The Status of Women in Academia

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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
  - Ginther & Kahn (2009, 2006a, 2006b, 2004a, 2004b, 2003a, 2003b, 2002); Ginther & Hayes (1999)
- Explaining gender inequities in academia
  - Valian (1999), Steinpreis, Anders & Ritzke (1999), Wenneras & Wold (1997), Goldin & Rouse (2000), Trix & Psenka (2003)
- 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 Suvey of Earned Doctorates

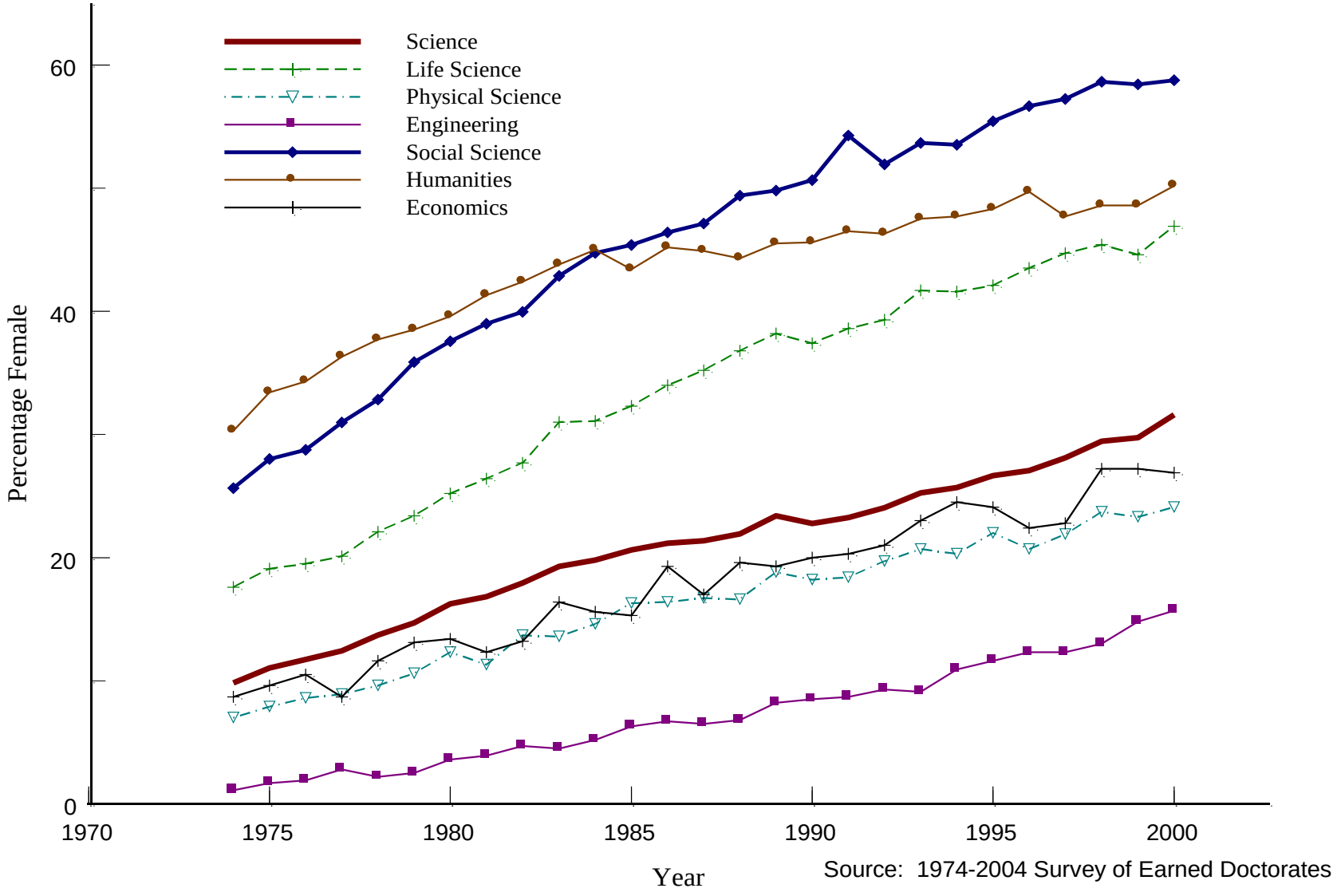
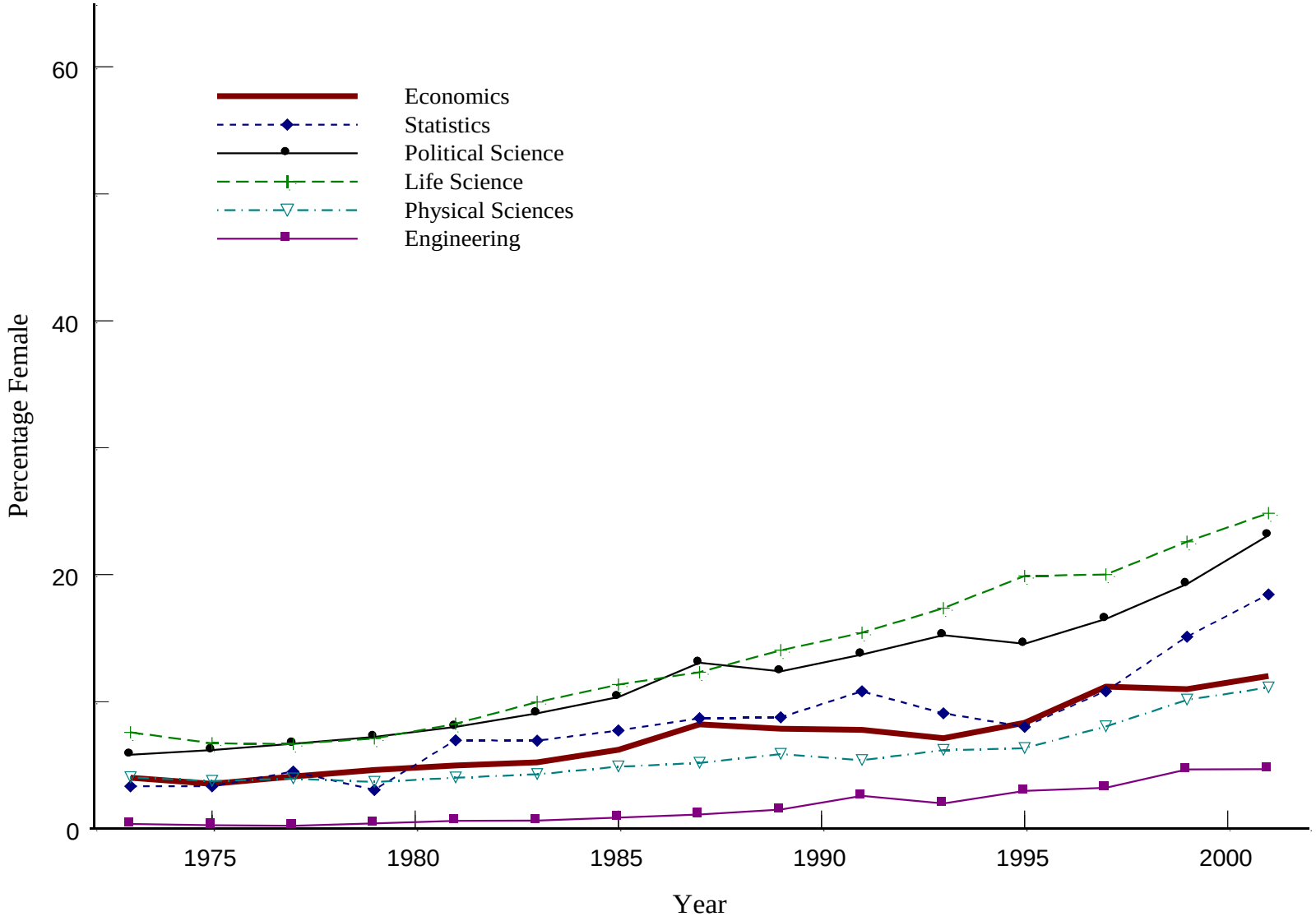


