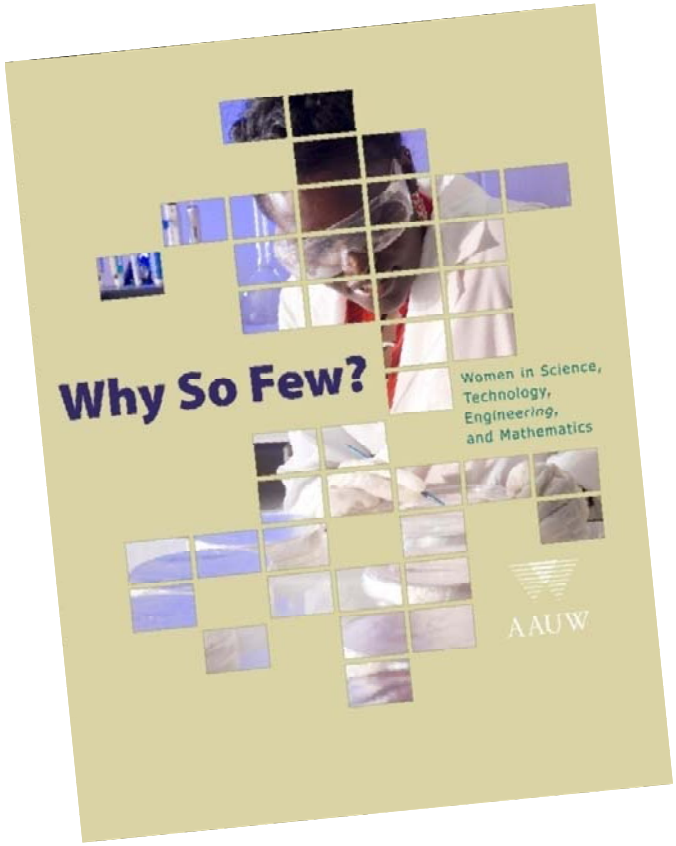
AAUW

Breaking through Barriers

for Women and Girls



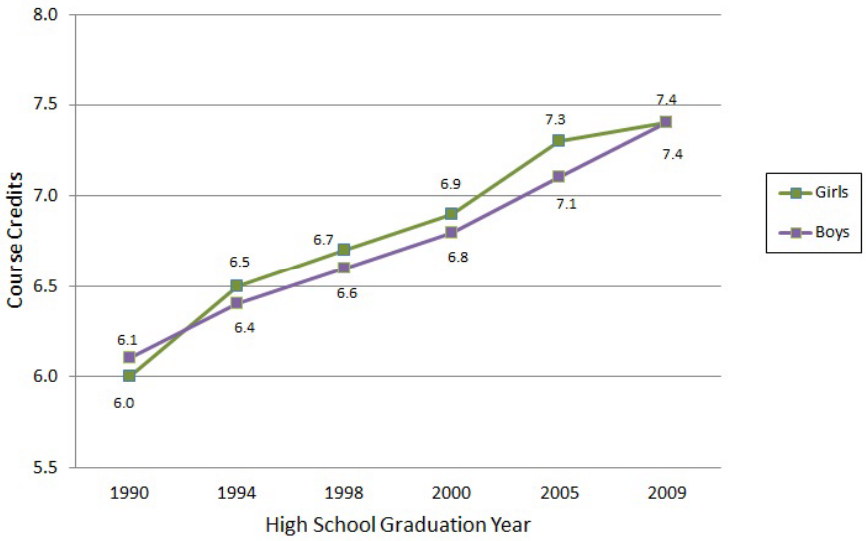
Why So Few? Women in Science, Technology, Engineering, and Mathematics

AAUW

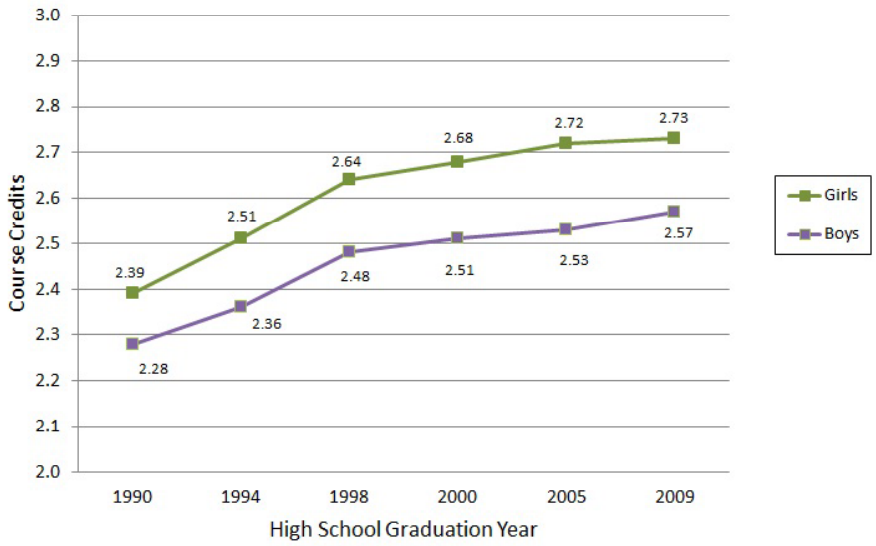
Breaking through Barriers for Women and Girls

