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

DO BABIES MATTER: THE EFFECT OF FAMILY FORMATION ON THE LIFE LONG CAREERS OF ACADEMIC MEN AND WOMEN

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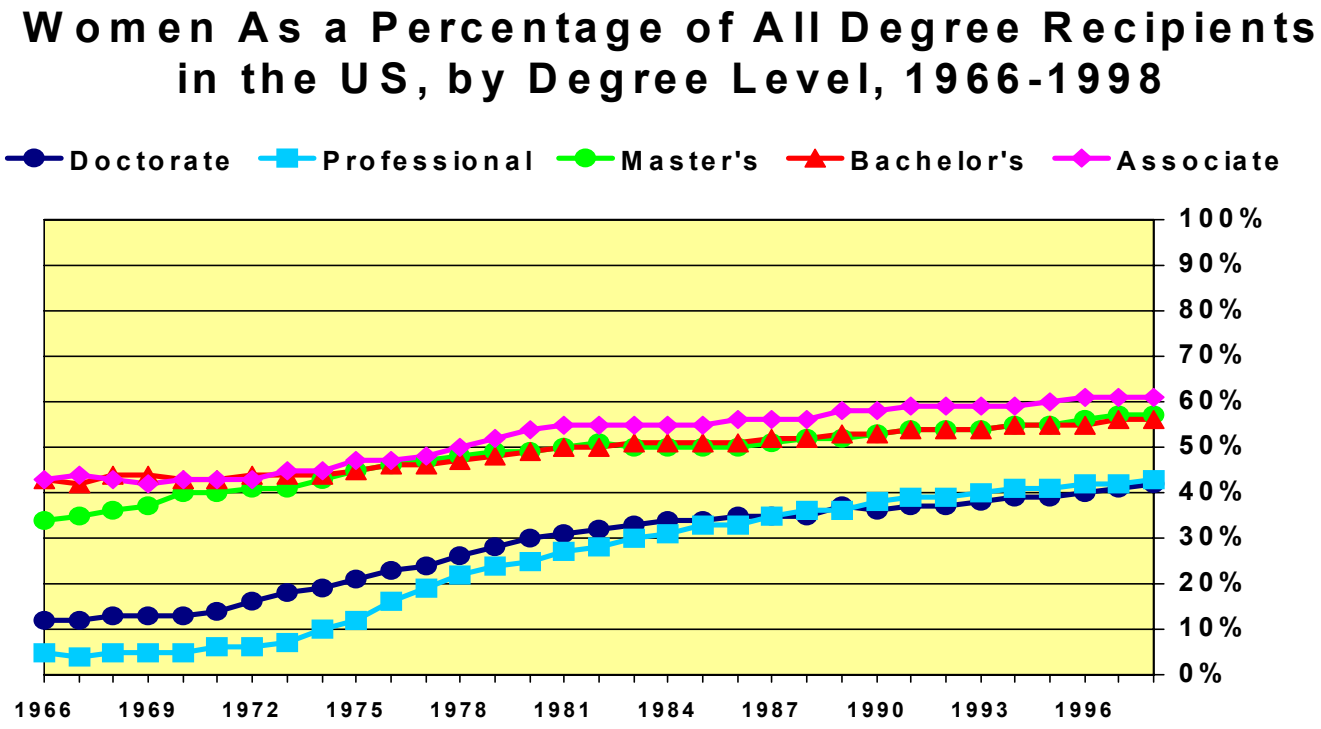
When I first became the Dean of the Graduate Division at Berkeley last year, I had an extraordinary experience. Fifty-one percent of the 2,500 new graduate students whom I welcomed were women. Thirty-five years ago that number would have been closer to 10%. The students I welcomed included not only doctoral students, but also graduate students seeking professional degrees in law, public health, social welfare, optometry, etc. On the Berkeley campus there is no medical school, but if there were, women would be close to the majority in that profession as well.



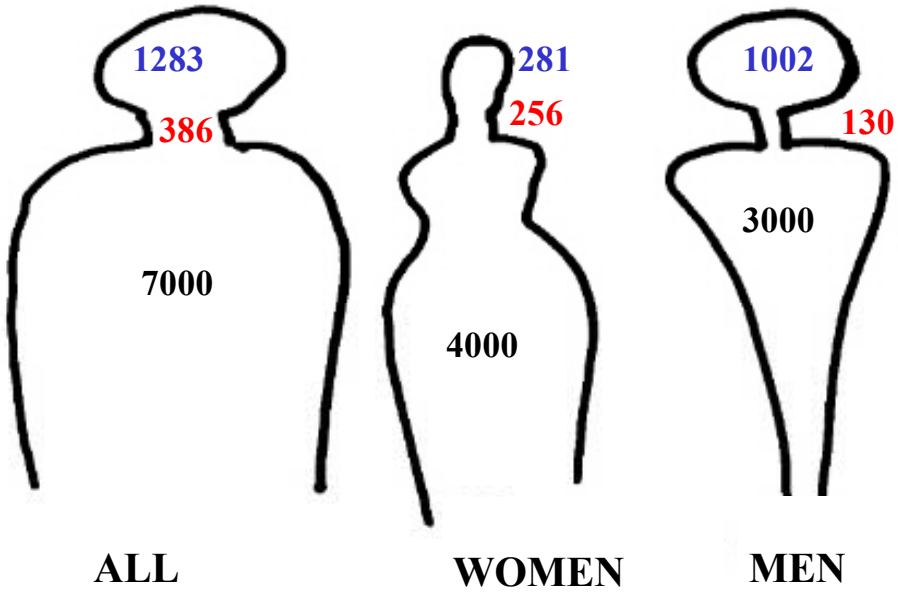
Source: National Center for Education Statistics, "IPEDS Completions Survey," taken from WebCaspar (IPEDS includes Doctorate Records File Data).

