Opportunities in Science Policy:

From a Ph.D. to the White House

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Associate Director for Science, OSTP, EOP

April 1, 2004

- Former NASA Chief Scientist*
- Former NASA Act. Assoc. Adm. For Biological & Physical Research*
- Former Brookings Fellow in the Office of Conrad Burns of Montana*

. . . Continued:

Former NSF Employee (at least five different positions)*

Former Adj Assoc.Prof. George Wash. Med.Sch.

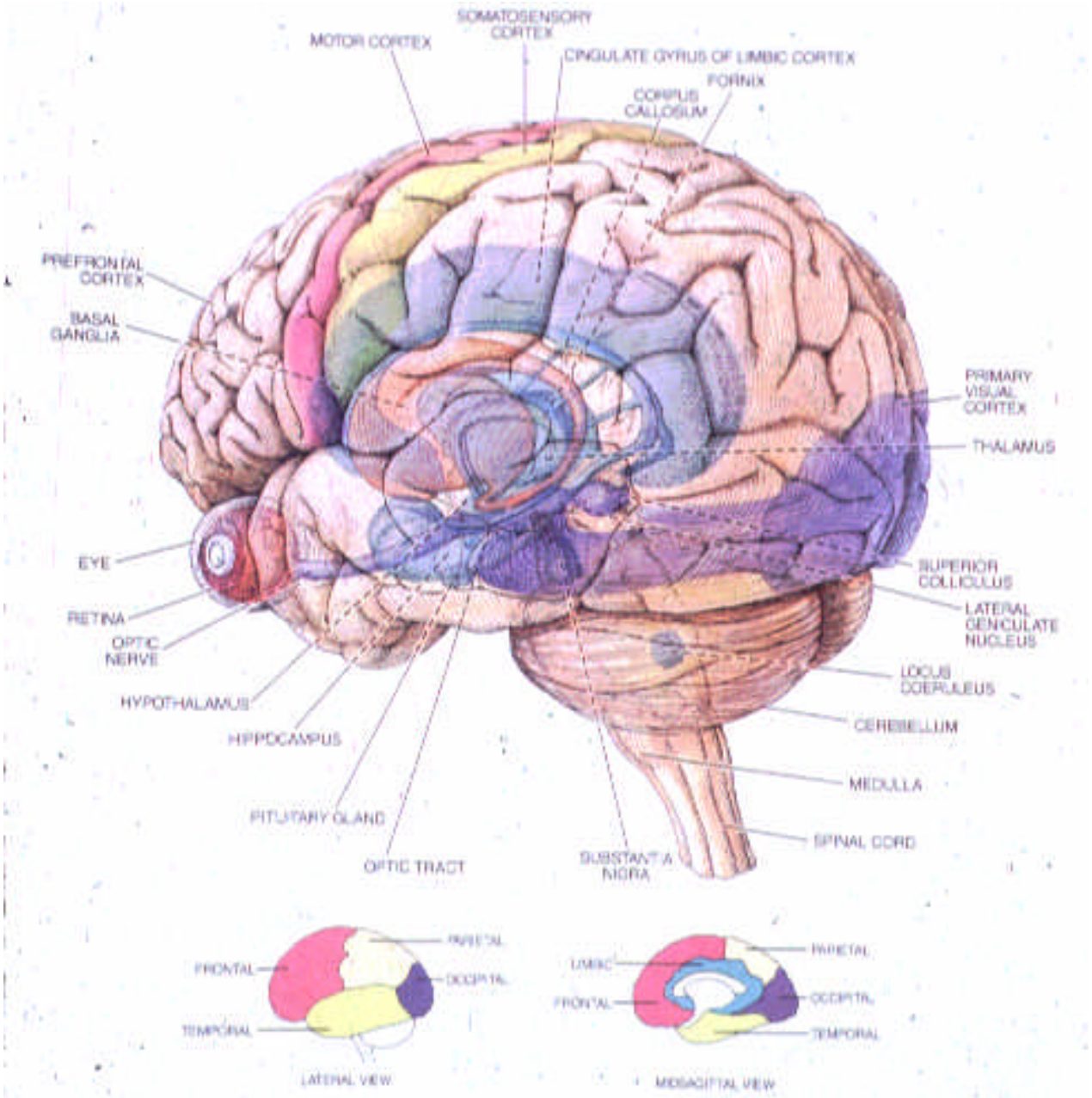
Former Asst. Prof. SUNY-Stony Brook

Former Postdoctoral Fellow- Harvard Med. Sch.

Former Graduate Student- UC-Irvine

“What we are to be
we are now
becoming”

Cleveland High School, Portland OR



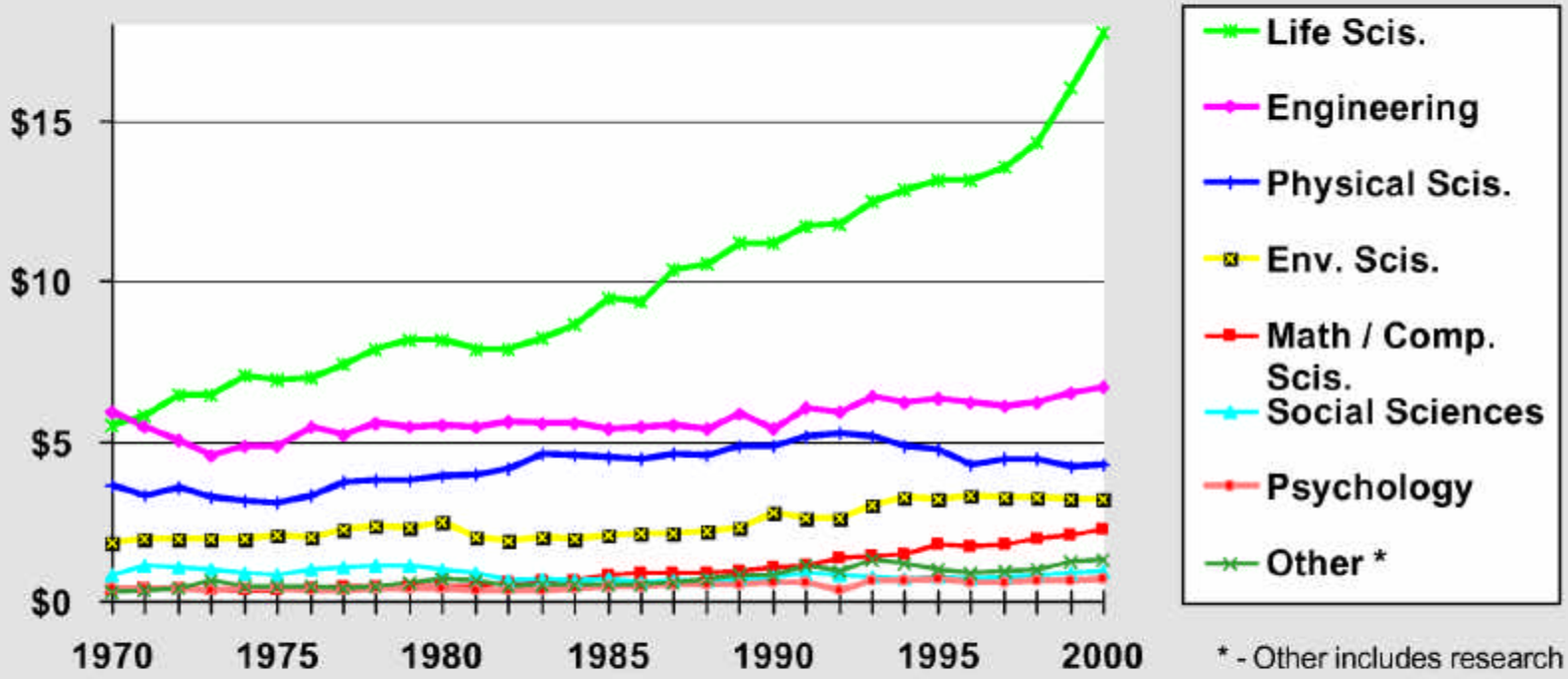
The Brain: Organ of the Mind

Traditional Scientific Career!

