Federal Grants and the Academic Pipeline

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Introduction

A great deal of recent research has explored the poor representation of women in the academic pipeline, on the effects of family formation and timing on academic careers, and on the impact of academic careers on family lives (Mason and Goulden, 2002; Mason and Goulden, 2004). However, the role of federal funding in the academic careers of men and women — including graduate students, postdoctoral fellows, and faculty — has received little attention despite the fact that federal grants may play a critical part in achieving promotion and tenure in academia. In some academic fields, such as public health and biology, salary is partially conditioned on support from federal grants; in other fields, prestige is related to funding (Hosek et. al, 2005; Focus group, January 31, 2006).

Although federal funding structures and policies have yet to be thoroughly investigated for links to issues of family formation and the academic pipeline, women in academia speak clearly of the challenges: *"If you depend on grants for your research, at least in the biomedical fields, it seems that irrespective of UC's [family accommodation] policies, it would be hard to come back once one takes time off for kids. Gaps in productivity are hard to overcome when one depends on grants* (Woman faculty member, University of California Work and Family Survey, 2003)."

The current body of research on federal funding is focused specifically on gender differences in application rates, funding receipt, and reward amounts. We propose, with support

from the Alfred P. Sloan Foundation, to move beyond this research to examine in detail the effects of grant making and the structure of the federal grant process on academic culture and academics' lives, as well as their influence on university policies. To date, no other project has focused on these complex issues related to federal grants.

Our preliminary analyses indicate (in contrast to university policies) an absence of rules and regulations related to family accommodations at all levels of federal funding. Further, our initial analyses of national data point to a lower rate of federal support among tenure-track faculty women with young children in comparison to other tenure-track faculty.[1] Our proposed project will provide findings to advocate for potential solutions, and may help plug the leaks in the pipeline to tenure and beyond that have resulted in the loss from the professoriate of talented academics with caregiving responsibilities. *"When a graduate student in my NSF-funded lab has a baby I don't have any provisions or guidance around maternity leave – my grants still need to be completed on time. In these cases, everyone else in the lab has to just pull together to get her work done while she's gone* (Female professor of chemistry, UC Berkeley)."

What We Know

Family, Gender, and the Academic Pipeline

In our earlier research, using data from the Survey of Doctorate Recipients (SDR), we highlighted the importance of family issues in understanding how and why many women leak out of the academic pipeline to tenure (Mason and Goulden, 2002). We found that women PhDs who have babies within five years of completing the degree are the least likely of all PhDs

[1] Based on our analysis of the Survey of Doctorate Recipients. For the purposes of this proposal, "receiving federal funding" or "supported by federal grants" indicates having any amount of monetary support by federal contracts or grants (supporting the individuals' work activities, presumably research activities), whether as Principal Investigators, Co-PI, staff research associate, collaborator, or postdoctoral researcher or fellow. For a full copy of preliminary findings, contact Marc Goulden at goulden@berkeley.edu. Please note: The use of NSF data does not imply NSF endorsement of research methods or conclusions contained in this report.

working in academia to become tenured professors, 12 to 14 years after receipt of the PhD. The effect of this pattern and other patterns affecting women in general are clear at universities across the country, where despite comprising approximately half of U.S. doctorate degree recipients, women remain significantly underrepresented on tenure-track faculties. Many women opt out or are pushed out of academia because they consider academia and family caregiving incompatible, or because they take time off for caregiving after the PhD and cannot easily re-enter (Wolfinger, Mason, and Goulden, 2004). Those women who stay in the pipeline and secure their first job prior to becoming parents, make very different family formation choices than do comparable men (Mason and Goulden, 2004a; Mason and Goulden, 2004b). Specifically, women tenure-track faculty are much less likely to marry and have children (12 years after receiving the PhD, only one in three tenure-track women have a child if they began their position without one), and they are more likely to become divorced. Many women make strained decisions to prioritize career over family in order to obtain tenure and success in academia: 38 percent of women faculty past the age of childbearing in our UC Work and Family Survey indicated that they had fewer children than they had wanted (UC Work and Family Survey, 2003).

