Perspectives from a Woman in Science

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Starting Points

- Women and other minorities are equally capable as current faculty (see Spelke 2005 review in American Psychologist).

- Diversity strengthens innovation (e.g. Phillips in Scientific American, October 2014).

- Both men and women equally biased.

- Why not 50% women?
  - barriers in the system
  - leaky pipeline: women “choose” to leave
## Starting Points

- Data: % women at each stage from survey of “top 100” US departments by Donna Nelson released in November 2007

<table>
<thead>
<tr>
<th>Department</th>
<th>% BS (2005)</th>
<th>% PhD (96-05)</th>
<th>% assist profs</th>
<th>% all profs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry</td>
<td>51.7</td>
<td>32.4</td>
<td>21.2</td>
<td>13.7</td>
</tr>
<tr>
<td>Math</td>
<td>44.9</td>
<td>28.7</td>
<td>26.8</td>
<td>12.9</td>
</tr>
<tr>
<td>Physics</td>
<td>21.1</td>
<td>14.3</td>
<td>16.8</td>
<td>9.1</td>
</tr>
<tr>
<td>Astronomy</td>
<td>42.4</td>
<td>22.7</td>
<td>25.3</td>
<td>15.8</td>
</tr>
</tbody>
</table>
Why do I care?

• BA in math, Cambridge University
  – ~30% women in math at my college

• PhD in Astronomy and Astrophysics from UCSC
  – ~30% women in the program

• Postdoc at the Institute for Advanced Study
  – ~15% women members in astronomy
Stereotype Threat

*Minorities are conscious of (and anxious about):*

(i) their minority status;

(ii) stereotypes of that minority;

(iii) need to overcome that stereotype;

(iv) need to combat it as a member of the minority

• Academic tests and African Americans (Steele & Aaronson, 1995)

• Math tests and women (Shih, Pittinsky & Ambady, 1999)

➡ 15% gap in women/men’s Physics GRE scores?
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• Postdoc at the Institute for Advanced Study
  - ~15% women members in astronomy
• Assistant professor at Wesleyan University
  - ~50% women scientists assist prof in 2001
  - 19 faculty hires in science 2002-2006, 0 women
Why do I care?

• Similar pattern seen at MIT (Nancy Hopkins, MIT Faculty newsletter in 2006)
Unconscious Bias

• Ben Barres, transgendered scientist, in 2006 Nature article “Does Gender Matter?”:

Shortly after I changed sex, a faculty member was heard to say "Ben Barres gave a great seminar today, but then his work is much better than his sister's."
Unconscious Bias

• Weneras & Wold (1997) commentary in Nature:

• prestigious postdocs awarded in 1995 by the Swedish Medical Research council
  - 52/62 female/male applicants - 4/16 female/male awards
  - applications peer-reviewed, score (0-4) in 3 categories
  - women score lower than men, particularly for “scientific competence”

• W&W objectively evaluated a scientist’s “impact”:
  - score: number of publication; number of 1st author publications; citations; prestige of journal
Unconscious Bias

- Only the group of women with impact scores greater than 100 were peer-reviewed to be as competent as any of the groups of men.

- Note: no error bars on plot BUT differences must be significant otherwise you would have 50/50 success rate.

→ question your own and others evaluation of any scientist’s “competence”
Unconscious Bias

e.g. Biases in....


• recommendation letters (Trix & Psenka, 2003)

• peer review of journal papers (Budden et al 2008)

• assessment of resumes (Heilman, 1980; Steinpreis, Anders & Ritzke, 1999)

ALL STUDIES FIND THAT BOTH MEN AND WOMEN ARE EQUALLY BIASED
Why do I care?

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  - 19 faculty hires in science 2002-2006, 0 women
  - motherhood
Why do I care?

- Goldin & Katz (2008) surveyed
  - ~7000 responded, ~20% PhD’s
- % women full-time employed 15 years on?

<table>
<thead>
<tr>
<th>women with</th>
<th>no children</th>
<th>1 child</th>
<th>2+ children</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>83.5</td>
<td>54.2</td>
<td>46.4</td>
</tr>
<tr>
<td>1980</td>
<td>80.6</td>
<td>62.4</td>
<td>47.3</td>
</tr>
<tr>
<td>1990</td>
<td>78.8</td>
<td>62.7</td>
<td>41.4</td>
</tr>
<tr>
<td>PhDs</td>
<td>91.5</td>
<td>64.9</td>
<td>57.5</td>
</tr>
</tbody>
</table>
Social Pressure

FIGURE 8
Percent of University of California postdoctoral scholars who shifted away from professor with research emphasis as a career goal, broken down by gender and family status/future plans

The issue of children is a dramatic influence on women’s decisions to abandon professorial career goals with a research emphasis

<table>
<thead>
<tr>
<th>Category</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>No children, no future plans</td>
<td>19%</td>
<td>20%</td>
</tr>
<tr>
<td>No children, future plans to have children</td>
<td>17%</td>
<td>28%</td>
</tr>
<tr>
<td>Children previous to postdoc</td>
<td>19%</td>
<td>32%</td>
</tr>
<tr>
<td>New children since postdoc</td>
<td>20%</td>
<td>41%</td>
</tr>
</tbody>
</table>

My personal plan

Combat biases:

• Make the case for diversity

• Maintain awareness - give this talk!

• On any admissions/search committee
  – question letter-writers’ assessment
  – watch my own reactions

Patch the pipeline:

• support development programs (e.g. Columbia’s “postbac” program in sciences)

• more realistic work/life plans within academic careers
Useful References

- Mason, M.A. & M. Goulden (2004), *"Do Babies Matter (Part II)? Closing the Baby Gap".*
- Shih, Pittensky & Ambady, 1999, Psychological Science, Vol 10, No 1, p 80