Why??

Trends in Federal Research by Discipline, FY 1970-2000

obligations in billions of constant FY 2001 dollars



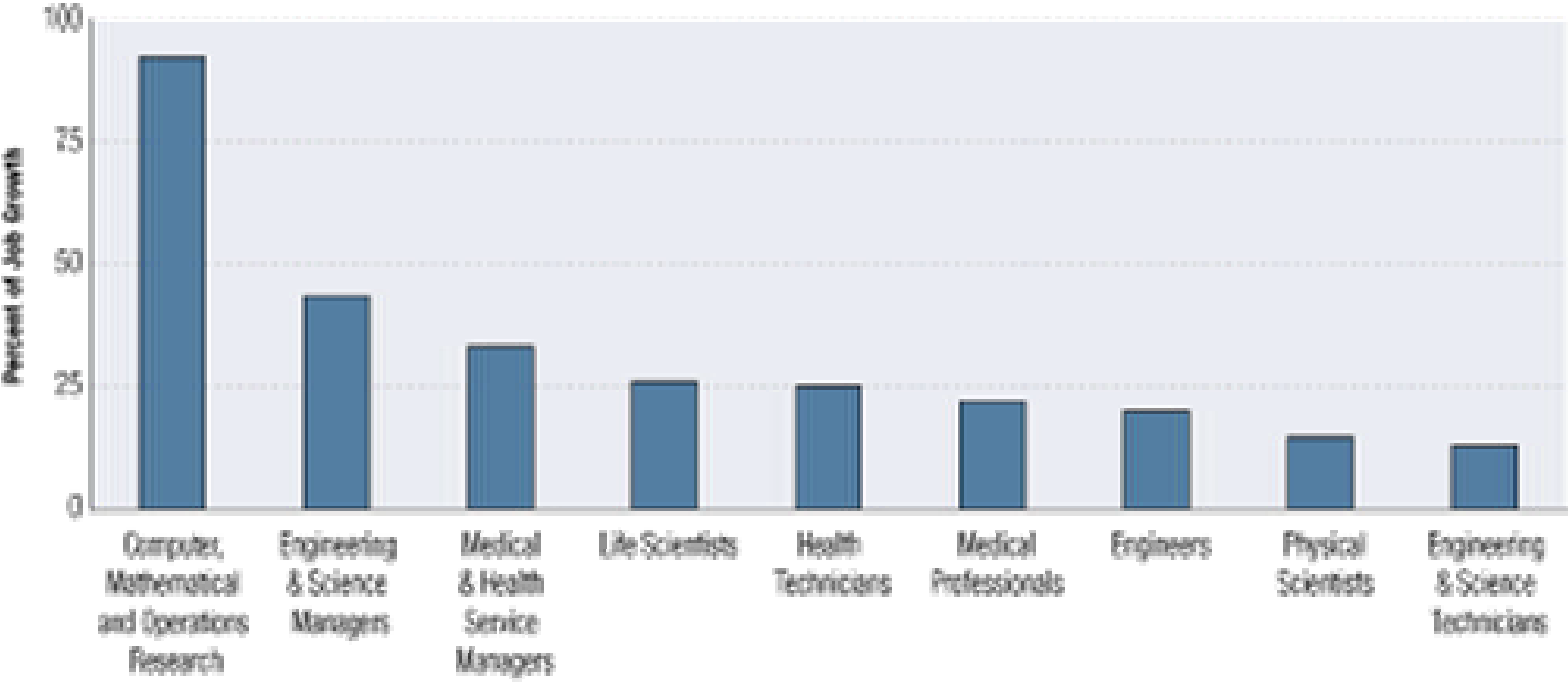
* - Other includes research not classified (includes basic research and applied research; excludes development and R&D facilities)

Source: National Science Foundation, *Federal Funds for Research and Development FY 1999, 2000, and 2001,* 2001. FY 2000 data are preliminary. Constant-dollar conversions based on OMB's GDP deflators.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

Jobs Requiring Technical Skills Are Projected to Grow by 51%

Projected New Job Growth by Technical Field, 1998-2008



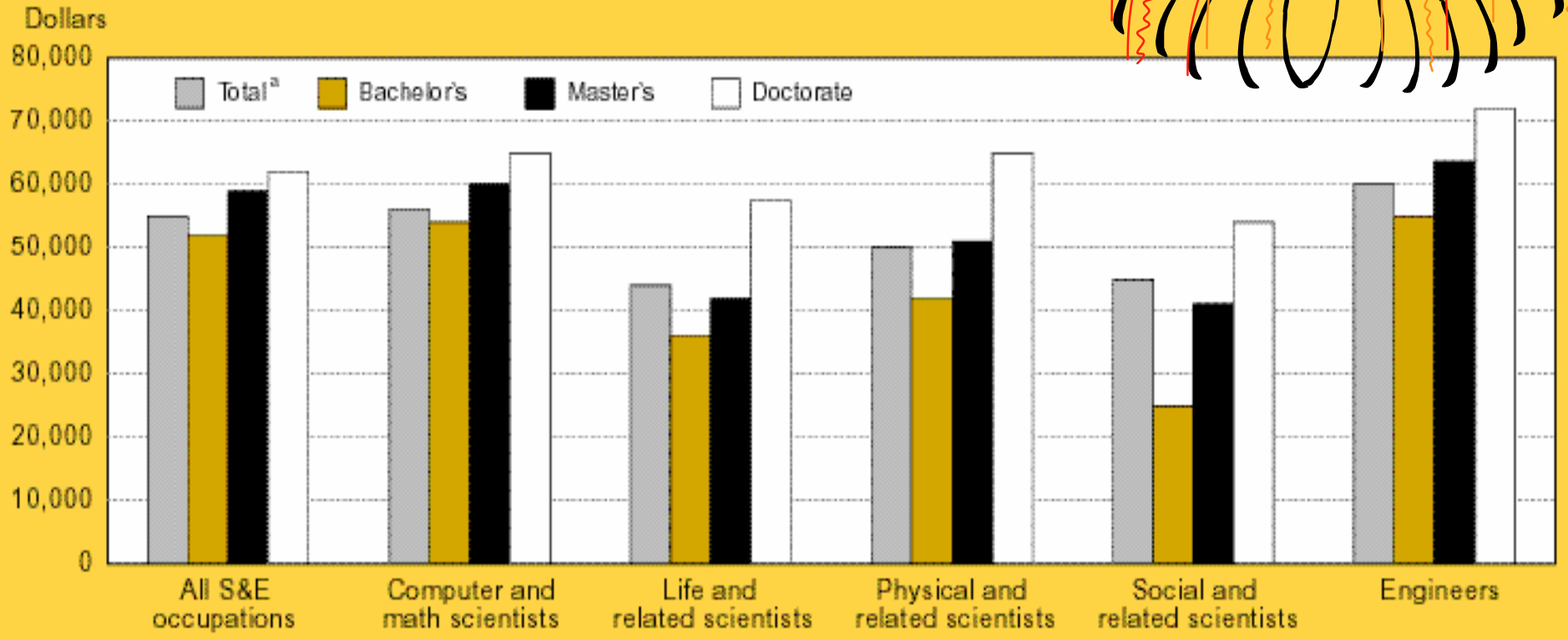
Source: Council on Competitiveness, *U.S. Competitiveness 2001*