In recognition of growing evidence of the difficulties experienced by women in academia, many universities across the country have responded by creating and supporting family accommodation policies. The goal of these policies is to assist tenure-track faculty in meeting both their professional and caregiving responsibilities, and to keep talented women in the pipeline. Policies may include paid childbearing leave, reduced duties following the birth or adoption of a child (often referred to as active service-modified duties or ASMD), the ability to work part-time as life-course needs arise, and extensions of the tenure clock to allow a longer period of time in which to achieve tenure. Without clear policies such as these, many faculty

will avoid requesting necessary family accommodations. Moreover, findings from our UC Work and Family Survey and other researchers (Drago et al., 2005; Williams, 2000) indicate that even with unambiguous policies, many faculty can be unaware of their existence or fear that it will hurt their careers if they exercise their option to use them (Mason, Goulden, and Wolfinger, 2006; UC Work and Family Survey, 2003).

Rules and Regulations at the Federal Granting Agencies

In 1999, nearly half (48%) of tenure-track faculty ages 25-45 in the sciences and social sciences (U.S. PhDs only) reported receiving monetary support in the last year from the federal government, either through grants or contracts (see Appendix, Table 1, p. 21, based on the Survey of Doctorate Recipients, Sciences, 1999), with the largest proportion receiving support from the National Institute of Health (NIH) or the National Science Foundation (NSF).[2] Our preliminary analysis of the SDR also demonstrates that among tenure-track faculty in the sciences, support from federal contracts and grants is strongly associated with career advancement, particularly at Carnegie Research I institutions.[3] Therefore, examining the structure of the federal granting agencies is a crucial component of understanding the choices and experiences of women in academia, and of men and women who have caregiving responsibilities.

Our preliminary investigation included searching granting policy manuals and relevant media reports, speaking with individuals, and hosting a recent meeting in Arlington, Virginia, of academic and federal agency representatives, including officers from NIH, NSF, and NASA (hereafter: D.C. federal agencies focus group, 2006). Our findings indicate an absence of policy related to family accommodations. For example, not until page 191 of the 295-page 2003 NIH

[2] Because the NIH budget doubled between 1999 and 2003 this table may understate the percentage of PhDs who are at least partially supported by federal grants and contracts.
[3] For a copy of the regression results, contact Marc Goulden at goulden@berkeley.edu.

Grants Policy Statement (http://grants.nih.gov/grants/policy/nihgps_2003/nihgps_2003.pdf) is the issue of parental leave or family accommodations mentioned. The three-sentence section pertains only to Kirschstein-NRSA postdoctoral fellows, who make up a small fraction of all postdocs (roughly one of every 25 in the United States). The policy states that NRSA fellows, with approval of their sponsor, "may receive stipends for up to 30 calendar days of parental leave per year for the adoption or the birth of a child when those in comparable training positions at the grantee or sponsoring institution have access to paid leave for this purpose."[4] This policy applies to all new parents, with birth mothers receiving no additional accommodation because of medical disability. Surprisingly, no participant in our recent meeting was aware of the existence of this policy (D.C. federal agencies focus group, 2006).

Moreover, there is no mention throughout the entire NIH document of family accommodation policies related to Principal Investigators (PIs) or any other class of researchers supported on NIH grants or contracts (e.g. non-tenure-track faculty, academic researchers, graduate students, and postdocs other than Kirschtein fellows or trainees). The lack of attention given to family accommodations is in direct contrast to a lengthy section in the manual titled *Public Policy Requirements* that covers a wide range of issues, including protection of human subjects, the ethical treatment of animals, smoke free and drug free workplace requirements, restrictions on abortion funding, and the use of seatbelts.

