

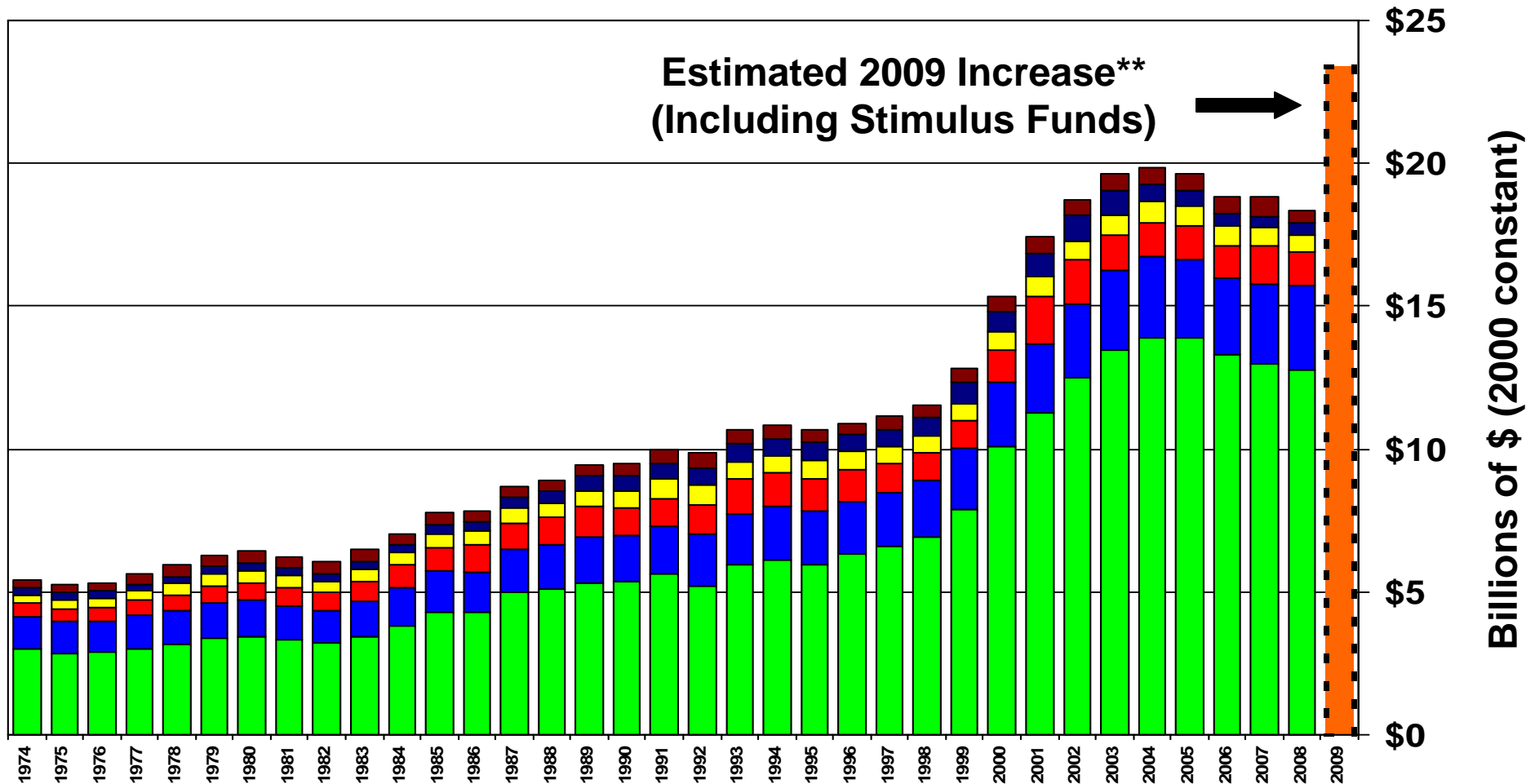
Staying Competitive: Patching the Leaky Pipeline in the Sciences

Available

at:http://www.americanprogress.org/issues/2009/11/women_and_sciences.html

Figure 1: Basic & Applied Research Funds Awarded by U.S. Federal Agencies to Universities and Colleges (2000 constant \$*)

■ NIH
 ■ NSF
 ■ DOD
 ■ DOE
 ■ NASA
 ■ USDA
 ■ 2009 Est.**

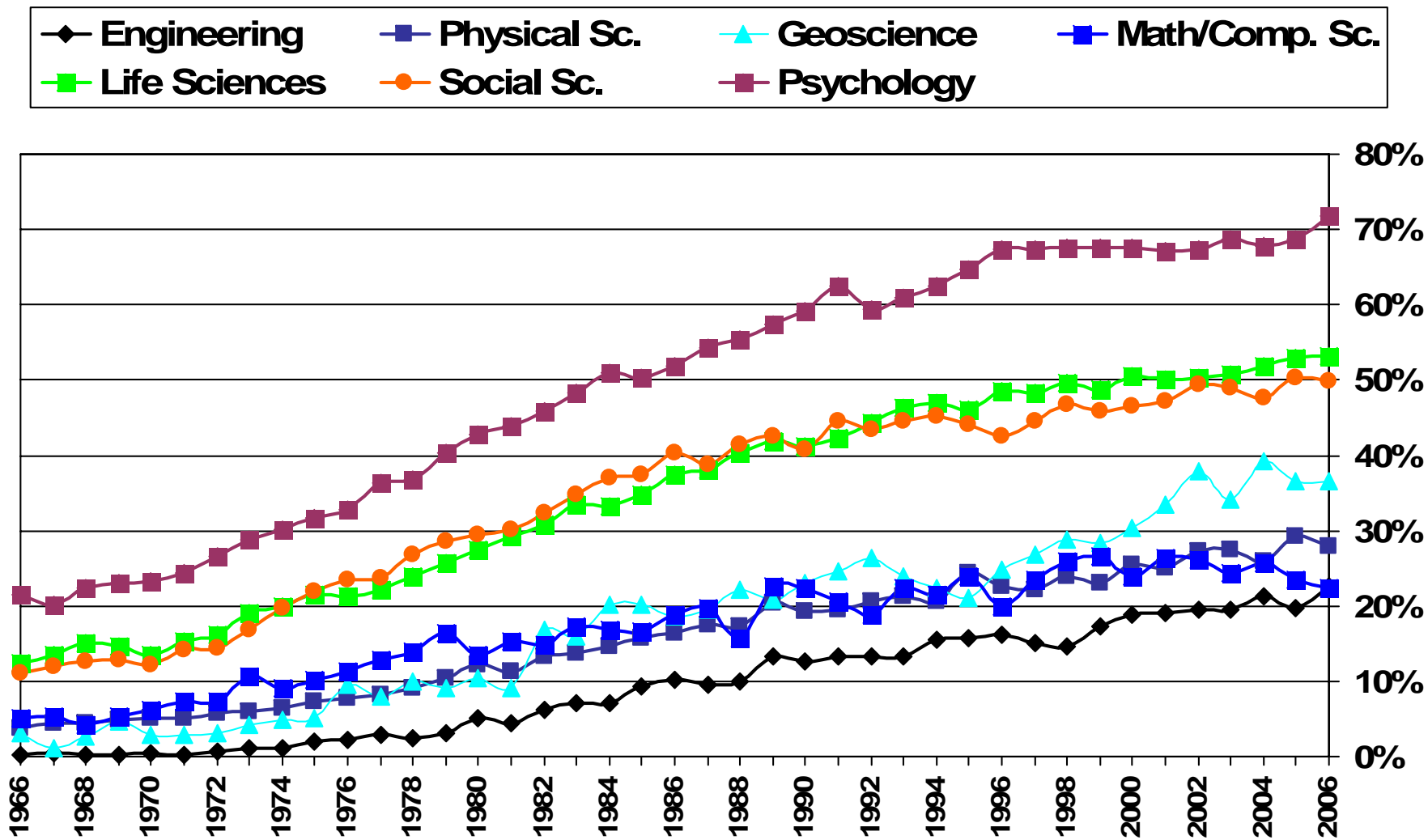


Source: NSF Survey of Federal Funds for Research and Development, 1974-2008. Retrieved from Webcapar, 4/20/2009; AAAS, *AAAS R&D Funding Update on the 2009 Omnibus Bill*. Retrieved from <http://www.aaas.org/spp/rd/omnibus09.htm>, 7/20/2009.

*Fiscal Year GDP Implicit Price Deflators (2000 base year), as of March 2008.