Figure 3: Percentage of Tenured Faculty who are Female, by Discipline



Source: 1973-2001 Survey of Doctorate Recipients

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

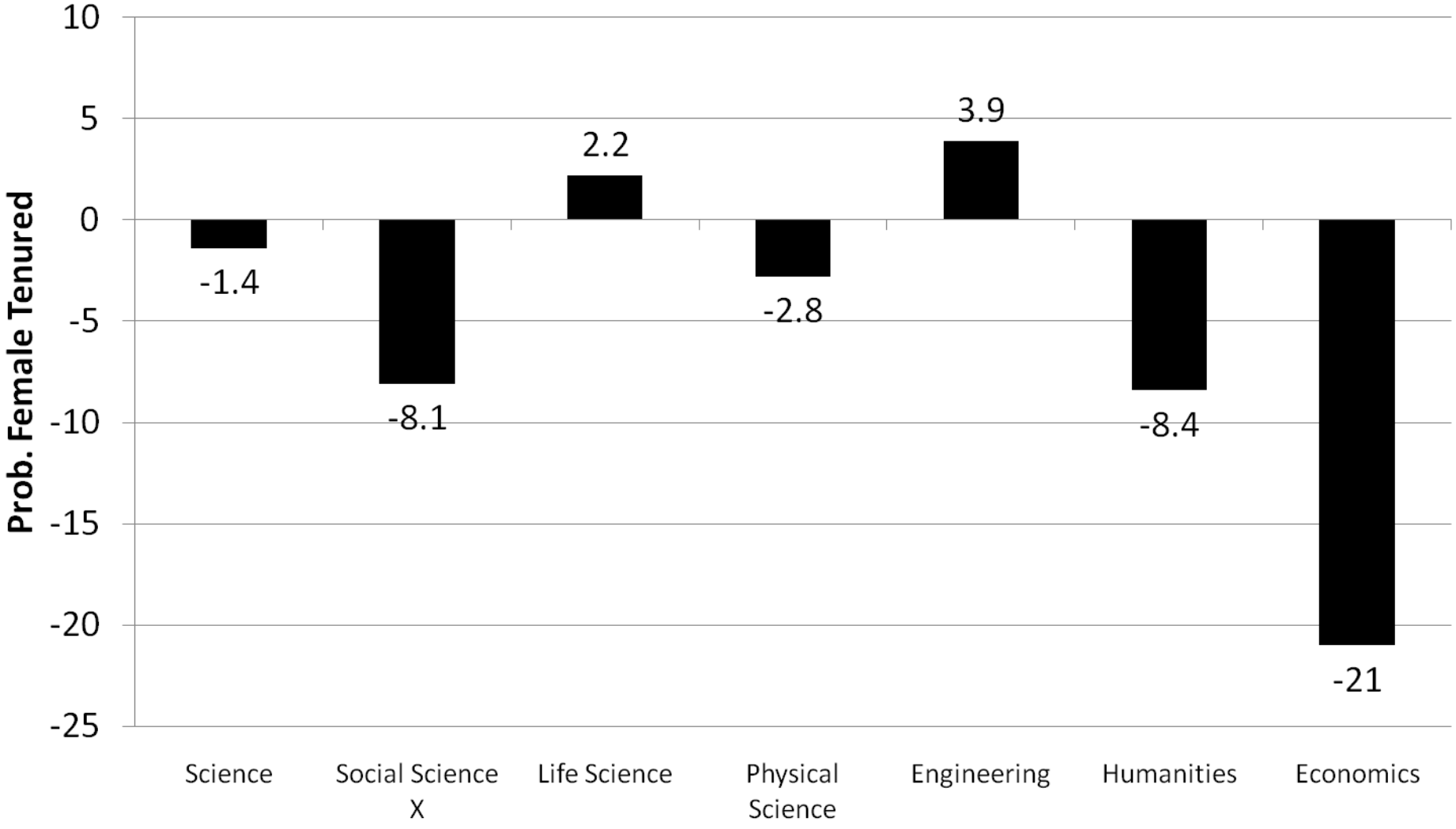
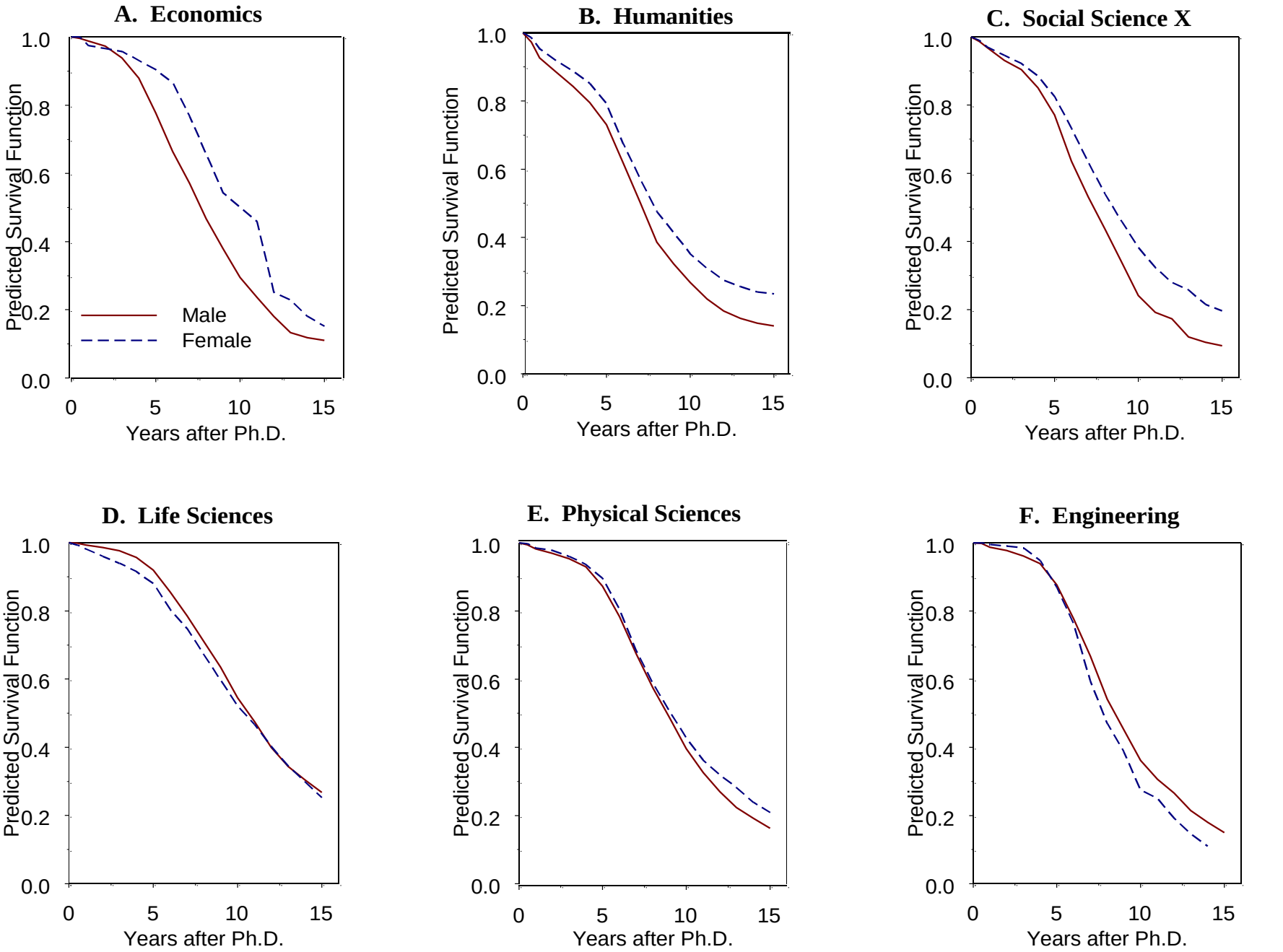