In examining the policy manuals for NSF, the Department of Defense (DOD), and the Department of Energy (DOE), we similarly found no mention of family accommodation policies. And no one in the D.C. federal agency focus group discussion was aware of any standardized family accommodation policies that applied to any class of researchers supported by grants. In

[4] One further mention of the same policy, here applicable to trainees at institutions that have received training grants, appears on page 214 of the manual.

contrast to the lack of clarity for grantees, these agencies offer highly progressive accommodations to their own employees under the federal government's Office of Personnel Management (http://www.opm.gov/oca/leave/), including maternity leave, family medical leave, sick and vacation leave, leave without pay, flexible work schedules and teleworking opportunities. Although we are not suggesting that PIs or individuals paid off of federal contracts or grants should be considered federal employees and thus entitled to these accommodations, we find the near absence of family accommodation guidelines for individuals who are supported by grants and contracts to be notable. Some researchers who are supported by federal grants, such as postdoctoral researchers, are not considered by either federal agencies or local institutions to be employees and thus have practically no recourse in seeking necessary family accommodations [e.g. the Federal Medical Leave Act (FMLA) does not apply to most postdoctoral fellows or graduate students because they are not considered employees].

To their credit, some of the federal agencies, most notably NIH and NSF, have begun to trial-test some innovative family accommodation programs. For example, in response to concerns about the poor representation of women in the sciences, as stated in their program announcement, NIH has created a re-entry postdoc fellowship for women or men who have taken between one and eight years off after the PhD for caregiving (http://grants.nih.gov/grants/guide/pa-files/PA-04-126.html).[5] Moreover, the National Institute of Allergies and Infectious Diseases (NIAID), an institute of NIH, has a small pilot program ($500,000 out of the total NIH budget of $28.6 billion in 2006) enabling PIs to apply for grant supplements to hire extra help on a project when a postdoc has new caregiving responsibilities (http://www.niaid.nih.gov/ncn/training/pctas.htm).

[5] NSF also funded re-entry postdocs through the ADVANCE program for a few years but has now discontinued them (http://www.nsf.gov/pubs/2002/nsf02121/nsf02121.htm).

While these programs are valuable first steps, few people know about them and few are funded by them (the NIAID pilot, for example, supports only about 10 PIs). In addition, these programs use discretionary funding and may lack the necessary metrics of success and evaluation strategies to document their efficacy, making them vulnerable to discontinuation. And some potential recipients may worry that there will be a stigma attached to receiving funding by a "special" program, rather than a traditional research project grant (termed RO1 by NIH) or other more prestigious grant (D.C. federal focus group, 2006).

NSF should be commended for its ADVANCE program which provides significant funding to institutions to increase the overall representation of women in science and engineering. NSF states that one of their strategies is to "broaden participation and enhance diversity in NSF programs" and that "NSF is committed to leading the way to an enterprise that fully captures the strength of America's diversity" (NSF GPRA Strategic Plan 2001-2006). However, NSF appears not to have considered the unintended consequences of a lack of specific family accommodation policies for individuals supported by NSF grants and how this might narrow participation.

In contrast, federal agencies in some other nations offer generous family accommodation policies. In Canada, for example, the federal agencies have paid parental leave policies that allow students and postdoctoral fellows up to four or six months, depending on the agency. These policies exist even though they are not required by the Canadian or provincial government because graduate students and postdoctoral fellows are not considered employees, and are therefore not eligible for benefits under the Canada Employment Insurance program (EI). Canadian agencies also provide PIs with grant extensions of up to two years, depending on the agency, to support parental, medical or "care and nurturing" leave

(http://www.nserc.ca/professors_e.asp?nav=profnavandlbi=f5). In the European Union, the European Molecular Biology Organization (EMBO) has provisions for postdoctoral fellows to extend two-year full-time fellowships to three years part-time for those with caregiving responsibilities, and provide three months of maternity leave (http://www.embo.org/about_embo/press/family_flexible.pdf).

The Federal Grant Application and Peer Review Process

The process of applying for a federal grant is laborious and competitive. Once a grant is submitted, the revision and resubmission process can take 15 months or longer. Unsuccessful applicants have to decide whether to revise further and submit at a different time, submit elsewhere, or shift the focus of their work. As a result of budget cuts for 2006, the success rate at NSF and NIH is predicted to drop to one award for every five applicants ("Federal Spending: Academe faces first real cuts in two decades." Jeffrey Brainard, Chronicle of Higher Education, 1/6/2006). The cumbersome nature of the process may discourage parents, particularly mothers, who are considerably busier than other academics (Mason and Goulden, 2004a).