Labor market rates for recent doctorate recipients one to three years after Ph.D.: 1997 and 1999 (Percentages)

Ph.D. field	Unemployment rate		Involuntary out-of-field rate	
	1997	1999	1997	1999
All S&E	1.5	1.2	4.5	4.2
Engineering	1.0	0.9	3.6	2.7
Chemical	1.7	1.7	5.8	1.8
Civil	0.0	1.5	5.5	0.0
Electrical	0.6	0.7	3.2	2.5
Mechanical	0.5	0.3	2.7	3.2
Other	1.6	0.9	3.0	3.6
Life sciences	1.7	1.1	2.6	2.5
Agriculture	2.2	0.0	7.3	3.1
Biological sciences	1.5	1.3	2.2	2.5
Computer sciences and mathematics	0.6	0.8	6.5	4.1
Computer sciences	0.7	0.9	2.1	1.8
Mathematics	0.6	0.7	11.0	6.2
Physical sciences	2.1	0.4	6.9	6.6
Chemistry	3.5	0.5	3.3	2.4
Geosciences	1.0	1.2	6.3	9.4
Physics and astronomy	0.7	0.0	12.2	11.1
Social sciences	1.6	2.1	5.4	5.7
Economics	0.9	0.5	5.2	4.2
Political science	2.6	3.4	7.9	11.6
Psychology	1.2	1.0	3.8	3.5
Sociology and anthropology	2.5	1.6	7.7	11.9
Other	2.5	1.9	7.1	4.4

SOURCE: National Science Foundation, Division of Science Resources Statistics (NSF/SRS), Survey of Doctorate Recipients, 1997 and 1999.

Median Annual Salaries for S&E by broad occupation and highest degree



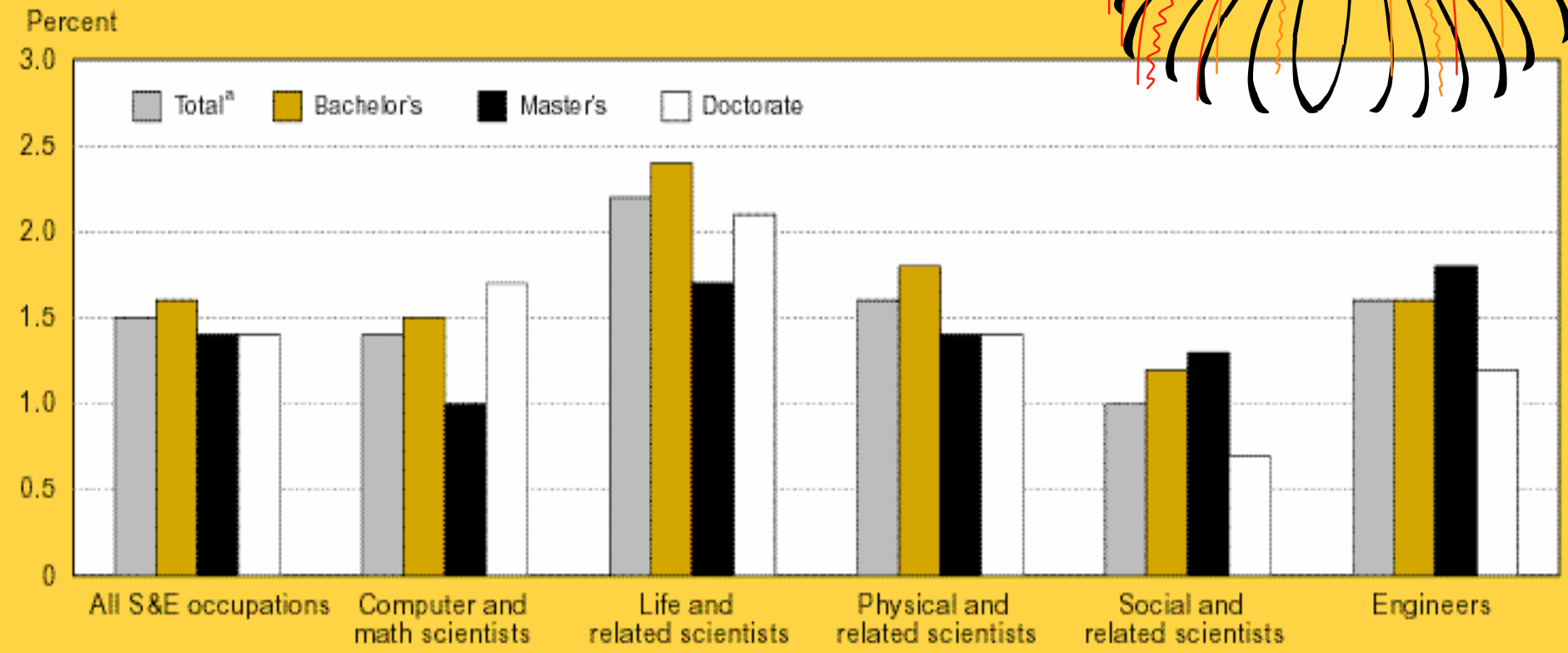
See appendix table 3-8.

NOTE: Individuals are characterized as scientists or engineers based on their current occupation.

[a] Includes professional degrees.

Science & Engineering Indicators – 2000

Unemployment rates for Scientists and Engineers by broad occupation and highest degree



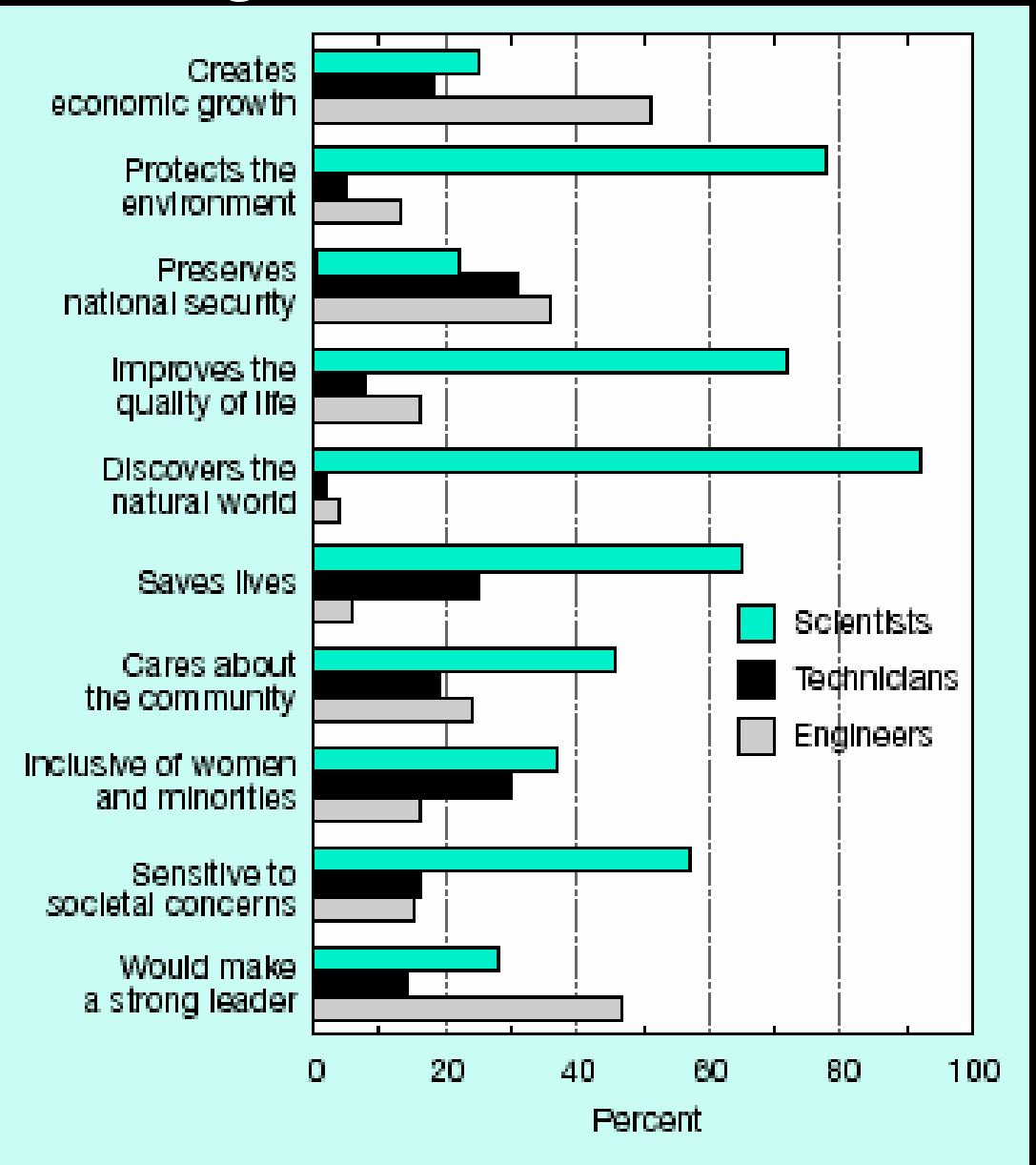
See appendix table 3-5.