Figure 4--Predicted Survival without Tenure Functions, by Gender and Discipline

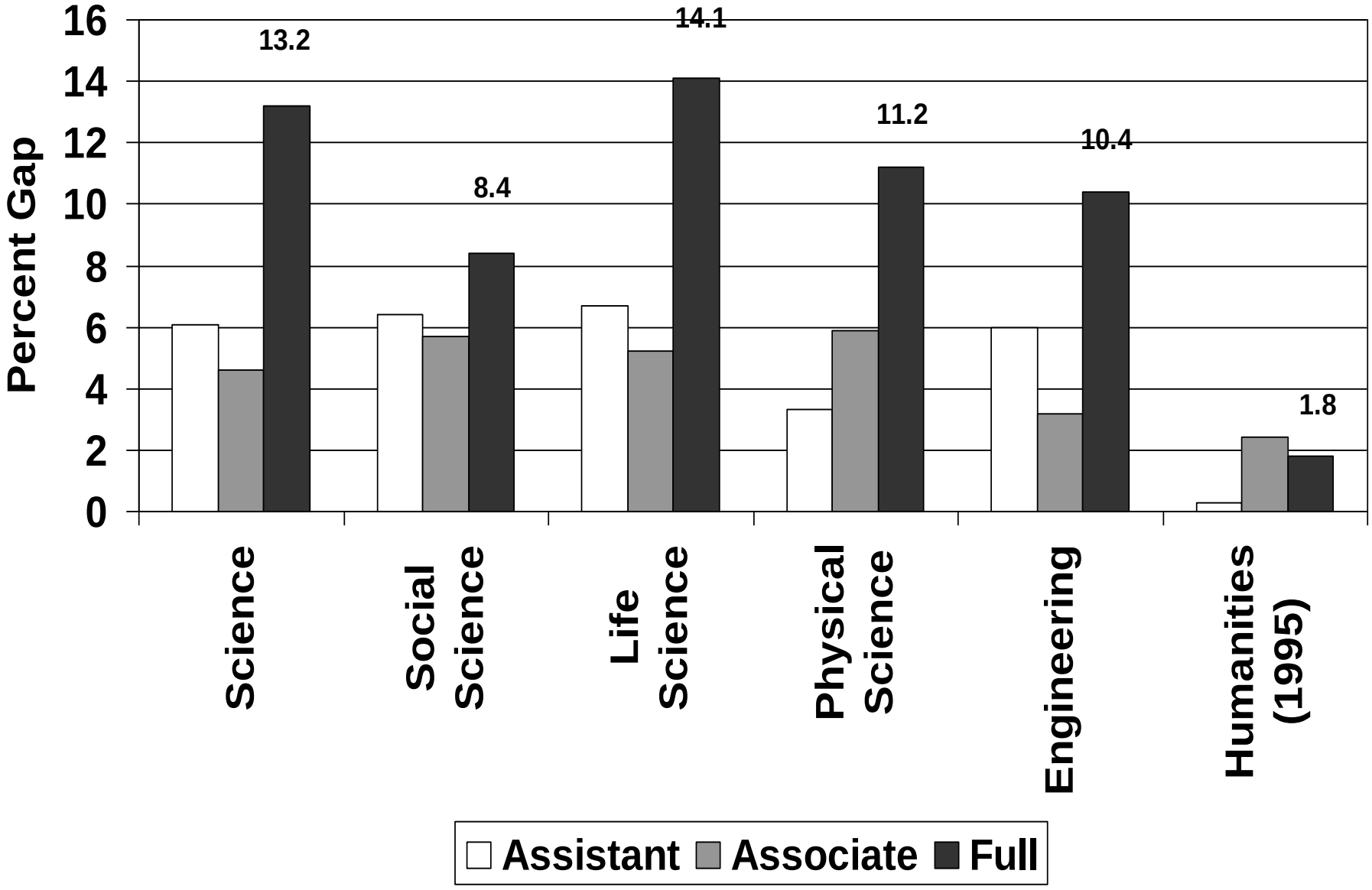


Source: 1973-2001 Survey of Doctorate Recipients

Salaries

- Control for rank
- Good: Humanities
- Not-so-good: Social Science
- Ugly: Sciences and Engineering

Gender Differences in Salary by Rank



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

Valian 1999, *Why So Slow? The Advancement of Women* MIT Press

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)…

Probability of Offer (1-7; higher better)

TABLE 2

MEANS AND STANDARD DEVIATIONS OF DESIRABILITY RATINGS FOR MEN AND WOMEN

Paragraph	*M*	*SD*	M_{diff} Men − Women
Ross			
James	3.29	1.26	+.32
Janet	2.97	1.17	
Baxter			
Albert	1.69	.78	−.19
Alice	1.88	.93	
Wilson			
Eugene	2.20	1.16	+.27
Edith	1.93	1.08	
LaSalle			
Thornton	4.88	1.37	+.25
Thelma	4.63	1.28	
Guyer			
Donald	3.95	1.42	−.17
Donna	4.12	1.39	
Pinney			
Thomas	3.39	1.44	+.17
Theresa	3.22	1.47	
Norton			
Jonathan	5.89	1.07	+.16
Joan	5.73	.99	
Clavel			
Patrick	4.96	1.50	+.47
Patricia	4.49	1.48	