At many of the large federal agencies grant proposals are peer reviewed, and significant consideration is given to the applicant's previous progress in the area of proposed study (Gillespie, Chubin, and Kurzon, 1985). We do not yet know how peer review committees view gaps in progress, as in cases where a woman investigator has taken maternity leave. Some federal agency officials assert that review committees consider only the merits of the applicants' ideas, and that program officers retain discretion to apply the recommendations of review committees or to make different decisions (D.C. federal agencies focus group, 2006). However, anecdotal evidence from women researchers indicates a perception that gaps will count against them when they apply for future funding.

This fear of a "bias against caregiving" in academia has been well documented (Drago et al, 2005; Williams 2004). A professor of biology at the University of Illinois, Chicago, said, *"Many scientists worry that grant reviewers will note the gap in productivity and go 'Oh, this person took a year's break, they aren't really serious'* (http://sciencecareers.sciencemag.org/career_development/previous_issues/articles/3360/women_say_stopping_tenure_clock_isn_t_enough/)." A former assistant professor cited among her reasons for leaving academia after having a baby: *"Taking a year off for parental leave might be fine with UCD but would be a disaster from the point of view of the funding agencies …no study section is going to excuse a poor publication record because of childbearing …* (http://wrrc.ucdavis.edu/baby_book/last.html)." And in response to questions about family accommodation policies, a woman faculty member in the UC system wrote *"…it is extremely difficult to take this time off and still maintain a competitive edge for grants at the national level (e.g. NIH; NSF). Thus for hard science faculty, I'm not so sure that taking time off for childbearing is necessarily a good long-term strategy since once behind, you may always be behind the curve* (UC Work and Family Survey, 2003)."

Potential Consequences of the Current Structure

Based on the work of others and our own preliminary analysis, we have an initial sense of how the lack of formal policies impacts those with caregiving responsibilities. For example, as a result of the NSF Authorization Act of 2002, the RAND Corporation recently conducted and released the report "Gender Differences in Major Federal External Grant Programs," which examines gender differences in federal grant funding outcomes (Hosek et al, 2005). While this study found few or no differences between men and women in funding requested, the probability of getting funded, or the size of the award, it did not examine the likelihood of men and women, with or without children, in securing federal funding, or the population of people who did not

apply for these grants. The RAND report did find that, at NSF and NIH, women first-time applicants, whether successful or not, were less likely than men to apply again within two years. This finding is supported by research from two other studies that found that women were less likely than men to apply for funding from federal agencies (Grant and Low, 1997; Blake and La Valle, 2000). In the study by Grant and Low of agencies in the U.K., women who took career breaks or who had young children were significantly less likely to apply for grants than others. A more extensive examination of application behavior in the U.S. will provide important information about what factors are involved in women's and men's choices to pursue federal funding.

As noted earlier, our preliminary analyses of the SDR complement these findings. We have found that tenure-track women with young children are 24% less likely than tenure-track men with young children and 22% less likely than tenure-track women without young children to indicate that their work is at least partially supported by federal grants or contracts.[6] Based on the findings of others (Hosek et. al, 2005; Grant and Low, 1997; Blake and La Valle, 2000), it appears that women faculty with young children are not applying for or being supported on federal grants as often as others, though we do not yet know all of possible the reasons for this.

We suspect that, in the absence of alternatives and in combination with a competitive academic culture, federal funding agencies inadvertently create conditions that make it more difficult for women and men with caregiving responsibilities to apply for and receive federal grants, as well as reinforce an inflexible model of full-time work that leaves little time for family formation or family life. Some agency officials assert that no-cost extensions are given readily and without negative repercussions for future funding, implying that they can be used as an informal, unpaid family accommodation policy (D.C. federal agencies focus group, 2006). But

[6] For a full copy of the regression results, contact Marc Goulden, goulden@berkeley.edu.

some researchers report anecdotally that they are afraid to use such extensions for the purposes of family leave. For example, one woman faculty in the sciences described her efforts to patch together six weeks of leave following the birth of her child: *"I had enough results/effort stored up to write nominal progress reports when needed. …Then I did no-cost extensions for those grants for which it was easier, and charged/worked mostly on the other ones where no-cost extensions were not an option.… From what the administrators at the agencies, plus our own grants admin. people could find out, pregnancy and childbirth/maternity leave is not a scientifically justifiable reason for no-cost extensions or reduced effort. What I've disclosed can put me in big trouble with the agencies, but I have yet to find any honest way to get maternity leave from federal grants* (http://www.aas.org/~cswa/bulletin.board/2001/05.25.01.html)."