NOTE: Individuals are characterized as scientists or engineers based on their current occupation of employed, or on their last reported occupation if unemployed. These figures do not reflect those S&E degree holders employed in non S&E occupations.

[a] Includes professional degrees.

Science & Engineering Indicators – 2000

Public perception of scientists, engineers, and technicians: 1998



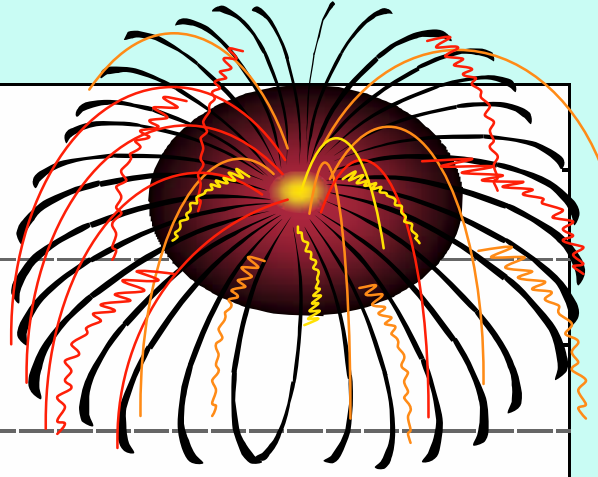
NOTE: Responses were to the question, "As I mention some characteristics, who first comes to mind—scientists, technicians, or engineers?"

SOURCE: Louis Harris & Associates, Inc. "American Perspectives on Engineers & Engineering." A "Harris Poll" Pilot Study conducted for the American Association of Engineering Societies. July 1998.

Our Responsibility & Challenge: Public Literacy

- *Since 1998, when total Ph.D.s reached an all-time high, a significant decline in science and engineering (S&E) doctorates has led a rollback of total Ph.D.s to pre-1994 levels. NSF, 2003*
- *No improvement in science literacy in 4th and 8th grade and a decline in science performance in grade 12 since 1996*
  - *2000 National Assessment of Education Progress*
- *70% of Americans do not understand the scientific process*
- *A higher percentage of men than women answered basic scientific questions correctly*
- *Most Americans feel they are not very well informed about S&T issues, and generally feel less informed than they used to.*
  - *Science and Technology: Public Attitudes and Public Understanding. NSF 2002.*

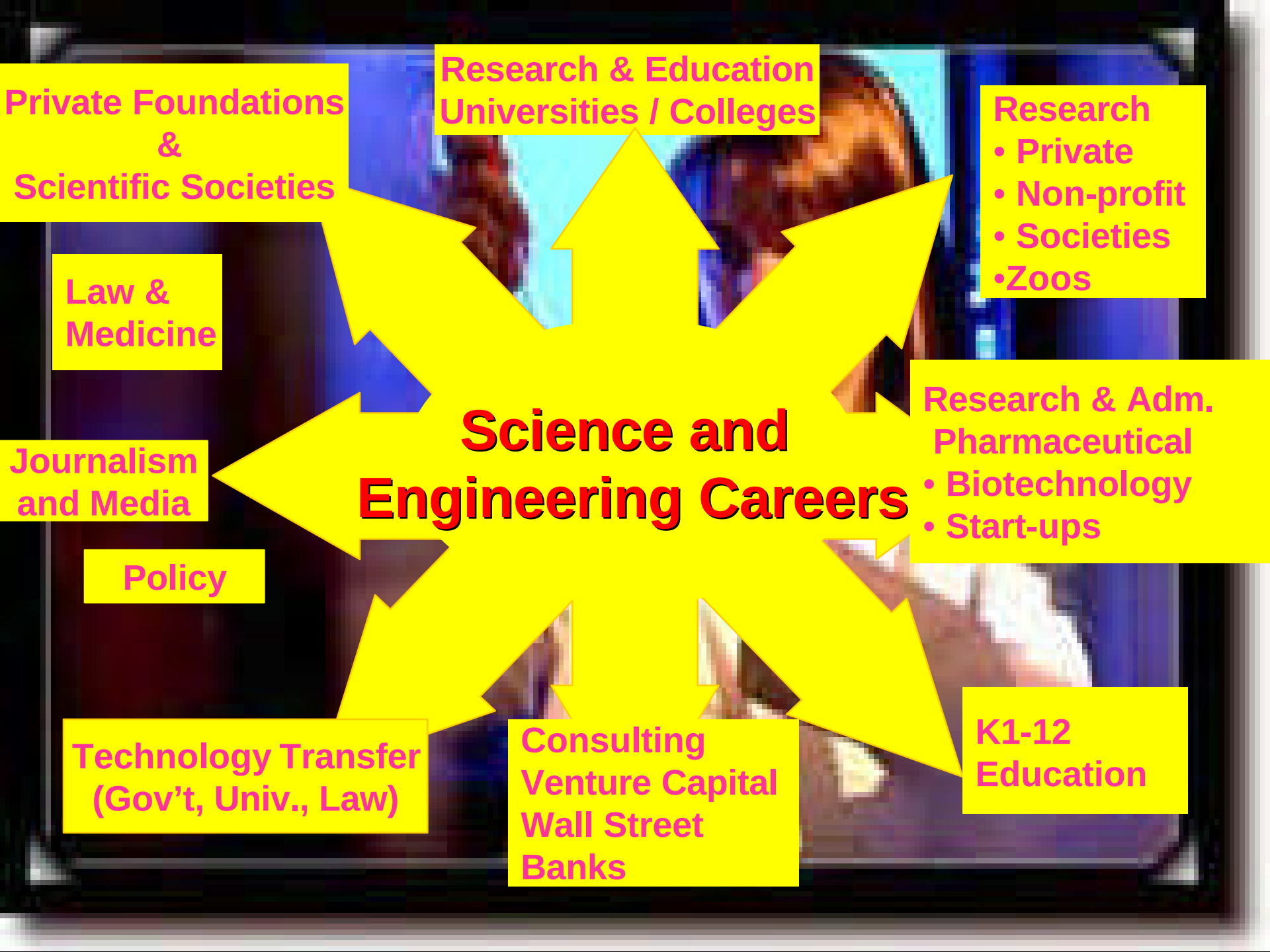
Public confidence in leadership of selected institutions: 1973–2000



See appendix tables 7-31.

