The Status of Women in Academia

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Member, AWIS-ADVANCE Program Committee
Gender (In)Equity: Women and men in the (academic) workforce

• Big picture
  – Women earn about 2/3 of what men earn for full-time employment around the world
  – Within a profession and controlling for rank, women earn 10-15% less than men
  – About 1% of Fortune 500 CEOs are women

• Academia
  – Women PhDs are less likely to choose academic jobs than men
  – Women academics earn less, have less lab space & other resources
  – Women are less likely to be granted tenure in every field
    • In economics, women are 22% of assistants, 15% of associates, 6% of professors; not a pipeline problem
Why Gender Equity Matters

• Quality
  – Failing to use the talents and energy of half our population negatively affects the potential quality of future faculty

• Legitimacy
  – Faculty demographics that differ from students’ can carry messages that discourage women from entering the academy, marginalized women faculty exacerbate this effect

• Fairness
  – Aspire to meritocracy, but fail to recognize and reward women’s talents and energies
Today’s Talk

• Review of others’ work (!)

• Documenting gender inequities in academia

• Explaining gender inequities in academia

• Suggestions for moving forward (discussion)
Ginther and Coauthors

• Use 1973 - 2001 Survey of Doctorate Recipients (SDR)
  – Biennial, Longitudinal Survey of U.S. Doctorates
  – Used by NSF to analyze scientific labor force
  – Includes Humanities 1977 – 1995

• Tenure-track or tenured academics (not practitioners)
Fields Covered

• Life Science
  – Agriculture and Food Science, Biology

• Physical Science (together “Science”)
  – Chemistry, Earth Science, Physics

• Engineering

• Social Science
  – Economics, Psychology, Sociology, Anthropology, Political Science

• Humanities
  – History, Philosophy, English, Modern Languages, Classics, Fine Arts
Controls in Analyses

• Academic field
• Degree institution characteristics
• University/College employer characteristics
• Rank and Tenure status
• Primary work activities (research/teaching)
• Government Support of Research
• Publications (number vs. quality)
Representation

• Good: Social science (except economics), humanities, life-science
• Not-so-good: Physical science, Economics
• Ugly: Engineering
Figure 1: Percentage of Doctorates Granted to Females, 1974-2004 Survey of Earned Doctorates

Source: 1974-2004 Survey of Earned Doctorates
Figure 3: Percentage of Tenured Faculty who are Female, by Discipline

Hiring

- Gender and Marital / Children status interact

- Rates of tenure-track job within 5 years of PhD
  - Single women are 16% more likely than (all) men
  - Married women are 17% less likely than (all) men
  - Married women with children are 20% less likely than (all) men
Promotion

• Good: Science, Engineering
• Not-so-good: Social science (except economics); humanities
• Ugly: Economics
Relative Tenure Rates: 10 Years Past PhD

- Science: -1.4
- Social Science: -8.1
- Life Science: 2.2
- Physical Science: -2.8
- Engineering: 3.9
- Humanities: -8.4
- Economics: -21

Prob. Female Tenured
Figure 4--Predicted Survival without Tenure Functions, by Gender and Discipline

A. Economics

B. Humanities

C. Social Science X

D. Life Sciences

E. Physical Sciences

F. Engineering

Salaries

• Control for rank
• Good: Humanities
• Not-so-good: Social Science
• Ugly: Sciences and Engineering
Gender Differences in Salary by Rank

Percent Gap

Science
Social Science
Life Science
Physical Science
Engineering
Humanities (1995)

Assistant
Associate
Full

Science: 13.2
Social Science: 8.4
Life Science: 14.1
Physical Science: 11.2
Engineering: 10.4
Humanities (1995): 1.8

Legend:
- Assistant
- Associate
- Full
Economic Explanations for the Salary Gap

• Gap not the result of:
  – Marriage & Children
  – Differences in Productivity

• Gap largely explained by gender differences in the returns to work experience.
  – Men rewarded more than women for each year of experience

• Consistent with Cumulative Advantage Model
Alternative Explanations

• Marriage and Children (endogeneity)
  – Impacts hiring and promotion, but not salaries

• Self-selection (Summers)
  – Impacts hiring and promotion, but not salaries

• Productivity
  – Include productivity controls
  – Women more productive than men at Research I institutions
Conclusion