Anecdotal evidence indicates that women in particular struggle with these issues. A chemistry professor who attended the recent NIH/NSF workshop "Building Strong Academic Chemistry Departments through Gender Equity" (http://www.chem.harvard.edu/groups/friend/GenderEquityWorkshop/, Arlington, VA., January 31, 2006) said in a group discussion that if a postdoc or graduate student becomes pregnant they send them to another faculty member's lab, presumably where there are no chemicals, and then bring them back later. Thus, they informally provide a safety net to the postdoc or student, but only because they have chosen to provide it. Negative experiences of postdoctoral researchers such as Sherry Towers, who was coerced into taking very little time off after the birth of her child, and whose story was recently described in the Chronicle of Higher Education ("The Law of Physics: A Postdoc's Pregnancy Derails her Career" by Robin Wilson) point to what can happen in the absence of clear policy. A woman faculty member wrote, *"As a scientist with NIH funding (and young children) and with postdocs working in my lab, it is very very difficult to get the work done if someone takes six weeks off. I have and do accommodate*

women who need maternity leave, but one has to understand, NIH does not give me extra money to hire extra people to cover the work that doesn't get done in those six weeks. … So here I am having to either report to the NIH that we are behind, or I have to work extra hours to get it done myself (Chronicle Forums, November 2005)." At the Strong Chemistry workshop, three group discussions of chemistry chairs and higher education leaders — one each focused on NIH, NSF, and DOE — resulted in recommendations for change. Each of the groups independently suggested that researchers supported on federal grants need access to family accommodation policies.

What More We Can Learn

Our project proposes to build on the information we have begun to learn about the structure of federal funding and its effects on academic culture and careers by employing a combination of qualitative and quantitative methods, including individual interviews to create pertinent case examples, additional focus groups with various populations, a national survey of different classes of researchers who are possible recipients of federal support (e.g., graduate students, postdocs, academic researchers, and faculty, particularly in the sciences), and analyses of national data sets. We will use the case examples and focus groups to flesh out the issues and to assist with the creation of survey items for the questionnaire and analyses of the larger data sets. All data findings will be used to collaborate with federal agencies and others to propose cost-effective solutions to identified problems.

<u>Individual Interviews and Case Examples</u>

We will conduct in-depth interviews with a variety of individuals, from students and faculty to researchers and administrators. First, to test the information we have gathered about the rules and regulations of the funding agencies, we will develop an interview protocol that will

enable us to construct an extensive database on federal agencies' policies. We will identify and interview at least two administrators from each of the ten government funding agencies that fund the highest percent of science and social science PhDs (see Appendix, Table 1, page 21) — including ones that provide a smaller proportion of grants, such as NASA, USDA, and the Department of Education — in order to corroborate our findings. We will also include administrators from the National Endowment for the Humanities (NEH), since they are the agency most likely to fund academics in the humanities.

Second, we will conduct investigatory interviews, based on protocols, with approximately 25-30 graduate students, postdoctoral fellows, faculty, and academic researchers (we will continue to interview individuals until we reach a convergence on identified themes). We will use snowball sampling for this component, with the goal of gathering in-depth information not just from those who have successfully navigated through the pipeline to the achievement of tenure, but also those who have struggled, encountered barriers, chosen not to pursue academia past the PhD, or who have not earned tenure. We will interview men and women, both with and without children, with the hope of understanding better how individual academics view federal grants and what role they may have played in their academic careers and family lives. These narratives should help in our development of focus group protocols and the survey, and in providing us with case examples of the impact of federal funding structures on academic life.

