Women Leaving Science

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Is Female Exit a Problem?

- Female exit is high in an absolute sense and it is increasing.
- Female exit is high relative to male exit.
- Female exit from the natural sciences is high relative to female exit from the social sciences.
## Occupational Exit Rates from the Natural Sciences

(\% of initial workforce who have left by end of period)

<table>
<thead>
<tr>
<th></th>
<th>1980s-NSF (7 years)</th>
<th>1980s-University (12 years)</th>
<th>1990s-NSF (6 years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Females</td>
<td>17.4</td>
<td>28.2</td>
<td>29.1</td>
</tr>
<tr>
<td>All Males</td>
<td>8.7</td>
<td>14.3</td>
<td>19.2</td>
</tr>
<tr>
<td>Female PhD</td>
<td>3.7</td>
<td>7.4</td>
<td>18.8</td>
</tr>
<tr>
<td>Male PhD</td>
<td>4.1</td>
<td>8.7</td>
<td>14.2</td>
</tr>
</tbody>
</table>
What Factors Influence Female Exit?
Econometric Analysis

- Personal Characteristics
  - Education, Salary
- Field Characteristics
  - Changing body of knowledge, growth in salary
- Family Characteristics
  - Marriage, children
Why Do Women Leave?
University Surveys and Interviews

- Most Prominent Reasons behind Female Exit
  - Discontent with Science
  - Lack of Mentoring
  - Family Responsibilities

- Most Prominent Reason behind Male Exit
  - Earnings and Opportunity
Discontent with Science

- Narrowsness of science
  - Work itself is narrow.
  - Those who succeed are narrow.

- Lack of Connections
  - Personal connections are absent.
  - Substance of work does not connect with issues of import to these women.

- Women leaving for this reason often enter occupations with a nurturing component
Lack of Mentoring

- Mentoring of women in universities is much lower than mentoring of men.
- Mentoring of women in the workplace (industry or government) is similar to mentoring of men.
- Short-term impacts of mentoring are much higher for women than for men.
# Mentoring Statistics by Sex

**(Interview Sample: n=102)**

<table>
<thead>
<tr>
<th></th>
<th>Women</th>
<th>Men</th>
</tr>
</thead>
<tbody>
<tr>
<td>% with mentor as an undergraduate</td>
<td>13.5</td>
<td>40.0</td>
</tr>
<tr>
<td>% with mentor as a graduate student</td>
<td>20.5</td>
<td>65.7</td>
</tr>
<tr>
<td>Effect of mentoring on probability of graduating</td>
<td>Increases from 0.6 to 1.0</td>
<td>No change</td>
</tr>
<tr>
<td>% with mentor in early employment</td>
<td>52</td>
<td>51</td>
</tr>
<tr>
<td>Effect of mentoring on probability of successful employment outcome</td>
<td>Increases from 0.5 to 1.0</td>
<td>Increases from 0.7 to 0.8</td>
</tr>
</tbody>
</table>
Family Responsibilities

- Women are twice as likely as men to marry professional spouses, to have a spouse who works full time and to sacrifice work for spouse.
- Women do twice as much housework and 3-4 times as much childcare as their spouses.
## Family Responsibilities by Sex

(University survey-sample sizes in parentheses)

<table>
<thead>
<tr>
<th></th>
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<th>Men</th>
</tr>
</thead>
</table>
| % of Household Chores spouse is responsible for | 34.8
t (649) | 65.1
t (479) |
| % of Child Care spouse is responsible for       | 15.1
t (449) | 67.0
t (363) |
| % of Child Care individual is responsible for   | 60.2
t (449) | 17.6
t (363) |
Difficulties balancing work and family change with career

- Women with PhDs had trouble finding acceptable jobs in the framework of a dual career couple
  - Every married PhD woman in the interview sample constrained her job search geographically to be near her husband

- Women with BS or MS degrees found child bearing and raising in conflict with jobs in industry or government
Earnings and Opportunity

- Female scientists earn 15-20% lower earnings than male counterparts.
- They perceive lost opportunities because of sex generally and child-bearing specifically.
- They do not see exit as a way to improve salary and opportunity.
- Data confirm that women who leave science experience lower lifetime earnings than those who stay.
Conclusion

- Women leave science as a result of widespread alienation.
  - Exit lessens social and private returns to scientific education
- Workplace Policies to Improve Retention
  - Training and retraining programs
  - Exploring alternatives to the high mobility early career path of PhD’s
  - Family friendly work options in industry and government
  - Mentoring programs
  - Progressive human resource practices -- team work and job rotation