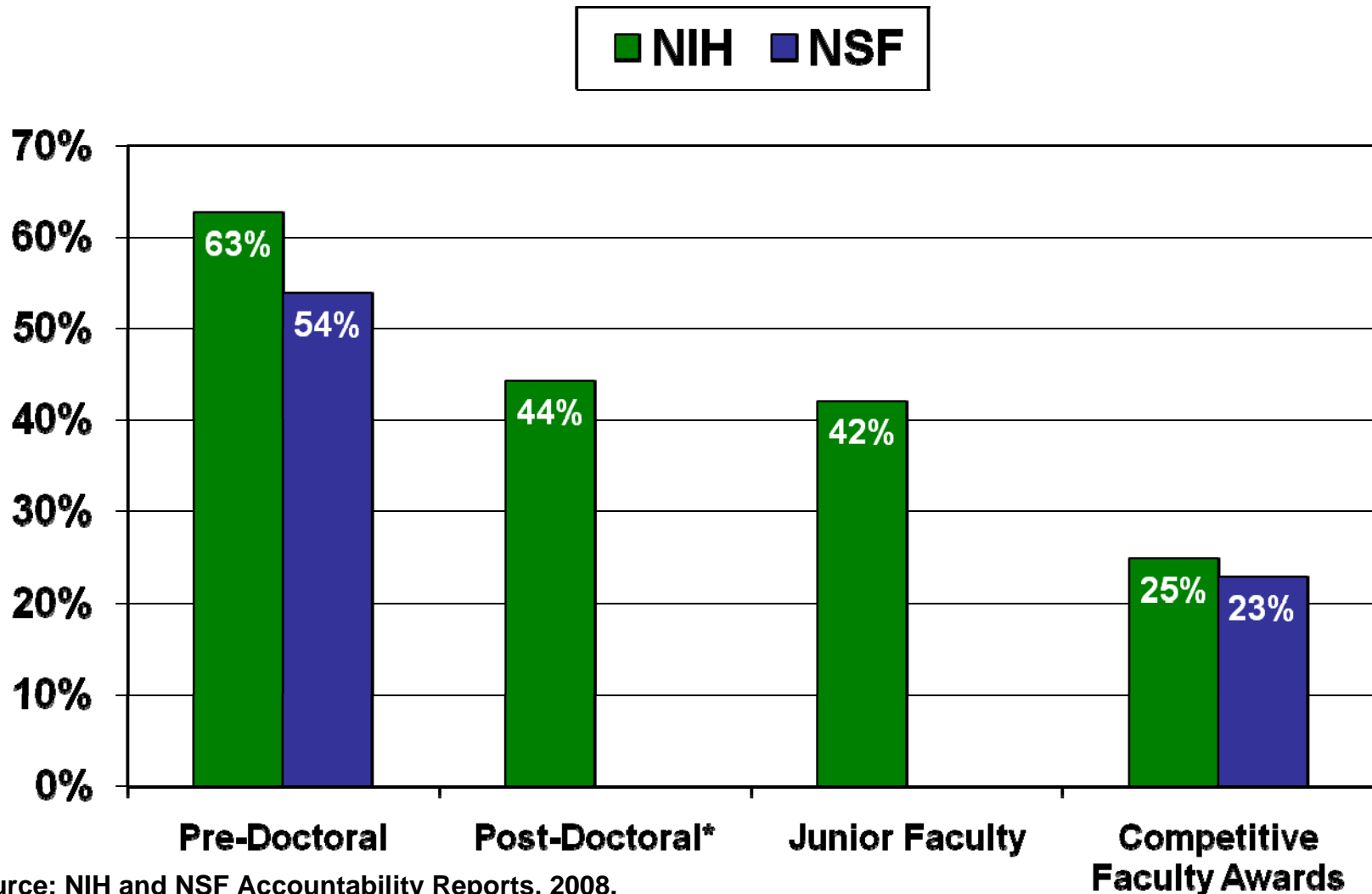
**Based on AAAS analysis of total R&D funds and 2% GDP inflation.

Figure 2: Women as a Percent of Doctoral Recipients in the United States (*U.S. Citizens Only*), Sciences, 1966-2006



Source: National Science Foundation (NSF), Survey of Earned Doctorates, retrieved from WebCaspar, 4/15/2009.

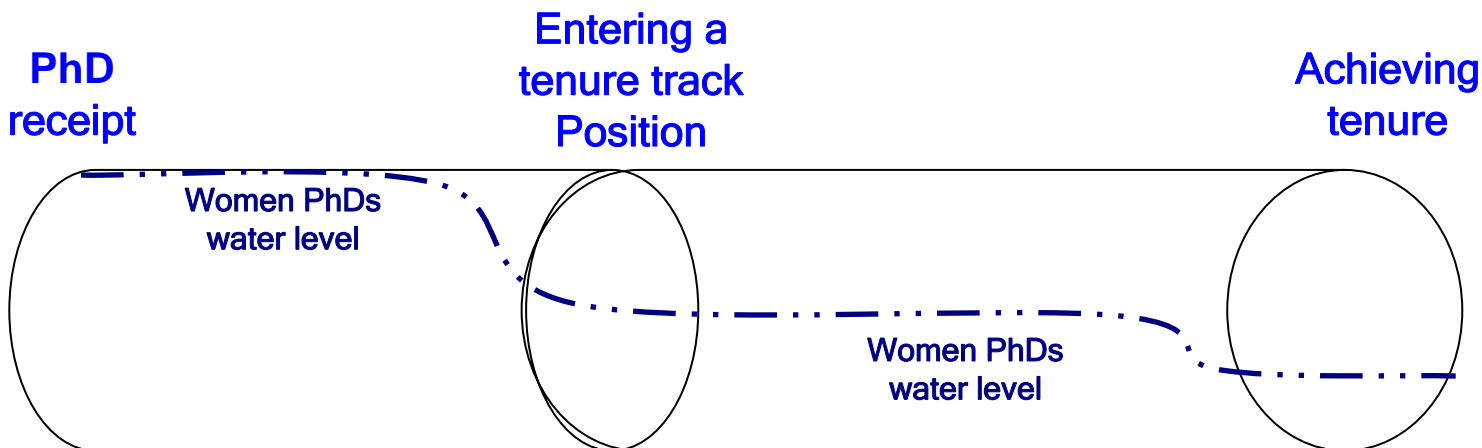
Figure 3: Problems in the Pipeline: Women as a Percent of NIH and NSF Awards*, by Level of Award (2007)



Source: NIH and NSF Accountability Reports, 2008.

* The postdoctoral award information for NSF is missing significant data (39% of awards were to women, 47% to men, and 14% of the sample was unknown in 2007). We chose not to include the data point because it is not comparable to the others. Source: Fae Korsmo, Senior Advisor, Office of the Director, NSF.

Figure 4: Leaks in the Pipeline to Tenure for Women PhDs in the Sciences*



Married women with young children

- 37% lower odds than married men with young children to get a tenure-track position
- 28% lower than married women without young children
- 33% lower than single women without young children

Married women without young children

- 8% lower odds than married men without young children to get a tenure-track position
- 10% lower than single women without young children

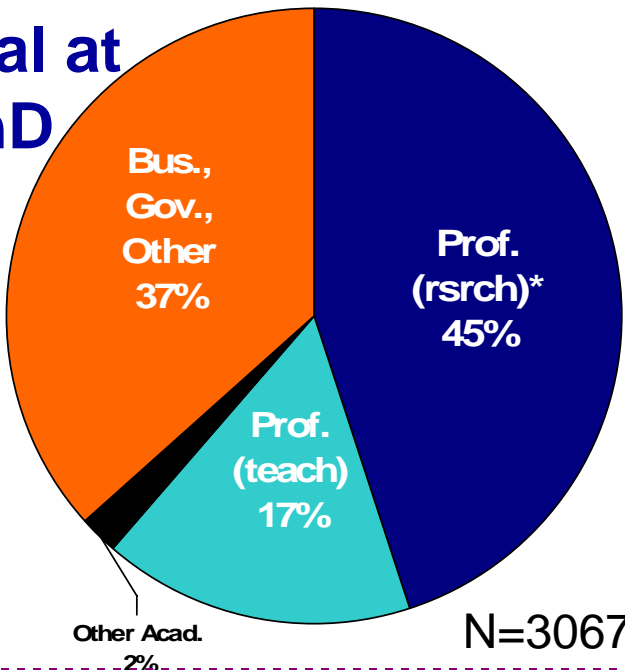
Married women with young children

- 27% lower odds than married men with young children to become tenured
- 13% lower than married women without young children
- 4% lower than single women without young children

*Results are based on Survival Analysis of the *Survey of Doctorate Recipients* (a national biennial longitudinal data set funded by the National Science Foundation and others, 1979 to 2003) in **All Sciences, including Social Sciences**. The analysis takes into account disciplinary, age, ethnicity, PhD calendar year, time-to-PhD degree, and National Research Council academic reputation rankings of PhD program effects. For each event (PhD to TT job procurement, or TT job to Tenure), data is limited to a maximum of 16 years. The waterline is an artistic rendering of the statistical effects of family and gender. Note: The use of NSF Data does not imply the endorsement of research methods or conclusions contained in this report. Person-Year N for entering tenure track=140,275. Person-Year N for Achieving Tenure=46,883.

