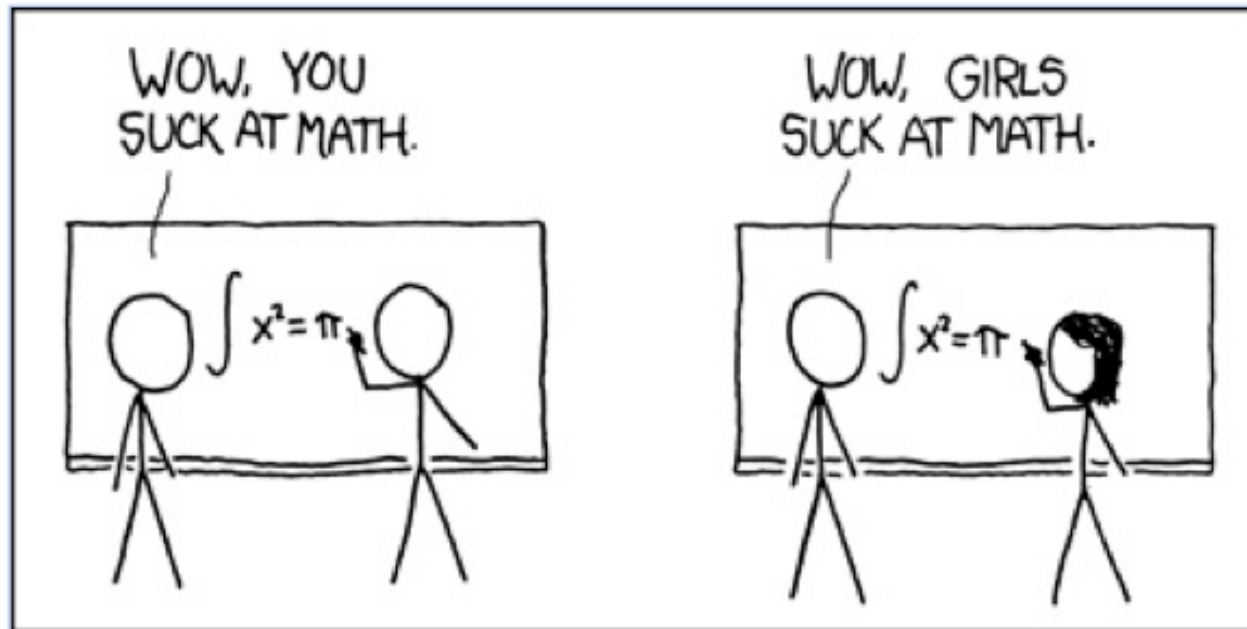
They can lead to mistakes, or miscategorization