The sharp increase in women's participation in graduate education is, of course, a striking national trend. The percentage of women who received degrees in all of higher education has risen dramatically since 1966, particularly those receiving doctoral and professional degrees. The number of women doctoral recipients has

risen from 12% to 42%**,** while the numbers of women receiving professional degrees has risen even more sharply (National Center for Education Statistics, 2000). Women law school graduates, for instance, comprised only about 5% of their class thirty years ago: now women make up almost 45% of professional law degrees (a nine-fold increase). There are, of course, significant differences by discipline. Engineering, for instance, has produced far fewer women Ph.D.s than English literature, but overall the rise has been dramatic and consistent over the past thirty years.

Does this persistent steady climb in all disciplines and in all professional schools over the last 30 years indicate that women are on a winning? Are women finally achieving equality in the academy?

Employment Patterns of the University of California, Berkeley



The employment patterns at the University of California at Berkeley, which are representative of major research universities, indicate that gender equality may be the reality for graduate students, but it is a far different story for ladder-rank faculty, non-ladder rank academic personnel and staff. Using a body profile to illustrate employment demographics, it is clear that the profiles of men and women are in dramatic contrast. The figure on the left illustrates a composite profile of all employees, both men and women. The head at 1,283 represents the total faculty

count on campus; this includes all ladder-rank faculty, both tenured and untenured. The middle, smaller figure with the very small head represents women employees. There are only 281 women faculty on campus — therefore the small head. The third figure on the right with the much larger head represents men employees. This large-headed profile indicates that there are 1002 male faculty.

Moving down the body profile to the neck, the general campus profile on the left, indicates that there are 386 non-ladder rank academic personnel. These include lecturers, adjuncts and an assortment of other academics on the campus; most of whom are engaged in teaching. The neck is particularly important since non-ladder rank faculty is the fastest growing segment in higher education. The women's profile demonstrates a substantial neck, compared with the head—256 lecturers, adjuncts, etc., compared to 281 faculty—while the man's neck is very slender compared to his head—130 lecturers compared to 1002 faculty.

And finally to the torso which represents the staff. In the general profile there are 7,000 staff. The shoulder regions represent the highest levels of management, where men prevail. Women are over-represented among the staff, particularly in the lower, non-managerial region.

Women, it appears, have a body problem. They're small of faculty head, fairly large in the lecturer neck, and exhibit a substantial staff torso. Men, in contrast, have a large head, and a very small neck. Their torso bottom is slimmer than that of women but they exhibit large shoulders since they are better represented among the directors and professional. Men taper down to the usual buildings and grounds jobs at the bottom, while women spread out at the hips with a higher representation of clerical employees and food-service workers.

The profile of women however, would look significantly different if it were a large state university that was not a major research institution. Many states, like California, support a second level of colleges and universities that are largely teaching, rather than research institutions. At these institutions the profile of women’s necks, the part-time and non-ladder rank faculty, would be much larger than their heads since this population would accomplish most of the teaching. In these teaching institutions, a majority of this segment of the teaching staff, sometimes referred to as the second tier, is composed of women (American Association of University Professors, 2001).

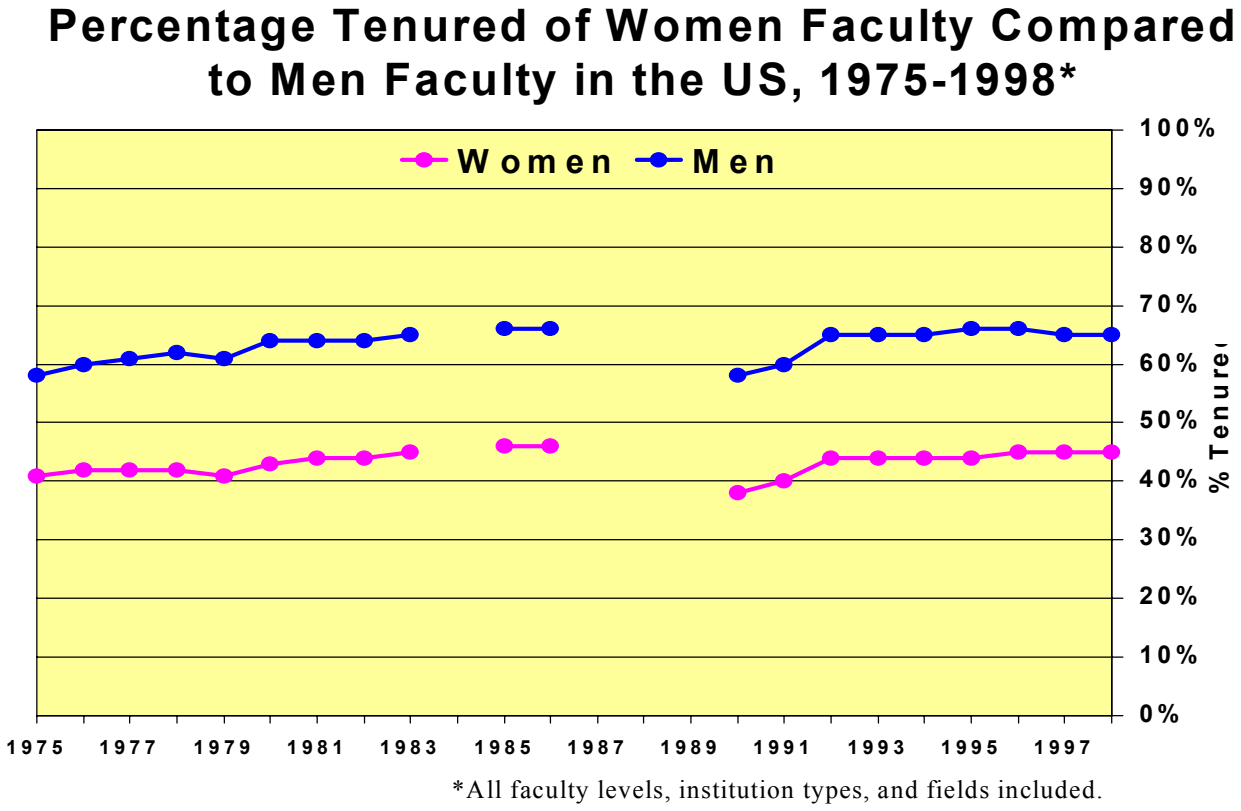
This large second tier, or neck, as represented in these illustrations, is the growing trend in Academia. Recently the Coalition on Academic Workforce (CAW) and