High School Performance

High School Credits Earned in Mathematics and Science, by Gender, 1990 - 2009

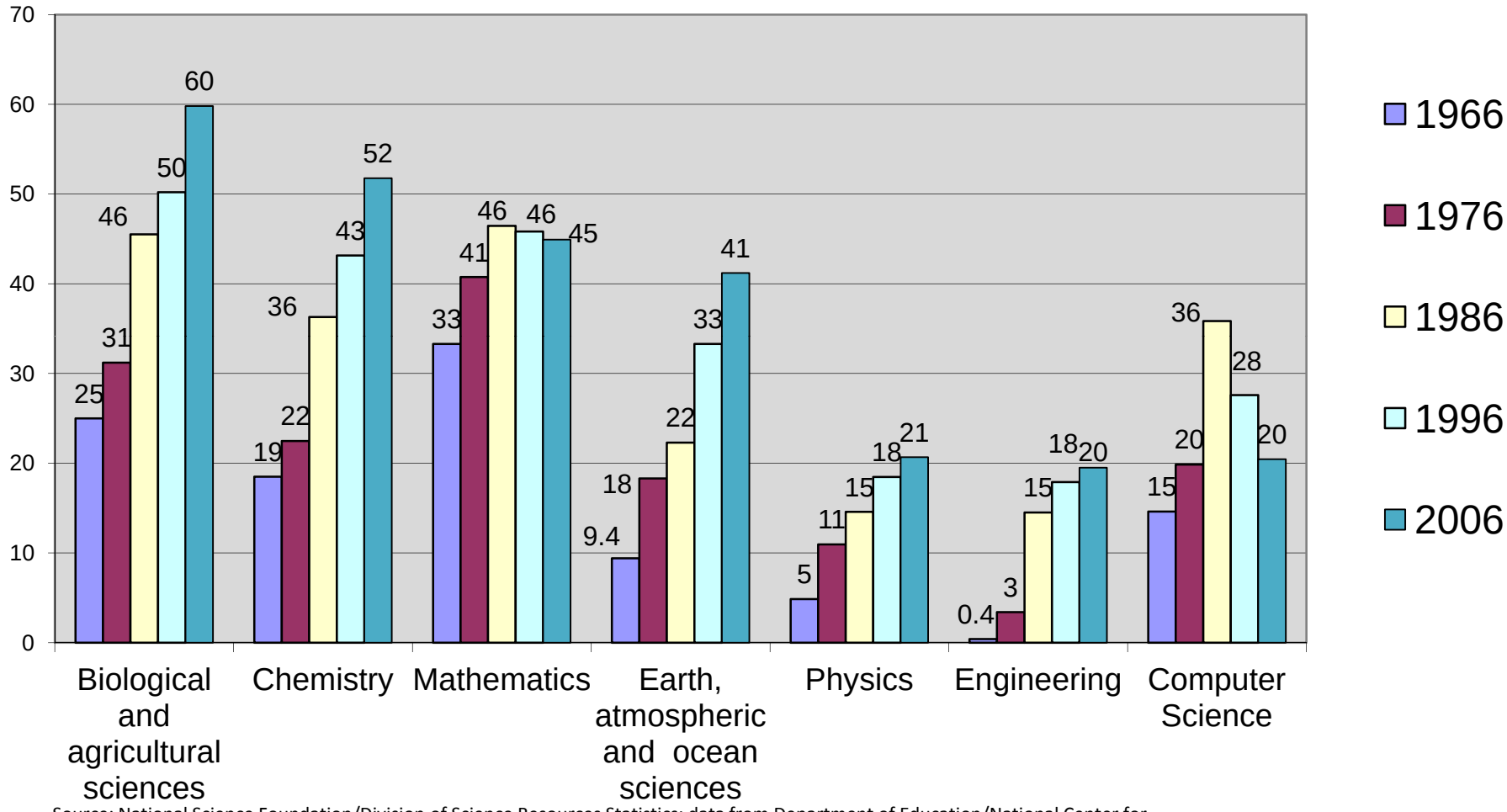


Grade Point Average in High School Mathematics, by Gender, 1990 - 2009



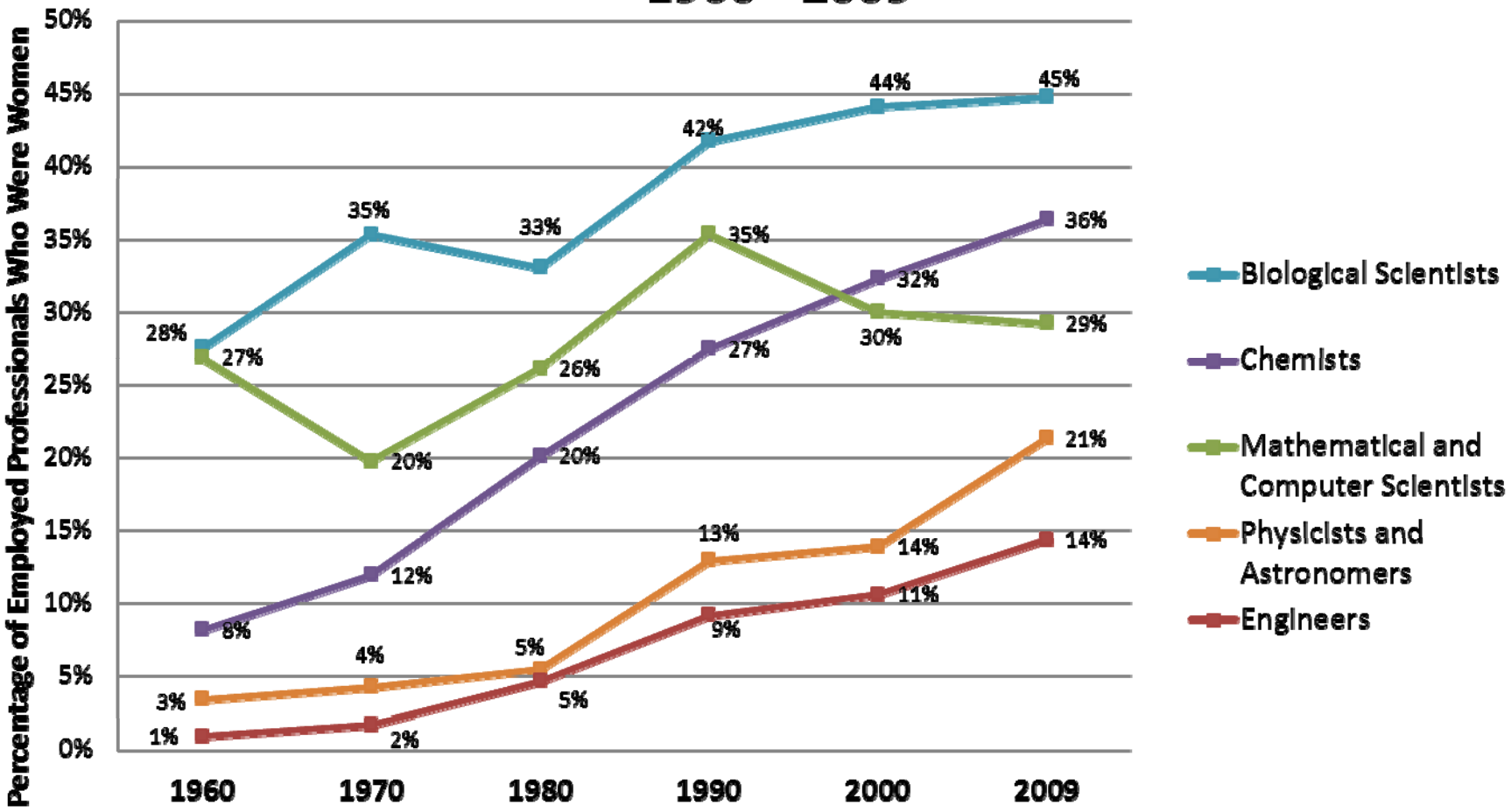
SOURCE: Nord, C., Roey, S., Perkins, R., Lyons, M., Lemanski, N., Brown, J., and Schuknecht, J. (2011). *The Nation's Report Card: America's High School Graduates* (NCES 2011-462). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Percentage of Bachelor's Degrees Earned by Women in selected STEM fields, 1966 to 2006

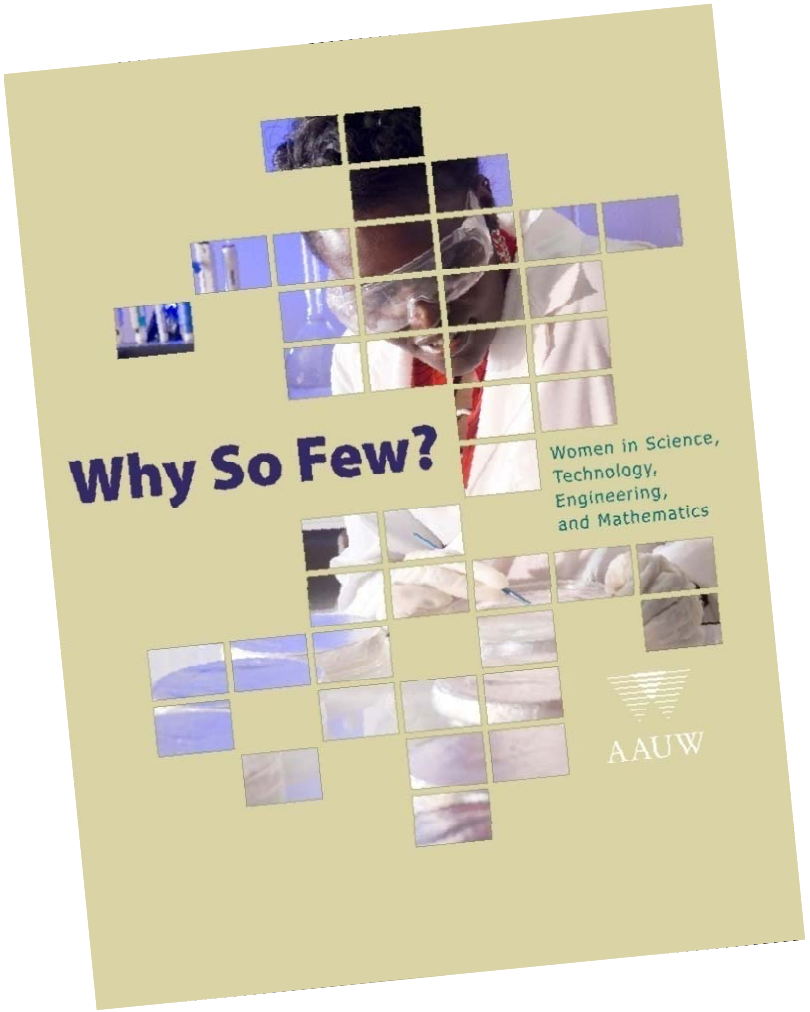


Source: National Science Foundation/Division of Science Resources Statistics; data from Department of Education/National Center for Education Statistics: Integrated Postsecondary Education Data System Completions Survey.

Women in Selected STEM Occupations, 1960 - 2009



Source: US Census Bureau, Decennial Census of the Population, 1960, 1970, 1980, 1990, and 2000. American Community Survey, 2009.



Why So Few?

presents evidence

that social and

environmental factors

contribute to the

underrepresentation of

women and girls in STEM.

Finding 1

Beliefs about Intelligence

Believing in the potential for intellectual growth, in and of itself, improves outcomes.

In math and science, a growth mindset benefits girls.