Rank of Offer

TABLE 1

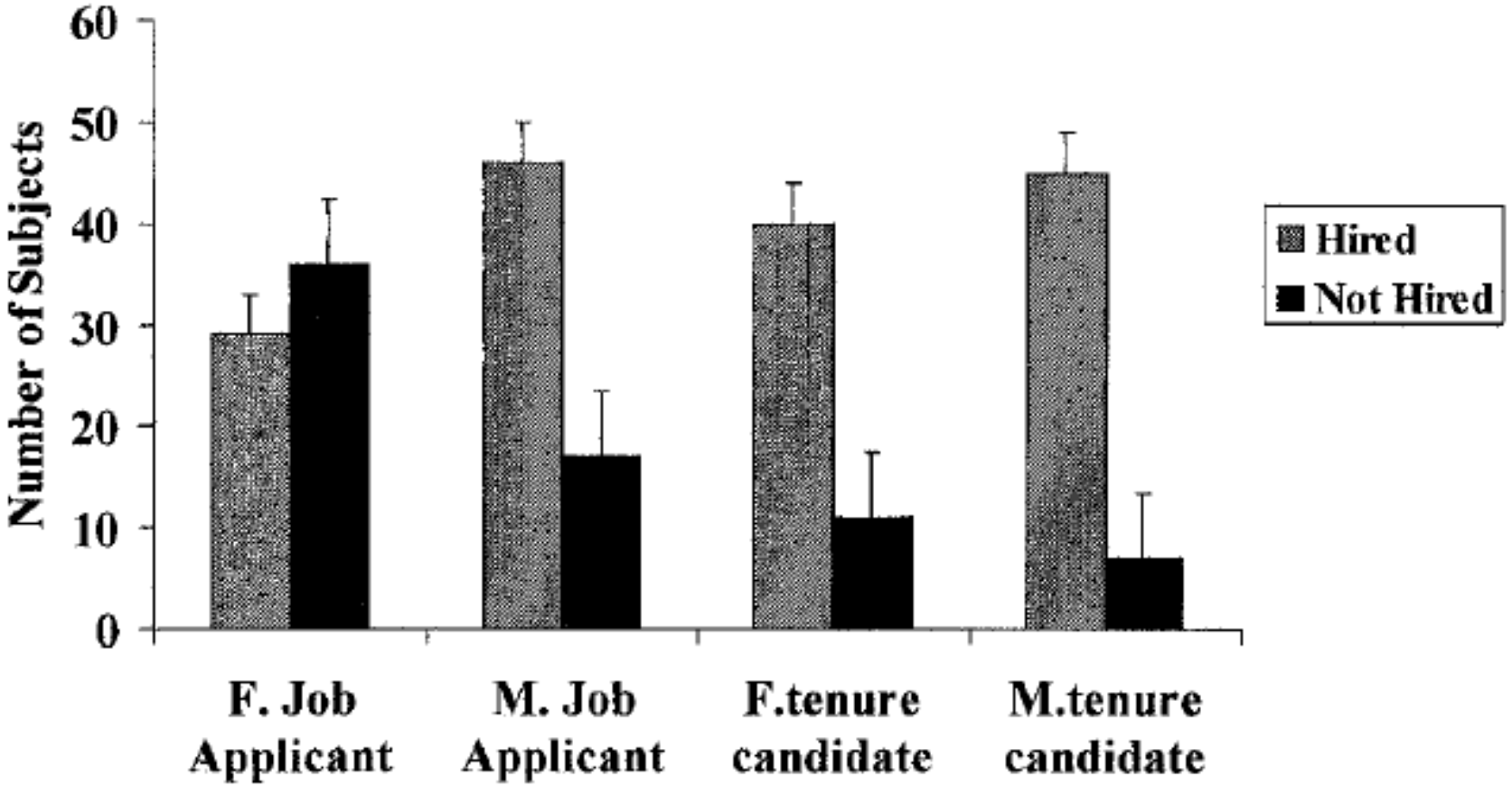
PROPORTION OF RESPONSES AT EACH ACADEMIC LEVEL FOR MEN AND FOR WOMEN

Paragraph	"Other"	Lecturer	Research associate	Assistant professor	Associate professor	Full professor
Ross						
James	.01	.00	.01	.47	.50	.00
Janet	.07	.03	.01	.51	.38	.00
Baxter						
Albert	.33	.07	.03	.49	.08	.00
Alice	.33	.08	.05	.43	.11	.00
Wilson						
Eugene	.26	.05	.00	.55	.14	.00
Edith	.31	.14	.03	.44	.08	.00
LaSalle						
Thornton	.00	.00	.07	.19	.74	.00
Thelma	.03	.00	.12	.28	.57	.00
Guyer						
Donald	.05	.01	.03	.52	.39	.00
Donna	.03	.01	.04	.64	.28	.00
Pinney						
Thomas	.10	.01	.03	.36	.49	.00
Theresa	.05	.08	.03	.39	.44	.00
Norton						
Jonathan	.00	.00	.01	.15	.75	.08
Joan	.03	.01	.04	.24	.68	.00
Clavel						
Patrick	.03	.03	.00	.34	.59	.01
Patricia	.03	.03	.00	.50	.44	.00
Men	.10	.02	.02	.39	.46	.01
Women	.11	.05	.04	.43	.37	.00