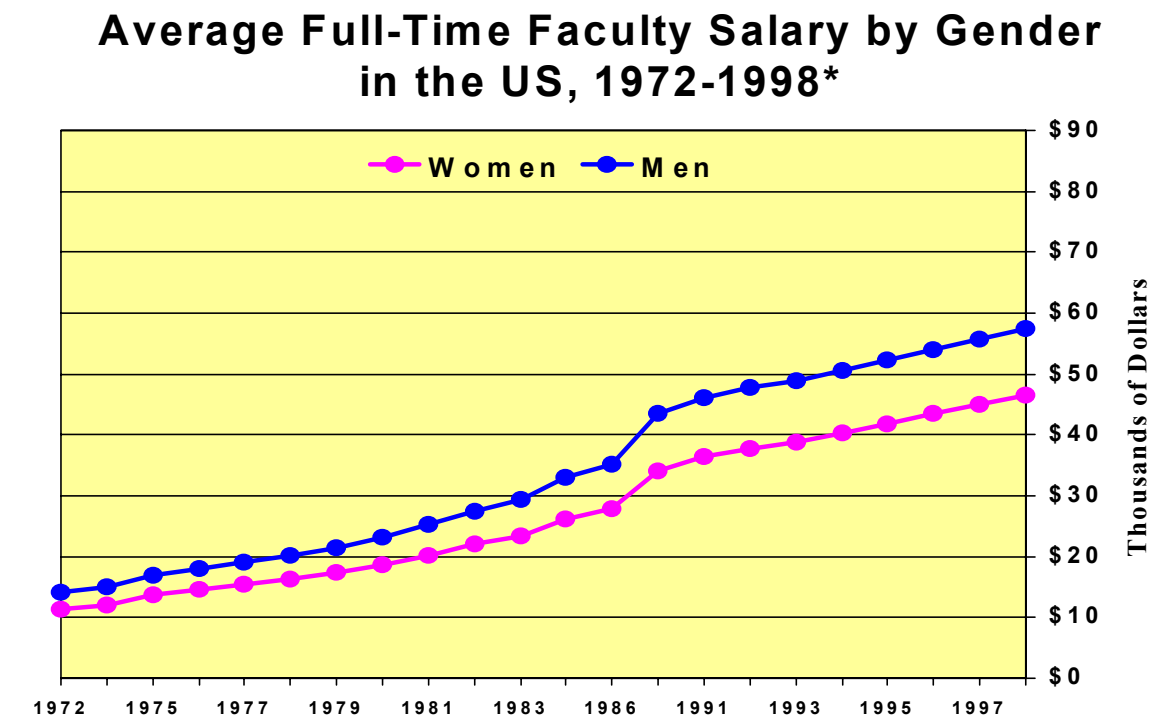
the AAUP announced that more than 50% of all undergraduate courses are now taught by non-ladder rank instructors (Coalition on the Academic Workforce, 2000; AAUP, 2001). The employment conditions of this tier vary widely. While some are unionized with benefits and security, most are without security of employment and often lack other employee benefits or any form of participation in governance.

The Under-representation of Women

Some analysts observe that women in the professoriate are not as well represented as men because they have only recently gained degrees in large numbers. Time will take care of the problem, they predict, as more young women professors are hired and the older cohort, mainly male, retires (for a discussion of historical trends, see, Jacobs, 1996).

The data from National Center for Education Statistics however indicate that the gap between the percentage of all men faculty who are tenured and the percentage of all women faculty who are tenured has been fairly consistent over time, even though the relative numbers of women faculty have grown. While women as a percentage of doctorates has grown, the proportion of those who are tenured nationally looks very much the same as it did in 1975 (NCES, 2000).