Career Goal at Start of PhD

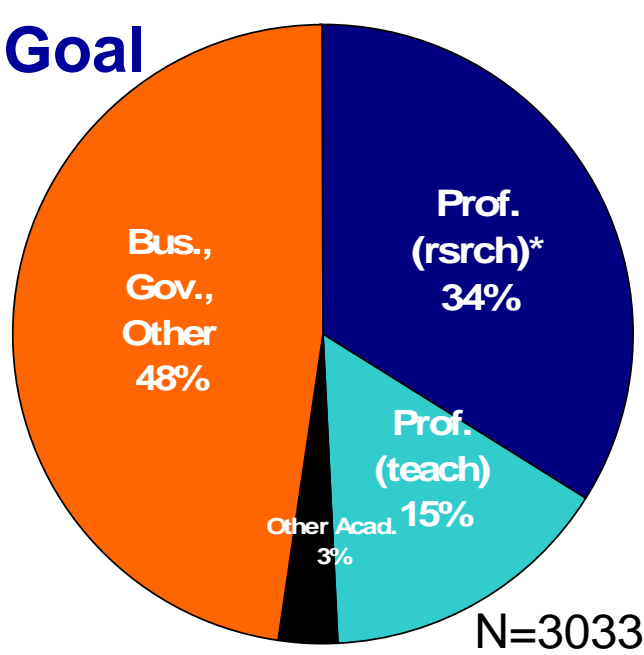
Men



**Professor w. Research Emphasis*

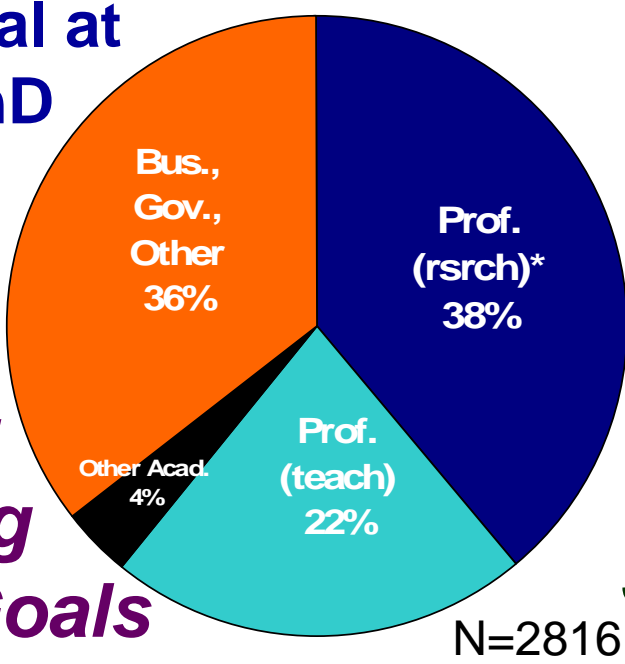
Current Goal

Men



Career Goal at Start of PhD

Women



Current Goal

Women

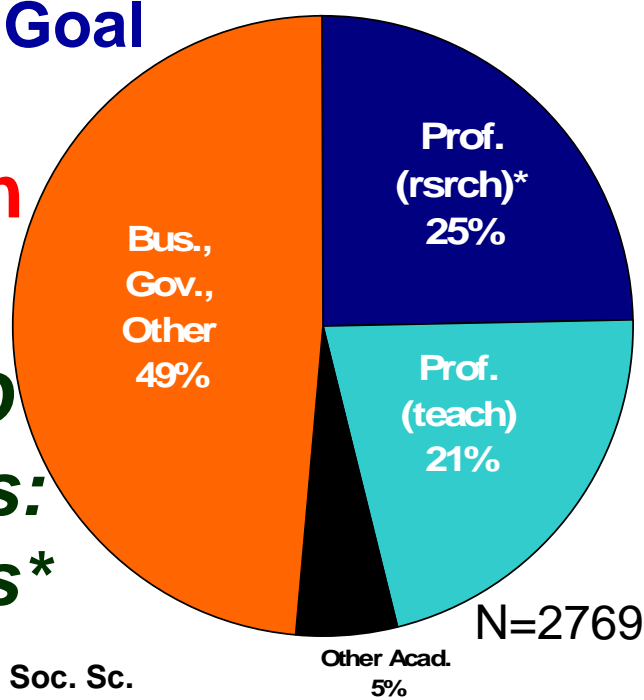


Figure 5: Changing Career Goals

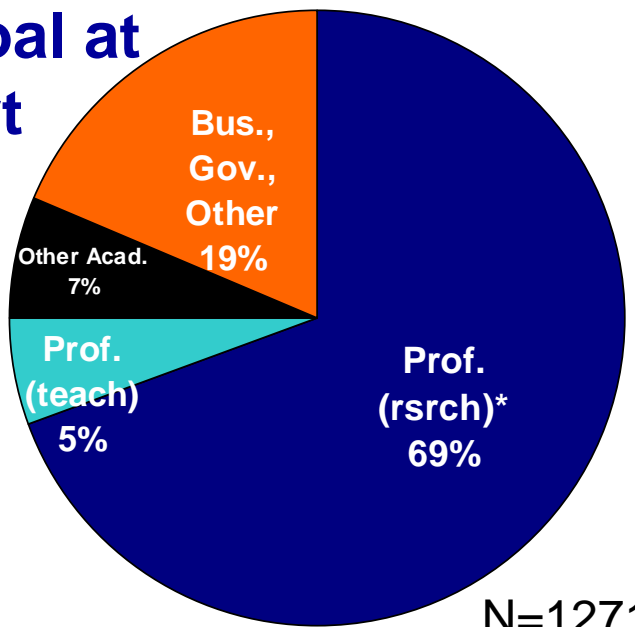
UC PhD Students: Sciences*

*Phys., Bio., & Soc. Sc.

Source: Mason, Mary Ann and Marc Goulden. 2006. "UC Doctoral Student Career Life Survey." (<http://ucfamilyedge.berkeley.edu/grad%20life%20survey.html>).