Fixed Mindset	Growth Mindset
Intelligence is static.	**Intelligence can be developed.**
Leads to a desire to *look smart* and therefore a tendency to	Leads to a desire to *learn* and therefore a tendency to
• **avoid challenges**	• **embrace challenges**
• **give up easily due to obstacles**	• **persist despite obstacles**
• **see effort as fruitless**	• **see effort as path to mastery**
• **ignore useful feedback**	• **learn from criticism**
• **be threatened by others' success**	• **be inspired by others' success**

- Teach children that intellectual skills can be acquired.
- Praise children (and adults) for effort.

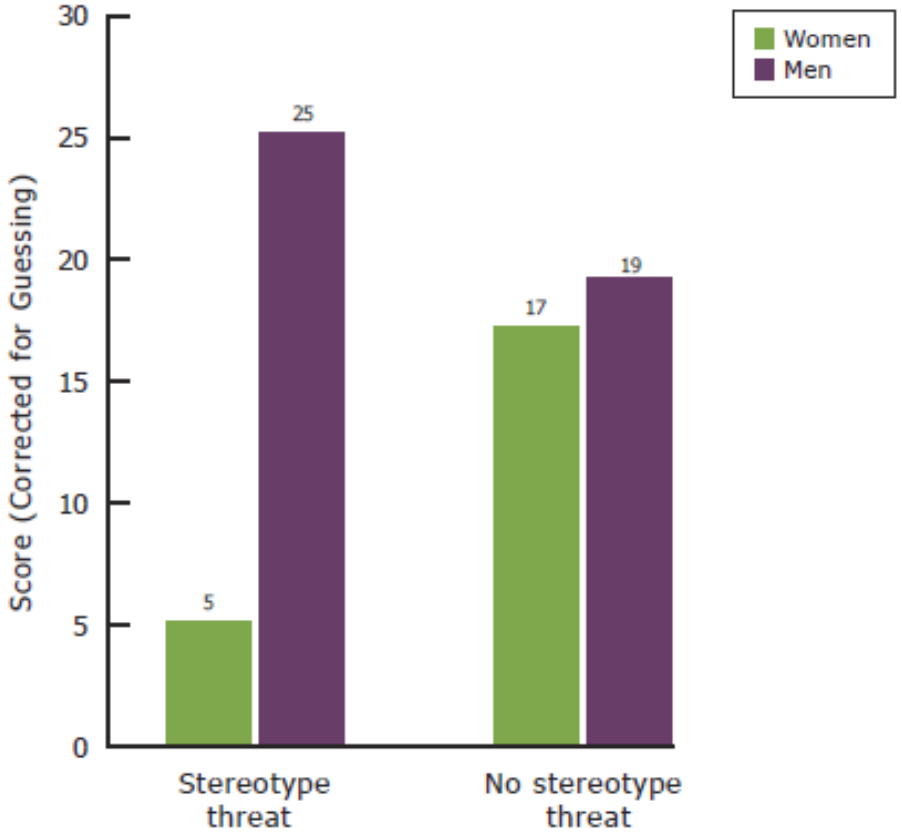
Finding 2

Stereotypes

Negative stereotypes
about girls' math abilities
can adversely affect girls' performance in math

Performance on a Challenging Math Test, by Stereotype Threat Condition and Gender

- Expose girls to successful female role models in math and science.
- Teach students about stereotype threat.