Source: National Center for Education Statistics, "IPEDS Salaries, Tenure, and Fringe Benefits of Full-Time Instructional Faculty Survey," taken from WebCaspar.

A similar phenomenon occurs when examining salary data. As with tenure there is a gap between men and women, but it is a gap that is growing larger over time. The gap between men and women has actually grown wider in the last 30 years (NCES, 2000).

What accounts for the consistent gaps in tenure and salary? Currently, there are two leading theories that attempt to explain these persistent gaps. These two theories are not necessarily contradictory, they are more likely overlapping, but their adherents tend to stand firmly in one camp or the other.

Inherent Patterns of Discrimination

The first theory, classically known as the "glass ceiling" theory, focuses on an alleged inherent pattern of discrimination, which bars women from top positions in academia and other institutions. Recently made popular again by Nancy Hopkins of M.I.T., proponents analyze the way in which women are persistently treated differently from birth. For example, its adherents claim that at birth girl babies are smiled at more than boy babies to encourage pleasing behavior; later girls are discouraged from taking "hard math" classes and steered to more "feminine pursuits. At M.I.T. according to Hopkins it meant that even the most successful

women scientists who had achieved tenure at that prestigious university were systematically excluded from important leadership roles and given different treatment in terms of spaces and resources (Massachusetts Institute of Technology, 1999). A "thousand paper cuts" as one commentator described the slights, both small and large which kept women in a subordinate position. In this theoretical framework family issues are given peripheral attention (e.g., Valian, 1998).

Work/Family Conflicts

This school of thought believes it is the unbending nature of the American workplace, configured around a male career model established in the nineteenth century, that forces women to make choices between work and family (e.g., Hochschild, 1987; Hochschild, 1997; Mason, 1988, 2001). Rather than a thousand paper cuts, it is the sixty-hour work weeks and the required travel that force women with children to leave high-track professions, including academia. In academia there is the added issue that professors must go where the jobs are and women with families do not have this flexibility. According to scholars in this theoretical framework, these women, for the most part, do not get as far as reaching tenure at MIT; they take a different route earlier. Most recently, Ann Crittenden has gained attention and praise from the feminist movement for her book, *The Wages of Motherhood*, which makes the work-family argument (Crittenden, 2001). Crittenden points out that at M.I.T., Nancy Hopkins' institution, only 7 of the 16 tenured women professors had children. Most women scientists who had children did not make it that far.

In truth there has been a great deal of rhetoric, but not much data to back up these heated debates. Until recently, there has been very little research on career patterns of most women in the academy. Women scientists and engineers at major research universities have gotten a fair amount of attention from NSF and others (Zuckerman, Cole, & Bruer, 1991; Ginther, 2001). A recent publication supported by the National Research Council, *From Scarcity to Visibility*, chronicles part of the work/family issue for this group (Long, 2001). However women in the humanities, social sciences and professions, almost half of Ph.D.s., have rarely been examined for work-family conflict (e.g., Ginther, 2001), nor have women in smaller, non-R1 universities. And almost no attention has been paid to the growing number of women in the second tier of non-ladder rank faculty, the "neck" issue.

The Survey of Doctorate Recipients and Work/Family Conflict

Our research focuses on both women and men after they receive their doctorates, from the time of degree up to 20 years out from the Ph.D. This research examines family formation and its effects on the career life of both women and men academics. Our data source is the richest available longitudinal employment database on Ph.D. recipients, the Survey of Doctorate Recipients (SDR). The SDR is a biennial weighted longitudinal study of Ph.D. recipients' post-graduate careers and family structure in the US from 1973 to 1999 (roughly a 10% subsample of the Survey of Earned Doctorates) (for more about the SDR, see, Brown, 1997; Clark, 1994; Cox, Mitchell, & Moonesinghe, 1998; Mitchell, Moonesinghe, & Cox, 1998; National Science Foundation, 1999). This data, funded by NSF, NIH, and by NEH through 1995, allows us to test the second theory; women make hard choices based on a workplace structure that does not accommodate families with children. With this data set we followed the life cycle of both women from the receipt of their Ph.D. throughout their career, pinpointing the effect of family formation on their career lives in the sciences, the social sciences, and the humanities.