• Each discipline has unique challenges for gender equity
  – E.g. Engineering: getting the PhD
  – E.g. Sciences (Life and Natural): Salary inequity (possibly space and other resources)
  – E.g. Economics: promotion/tenure rates

• Possible explanation: Men recognized and rewarded more than women for similar productivity levels (see below)
Gender Schemas (Valian 1999)

• Non-conscious hypotheses about male/female differences that guide everyone’s (men’s and women’s) perceptions and behaviors

• Expectations or stereotypes that define “average” members of a group
  – E.g. Men are instrumental, task-oriented, competent
  – E.g. Women are nurturing, emotional, and care about relationships

• Normal, human brains categorize

• More likely to apply them when group or category salience is high

Fidell (1970)

• Sent 10 one-paragraph descriptions to department chairmen (psychology)
  – Varied gender in each
  – Varied other details (e.g. experimental vs. clinical, publication rate, marital status, …)

• Asked to judge
  – The chances of this person getting an offer for a full-time position (1-7)
  – At what level (Full, Associate, Assistant, Research Associate, Lecturer, Other)
  – Rank quality
Results

• 68% response rate (155 responses)
  – Men are somewhat more likely to get offer
    • Two exceptions; stereotypically “female” fields
  – Men get significantly higher-ranked offers (p<.01)
    • 48% vs 37% Associate overall
  – Men ranked somewhat higher (same description)
• Note: dated (e.g. marital status)...

### TABLE 2

**Means and Standard Deviations of Desirability Ratings for Men and Women**

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<tr>
<th>Paragraph</th>
<th>$M$</th>
<th>$SD$</th>
<th>$M_{diff}$ Men - Women</th>
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# Rank of Offer

## Table 1

Proportion of Responses at Each Academic Level for Men and for Women

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<td>.39</td>
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</table>
Steinpreis, Anders and Ritzke (1999)

• Update (and more careful)
• Sent CV (real) to faculty (psychology)
  – Male/female rookie, male/female tenured
• Between-subjects design (one CV/gender only)
• 238 male and female academics
  – Would you hire?
  – Does applicant have adequate experience?
More Likely to Hire Males (p<.001)
Independent of Own Gender
Other Ratings

• Male candidates more likely to have
  – Adequate research (p<.005), teaching (p<.005), service experience (p<.005)
  – Even though the CVs are the same!

• Concerns about female candidates
  – Respondents four times more likely to write cautionary comments in the margins of the questionnaire for female candidates
    • “We would have to see her job talk”
    • “It is impossible to make such a judgement without teaching evaluations”
    • “I would need to see evidence that she had gotten these grants and publications on her own”
Wenneras & Wold (1997)

• Sweden, biomedical academics
• Peer-reviewed system of Swedish Medical Research Council (postdoctoral fellowships)
  – Vita, bio, research proposal
  – Reviewed by one of 11 evaluation committees
  – Score of 0-4 on three attributes (multiplied, averaged across reviewers)
    • Scientific competence
    • Relevance of the research proposal
    • Quality of the methodology
Data

• Scores from 1995 applications
  – Women scored lower on all three parameters
  – .25 lower on scientific competence, .13 on relevance, .17 on methodology

• Were women less productive (scientifically competent)?
  – Number of papers, number of first-authors, impact factor of journals, citation count
  – Calculated “total impact”
Results

• Regression of competence scores with controls
  – Male dummy significant; 0.21 extra competence points
  – Approximately three extra papers in *Science* or *Nature*, or 20 extra papers in top specialty journal
  – Women had to be 2.5x as productive as men to get same score

Figure 1 The mean competence score given to male (red squares) and female (blue squares) applicants by the MRC reviewers as a function of their scientific productivity, measured as total impact. One impact point equals one paper published in a journal with an impact factor of 1. (See text for further explanation.)
# Regression Results

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<th>Multiple regression model based on:</th>
<th>Scientific productivity</th>
<th>Additional points given by the reviewers for the following factors</th>
<th>Size of the influence of the non-scientific factors in productivity equivalents</th>
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<td>Total impact</td>
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<td>Intercept</td>
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<td>Competence points per productivity unit</td>
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<td>Impact points</td>
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<td>First-author impact</td>
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<td>2.13</td>
<td>0.24</td>
<td>(14-36)</td>
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<td>&lt;0.00001</td>
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*Italicized numbers indicate $P$-values for the variable in question.
† Numbers in parentheses indicate 95% confidence interval.
NS, not statistically significant, $P$-value > 0.05.
Trix and Psenka (2003)