Science & Engineering Indicators – 2002

Why??


Private Foundations
&
Scientific Societies
Research & Education
Universities / Colleges
Research
• Private
• Non-profit
• Societies
•Zoos
Law &
Medicine
Science and
Engineering Careers
Research & Adm.
Pharmaceutical
• Biotechnology
• Start-ups
Journalism
and Media
Policy
Technology Transfer
(Gov't, Univ., Law)
Consulting
Venture Capital
Wall Street
Banks
K1-12
Education

WASHINGTON BECKONS YOU

Washington Beckons You

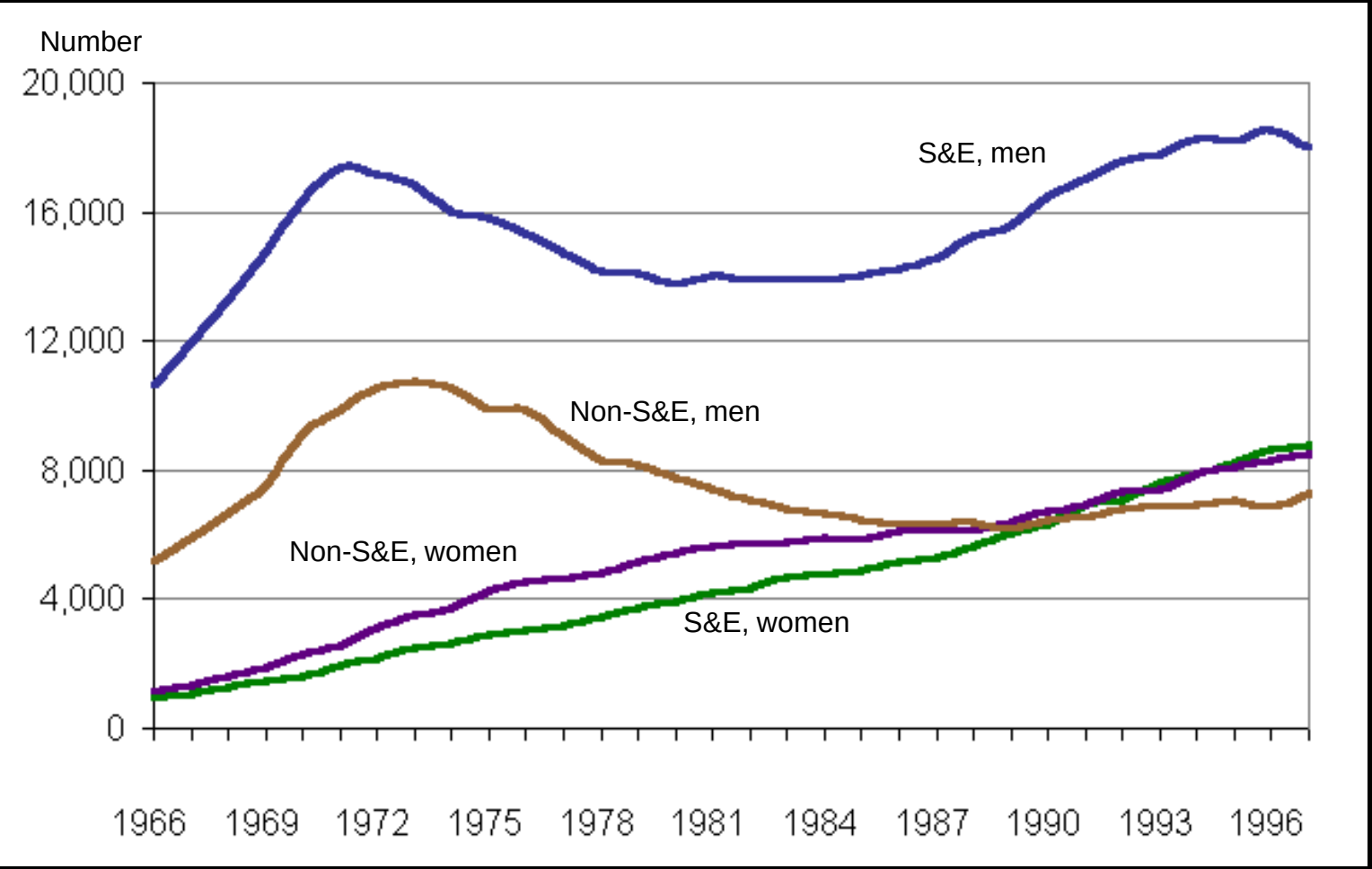
Federal Research Agencies:

- **NIH** - life sciences (biology, medical), psychology, social sciences
- **NSF** - physical sciences, engineering, environmental sciences, life sciences, computer sciences, mathematics, social sciences
- **DoD** - engineering, computer sciences, physical sciences, environmental sciences, life sciences, psychology, mathematics,
- **NASA** - physical sciences, environmental sciences, engineering, life sciences, computer sciences
- **DOE** - physical sciences, environmental sciences, life sciences, engineering
- **USDA** - life sciences, social sciences, physical sciences, engineering
- **Interior** - life sciences, environmental sciences, computer sciences

Congress:

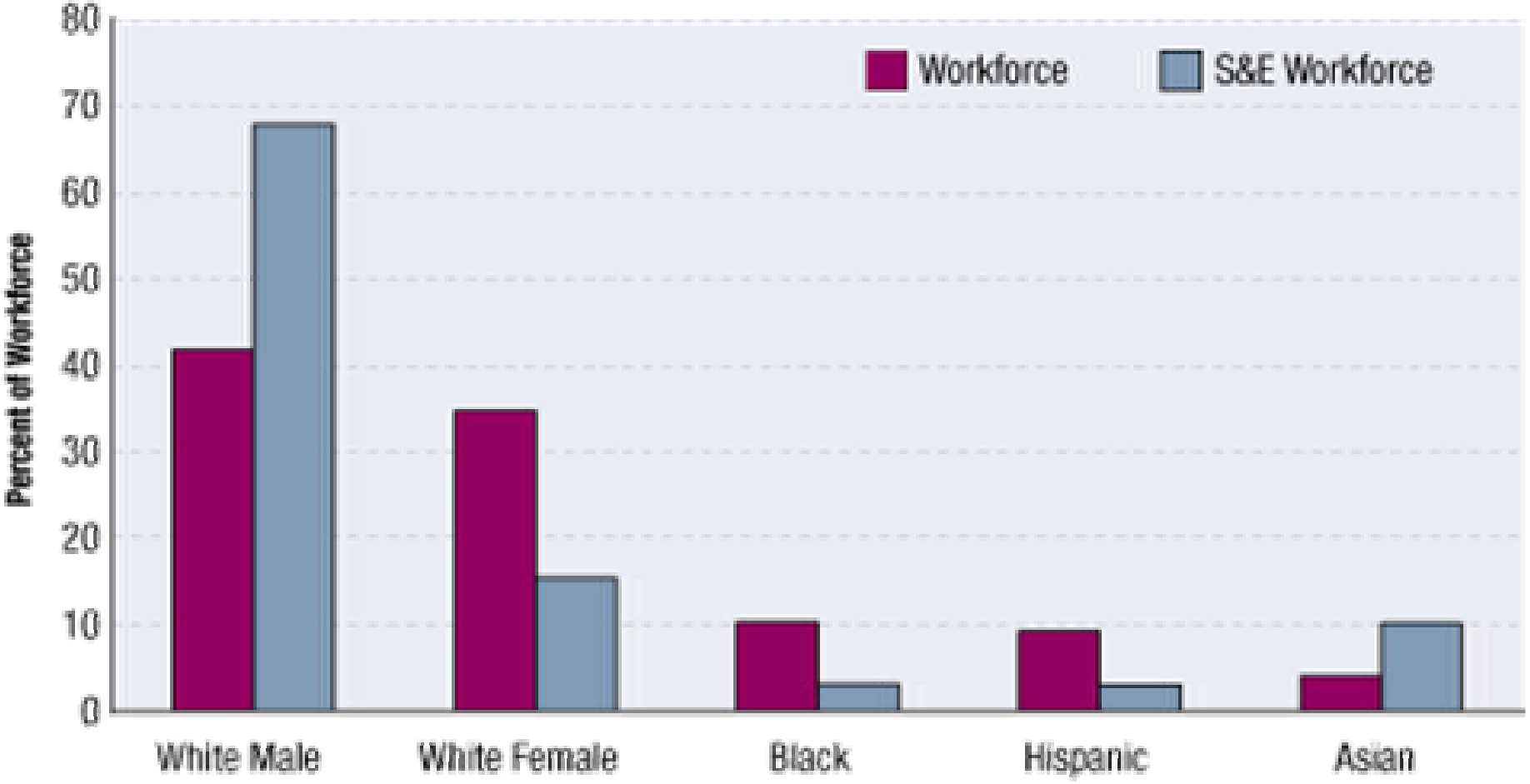
- **Personnel Office**
- **Committees**
- **Lobbyists**
- **Societies**