Early Babies Make a Difference

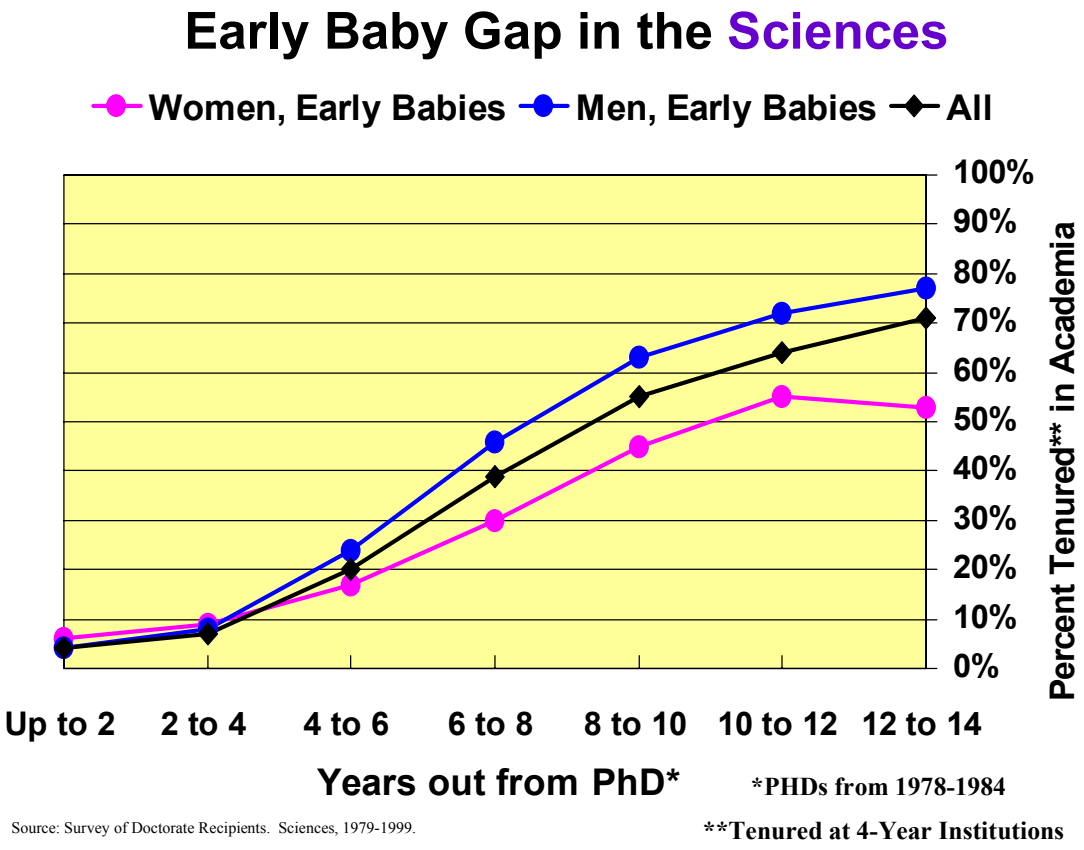
The findings illustrate, not surprisingly, that babies do matter—they matter a great deal. And what also matters is the timing of babies.

The most important finding is that there is a consistent and large gap in achieving tenure for women who have early babies in contrast to men who have early babies, and this gap is surprisingly uniform. While there are some differences between science and the social sciences and humanities, and there are some differences between large research universities and small liberal-arts colleges, the "baby gap" is robust and consistent. By our definition, early babies means that a woman or man has at least one child within the household prior to five years post-Ph.D. We chose this time period because for most it represents the time of early career development; graduate school and assistant professor or postdoctoral years. These are years of high demands and high job insecurity.

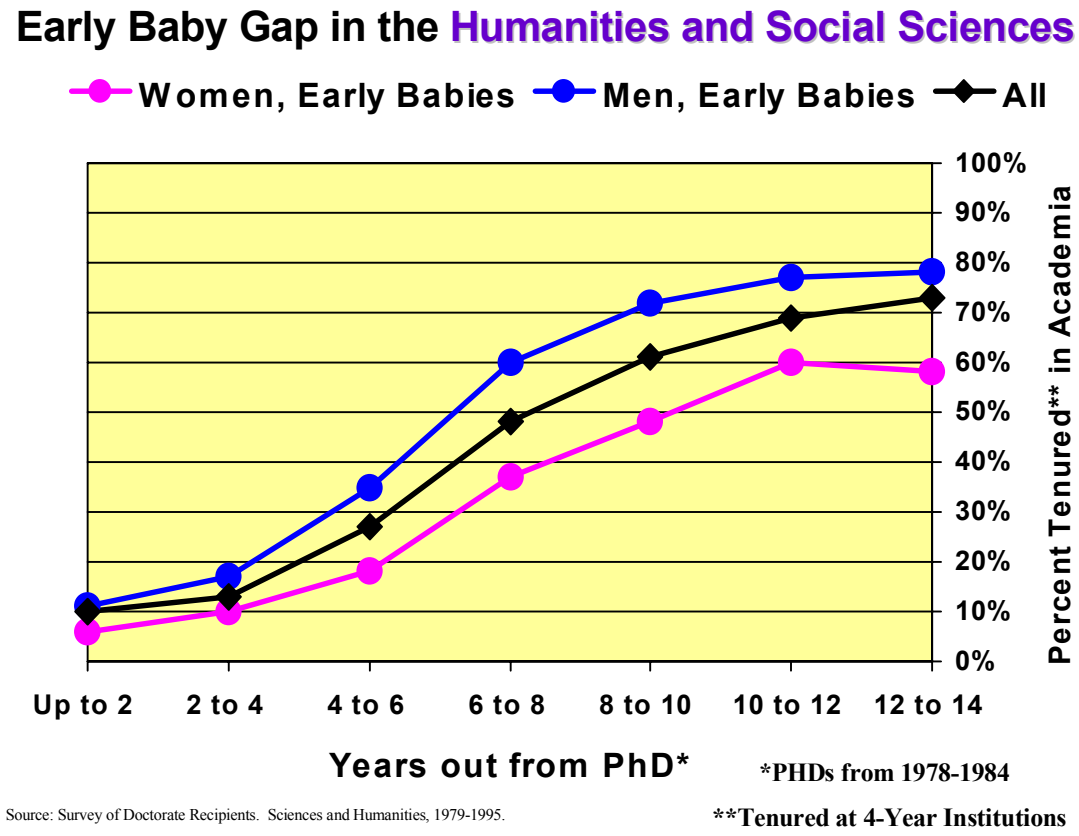
Science and Engineering Baby Gap

The striking finding in the sciences and engineering, across all institutions, no matter how large or small, is that there is an overall 24% gap between women Ph.D.s who have early babies and men who have early babies in their rate of

achieving tenure at 4-year universities among those working in academia 12 to 14 years out from the Ph.D. This gap is slightly larger at R1 universities; but it is clearly robust at all institutions.