Source: www.xkcd.org

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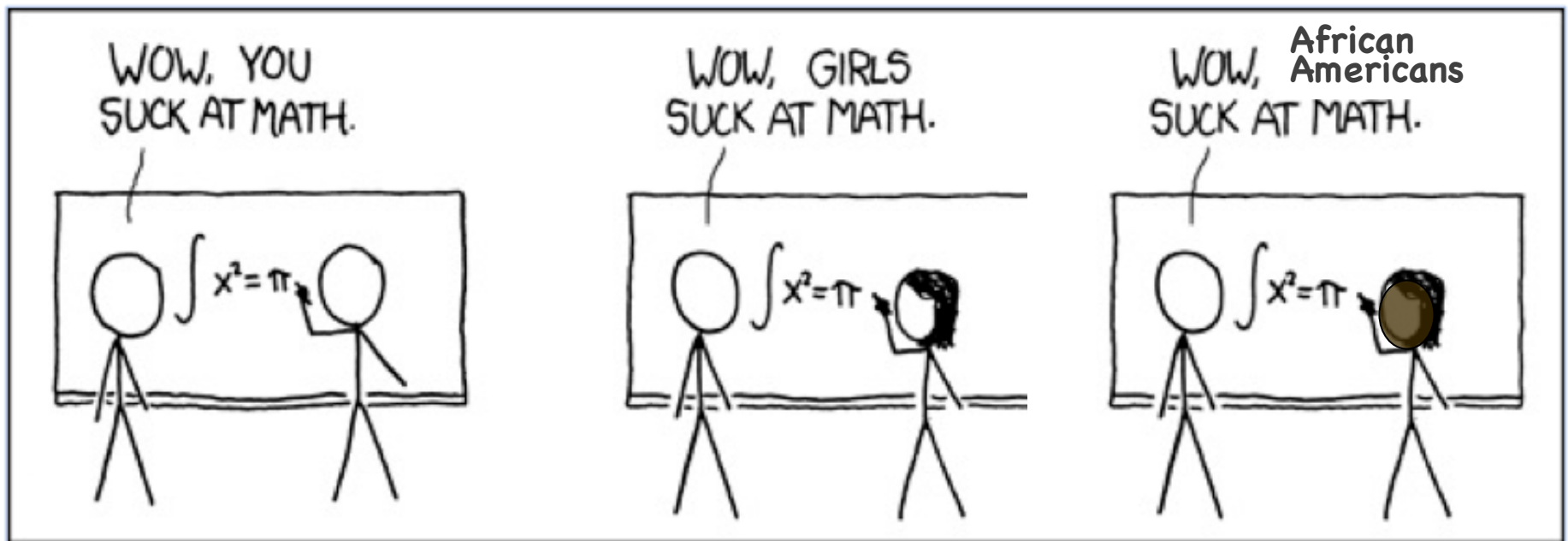


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with modification by Cohoon 2012