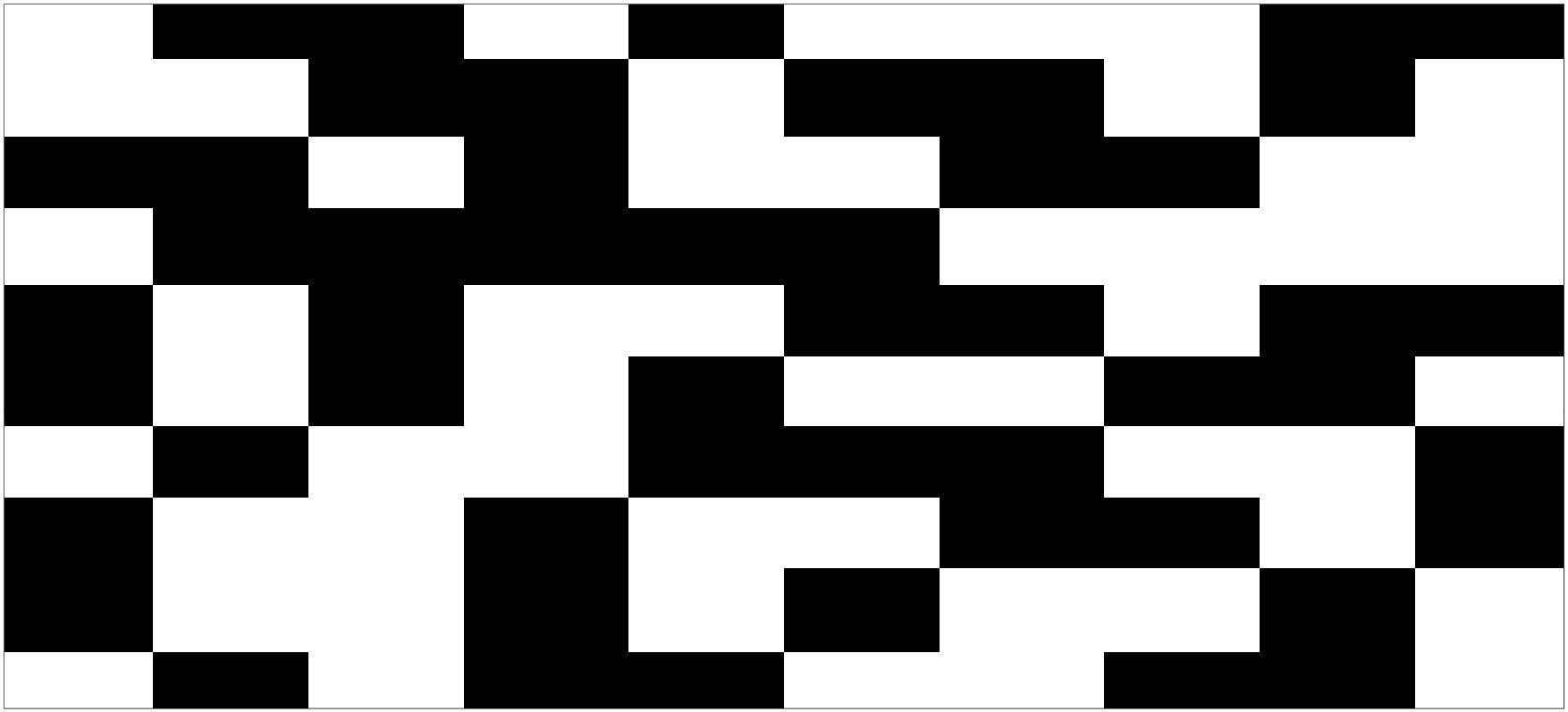


Source: Spencer, S. J., Steele, C. M., & Quinn, D. M., 1999, "Stereotype threat and women's math performance," Journal of Experimental Social Psychology, 35(1), p. 13.

Finding 3

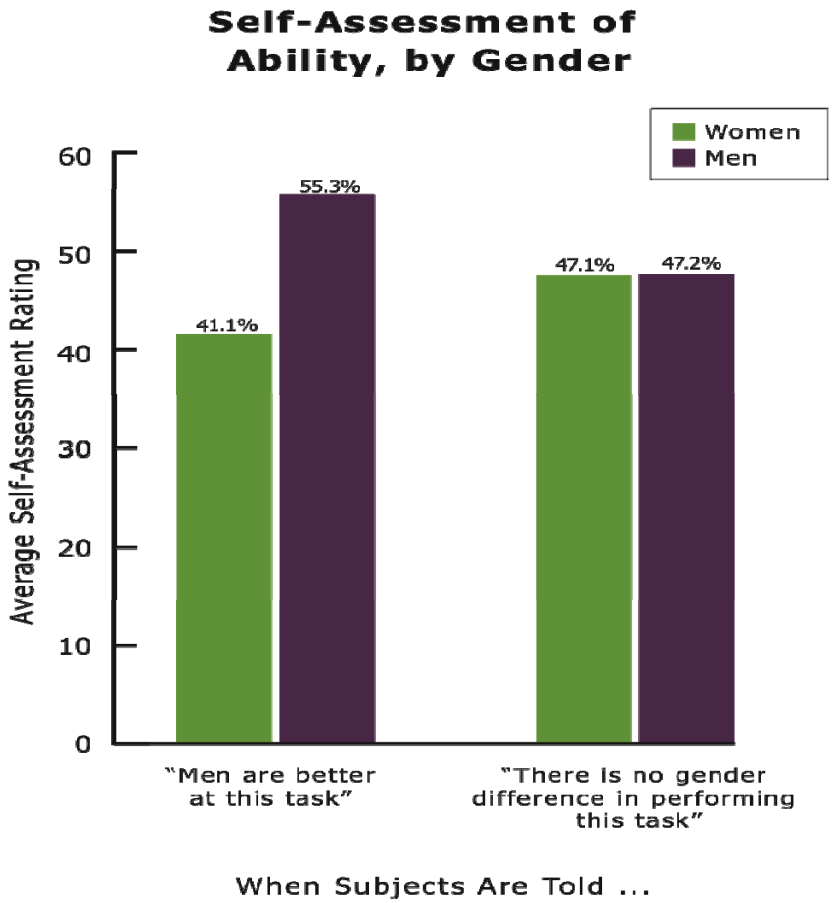
Self-Assessment

Girls are “harder on themselves”
and hold themselves to a higher standard
when assessing their abilities
in “male” fields like science and math.



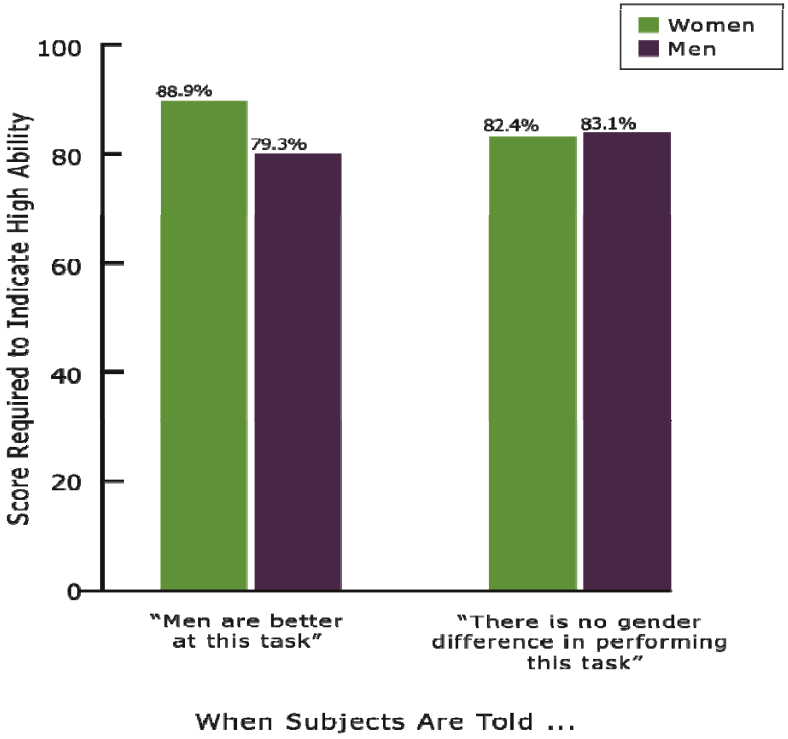
Does this rectangle have more black or more white?