Focus groups

We will conduct a series of approximately eight focus groups in which four separate groups of academics from the UC system – graduate students, postdocs, academic researchers, and faculty – will discuss federal granting agencies, the role of federal funding, the grant

application and review process, the experience of being supported by federal grants, and familial and career history. The focus groups will include both men and women, with and without caregiving responsibilities. We will ask them general questions about their attitudes toward federal grants and how they believe they impact careers and family or personal life. For those who have children or who imagine having them in the future, we will also ask general questions about agencies, e.g., "How do new parents manage caregiving responsibilities when they have a federal grant?" and specific questions about policies, e.g., "What policies exist for PIs with caregiving responsibilities?" We will pursue issues around application behavior, e.g., "What factors weigh in to your decision to apply or not for federal funding?" A different semi-structured interview protocol will be created for each of the groups to reflect the relative significance of different issues. For example, the graduate student focus groups will focus more on their experiences with PIs while being supported by grants, their plans and expectations for the future, and their understanding of how the need for parental leave is handled when working on a grant.

Questionnaire

Using focus group and interview findings to inform us, we will develop an on-line self-administered questionnaire for use with different populations, containing both scaled items and open-ended questions. We are adept at these types of operations, regularly conducting four to five surveys a year with a wide range of populations, including the well-known University of California Work and Family Survey of Ladder-Rank Faculty (see http://ucfamilyedge.berkeley.edu for a copy of the survey and additional information). Because the issues of concern have to do with federal agencies, this survey will include a national sample of academics from the four groups used for focus groups. Academics at different types of institutions and in different geographic

regions will likely have a different range of experiences, e.g., R1 versus liberal arts institutions. We will work with American Council on Education (ACE) to identify appropriate institutions from around the country, and work to obtain a sample of approximately 8,000 potential respondents. Assuming a response rate of around 50 percent, we will have a final sample of approximately 1,000 respondents from each of the four groups from which to conduct analyses.

Quantitative analyses of national data sets

We will seek to complement and expand our understanding of the impact of federal agency grant structures on academic careers and family lives by conducting analyses of several national datasets. To provide background information and trend data, we will access existing agency databases, such as those at NIH and NSF (assuming access is granted). Based on what we learn from the focus groups and survey, we will also conduct additional analyses of the SDR and possibly the National Study of Postsecondary Faculty (NSOPF).

One additional study will help sharpen our analysis of the impact of federal funding on academic career patterns and academic culture. Our own experience at UC Berkeley's graduate studies division indicates that many of our policies related to graduate student and postdoctoral funding are directly borrowed from federal guidelines. Institutions of higher education routinely draw on these guidelines when developing the policies that pertain to their faculty, academic researchers, post-doctoral fellows, and graduate students. Thus the impact of federal policies is magnified throughout academia as 'copy-cat' versions are replicated at universities across the nation (e.g., NIH's policies on human subjects, postdoc salary issues, ethical treatment of animals, etc.). As part of our project, we will seek to document this process of cultural transfer from federal standards to local campuses. Presumably, a similar transfer of culture from federal

agencies to academic institutions could result if federal agencies reformed their policies in ways that promoted work and family balance.

Policy Findings and Making the Case for Change

The D.C. federal agencies focus group meeting that we recently conducted was a first step toward a collaborative working relationship with representatives from the federal agencies. Many participants were enthusiastic about the need to explore further at their agencies the issues we discussed. We will create an advisory group of federal agency representatives, administrators from institutions of higher education, and academics with government funding experience to work in partnership with us throughout the course of the proposed project. Based on the overall findings of the project, we will develop specific recommendations in collaboration with this group to implement appropriate changes.

We also intend to undertake our work in close association with ACE's Center for Effective Leadership (http://www.acenet.edu/Content/NavigationMenu/ProgramsServices/CIII/), which can make the national case for needed reforms identified through the project, and assist in the dissemination of findings. We have worked with them on their highly successful Alfred P. Sloan Funded "Flexibility in Tenure-Track Careers" and would benefit from continuing collaboration. Their media conduits, access to higher education leaders from around the country, and proximity to and contact with federal agencies make them the ideal partner for maximizing the policy impact of our research efforts. We will also seek advice from legal scholars (e.g., Joan Williams, Martha West) if Title IX, or other issues of gender discrimination, come to our attention that are best assessed by a legal expert. And U.S. Senator Wyden, who attended the Strong Chemistry workshop, emphasized his intention to continue working on these issues.