This finding focuses on that relatively small group of women who do eventually receive a Ph.D. This is different than comparing all men in science with all women in science. We know there is an even larger gap there if we simply compared all men in science with all women in science, since men Ph.D.s greatly outnumber women Ph.D.s. This gender gap begins early in the pipeline, from the first grade.



Humanities and Social Sciences Baby Gap

The same phenomenon exists in the humanities and social sciences. There is close to a 20% gap between men and women who have early babies. While the total numbers of women are greater in the humanities and social sciences than in science and engineering, the gap reflecting the effects of gender and early family is startlingly similar to that of engineering and the sciences.

Surprisingly, men who have early babies do somewhat better than all women and men who do not experience early family formation. The phenomenon is slight and the explanation is illusive. Perhaps men with family responsibilities become more focused?

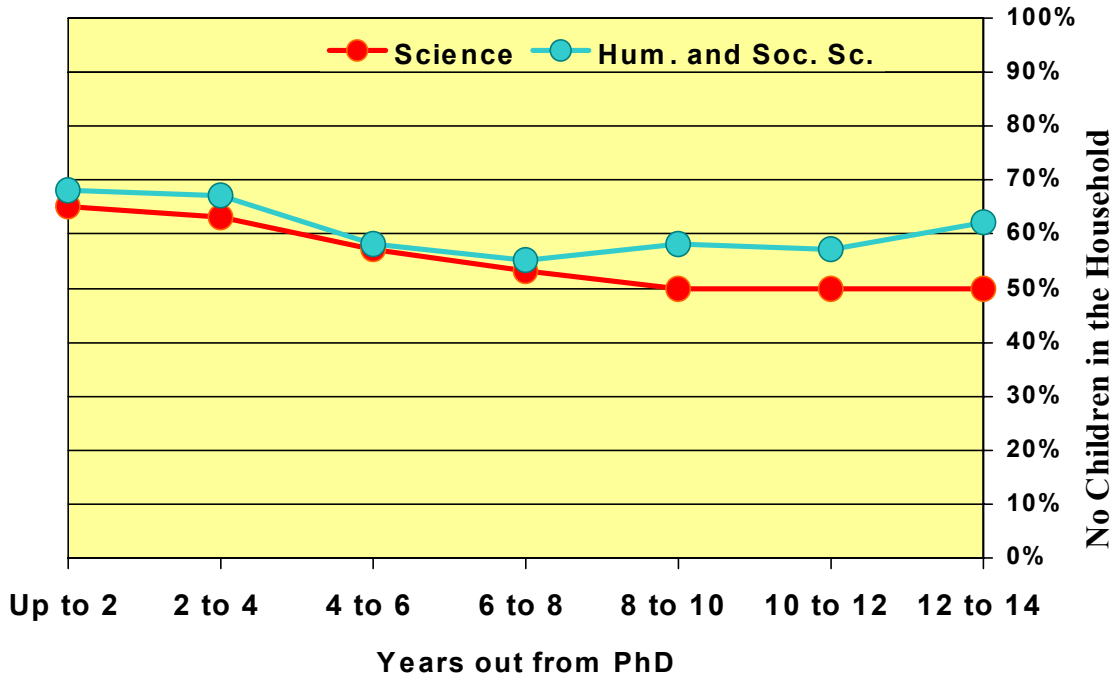
Late or No Babies

The effects are far less obvious for women with late babies. Overall, women with late babies (more then five years post Ph.D.) and women without children demonstrate about the same rate of achieving tenure 12 to 14 years out from the

Ph.D.; a rate higher than women with early babies. Presumably, women who have babies later in their career life have already achieved job security. They are also more likely to have only one child.

Overall, women who attain tenure across the disciplines are not likely to have children in the household. Twelve to fourteen years out from the Ph.D., 62% percent of women who achieve tenure in the humanities and social sciences and 50% of tenured professors in the sciences do not have children in the household (in contrast, only 39% of tenured men in social sciences and humanities and 30% of tenured men in the sciences do not have children in the household 12 to 14 years out from the Ph.D.).

Tenured Women with No Children in the Household*



***PHDs from 1978-1984 who are eventually tenured at 4-year institutions.**

Source: Survey of Doctorate Recipients. Sciences, 1981, 1985-1999; Humanities, 1981, 1985-1995.