Gender differences in self-assessment



Source: Correll, S. J., 2004, "Constraints into preferences: Gender, status, and emerging career aspirations," *American Sociological Review, 69*, p. 106, Table 2.

Students' Standards for Their Own Performance, by Gender



Note: Respondents were asked, "How high would you have to score to be convinced that you have high ability at this task?"
Source: Correll, S. J., 2004, "Constraints into preferences: Gender, status, and emerging career aspirations," *American Sociological Review, 69*, p. 106, Table 2.

- Set clear performance standards
- Help girls recognize their career-relevant skills

Finding 4

Spatial Skills

Spatial skills are not innate
and can be improved with training.

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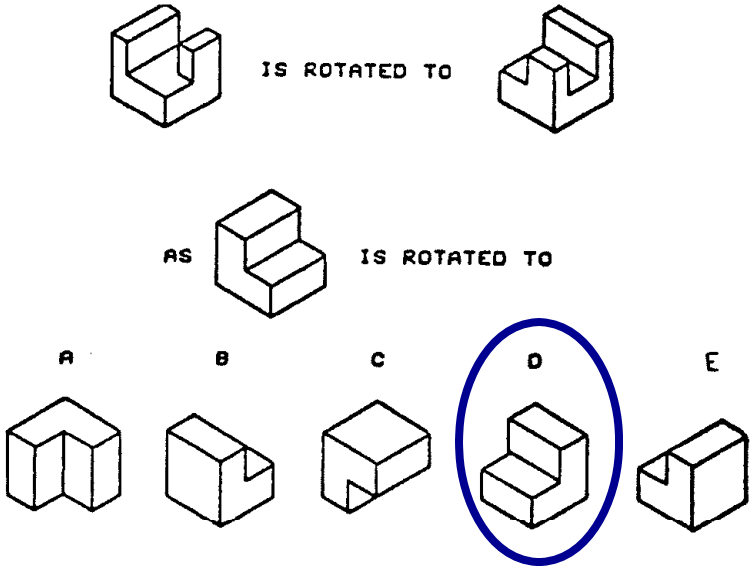


This is a sample question on mental rotation.

Do you know the right answer?

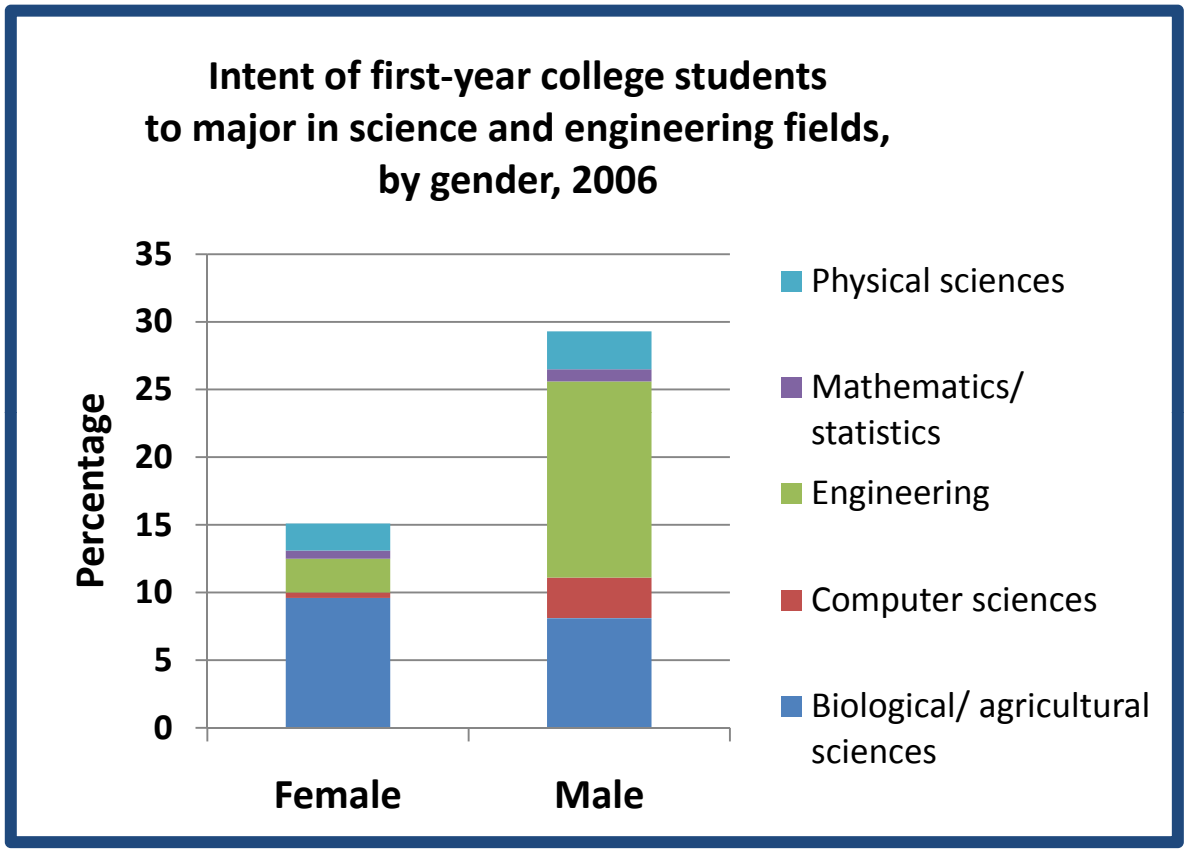
Encourage girls to play with building toys and to draw to develop their spatial skills.