In our recent federal agencies focus group meeting, agency representatives and others suggested a number of possible ways federal agencies and institutions of higher education could work together to help researchers supported on grants and contracts to better balance family and career issues. We will consider these potential solutions among the larger study findings. For example, many participants agreed that there should be clear family accommodation policies so that the various classes of researchers know that they exist and feel they can use them without negative consequences; and so that PIs know that it is even allowable for those working on their grants to take time off. Other ideas included the allowance of grant supplements for family accommodation (they are commonly given for equipment breakdown or malfunction, though the use of supplement money is discretionary and thus not to be counted on); built-in provision for the cost of family accommodation policies into the institutional overhead rates charged to federal grants; instructions to peer reviewers to discount resume gaps due to caregiving; no-cost extensions due to family accommodations as a clear option in addition to the seemingly automatic one year extension, and trial programs (e.g., reentry postdocs) with clear metrics of success from the beginning, assessed along the way to demonstrate utility.

Deliverables

Our work on this project will result in a number of deliverables, each focused on better understanding the issues at hand and the best approaches to addressing them. For example, we will:

- identify an advisory group early on and collaborate with them over the course of the project in the interpretation of research findings and the development of policy recommendations;
- create a database of policies related to family accommodation issues for the ten federal agencies identified above;
- produce case studies and reports based on focus group and questionnaire findings, and in collaboration with different members of the advisory group;

- document the influence of federal policies on academia, with resulting proposals for change (assuming they are necessary);
- write scholarly articles that share our work with the broader academic audience (e.g. the "Do Babies Matter" project and the "UC Faculty Family Friendly Edge" have received extensive national attention [see http://ucfamilyedge.berkeley.edu/press.html] and we expect this project will result in similar types of outreach);
- continue our tradition of data-driven advocacy for academics with caregiving responsibilities, seeking to plug leaks in the academic pipeline.

Conclusion

This project has the potential to lead to a substantial reform in the way that federal grant programs are formulated and, thus, on their impact on the academic pipeline. Making an effective case for change will require a great deal of additional work to allow us to identify specific problem areas and potential solutions. This effort, in concert with other reforms directed at colleges and universities, offers the hope of achieving an inclusive professoriate that maximizes the talents of all.

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Table 1: Percent of Science and Social Science PhDs Who's Work (partial or full) is Supported by Contracts or Grants from the U.S. Government, 1999

Agency	All Employed PhDs	All Employed PhDs, ages 25-45	Employed PhDs in Academia, ages 25-45	Tenure-Track Faculty, ages 25-45	Acad. Postdocs, ages 25-45	Non. Ten. Track Faculty, ages 25-45	Acad. Researcher/ Admin., ages 25-45	Employ. in Business/ Govern./ Non-Profit., ages 25-45
Any Federal Support	30%	34%	51%	48%	70%	55%	56%	19%
National Institute of Health (NIH)	9%	12%	22%	17%	45%	26%	21%	4%
National Science Foundation (NSF)	6%	8%	15%	18%	12%	10%	12%	2%
Defense Department (DOD)	6%	6%	6%	7%	4%	7%	7%	6%
Energy Department (DOE)	4%	4%	5%	4%	6%	7%	7%	3%
Health and Human Services (HHS)	3%	3%	3%	3%	4%	5%	4%	2%
NASA	3%	3%	3%	3%	3%	4%	6%	2%
Agricultural Department (USDA)	2%	2%	4%	5%	3%	3%	4%	1%
Environmental Protection Ag. (EPA)	1%	1%	2%	2%	1%	1%	2%	1%
Department of Education	1%	1%	1%	1%	0%	1%	1%	1%
Commerce Department	1%	1%	1%	1%	0%	1%	1%	1%
Interior Department	1%	1%	1%	1%	0%	1%	1%	0%
Department of Transportation (DOT)	1%	1%	1%	1%	0%	0%	0%	1%
Agency for Internat. Development (AID)	0%	0%	0%	0%	0%	0%	0%	0%

Source: 1999 Survey of Doctorate Recipients, Sciences.
Please note: The use of NSF data does not imply NSF endorsement of research methods or conclusions contained in this report.