Career Goal at Pdoc Start

Men

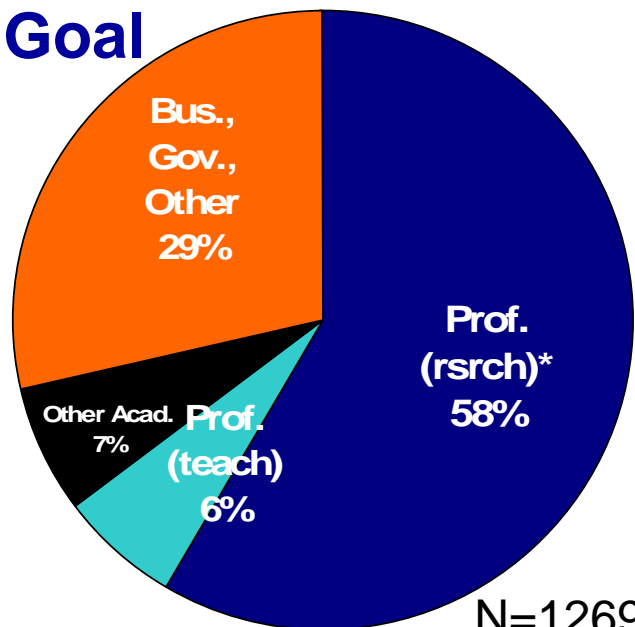


**Professor w. Research Emphasis*

N=1271

Current Goal

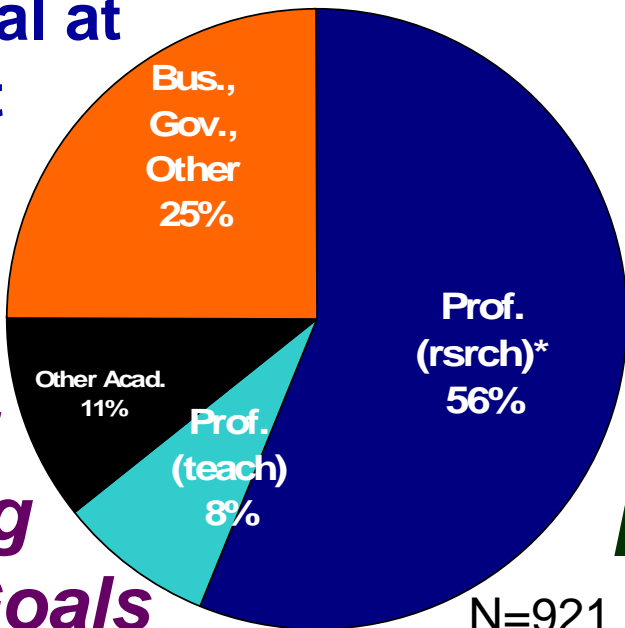
Men



N=1269

Career Goal at Pdoc Start

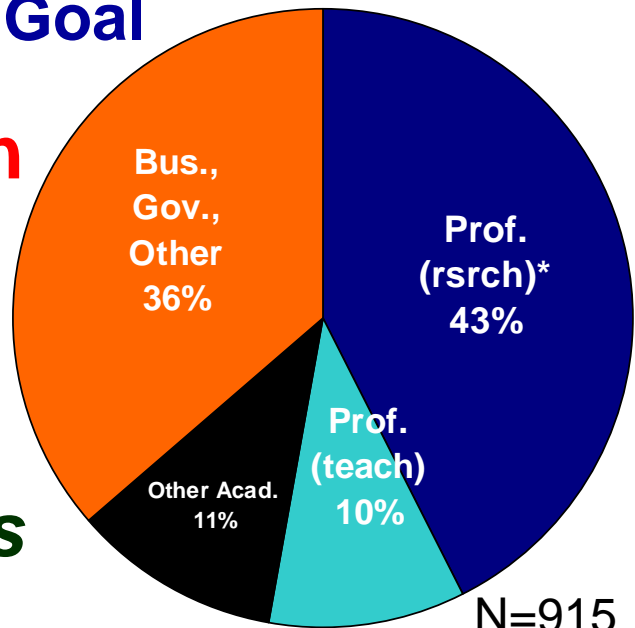
Women



N=921

Current Goal

Women



N=915

Figure 6: Changing Career Goals

UC Postdocs

Source: Mason, Mary Ann, Marc Goulden, and Karie Frasch. 2008. "UC Postdoctoral Career Life Survey." (<http://ucfamilyedge.berkeley.edu/grad%20life%20survey.html>).

Figure 7: Reasons Most Commonly Cited by UC PhD Students in the Sciences* for *Shifting Career Goal away from Professor with Research Emphasis*

% Citing Factor As “Very Important**” in Career Goal Shift		Total	Men	Women
1	Negative experience as PhD student	44%	44%	45%
2	Other life interests	42%	35%	48%
3	Professional activ. too time consuming	41%	35%	47%
4	Issues related to children	34%	20%	44%
5	Geographic location Issues	33%	27%	37%
6	Feelings of isolat./alienation as PhD stud.	31%	30%	31%
7	Career advancement issues	30%	33%	27%
8	Job security	28%	28%	28%
9	Bad job market	27%	27%	27%
10	Monetary compensation (e.g. salary, ben.)	26%	31%	22%
11	Spouse/partner issues or desire to marry	26%	21%	29%
12	Other career interests	24%	22%	26%

*Phys., Bio., & Soc. Sc. **Not applicable is excluded from analysis. N=797 to 1006 358 to 475 435 to 526

Yellow shading indicates the group’s response is significantly higher than the other group’s response (P<.01).

Source: Mason, Mary Ann and Marc Goulden. 2006. “UC Doctoral Student Career Life Survey.” (<http://ucfamilyedge.berkeley.edu/grad%20life%20survey.html>).

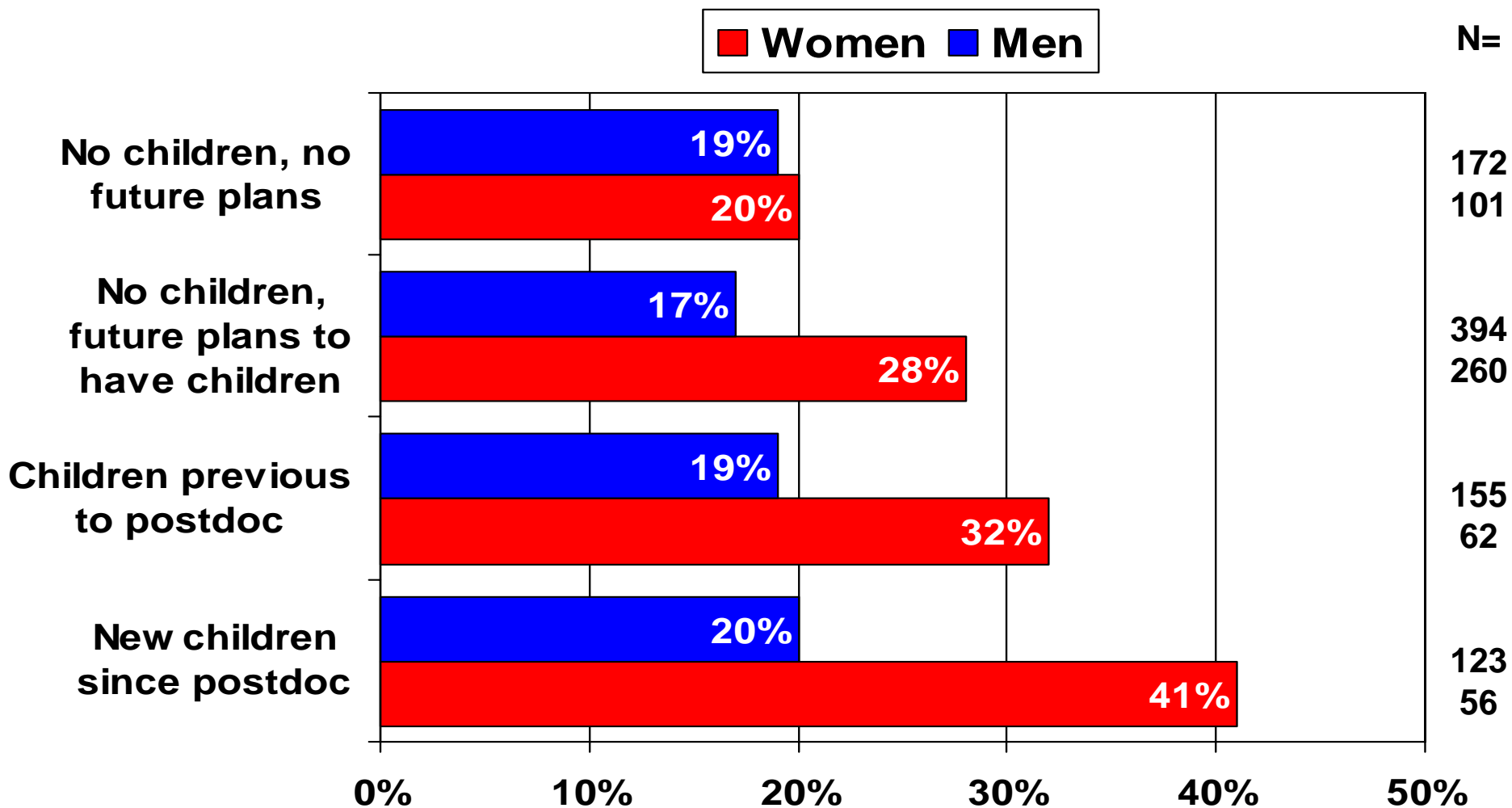
Figure 8: Reasons Most Commonly Cited by UC Postdoctoral Scholars for *Shifting Career Goal away from Professor with Research Emphasis*

% Citing Factor As “Very Important*” in Goal Shift		Total	Men	Women
1	Career advancement issues	49%	56%	42%
2	Bad job market	47%	50%	43%
3	Job security	46%	50%	42%
4	Monetary compensation (e.g. salary, ben.)	46%	54%	37%
5	Issues related to children	42%	34%	52%
6	Geographic location Issues	40%	44%	37%
7	Professional activ. too time consuming	36%	31%	42%
8	Other life interests	32%	29%	35%
9	Spouse/partner issues or desire to marry	32%	33%	31%
10	Negative experience as a postdoc	28%	30%	27%
11	Other familial-related concerns	26%	26%	26%
12	Feel. of isolation/alienat. as posdoc	25%	19%	33%
13	Good job market (elsewhere)	25%	27%	22%
14	Lack of encouragem./lack of mentor	24%	15%	33%

*Not applicable is excluded from analysis. N=186 to 247 101 to 126 85 to 120

Yellow shading indicates the group’s response is significantly higher than the other group’s response (P<.05).