Finding 5

The College Student Experience

At colleges and universities,
little things can make a big difference
for female students in science and engineering.

Small changes in college and university STEM departments can make a big difference



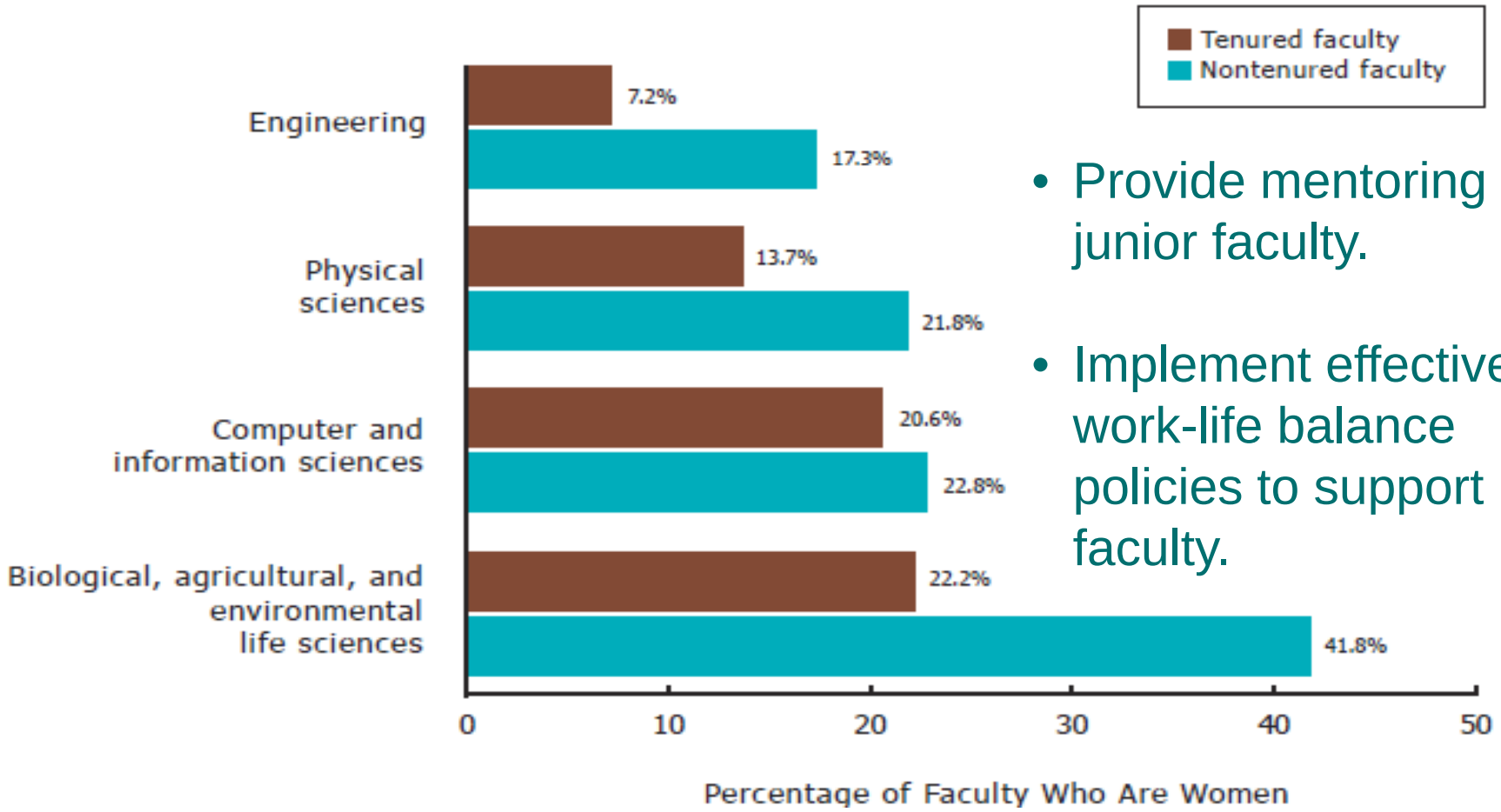
- Actively recruit female students
- Emphasize broad applications of science and engineering in introductory courses.
- Consider pre-requisites carefully.

Finding 6

University and College Faculty

Women STEM faculty are less likely
than their male peers
to feel that they fit or belong
in their departments.

Female STEM Faculty in Four-Year Educational Institutions, by Discipline and Tenure Status, 2006



- Provide mentoring for junior faculty.
- Implement effective work-life balance policies to support faculty.

Source: National Science Foundation, Division of Science Resources Statistics, 2009, Characteristics of doctoral scientists and engineers in the United States: 2006 (Detailed Statistical Tables) (NSF 09-317) (Arlington, VA), Author's analysis of Table 20.

Finding 7

Implicit Bias

In a test of implicit bias, most people associate science and math fields with “male” and humanities and arts fields with “female”.

Our unconscious beliefs may be more powerful than our explicitly held beliefs simply because we are not aware of them.

- Take a test to learn about your unconscious bias at https://implicit.harvard.edu.
- Take steps to address your biases.