Doctoral degrees awarded in science and engineering (S&E) fields and in non-S&E fields, by sex: 1966–97



Women and Minorities Are Underrepresented in the Science and Engineering Workforce

Percent of Women and Minorities in the Workforce



Source: Council on Competitiveness, *U.S. Competitiveness 2001*

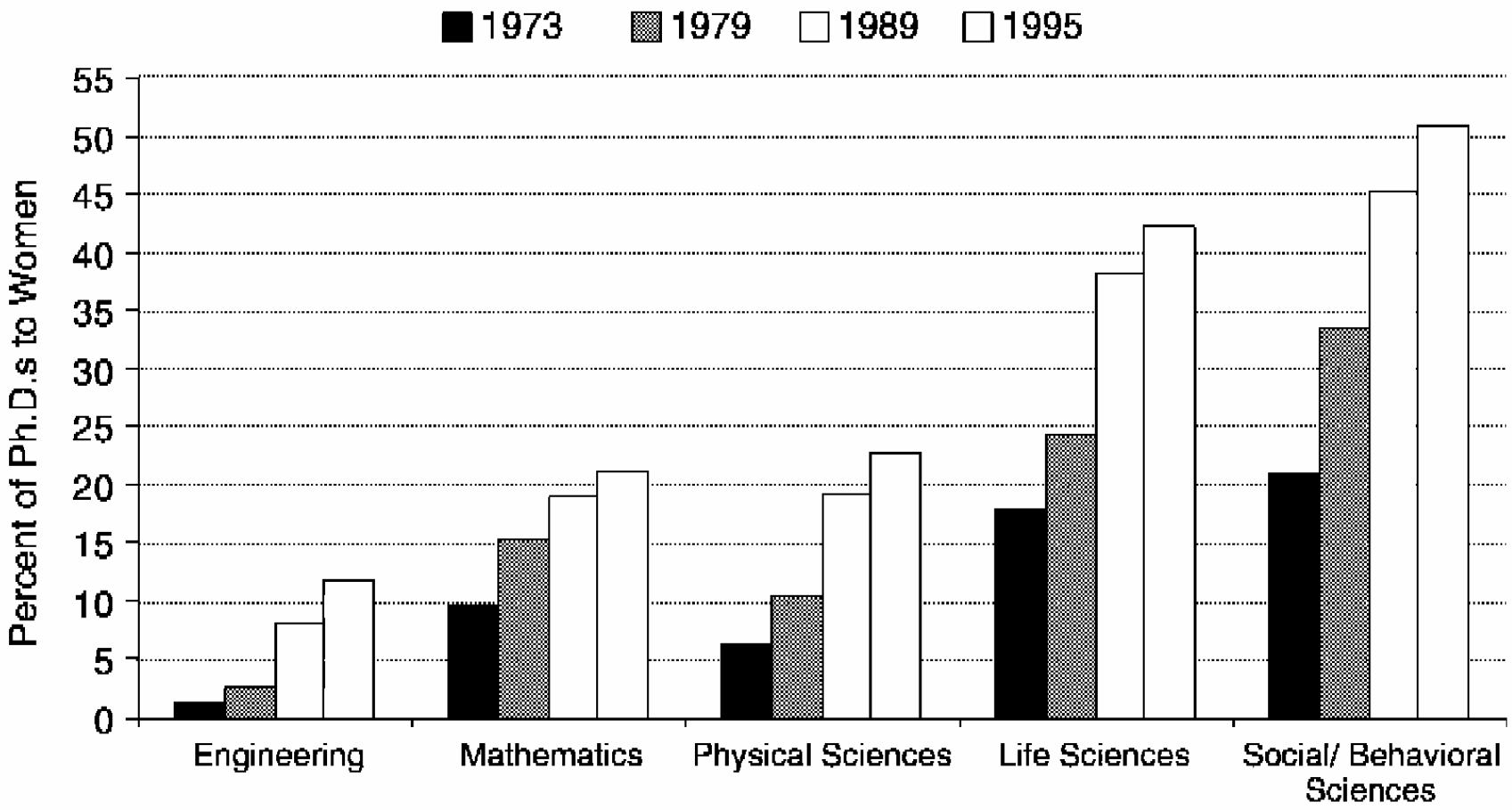


FIGURE 3-5 Percent of Ph.D.s awarded to women, by field and year of survey. SOURCE: Doctorate Records File.