• Letters of recommendation for medical school faculty (linguistics)

• All letters from successful applicants for faculty in large American medical school 1992-1995 (312 letters)
  – Compare letters written for male (222) and female (89) hires
Results: Existence

• Women more likely to get minimal letters
  – 15% vs 6% (p=.021); women’s letters were only 84% as long as men’s

• Women more likely to have doubts raised
  – 24% vs 12% (p=.01)

• Stereotypical terms
  – For men
    • “successful” (7% vs 3%)
    • “accomplishment or achievement” (13% vs 3%)
  – For women
    • “compassionate” (16% vs 4%)
    • “grindstone” (34% vs 23%)
Results: Frequency

• Male letters include more instances of “standout” adjectives (excellent, superb, ...)
  – 2.0 vs 1.5

• Male letters more likely to mention “research” multiple times
  – 62% vs 35%

• Male letters more likely to include scientific terminology
  – 3.3 lines vs 1.9 lines
Results: Possessives (his/her)

Figure 3. Semantic realms following possessives. Rank-ordered within gender sets from equal numbers of letters ‘her training’; ‘his research’
Results: Possessives (his/her)

Figure 4: Distinctive semantic realms following possessives. Greatest contrasts across genders in equal number of letters ‘her personal life’; ‘his publications’
Goldin and Rouse (2000)

• Auditions of musicians for orchestras
  – Before 1980, 12% female or less
  – 1970-1980, start of open auditions
  – Some in view, some behind screen (*Blink*, Gladwell)
  – Data on applicant pool, advancement, and hiring

• Impact of screen on female hiring is significant
  – Controls for ability, year of audition, instrument played, ...
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<td>Proportion advanced</td>
<td>Number of person-rounds</td>
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<td>(0.000)</td>
<td></td>
<td>(0.091)</td>
<td></td>
</tr>
<tr>
<td>&quot;Hired&quot;</td>
<td></td>
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<tr>
<td>Women</td>
<td>0.027</td>
<td>445</td>
<td>0.017</td>
<td>599</td>
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<tr>
<td></td>
<td>(0.008)</td>
<td></td>
<td>(0.005)</td>
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</tr>
<tr>
<td>Men</td>
<td>0.026</td>
<td>816</td>
<td>0.027</td>
<td>1102</td>
</tr>
<tr>
<td></td>
<td>(0.005)</td>
<td></td>
<td>(0.005)</td>
<td></td>
</tr>
</tbody>
</table>
Summary

• Exist many other studies (within and outside academics), supporting gender schemas
  – success is attributed to skill for men and luck for women (Deaux and Emmswiller 1974)
  – biases are more pronounced under time pressure (Martell 1991)
  – women perceived to be worse leaders (Eagly and coauthors)
  – reliance on qualifications (education vs experience) depends on the pool (Norton et al. 2004)...

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What to Do?

• Education is the first step (show me the data)
• Identify hurdles at individual schools/departments (get new data)
  – Compare hiring/retention rates with pool, peers
  – Identification
    • e.g. Harvard
    • Especially when pool is small and market is decentralized (engineering)
  – Offers made
    • Objective evaluation policies
    • Especially when current faculty are mostly male (natural sciences)
  – Recruitment
    • Spousal hires
    • Family leave policies, ...
Other Policies to Consider/Benchmark

• Maternity/Paternity leave
  – New norm: 1 semester off teaching (1/2 load), 1 year on clock (no penalty)
  – Decisions: Male/female, adoption, other life-events

• Other on-ramps and off-ramps
  – Half-time appointments, longer clocks, ...

• Spousal hiring policies
  – Especially when only game in town
  – E.g. Penn State, Michigan, Indiana, Columbia ...

• Mentoring and advising
Conclusion and Summary

• Gender equity is important (instrumental and ontological)

• Improvements in academia, but still inequities
  – Hiring, promotion, salary differentials
  – Field-specific (need individualized solutions)

• Possible reasons: subtle bias

• Solutions
  – Customized for institution, field
  – Virginia Tech portal (ADVANCE IT sites)