Many of these women, we presume, have made hard life choices (e.g., Finkel & Olswang, 1996; Varner, 2000). Women in science who achieve tenure are twice as likely as men to be single. The spread is also wide in the social sciences and humanities between women who remain single and men who remain single. There are many reasons why women are more likely to remain single and less likely to

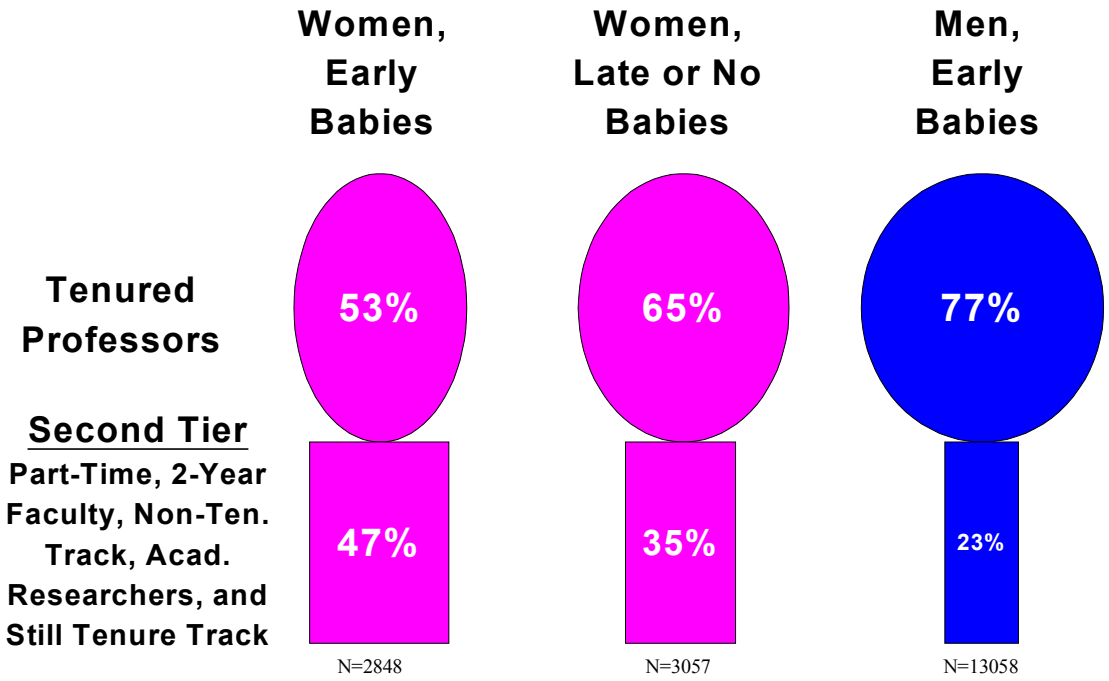
have children, but one may assume that for many it a realistic career choice based on their observations of who gets tenure in their universities.

The "Neck" Issue

Women with early babies often do not get as far as that ladder-rank job. They make choices based on family, including work conditions and location, which may force them to leave the academy or put them into the second tier of faculty: the lecturers, adjuncts, and part-time faculty, some of whom become gypsy scholars, travelling between part-time teaching jobs. Women with early babies are far more likely than those who have late or no babies to be part of the neck rather than the head. Again, this finding is consistent across the disciplines. Overall, women with early babies in sciences and engineering look very much like women in the social sciences and humanities in terms of their participation in the second teir.

Women with late or no children are also found in this second tier, but at lower rates than those who experience early family formation. Once again, men across the disciplines exhibit big heads and tiny necks. They are far more likely to be tenured faculty, and far less likely to part of the second tier.

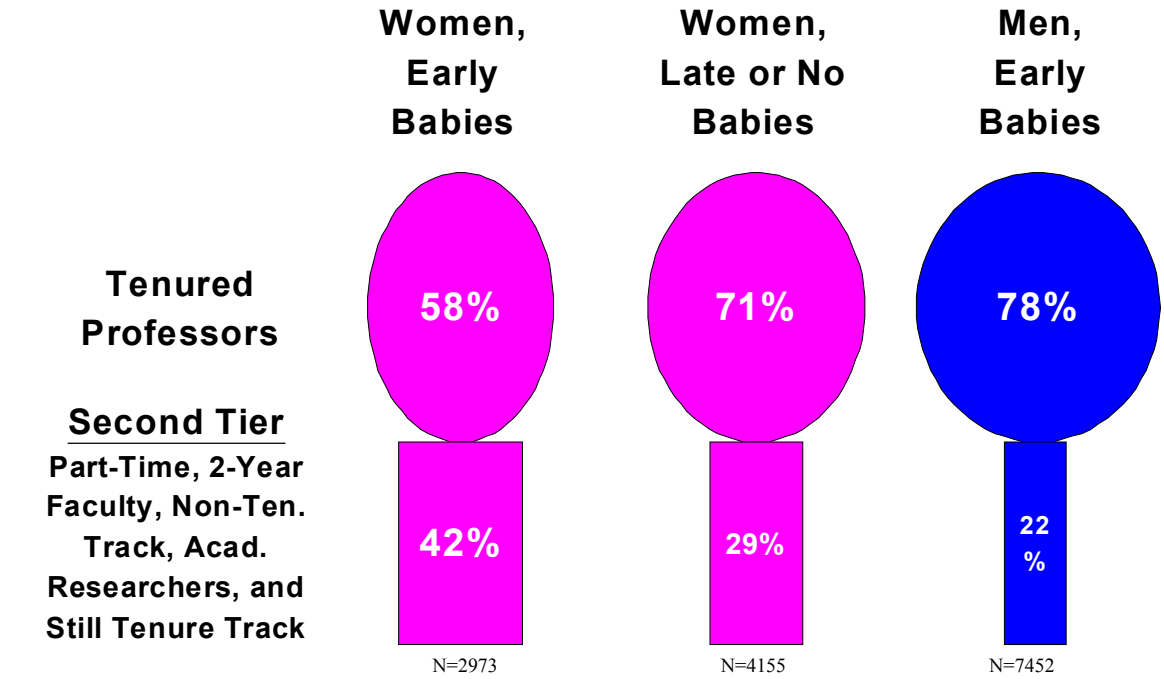
Heads and Necks of Science PhD Recipients*



***PhDs from 1978-1984 Who Are Working in Academia 12 to 14 Years Out from PhD**

Source: Survey of Doctorate Recipients. Sciences, 1979-1999.