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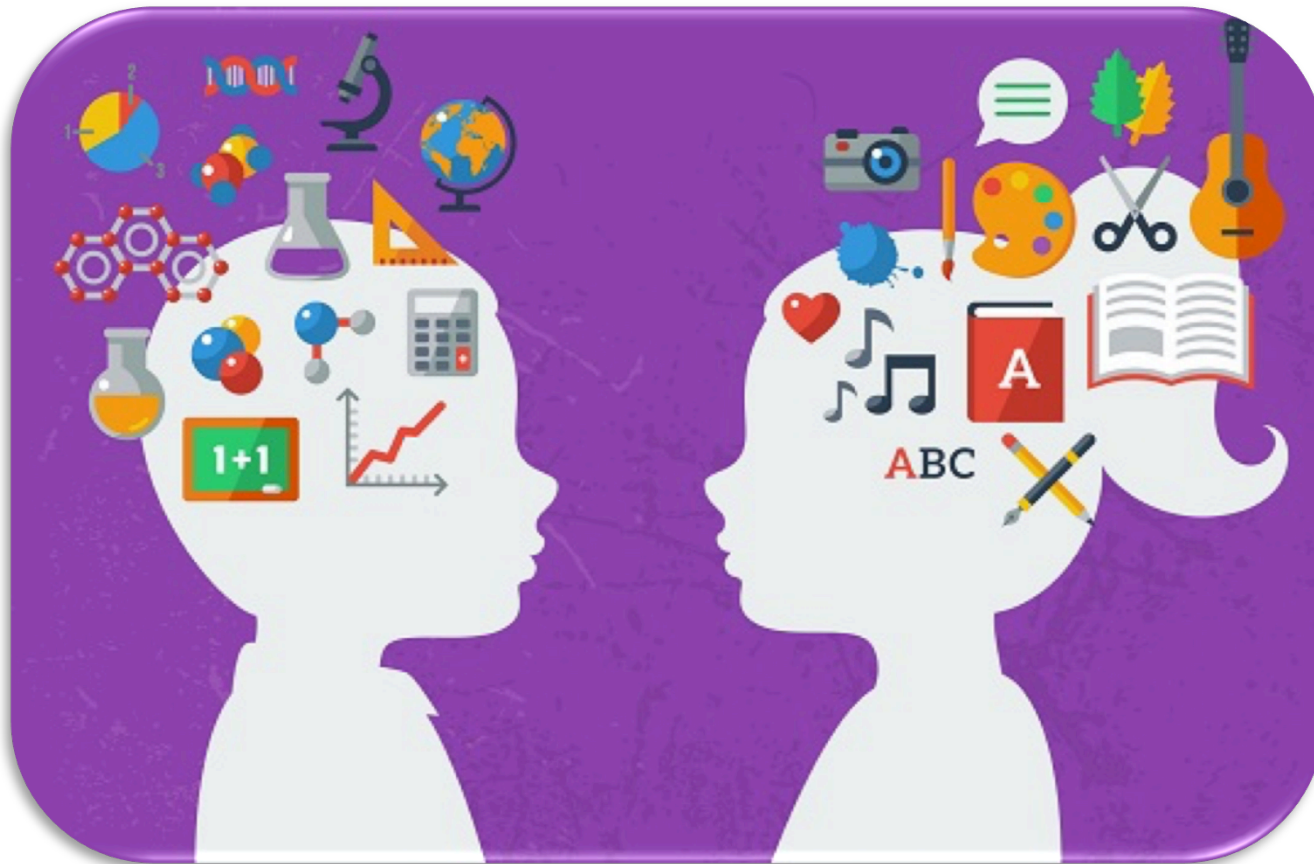
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Stereotypes Can Shape our Expectations for Others