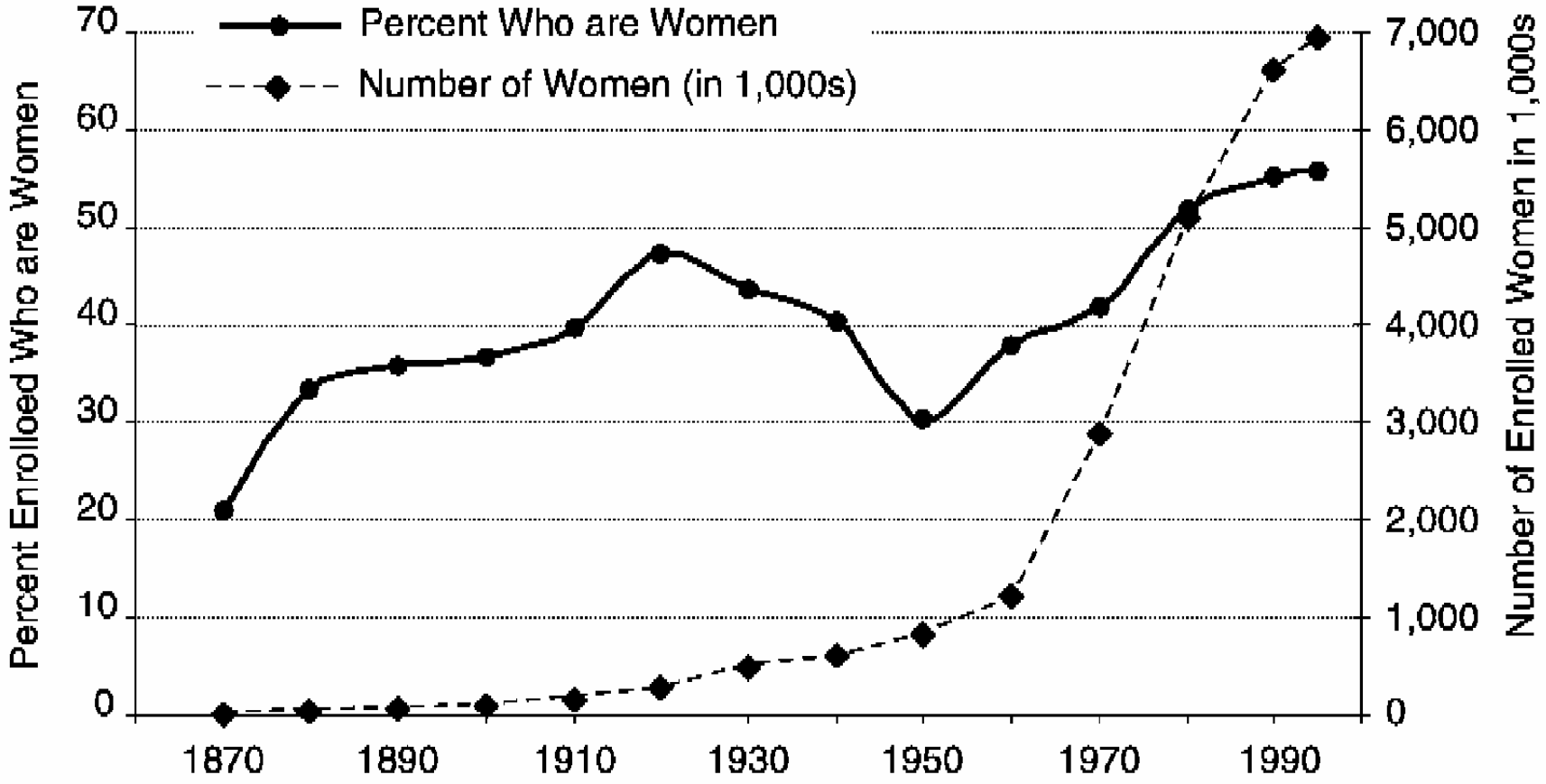
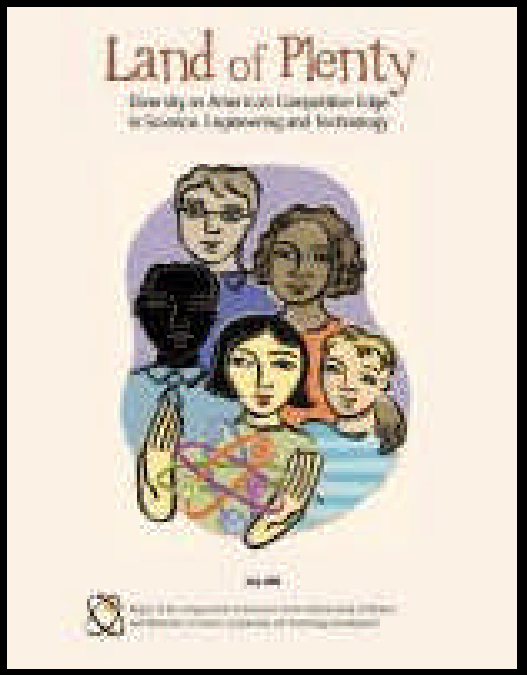


FIGURE 3-2 Percent of those enrolled in college who are women. SOURCES: Solomon 1985:63; NSB 1998:A-53.

The Morella Commission Recommended:

Public Image

Identify or establish a body representing public, nonprofit, and private sectors, to coordinate efforts to transform the image of the SET professions and their practitioners so that the image is positive and inclusive for women, underrepresented minorities, and persons with disabilities.