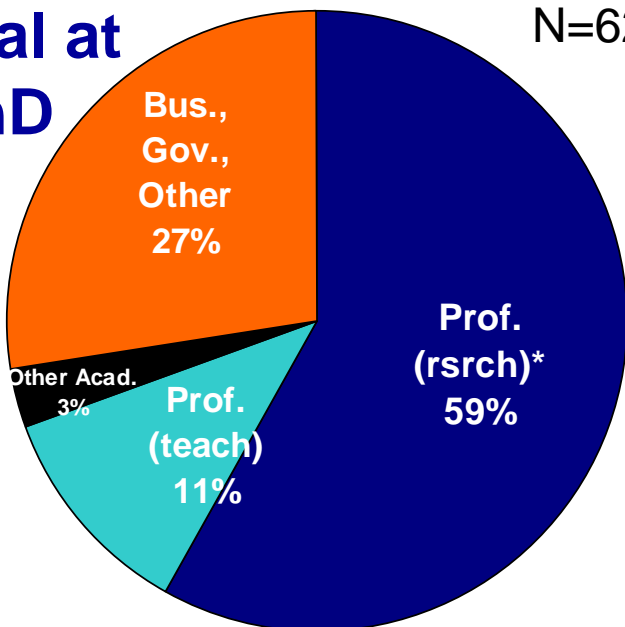
**Figure 9: Shifting Career Goal away from Professor with Research Emphasis:
UC Postdoctoral Scholars, by Gender and Family Status/Future Plans**



Percent of Postdocs with Professor with Research Emphasis Goal at Start Who Shifted Career Goal to Another by Time of Survey

Career Goal at Start of PhD

Men

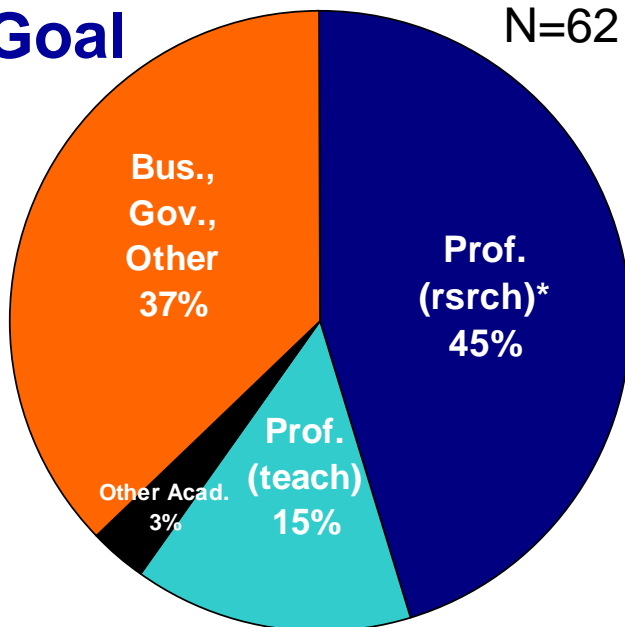


**Professor w. Research Emphasis*

N=62

Current Goal

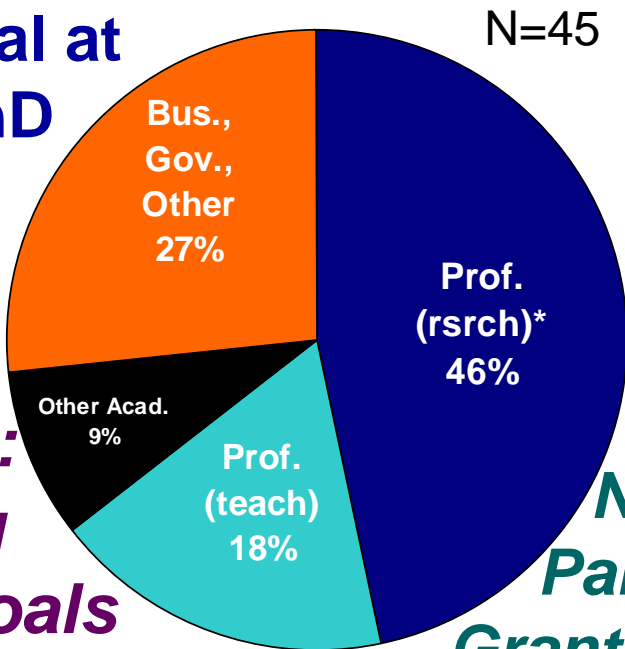
Men



N=62

Career Goal at Start of PhD

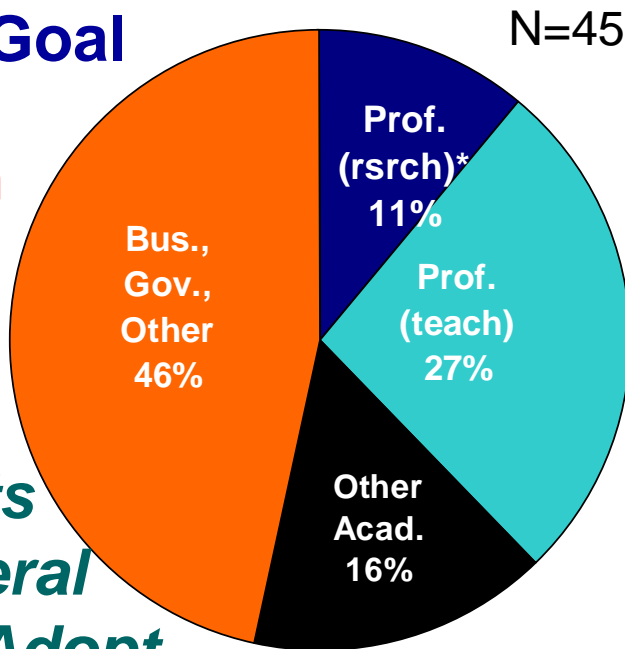
Women



N=45

Current Goal

Women



N=45

Figure 10: Changing Career Goals

*UC PhD Students:
New Parents
Paid Off Federal
Grants at Birth/Adopt.*

Source: Mason, Mary Ann and Marc Goulden. 2006. "UC Doctoral Student Career Life Survey." (<http://ucfamilyedge.berkeley.edu/grad%20life%20survey.html>).