False dichotomies

What empirically identifiable attitudinal differences are *stable across time* in the U.S.?

Women

Greater interest in protection of environment

Reservation wages: lower

Men

Greater interest in warfare, warring technology

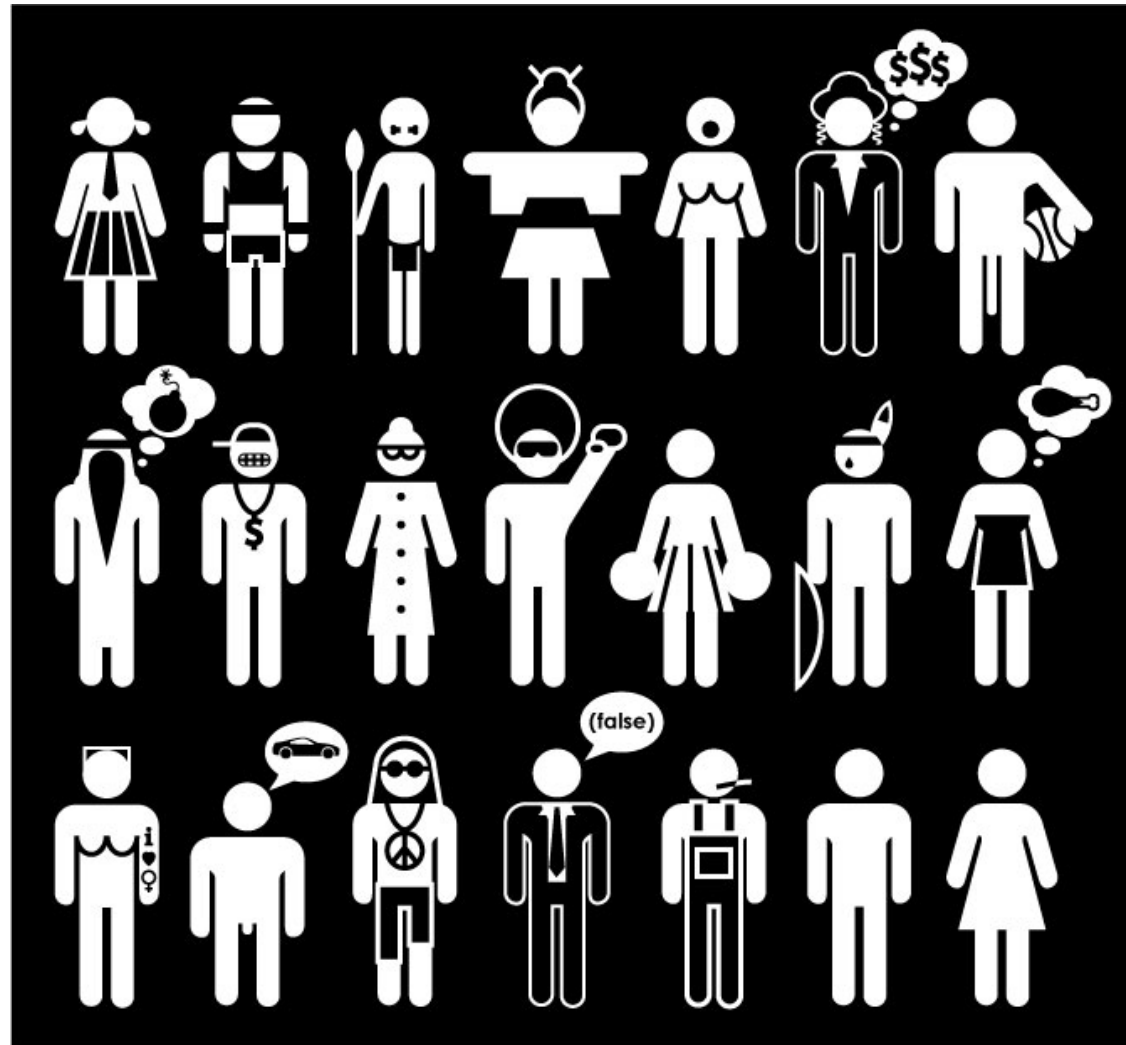
Reservation wages: higher

Common Stereotype: Feminine \neq Technical



Stereotypes Aren't Just About Gender

Race
Age
Body mass
Religion
Social class
...



Example: Who scores higher on math tests?

- A. White male engineering students
- B. Asian male engineering students

Stereotypes Can Create Threatening Situations



Fear of confirming negative beliefs about my group ...

- » Hinders performance
- » Affects choices and aspirations
- » Leads to harsh personal standards, opting out if not met

Correll 2004; Chasteen et al. 2005

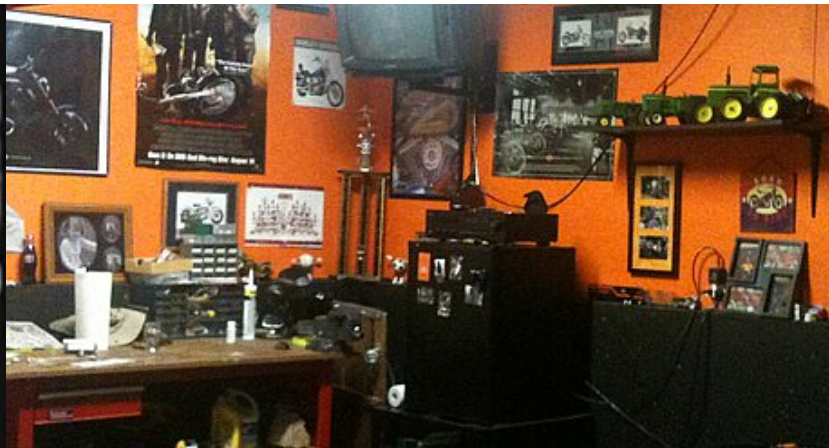
Stereotype Threat: Easy to Trigger; Affects Motivated Students

Some triggers:

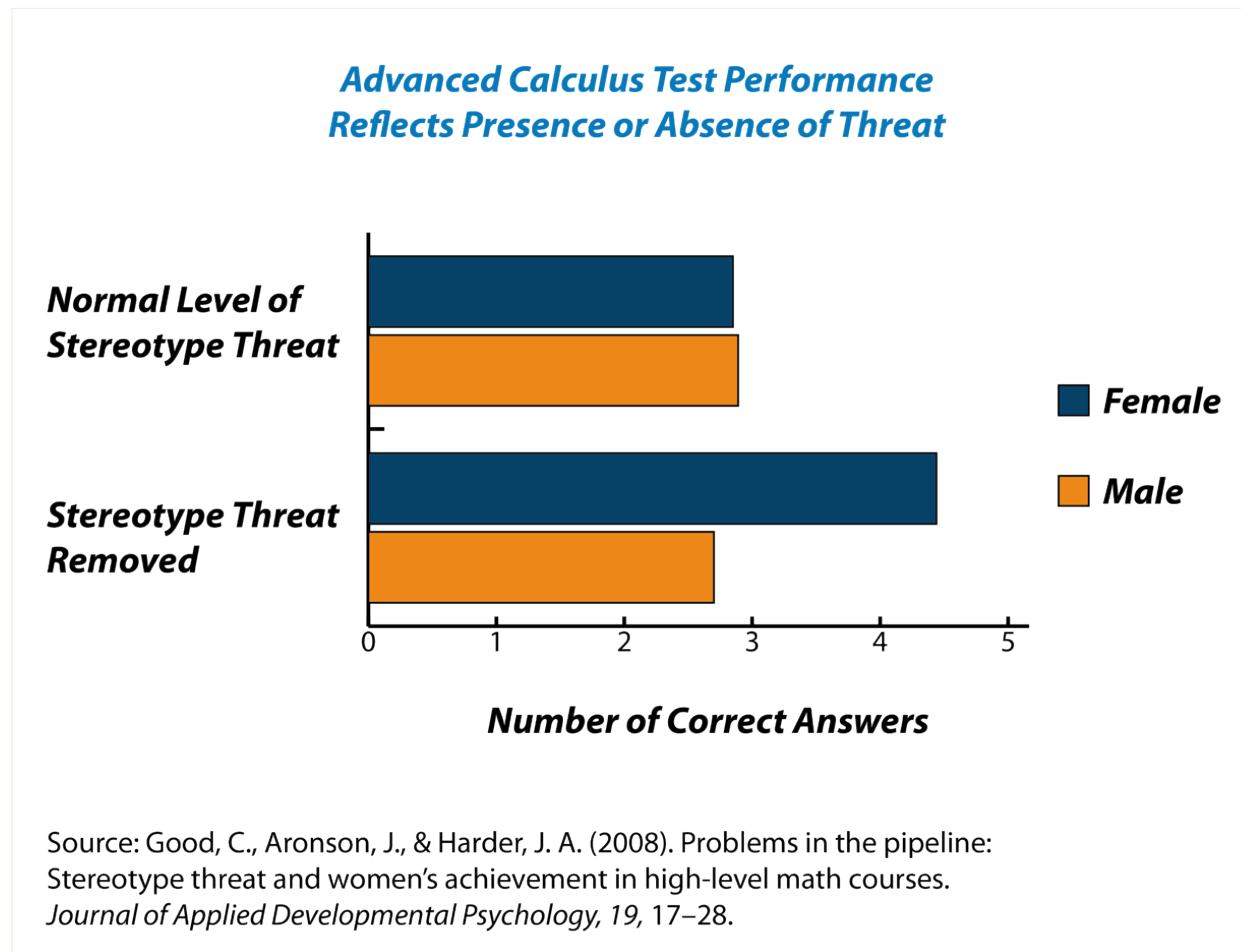
- Gender imbalance in room

- Stereotyped physical space

- Attention called to gender



Stereotype Threat Masks Ability



Remove threat and women test better

- » Advanced calculus course with 100 male, 57 female students
- » No gender difference in course grades
- » Significant difference in test performance without threat

Stereotype Threat Reduces Learning and Persistence

Note-taking skill reduced by stereotype threat



Appel et al. 2011; Good et al. 2012

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Stereotype Threat Reduces Feelings Of Belonging