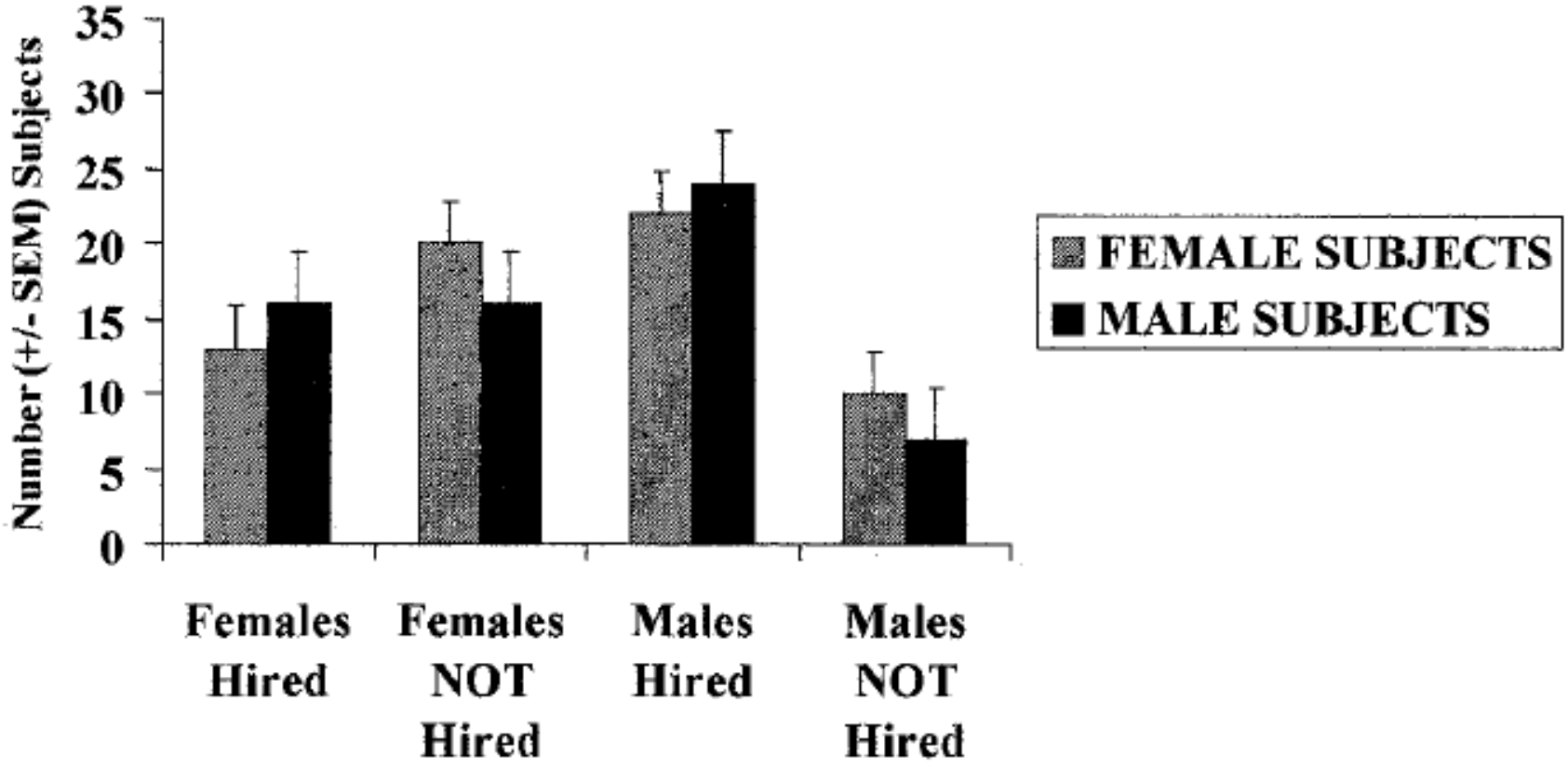
Steinpreis, Anders and Ritzke (1999)

- 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

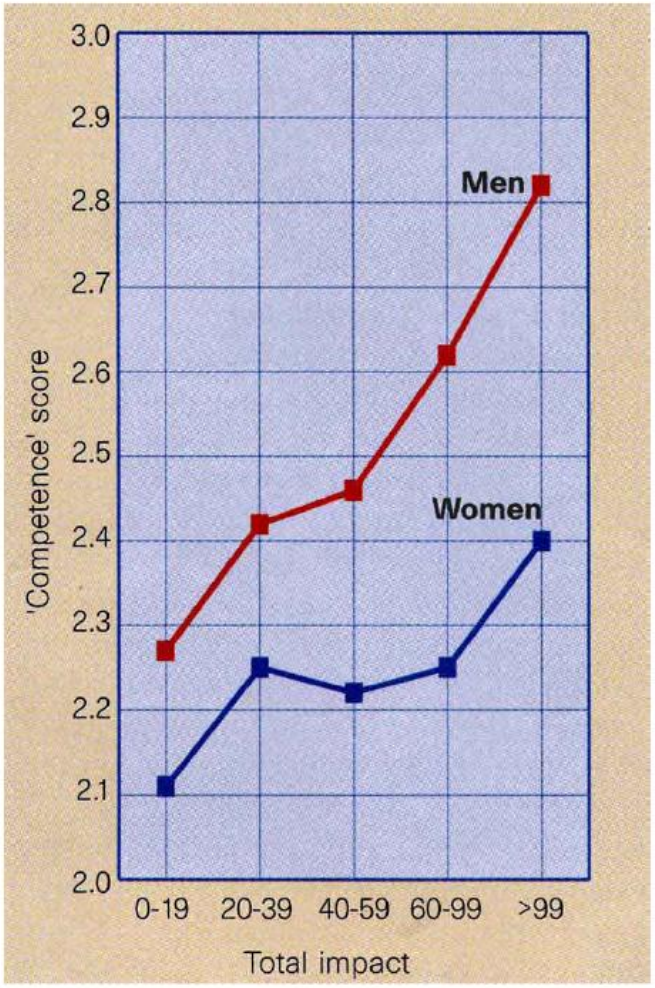


Figure 1 **The mean competence score given to male (red squares) and female (blue squares) applicants by the MRC reviewers as a function of their scientific productivity, measured as total impact. One impact point equals one paper published in a journal with an impact factor of 1. (See text for further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