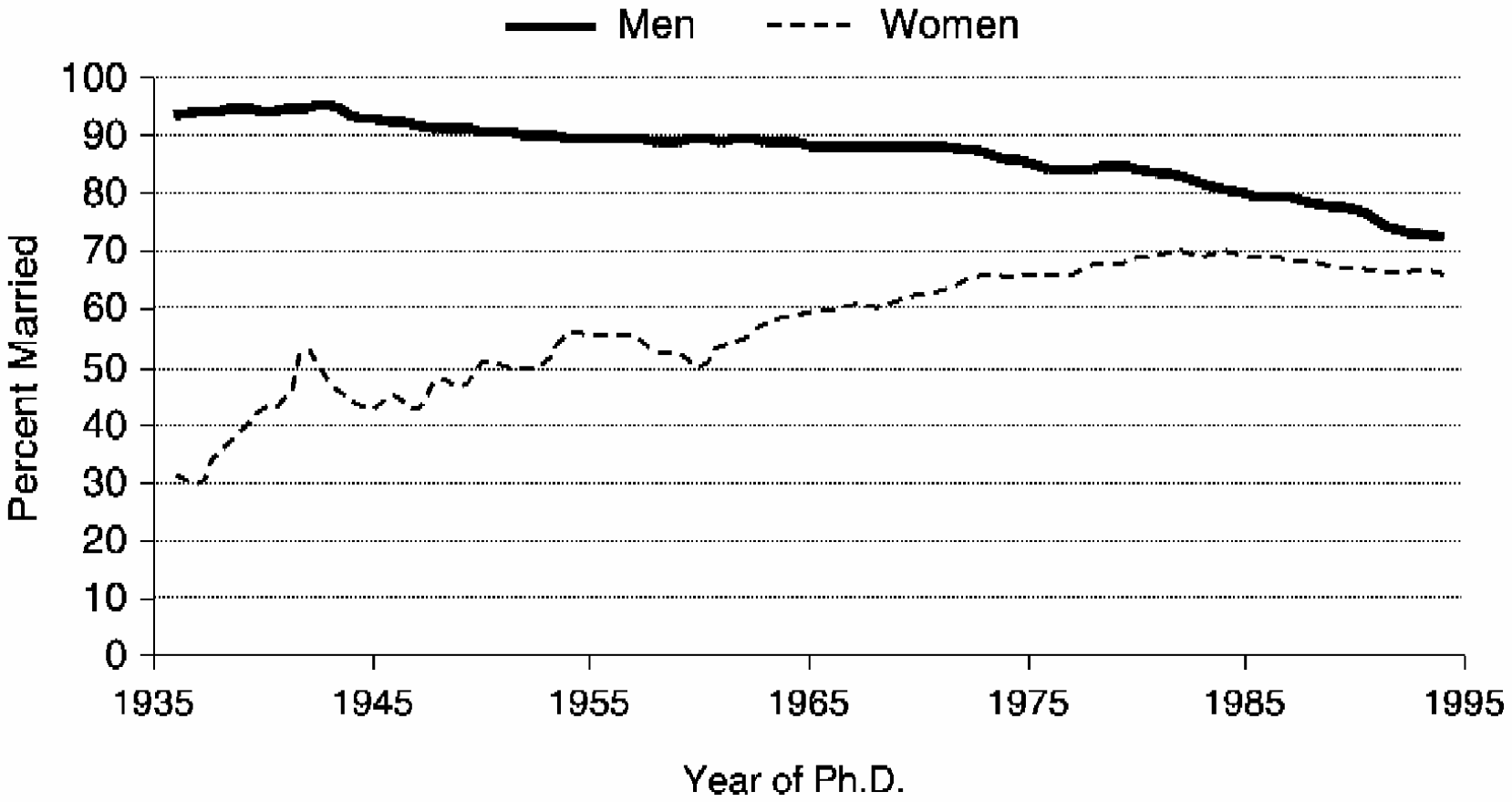
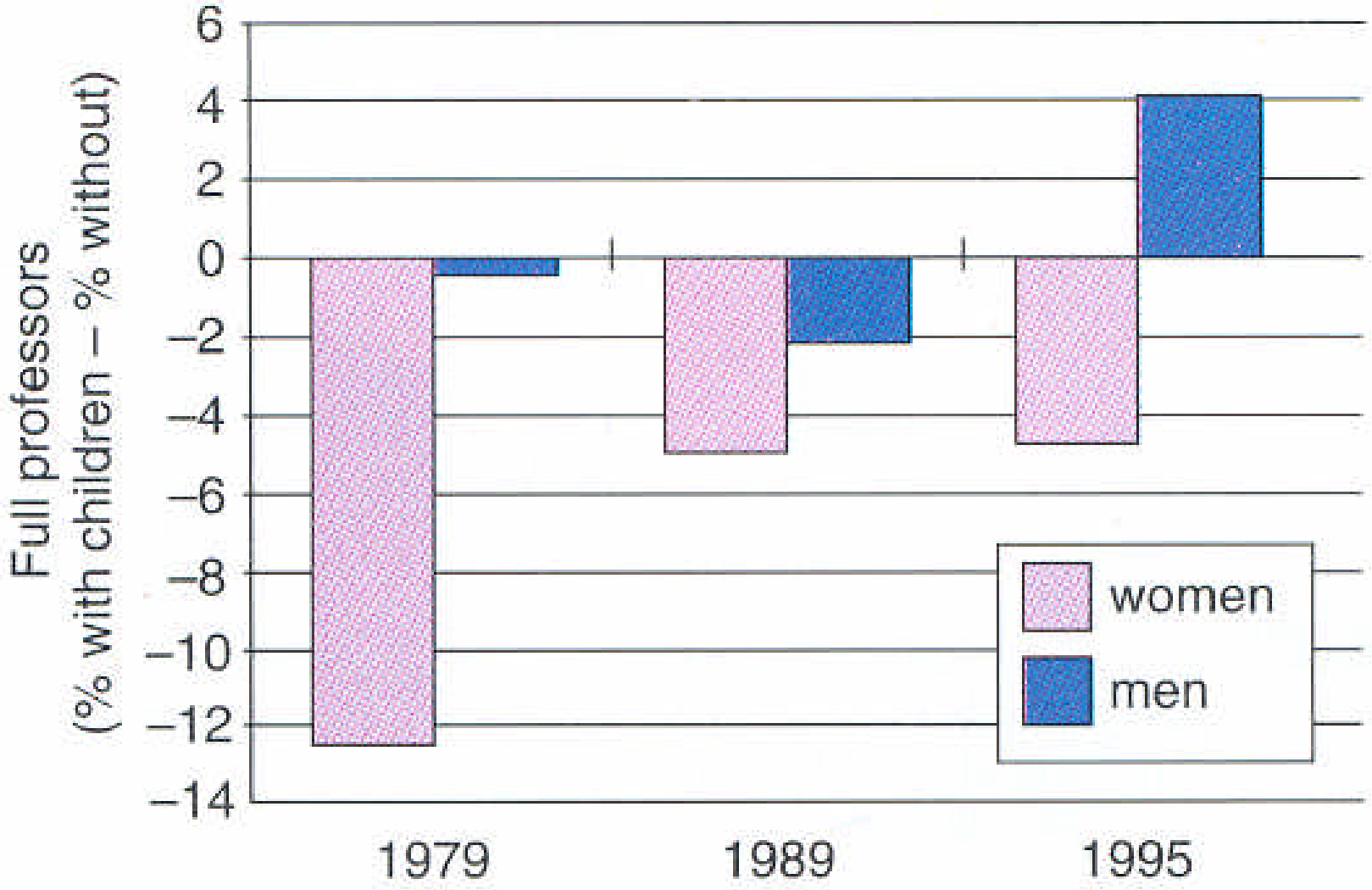


FIGURE 3-23 Percent of men and women who are married, by year of Ph.D.

FIGURE 4-13 Predicted percent with full-time employment in 1995, by sex and familial status.



The family effect. Married women with children are less likely to be full professors than those without. The opposite is now true for men.

Science Magazine **recently found that women in the Life Sciences are generally less satisfied with their careers than their male colleagues.**

What can we do to help?

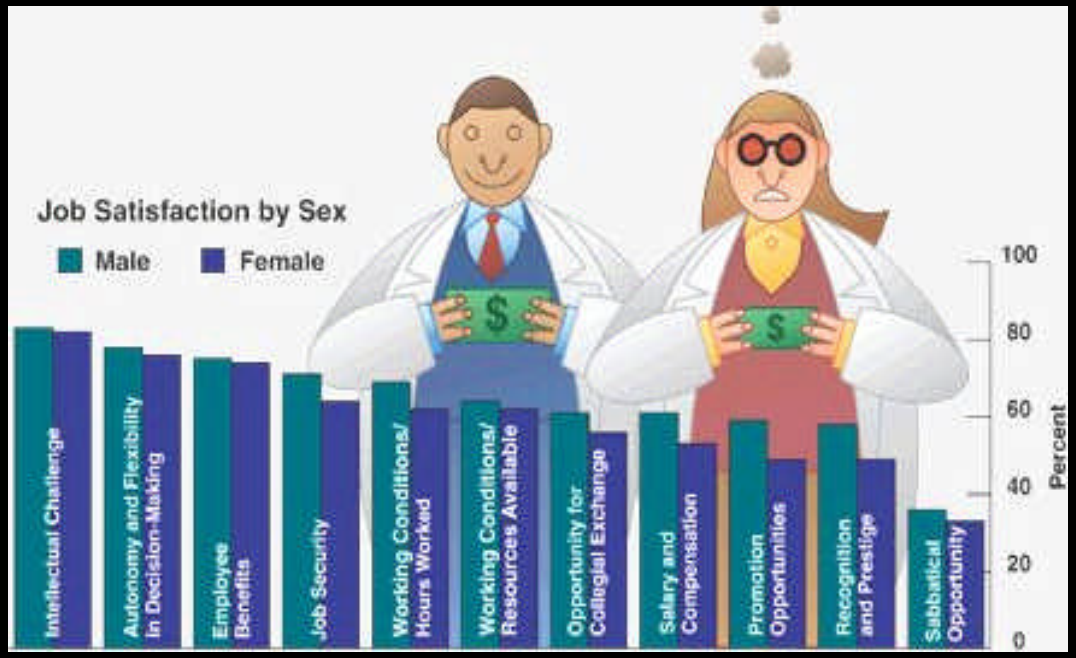


ILLUSTRATION: TERRY E. SMITH, *Science Magazine,* Oct 12 2001

For both men and women, an informed understanding of Federal science policy development can lessen career frustrations.

Finally…

Careers in science offer women an unusual bonus:

IMMORTALITY

An analysis of death notices and obituaries in Nature every 10 years from 1949 to 1999, and in Science from 1949 to 1969 (when they stopped publishing these) suggests that women scientists rarely die.

“Although women in the Physical sciences were represented by 4.8% of the death notices in Science and 8.3% of the obituaries in Nature in 1969, by 1979 there were none -- they had become immortal.”

From a letter to the editors of *Nature*, October 19, 2000


You are here

"What we are to be
we are now becoming"

Cleveland High School, Portland OR

"What we are becoming is
continually changing"

Kathie Olsen, OSTP