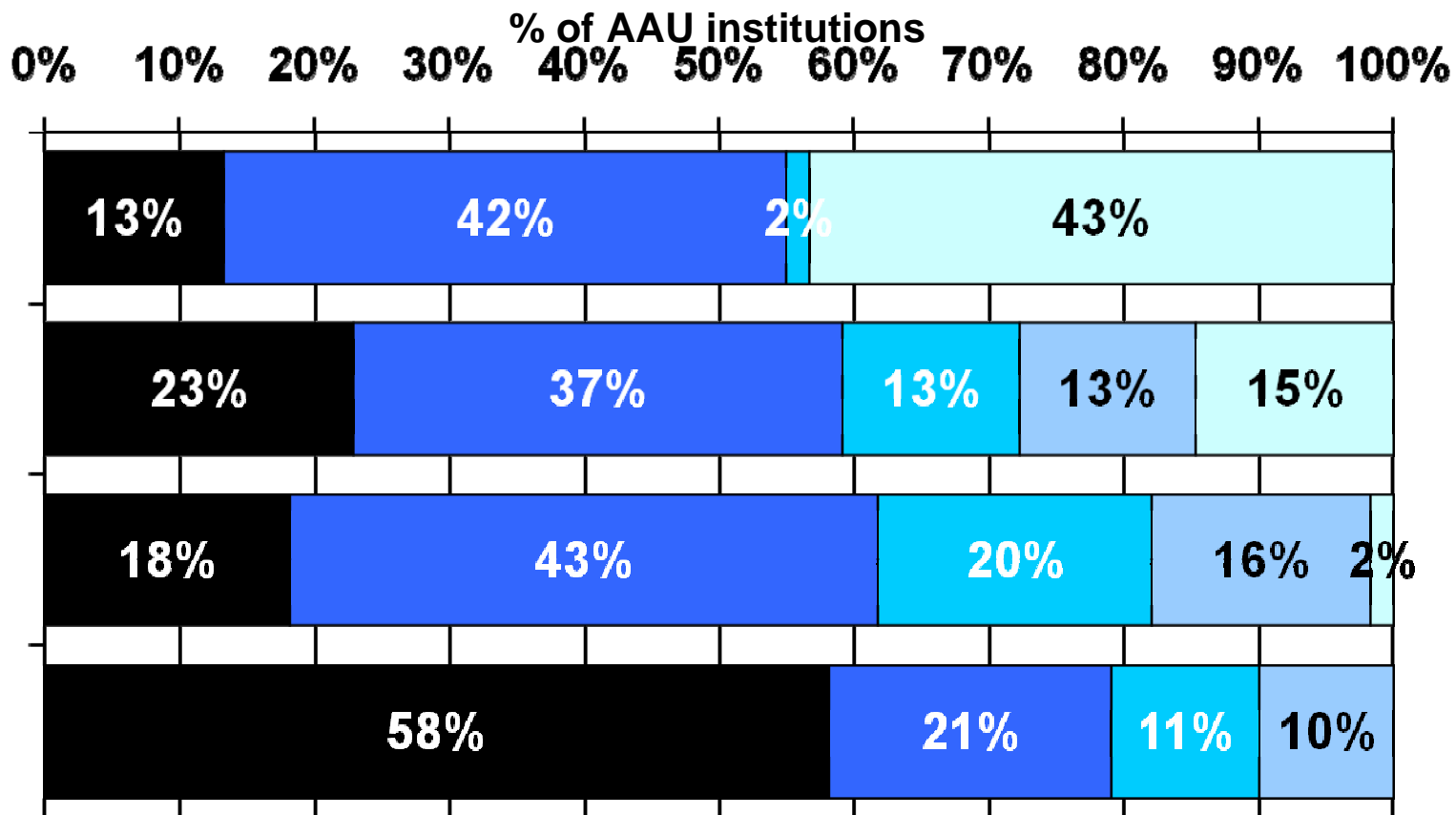
**Figure 11: Shifting Goal away from Professor w. Research Emphasis: All 13 Respondent Explanations*:
*UC Women PhD Stud. Parents Paid Off Federal Grants at Time of Birth/Adopt. Event***

- *Can't keep working 60 hours a week b/c of family.*
- *Having a child.*
- *I don't see how I could balance family and career as a professor at a research university, as I find it increasingly rewarding and necessary to be with my children.*
- *I have always been conflicted about the amount of time I want to devote to career and family. I like research. I like academia. I also like working in the non-profit world. Geographic location - proximity to family is also important to me, and I would compromise on career to be closer to family and/ or a location I am comfortable in.*
- *I haven't had an outstanding graduate career in terms of making an impact on my field and I don't see myself wanting to put in enough time and effort to be an outstanding postdoc (the next step). I am not willing to sacrifice my home life to become a top-notch academic. Plus, I am very interested in communicating science to the public and I love writing, so a career in science writing or science outreach has become my focus.*
- *I often feel disgusted by the political climate found in academic settings. Having ones idealistic notions that merit will trump spin dashed is a painful experience. Furthermore, I am frustrated and annoyed by the attitude/reality that unless you are brilliant or childless with a very supportive spouse you should not expect a pleasant career. The propagation of these ideas by senior faculty has disgusted me.*
- *I think it might be easier to balance work and family in a faculty position where the emphasis is on teaching. I have also found that while I enjoy research, my strength is teaching.*
- *I think that working as an academic at a major research university will be too difficult (very stressful) for me, as a person who wants to expand her family in the very near future.*
- *I waiver because of the amount of time needed to work at a research institution and the lack of salary that it entails (not enough to justify moving my entire family to an area where my partner might not be able to find work in his field).*
- *I've realized that an academic career that involves research AND teaching demands far more time than I'm willing to take away from my family.*
- *Largely due to familial responsibilities and time commitments. I feel that for me, research demands too much time away from my family. Also, as a woman, I don't feel as if current academic environments are any more supportive of women with families in research. The majority of women I've seen in research do not hold high faculty position, and those with families are even fewer. I do not want to sacrifice family for career, so I've changed my goals to accommodate these changes. Now, I would like to miss as little as possible in my children's lives*
- *Time commitment until starting as a professor: nowadays need 4-5 year postdoc. I would rather do a ~2 yr postdoc and then go to industry, or go to industry right away.*
- *I wanted a life outside my job, time for my family, and more flexibility in the geographical availability of potential jobs*

***3 women respondents chose not to explain their reason for shifting their career goal away from Professor (res, emphasis).**

Source: Mason, Mary Ann and Marc Goulden. 2006. "UC Doctoral Student Career Life Survey." (<http://ucfamilyedge.berkeley.edu/grad%20life%20survey.html>).

Figure 12: Provision of Paid Maternity Leave for Academic Populations at Association of American Universities (AAU) (62 total)



Black = Entitlement to at least 6 weeks of paid leave.

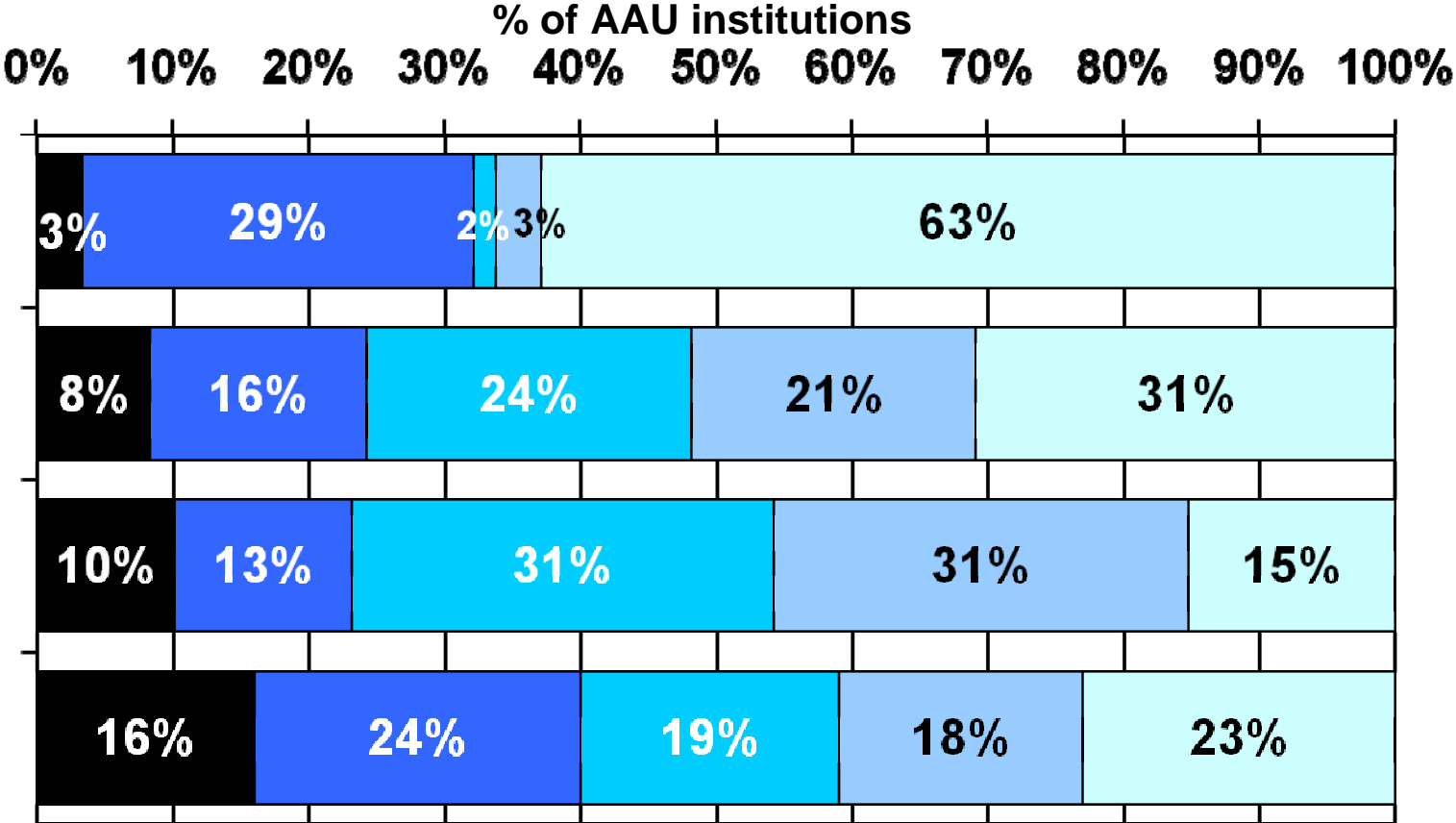
Blue = Limitations to paid leave (e.g., only for particular groups, partial pay, less than 6 weeks, requirements for previous service time, etc.).