- Regression 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

Regression Results

Table 1 **Factors that significantly influenced peer reviewers' rating of scientific competence, according to three multiple regression models.**

			Scientific productivity	*Additional points given by the reviewers for the following factors*			*Size of the influence of the non-scientific factors in productivity equivalents*		
Multiple regression model based on:	r^2	Intercept	Competence points per productivity unit	Male gender	Reviewer affiliation	Recommendation letter	Male gender	Reviewer affiliation	Unit of measure
Total impact	0.47	2.09	0.0033 *<0.00005**	0.21 *<0.00005*	0.22 *0.0008*	0.10 *0.04*	64 (35–93)†	67 (29–105)	Impact points
First-author impact	0.44	2.13	0.0094 *<0.0001*	0.24 *<0.00005*	0.20 *0.005*	NS	25 (14–36)	21 (6–36)	Impact points
First-author citations	0.41	2.17	0.0054 *0.001*	0.23 *<0.00005*	0.23 *0.001*	NS	42 (23–61)	42 (17–67)	Citations during 1994

* 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)

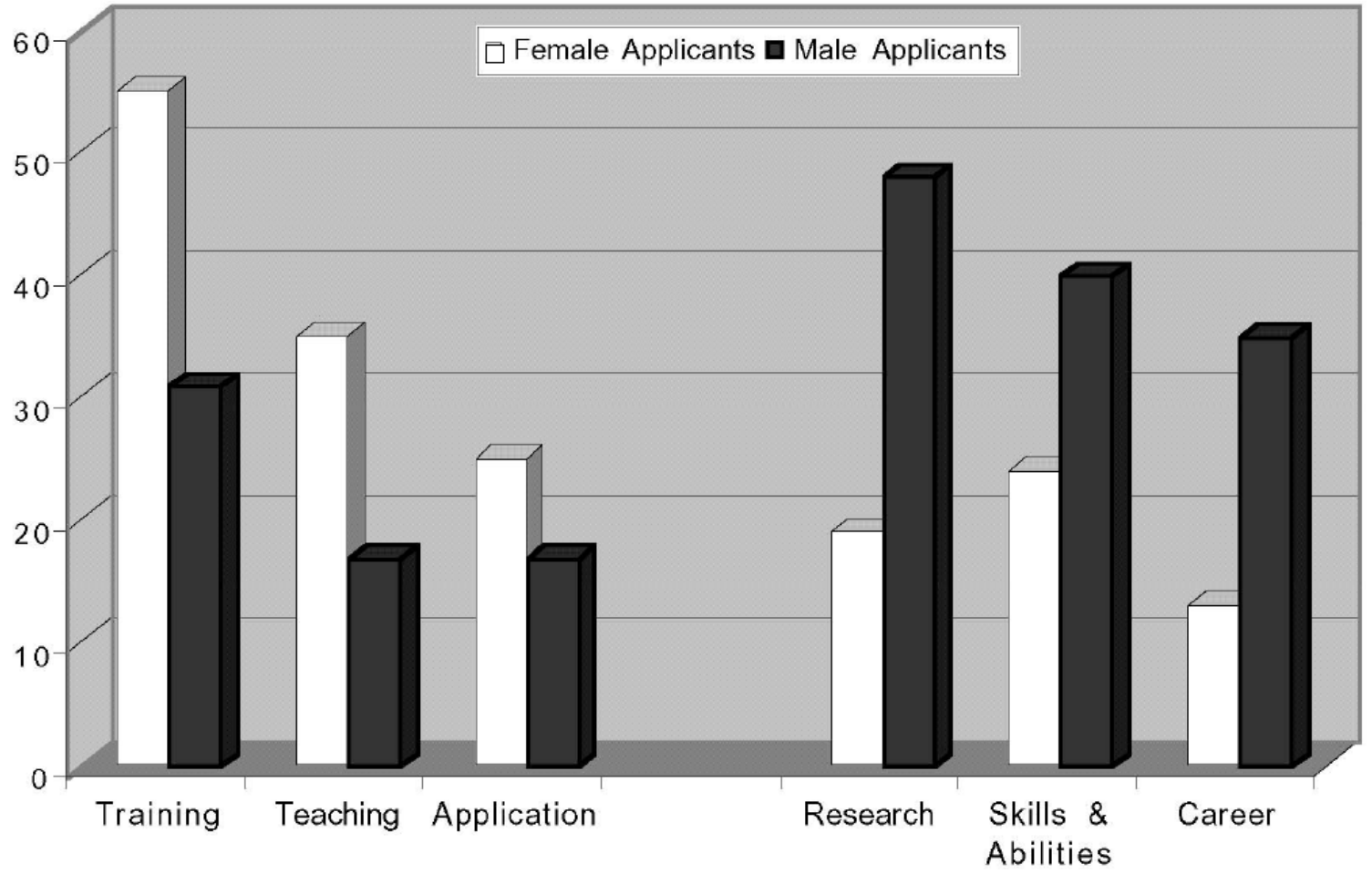


FIGURE 3. *Semantic realms following possessives. Rank-ordered within gender sets from equal numbers of letters 'her training'; 'his research'*