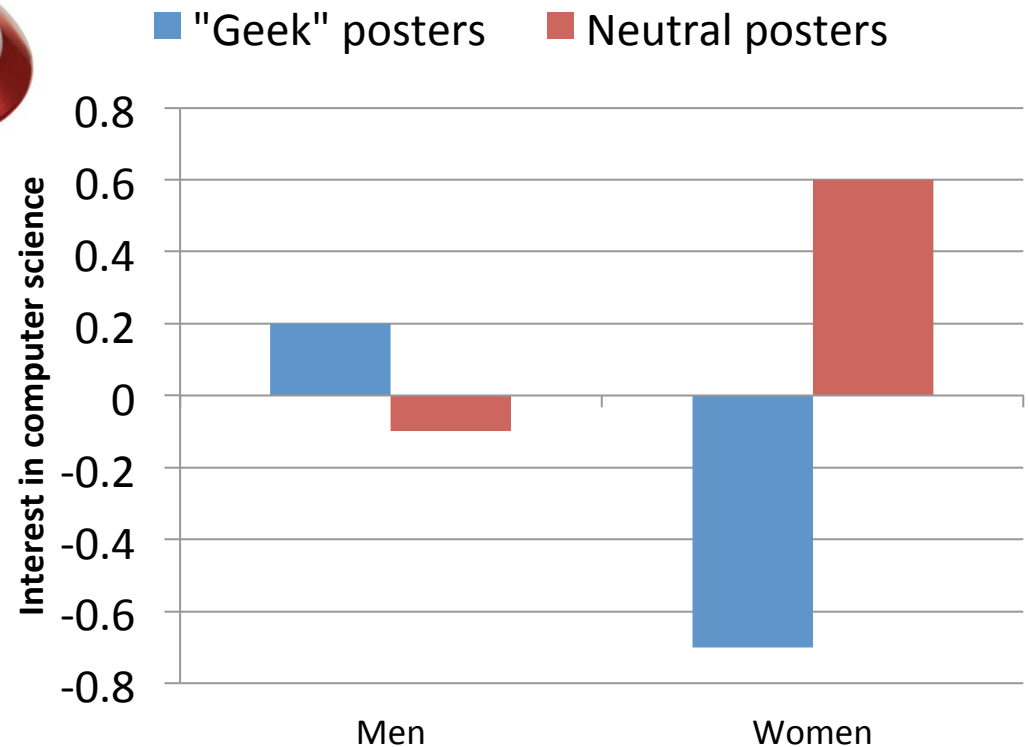
Purdie-Vaughns et al., 2008, *Journal of Personality & Social Psych.*

I Don't Belong Here



Murphy, Steele, & Gross, 2007, *Psychological Science*

Stereotypic Physical Environments



Cheryan et al., 2009, *Journal of Personality & Social Psychology*

Stereotypic Virtual Environments



Stereotype Threat Has Subtle Negative Effects Too

- » Don't speak up in groups or classes
- » Reluctant to take leadership roles
- » Discount their performance



Mindset Amplifies Impact of Stereotypes

- Fixed or Growth?
 - Innate ability or developed mastery?
- Stereotypes imply that ability is innate

NCWIT Tips: 8 Ways to Give Students More Effective Feedback Using a Growth Mindset

