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

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Why So Few?
Women in Science, Technology, Engineering, and Mathematics
Why So Few? presents evidence that social and environmental factors contribute to the underrepresentation of women and girls in STEM.
Overview

➢ Stereotypes and stereotype threat

➢ Self-efficacy or self-assessment in science and math

➢ Development of spatial and visualization skills

➢ Climate of science and engineering departments in colleges and universities
Stereotypes about Girls and Math
High School Credits Earned in Math and Science, by Gender, 1990-2009

Grade Point Average in High School Math and Science, by Gender, 1990-2009

High School Credits Earned in Math and Science, by Race/Ethnicity, 1990-2009

Grade Point Average in High School Math and Science, by Race/Ethnicity, 1990-2009

Grade Point Average in High School Math and Science, by Race/Ethnicity, 1990-2009

Negative stereotypes about girls’ and women’s abilities in math and science persist despite girls’ and women’s considerable gains in these areas in the last few decades.
Stereotype Threat

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

What can you do to support girls and women in STEM?

• Expose girls — all students — to successful female role models in math and science to combat the negative stereotypes about women in these fields.

• Explicitly talk to students about stereotype threat, which has resulted in improved performance.
Gender differences in self-assessment
Self efficacy or self assessment is belief in your capacity to succeed at tasks. General self efficacy is belief in your ability to handle tasks in general. Levels of self efficacy can also vary based on the specific area, such as STEM or leadership.
“Boys do not pursue mathematical activities at a higher rate than girls do because they are better at math. They do so, at least partially, because they think they are better.”

—Shelley Correll, professor
Does this rectangle have more black or more white?
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?”
What can you do to support girls and women in STEM

• Provide students with clear information about what grade or score signifies good performance, so they are less likely to rely on stereotypes to assess their abilities

• Encourage girls to see their success in high school math and science for what it is: not just a requirement for going to college but also an indication that they have the skills to succeed in a range of professions, including science and engineering
The Importance of Spatial and Visualization Skills
One of the largest and most persistent gender gaps in cognitive skills is found in spatial skills, where boys consistently outperform girls.
Spatial skills are not innate and can be improved with training.
What can you do to support girls and women in STEM

• Support the development of spatial skills through play and fun activities like playing with building toys, drawing, sports and sewing

• Provide spatial skills training as part of curriculum in primary and secondary school and in colleges and universities
The climate of science and engineering departments in colleges and universities
The climate of science and engineering departments at colleges and universities is especially important for women—both students and faculty.
Intentions of freshmen to major in STEM fields by gender, 2014

SOURCE: Higher Education Research Institute, University of California at Los Angeles, special tabulations (2014) of the Survey of the American Freshman.
Process for Improving Recruitment and Retention of Women in Computer Science

What can you do to support girls and women in STEM

• Actively recruit female students.
• Review admissions policies to ensure that departments are not unintentionally “weeding out” potentially successful students.
• Emphasize broad applications of science and engineering in introductory courses.
What can you do to support girls and women in STEM

• Don’t reinforce gender stereotypes about interest and ability in math and science

• Expose all students –and especially girls-- to female role models in math and science

• Provide spatial skills training and other opportunities to develop spatial skills

• Create learning environments that are welcoming and nurture interest in STEM versus environments that aim to “weed out” students

• Provide students with clear standards and expectations about what constitutes good performance in math and science
Think about a strategy that you and/or your team

• Want to use,
• Already use that works well, OR
• Want to know more about
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