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

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

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

Percentage of Bachelor's Degrees Earned by Women in selected STEM fields, 1966 to 2008

Labor Force

Women in Selected STEM Occupations, 1960 - 2009

Percentage of Employed Professionals Who Were Women

- Biological Scientists
- Chemists
- Mathematical and Computer Scientists
- Physicists and Astronomers
- Engineers

47% of entomology / parasitology graduate students were women in 2008

Women make up 26% of non-student members in the ESA. And 50% of student members
Why So Few?

presents evidence that social and environmental factors contribute to the underrepresentation of women and girls in STEM.
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

<table>
<thead>
<tr>
<th>Fixed Mindset</th>
<th>Growth Mindset</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intelligence is static.</td>
<td>Intelligence can be developed.</td>
</tr>
<tr>
<td>Leads to a desire to <em>look smart</em> and therefore a tendency to</td>
<td>Leads to a desire to <em>learn</em> and therefore a tendency to</td>
</tr>
<tr>
<td>• avoid challenges</td>
<td>• embrace challenges</td>
</tr>
<tr>
<td>• give up easily due to obstacles</td>
<td>• persist despite obstacles</td>
</tr>
<tr>
<td>• see effort as fruitless</td>
<td>• see effort as path to mastery</td>
</tr>
<tr>
<td>• ignore useful feedback</td>
<td>• learn from criticism</td>
</tr>
<tr>
<td>• be threatened by others’ success</td>
<td>• be inspired by others’ success</td>
</tr>
</tbody>
</table>

- **Teach children that intellectual skills can be acquired.**
- **Praise children for effort.**
Self-Assessment

Girls assess themselves lower 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?
When a Skill is Identified as "Male", Women Assess Their Abilities Lower Than Men Do

![Bar chart showing self-assessment of ability by gender.](chart.png)

When Subjects Are Told...

Women Set the Bar Higher at Male-Identified Tasks

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

**Students’ Standards for Their Own Performance, by Gender**

<table>
<thead>
<tr>
<th>Score Required to Indicate High Ability</th>
<th>Women</th>
<th>Men</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>88.9%</td>
<td>79.3%</td>
</tr>
<tr>
<td>20</td>
<td>82.4%</td>
<td>83.1%</td>
</tr>
</tbody>
</table>

When Subjects Are Told ...

*Note: Respondents were asked, “How high would you have to score to be convinced that you have high ability at this task?”
Why Do Women Leave Science and Engineering Careers?

- Isolation
- Unsupportive work environment
- Extreme work schedules
- Unclear rules about advancement and success
Implicit Bias

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

AAUW
Breaking through Barriers for Women and Girls
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.
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.”
- Raise awareness about bias against women in STEM fields.
- Create clear criteria for success.
Why so few women in leadership?
Why so few women in leadership?
Gender Schemas

Hypotheses about what it means to be male or female
“I don’t have a traditionally female way of speaking. I’m quite assertive. If I didn’t speak the way I do, I wouldn’t have been seen as a leader. But my way of speaking may have grated on people who were not used to hearing it from a woman. It was the right way for a leader to speak, but it wasn’t the right way for a woman to speak.”

Kim Campbell, former Canadian prime minister
Accumulation of Advantage

Martell, Lane, and Emrich's (1996) model assumed a tiny bias in favor of men, which accounted for only 1% of variance in promotion.

After many iterations the top level was 65% male.

Operating at a systematic minute disadvantage can have substantial long term effects.

Why so few women in leadership?
Recommendation

Challenge gender schemas
Recommendation

Vouch for women
Recommendation

Invite women in proportion to their representation in your field, and keep track.
Recommendation

Encourage women to run
Why So Few? Women in Science, Technology, Engineering, and Mathematics

To download a pdf of the report: www.aauw.org/learn/research/whysofew.cfm

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