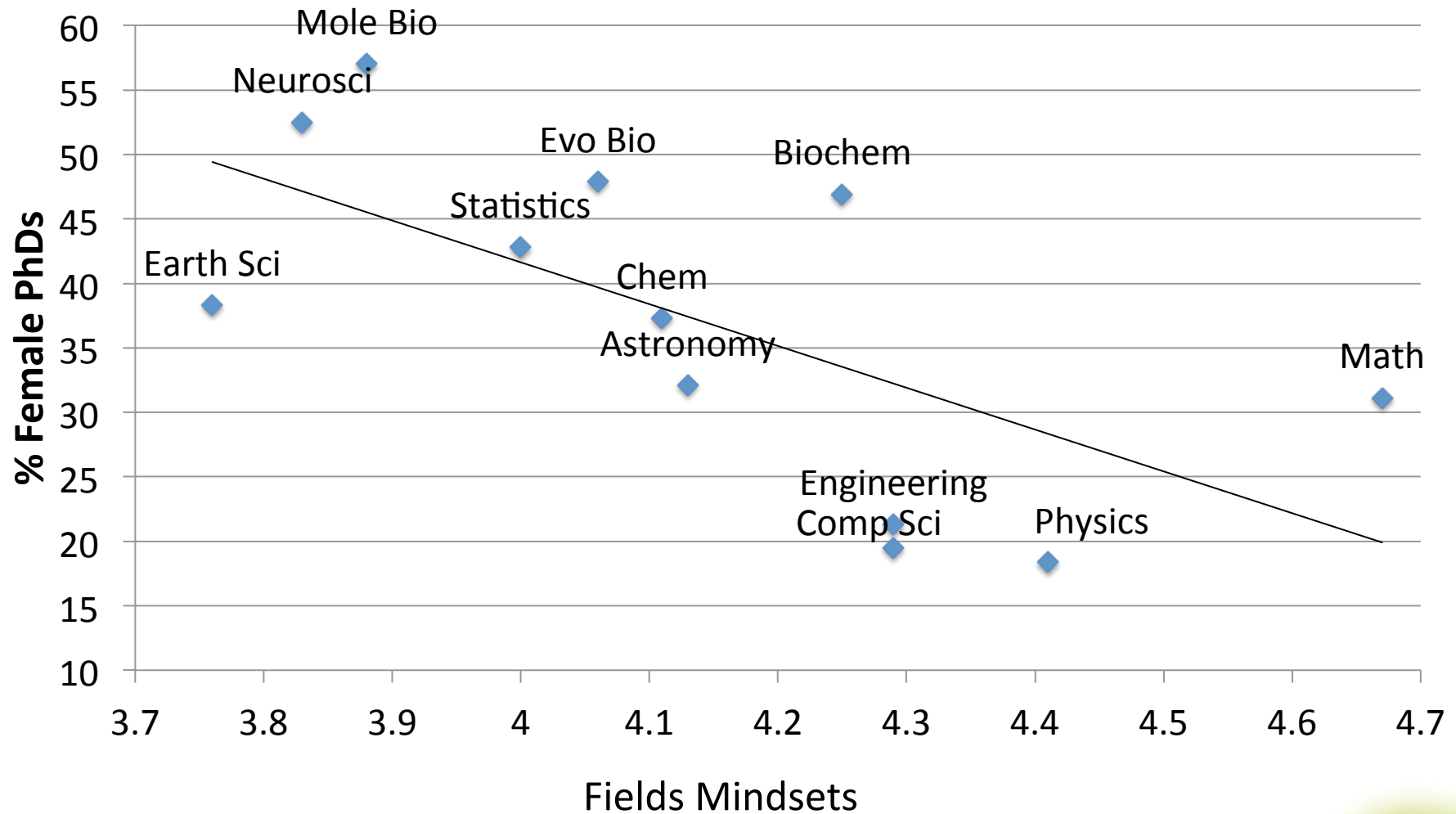
Effective feedback gives students information they actually use to increase their learning and improve their performance. It should employ a “growth mindset” that focuses on developing intelligence through effort and practice, and “wise feedback” that spurs additional effort.



Fields Have General Mindsets

- Leslie, Cimpian, & Meyer assessed scholars' mindsets across 30 academic (12 STEM) disciplines
 - Being a top scholar in [math] requires a special aptitude that just can't be taught
 - When it comes to [math] the most important factors for success are motivation and sustained effort; raw ability is secondary

Mindset Strongly Correlates With Women's Representation



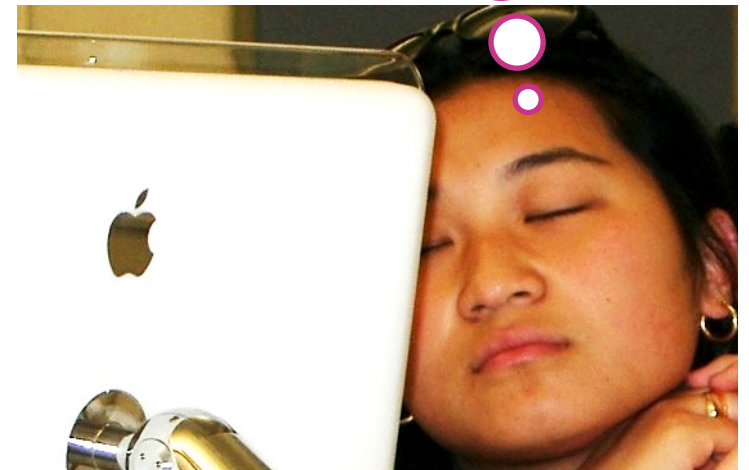
$r = -.64, p = .025$

Leslie, Cimpian, & Meyer

Lack of Information and Misconceptions

- Computer science is what?
Programming? Keyboarding?
Excel spreadsheets?
- Few students, parents, or teachers
know what computer scientists do
- Too many sources misinform
and reinforce stereotypes