Results: Possessives (his/her)

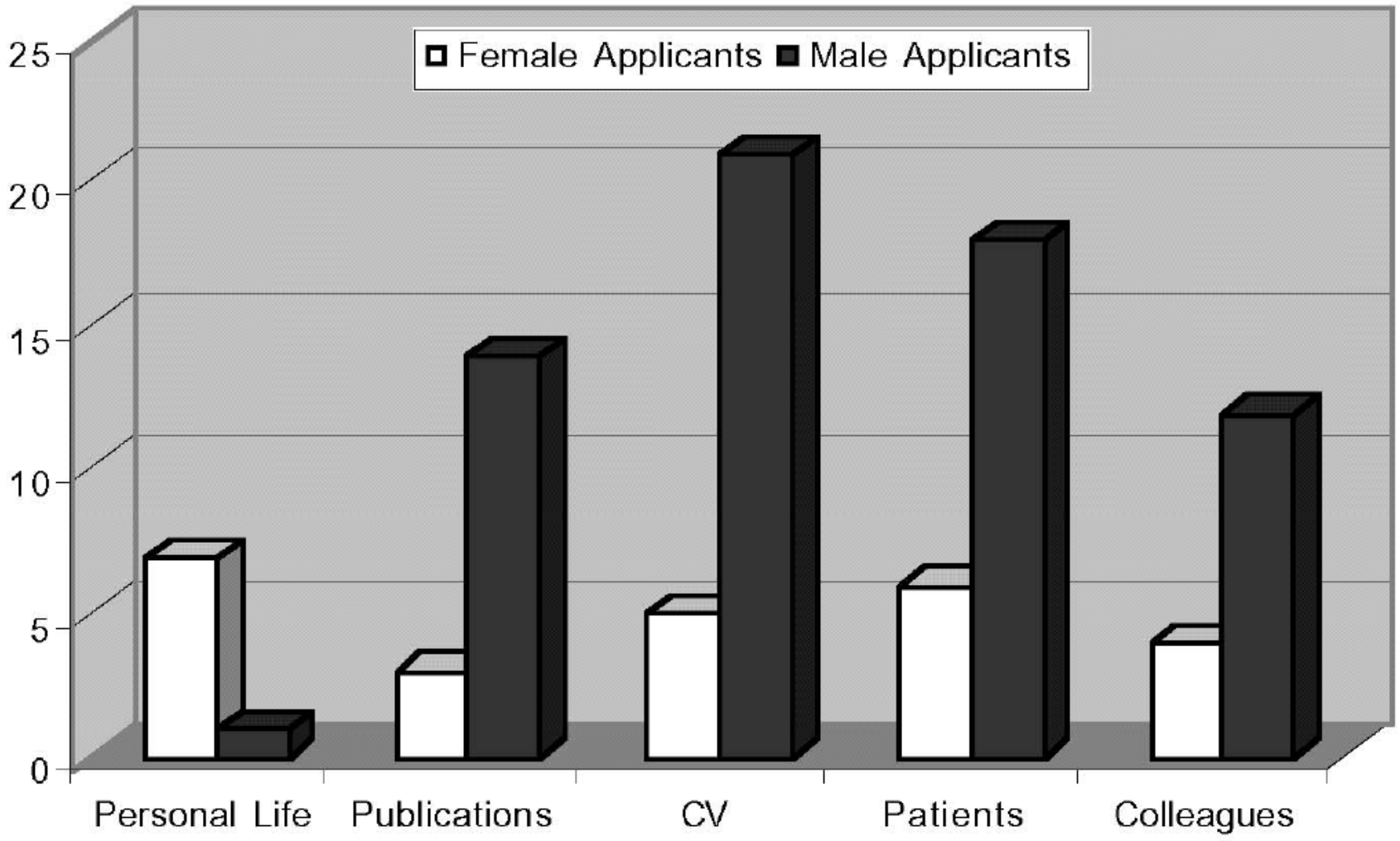


FIGURE 4. *Distinctive semantic realms following possessives. Greatest contrasts across genders in equal number of letters 'her personal life'; 'his publications'*

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, …

TABLE 5—AVERAGE SUCCESS AT AUDITIONS BY SEX AND STAGE OF AUDITION FOR THE SUBSET OF MUSICIANS WHO AUDITIONED BOTH BLIND AND NOT BLIND

	Blind		Not blind	
	Proportion advanced	Number of person-rounds	Proportion advanced	Number of person-rounds
	Preliminaries without semifinals			
Women	0.286	112	0.193	93
	(0.043)		(0.041)	
Men	0.202	247	0.225	187
	(0.026)		(0.031)	
	Preliminaries with semifinals			
Women	0.200	20	0.133	15
	(0.092)		(0.091)	
Men	0.083	12	0.000	8
	(0.083)		(0.000)	
	Semifinals			
Women	0.385	65	0.568	44
	(0.061)		(0.075)	
Men	0.368	68	0.295	44
	(0.059)		(0.069)	
	Finals			
Women	0.235	17	0.087	23
	(0.106)		(0.060)	
Men	0.000	12	0.133	15
	(0.000)		(0.091)	
	"Hired"			
Women	0.027	445	0.017	599
	(0.008)		(0.005)	
Men	0.026	816	0.027	1102
	(0.005)		(0.005)	

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 Emswiller 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)…

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)