Turquoise = Paid leave depends on sick and/or vacation leave accruals.

Lighter Blue = Delay in availability of sick and/or vacation leave accruals, ie., FMLA.

Lightest Blue = Less, ad hoc, or no paid leave available.

Figure 13: Provision of Paid Parental Leave for Academic Populations at Association of American Universities (AAU) (62 total)



Black = Entitlement to at least 1 week of paid leave.

Blue = Limitations to paid leave (e.g., only available to primary caregiver, only for particular groups, partial pay, requirements for previous service time, etc.).

Turquoise = Paid leave depends on sick and/or vacation leave accruals.

Lighter Blue = Delay in availability of sick and/or vacation leave accruals, ie., FMLA.

Lightest Blue = Less, ad hoc, or no paid leave available.

Source: Mason, Mary Ann, Marc Goulden, and Karie Frasch. 2008. "Family Accommodation Policies for Researchers at AAU Universities Survey."

Figure 14: Title IX: Pregnancy & Family Status Discrimination

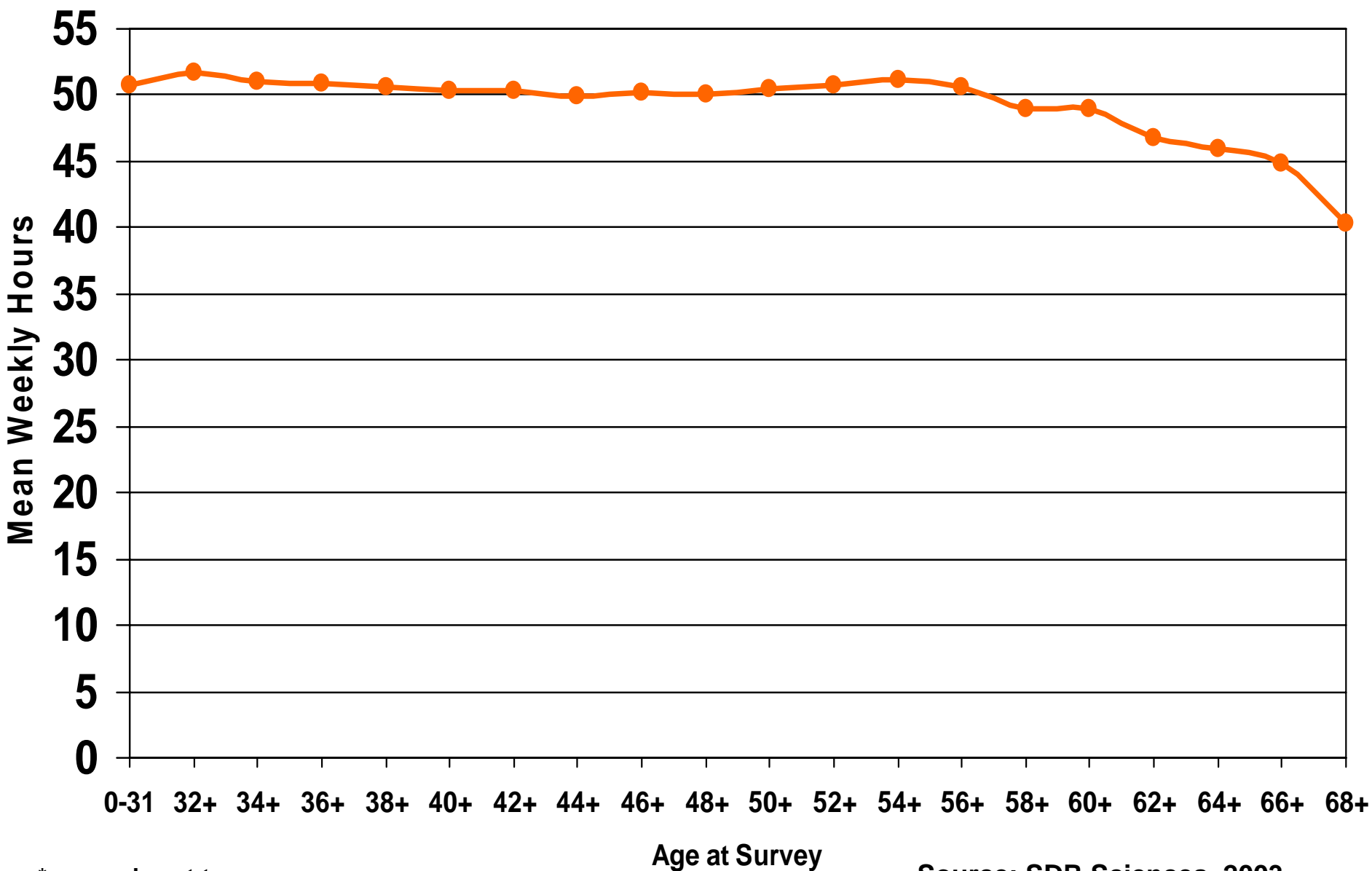
“No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance.”¹

- (a) **General.** A recipient shall not apply any policy or take any employment action:
- (1) **Concerning the potential marital, parental, or family status of an employee. . . which treats persons differently on the basis of sex; or**
 - (2) Which is based upon whether an employee or applicant for employment is the head of household or principal wage earner in such employee's or applicant's family unit.
- (b) **Pregnancy.** A recipient shall not discriminate against or exclude from employment any employee or applicant for employment on the basis of pregnancy, childbirth, false pregnancy, termination of pregnancy, or recovery therefrom.
- ...
- (d) **Pregnancy leave.** In the case of a recipient which does not maintain a leave policy for its employees, or in the case of an employee with insufficient leave or accrued employment time to qualify for leave under such a policy, **a recipient shall treat pregnancy, childbirth, false pregnancy, termination of pregnancy and recovery therefrom as a justification for a leave of absence without pay for a reasonable period of time, at the conclusion of which the employee shall be reinstated to the status which she held when the leave began or to a comparable position, without decrease in rate of compensation or loss of promotional opportunities, or any other right or privilege of employment.**²

¹ 20 U.S.C. § 1681.

² 45 C.F.R. 618.530 (National Science Foundation); 45 CFR 86.57 (Department of Health and Human Services, including the National Institutes of Health); 10 CFR 1040.53; (Department of Energy).

Figure 16: Mean Weekly Hours Worked by Science and Social Science Tenure-Track Faculty* in the U.S. by Age, 2003



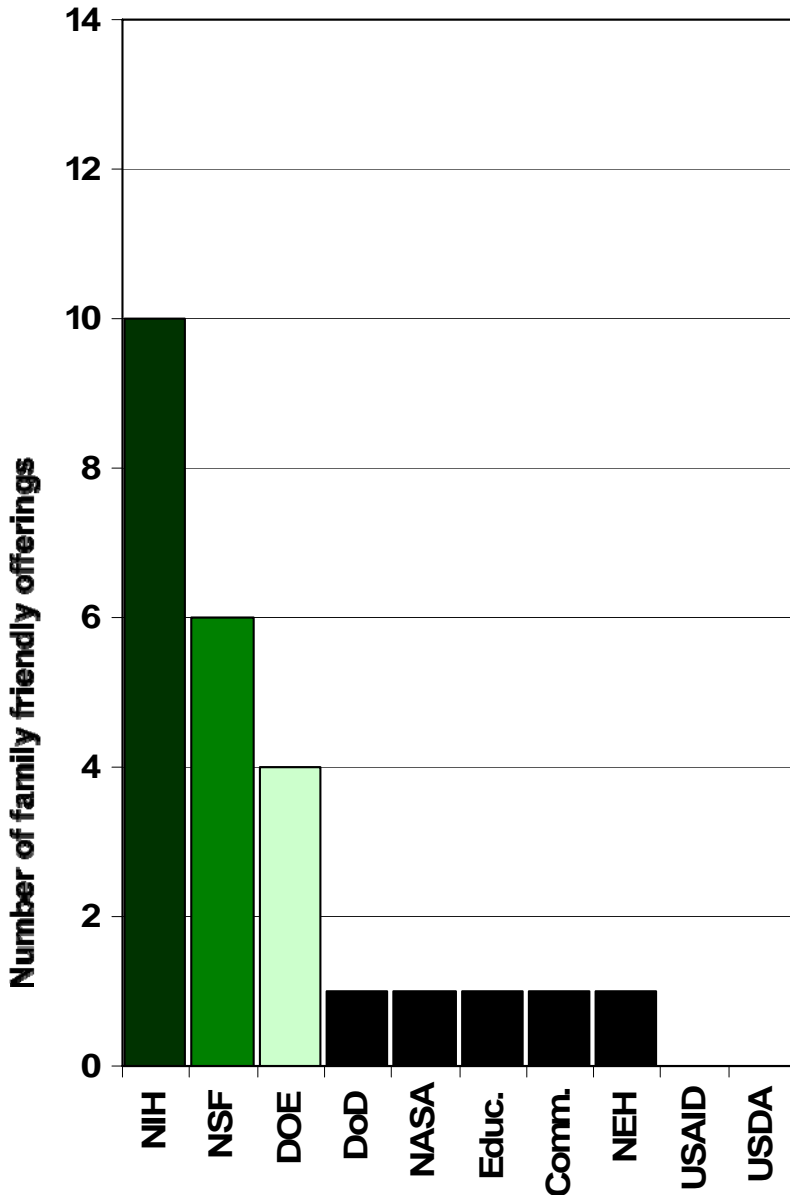
*pre- and post-tenure.