***I don't wanna sit
in front of a
computer all day***
- Carter 2006



Policies Allow Stereotype-Based Choice

Carter 2006

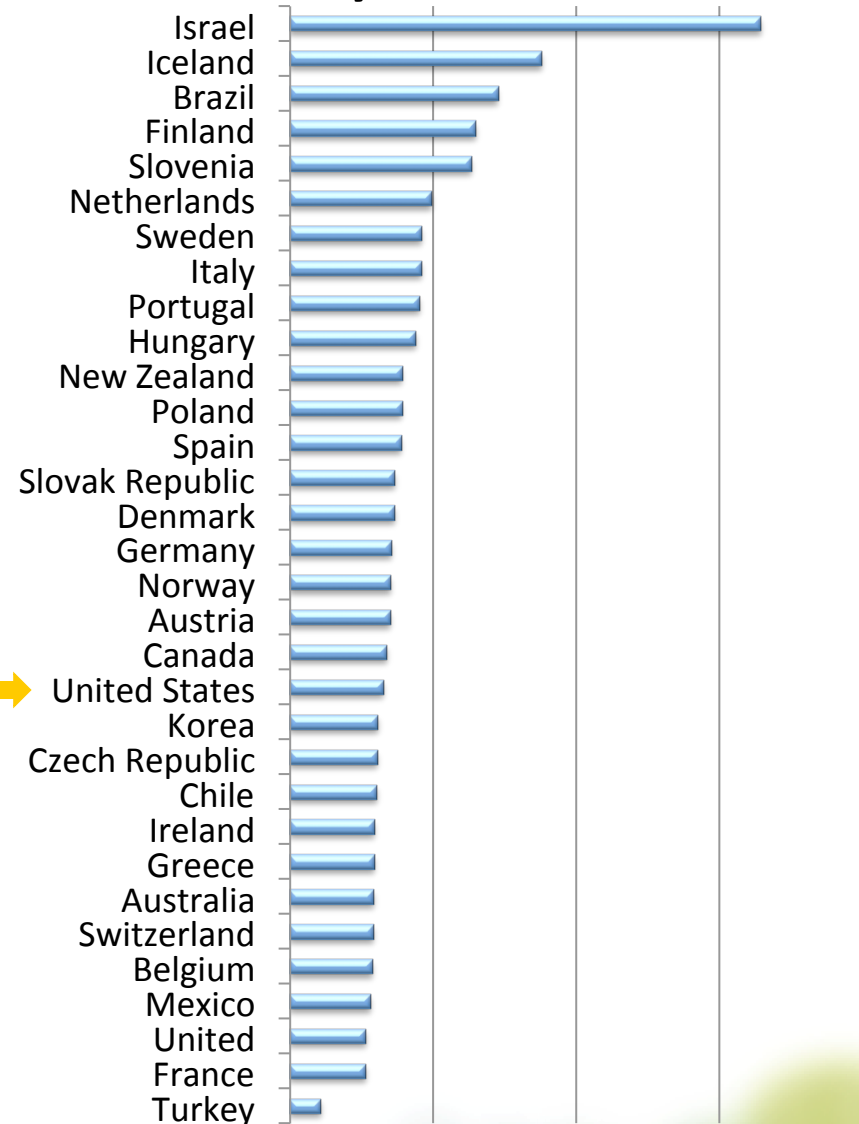
Charles &
Bradley 2006



Policies Steer Girls Away

- Choices made when gender stereotypes are most influential
- Fewer women in countries with
 - Belief in gender differences
 - Weak STEM requirements
- Restricted choices
 - Real CS rarely offered
 - Competes with electives

Male Overrepresentation in Tertiary CS, 1998-2007



We can take action every day to change the stereotypes that shape thinking and policies.