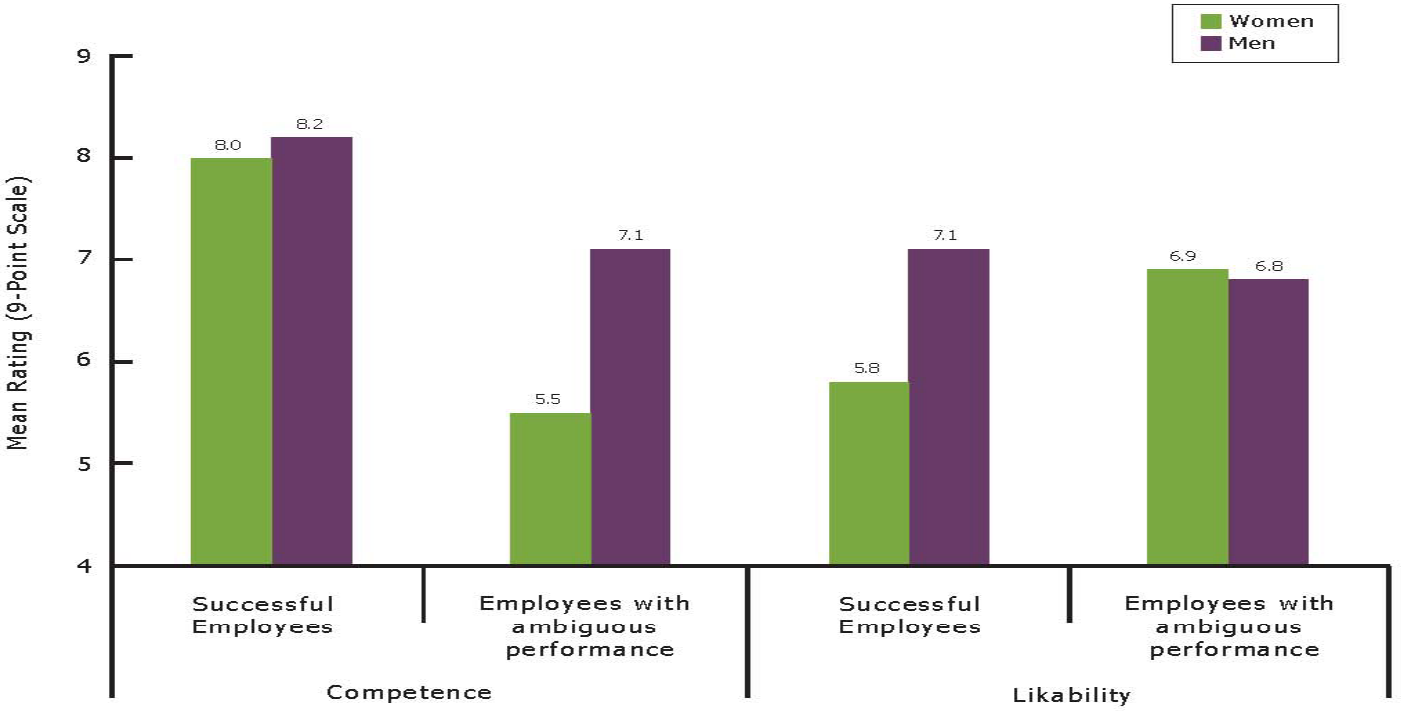
Finding 8

Bias against Women in Non-traditional Fields

Women in “male” jobs are viewed as less competent than their male peers.

When women are clearly competent, they are often considered less “likable.”

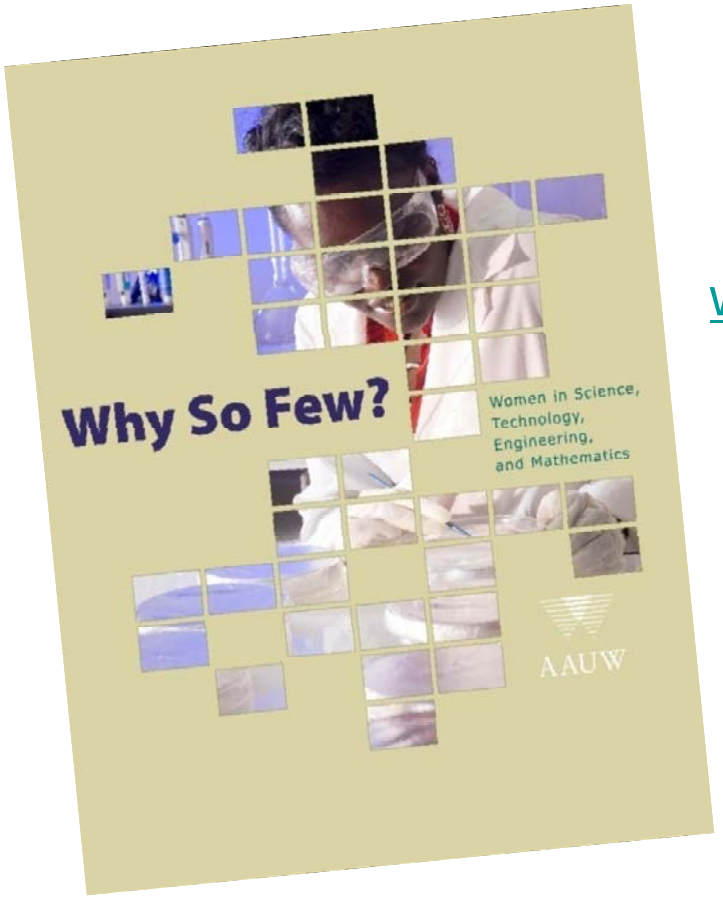
Figure 21. Competence and Likability for Women and Men in "Male" Professions



Source: Heilman et al., 2004, "Penalities for success: Reaction to women who succeed in male gender-typed tasks," *Journal of Applied Psychology, 89*(3), p. 420, Table 2.

- Raise awareness about bias against women in STEM fields.
- Create clear criteria for success.

Why So Few? Women in Science, Technology, Engineering, and Mathematics



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