“What’s Holding Women Back in Science?”
Wrong Question

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University of Delaware
Broader Perspective

World of Work

Level
(education and intelligence)

Physics
Engineering

Technicians

Skilled trades

Fisherman
Miners

Medicine
Biology

Managers

Protective services

Guards

Social work
Teaching
Nursing

Psychology
Sociology

Sales

Packers

Food service

Law

Accounting

Clerical

Fields (interests & specialized abilities)
### Trends in Degrees Awarded: % Women

<table>
<thead>
<tr>
<th></th>
<th>BA</th>
<th>MA</th>
<th>Doct</th>
<th>Prof</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>43</td>
<td>40</td>
<td>13</td>
<td>2</td>
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<tr>
<td>2002</td>
<td>57</td>
<td>59</td>
<td>46</td>
<td>47</td>
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</table>

**PhD:**

<table>
<thead>
<tr>
<th></th>
<th>Educ</th>
<th>Social</th>
<th>Life</th>
<th>Physical</th>
<th>Eng</th>
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</thead>
<tbody>
<tr>
<td>1980</td>
<td>45</td>
<td>35</td>
<td>25</td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td>2001</td>
<td>65</td>
<td>54</td>
<td>47</td>
<td>26</td>
<td>17</td>
</tr>
</tbody>
</table>

**People** ←—— **Things**
### Degrees in Specialities—% Women (2001)

<table>
<thead>
<tr>
<th>Engineering BA</th>
<th>%</th>
<th>Engineering PhD</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bio/biomedical</td>
<td>45</td>
<td>Bio/biomedical</td>
<td>29</td>
</tr>
<tr>
<td>Chemical</td>
<td>37</td>
<td>Chemical</td>
<td>29</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>26</strong></td>
<td><strong>Total</strong></td>
<td><strong>21</strong></td>
</tr>
<tr>
<td>Electrical</td>
<td>15</td>
<td>Electrical</td>
<td>12</td>
</tr>
<tr>
<td>Mechanical</td>
<td>13</td>
<td>Mechanical</td>
<td>12</td>
</tr>
</tbody>
</table>

**All follow the people-things gradient**

<table>
<thead>
<tr>
<th>Social Sciences BA</th>
<th>%</th>
<th>Psychology PhD</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sociology</td>
<td>71</td>
<td>Counseling</td>
<td>71</td>
</tr>
<tr>
<td>Anthropology</td>
<td>68</td>
<td>Clinical</td>
<td>70</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>62</strong></td>
<td><strong>Total</strong></td>
<td><strong>68</strong></td>
</tr>
<tr>
<td>Political science</td>
<td>48</td>
<td>Experimental</td>
<td>62</td>
</tr>
<tr>
<td>Economics</td>
<td>34</td>
<td>Industrial-organizational</td>
<td>54</td>
</tr>
</tbody>
</table>
Source of Sex Differences

2 Competing Hypotheses

<table>
<thead>
<tr>
<th></th>
<th>Inner compass</th>
<th>Modeling clay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genetic tilt</td>
<td>50%</td>
<td>0%</td>
</tr>
<tr>
<td>Socialization &amp; bias</td>
<td>50%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Which best fits the evidence?
All the Evidence

Can’t pick & choose by results

(Anecdotes don’t negate or constitute good evidence)
## More Evidence for Genetic Tilt: Abilities, Interests, Temperament

### Average differences
- Chromosomes
- Hormone balance
- Brain bilaterality
- Abilities
- Interests
- Interest at 1 day old
- Values
- Personality traits
- Response to frustrating task (infant)
- Mode of aggression

### Male
- Y
- Testosterone
- Less connected
- Spatial
- Things (non-living)
- "Realistic"
- Mechanical mobile
- "Assertive"
- "Dominant"
- Physical

### Female
- X
- Estrogen
- More
- Verbal
- People, living things
- "Social"
- Faces
- "Social," "Feelings"
- "Agreeable"
- "Nurturant"
- Stopped & cried
- Verbal

### Persistent, consistent, most confirmed worldwide
<table>
<thead>
<tr>
<th>Large male advantage</th>
<th>Small male advantage</th>
<th>No difference</th>
<th>Female advantage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sport</td>
<td>Literature</td>
<td>Film</td>
<td>Cooking</td>
</tr>
<tr>
<td>History</td>
<td>Jazz &amp; blues</td>
<td>Art</td>
<td>Medicine</td>
</tr>
<tr>
<td>Finance</td>
<td>Biology</td>
<td>Clas Music</td>
<td></td>
</tr>
<tr>
<td>Politics</td>
<td>Geography</td>
<td>Fashion</td>
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</tr>
<tr>
<td>Games</td>
<td>History science</td>
<td>Pop music</td>
<td></td>
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<tr>
<td>Exploration</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Science</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Inner Compass: Example

- “Active gene-environment correlation”

People select and modify their environments

Children resist redesign
Complaints Themselves Illustrate Sex Differences

• Summers, the man male
  – Disagreeable, domineering, socially insensitive
  – “Why can’t he be more like a woman?”

• Summers’ theorizing
  – Verbally assaulted women
  – Created emotional pain
  – “The standard for judging ideas should be emotional impact, not intellectual merit.” (Note: It is appropriate for mothering behavior.)

• Physics & engineering
  – Would interest more women if emphasized how they help people
  – “Why can’t the content of physics and engineering be more like medicine and sociology?”
0% Genetic Is Not Plausible (And Never Was)

- There is no plausible non-genetic explanation for the pattern of results
- Sex differences in basic traits, physical and behavioral, are an evolutionary fact
- Cultures can narrow or magnify their expression, but not eliminate them
- Insisting on 0% genetic as the default hypothesis is “re-creationism”

- It also ignores the huge challenges facing women committed to both children and careers.
Yet Broader Perspective

World of Work

Fields (interests & specialized abilities)