Source: SDR Sciences, 2003

Figure 17: AAU Survey: Examples of Family Responsive Policies, Benefits, & Resources

- **Time-based policies/benefits** (and associated review criteria)
 - Stopping the clock/extension of acad. progress timelines & funding
 - Reentry rights
 - Flex time and flexible scheduling
 - Part Time/Unpaid Leaves
 - Modified Duties
 - Sabbaticals and Leave of Absence
- **Childcare**
 - On and off-campus centers
 - Subsidies
 - Referral services
 - Emergency backup
- **Monetary supplements/benefits**
 - Tuition remission
 - Health care, continued coverage, and dependent healthcare
 - Dependent care expenses (pretax) and dependent care travel funds
 - Adoption reimbursement
- **Other resources:** Lactation rooms, family housing, caregiver groups, resources lists, etc.

Figure 18: Possible Family Friendly Offerings by Federal Agencies to Support Researchers Paid Off of Grants/Contracts and PIs



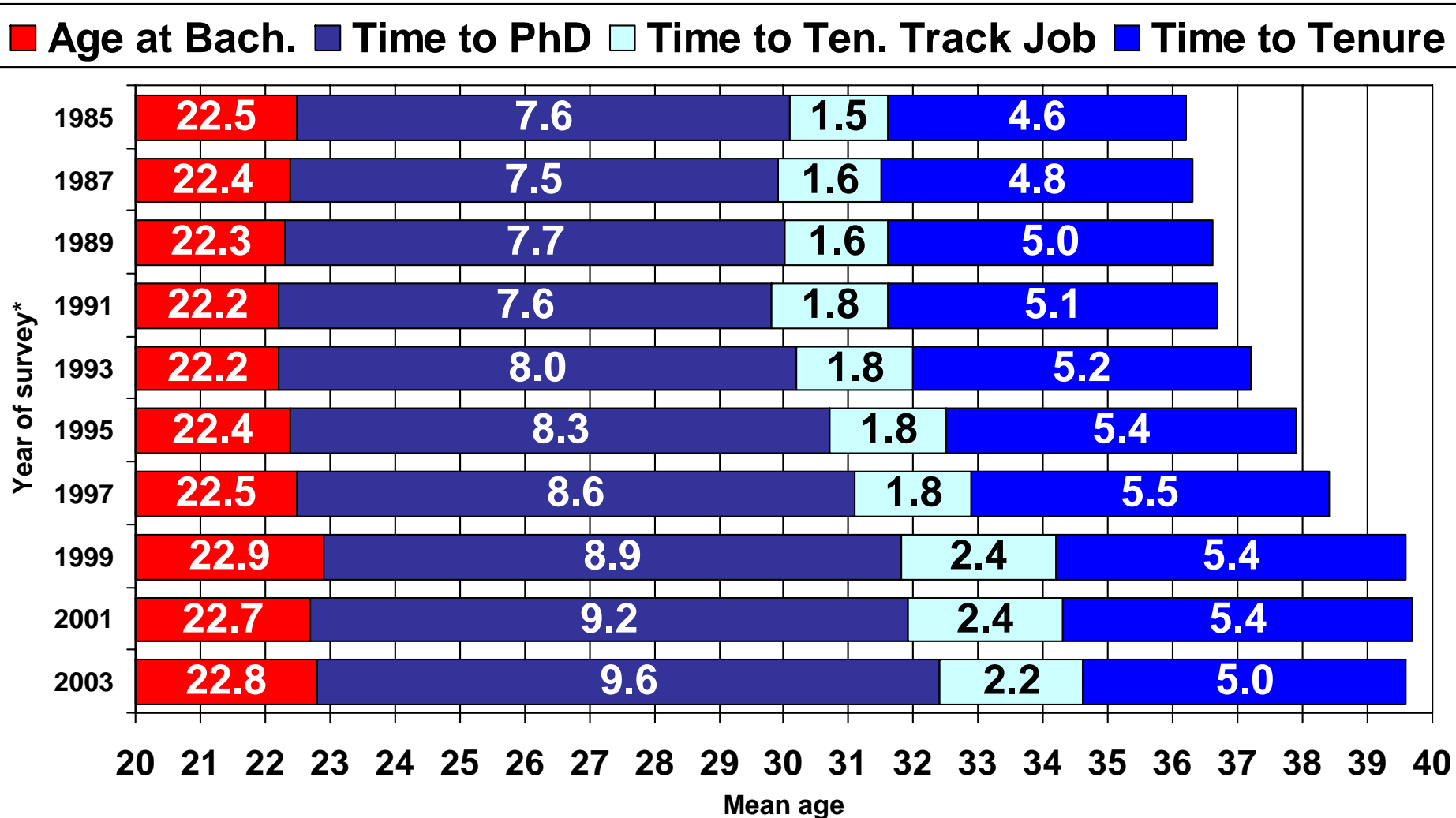
Possible Offering	# offer
1. No-Cost Extensions	8
2. Supplements to support family accommodations	3
3. Gender equity workshops	3
4. Formalized agency policy or statement supporting women in the academic pipeline	2
5. Part-time effort on fellowship or grant to accommodate family caregiving needs	2
6. Extend fellowship period for caregiving	2
7. Defer start of fellowship period for caregiving	1
8. Website(s) with clear information on support for family accommodations	1
9. Clear policy expectations for various classes of researchers (ie., not ad hoc)	1
10. Allow dependent care expenses to be charged to grants for conferences or meetings	1
11. Re-entry grants for those who have stopped out for family caregiving needs	1
12. Discount caregiving gaps in grant reviews	0
13. Provide instructions to peer reviewers on family accommodations	0
14. Data collection on gender <u>and</u> family status	0

Source: Mason, Goulden, Frasch. 2009 .“Federal Agencies Survey.”

Figure 19: Policy Recommendations – Universities and Federal Agencies

- 1. Promote clear, well-communicated, base-line family responsive policies for all classes of researchers.***
 - Federal Agencies can play a role in this by setting clear policies for various classes of researchers (e.g. NIH Kirchstein Fellows).**
 - Universities can be more proactive (draw on best practices).**
- 2. Provide Federal Agency or University supplements to offset family event productivity loss and help PIs.***
 - Explore funding models: University direct costs vs. indirect costs.**
- 3. Collaboratively, move toward a full package of family friendly policies/resources that take into account the career/family life-course.***
- 4. Remove time-based criteria for fellowships and productivity assessments that does not acknowledge in a meaningful way family events and their impact on career timing (start and end dates).***
 - Discount resume gaps due to family issues.**
 - Provide relevant instructions to peer reviewers.**
- 5. Collect and analyze the necessary data to assure Title IX compliance and assess the efficacy of existing and future policy initiatives.***

Elongating Career Timelines (Mean Time-to-Events): U.S. Science & Social Sci. PhDs Who Achieve Tenure, 1985-2003*



*Mean age calculations are based on PhD Recipients who are given up to 14 years from PhD receipt to achieve tenure, e.g. 1999 includes SDR respondents who received their PhD from 1985-1987.

Source: NSF, SDR Sciences, 1973-2003.

Note: The use of NSF Data does not imply the endorsement of research methods or conclusions contained in this report.