Heads and Necks of Humanities and Social Science PhDs*



***PhDs from 1978-1984 Who Are Working in Academia 12 to 14 Years Out from PhD**

Source: Survey of Doctorate Recipients. Sciences and Humanities, 1979-1995.

And finally men, once again, have tiny necks and big heads. Men are more far more likely to become tenured professors and far less likely to become second tier academics.

This comparison reveals another finding. Women with late or no babies are more successful than women with early babies, but they are lagging behind men. This suggests that babies are not completely responsible for the gender gap. There are other factors at work, perhaps including the thousand paper cuts of discrimination.

Summary of Findings from the SDR

In sum, our study of men and women working in academia 12-14 years out from the Ph.D. reveals the following:

DO BABIES MATTER?
Our preliminary findings based on the SDR

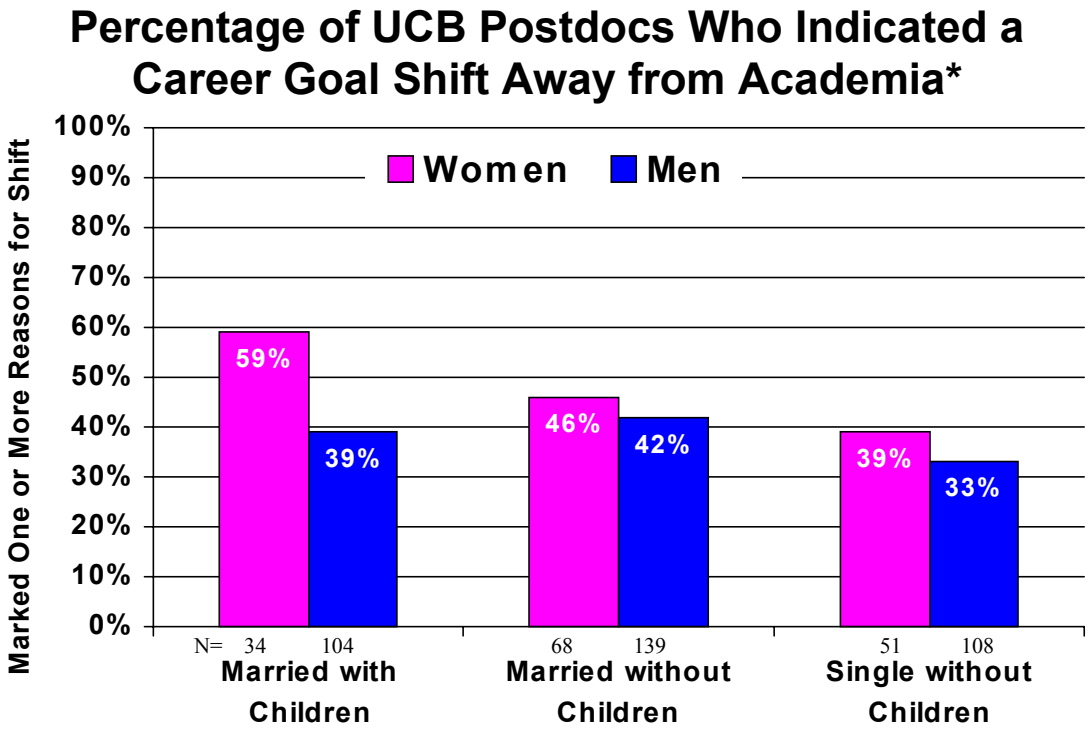
- The baby gap. Women who have at least one child in the household early in their career are 24% less likely in the sciences and 20% less likely in the social sciences and humanities to achieve tenure than men who have early babies.
- Men who have early babies are somewhat more likely than all others to achieve tenure
- Women who have babies later in the career look more like women who have no children.
- Overall, the majority of women who achieve tenure have no children in the household at any point in time after the Ph.D.
- Women who have early babies are more likely than others to become a "neck problem", i.e. part of the non-tenured academic second tier (lecturers, etc.).

The Decision-Making Process

The SDR data reveals large-scale trends over time. But how are the decisions actually made and at what point? This information can best be obtained by a smaller and different kind of database. We have used a survey of the attitudes of postdoctorates at Berkeley in the year 2000. This snapshot survey of the life of postdocs captures some of the decision points for women and men and isolates the effect of family formation on these decisions.

More than 800 postdoctoral fellows at the University of California, Berkeley were surveyed. Most of these postdocs are in the biological and physical sciences, with a relatively small number in the social sciences. About 35% of the postdocs are women; and of these, 32% already have at least one child. The majority of these postdocs, both men and women, are married. Within this group, many of whom are in the beginning of their family formation cycle, there is a wide range of responses to issues of family and future career path.

The postdocs were asked a number of "feeling questions"; how do you feel about your future career, about your postdoc experience, the quality of mentoring, etc.

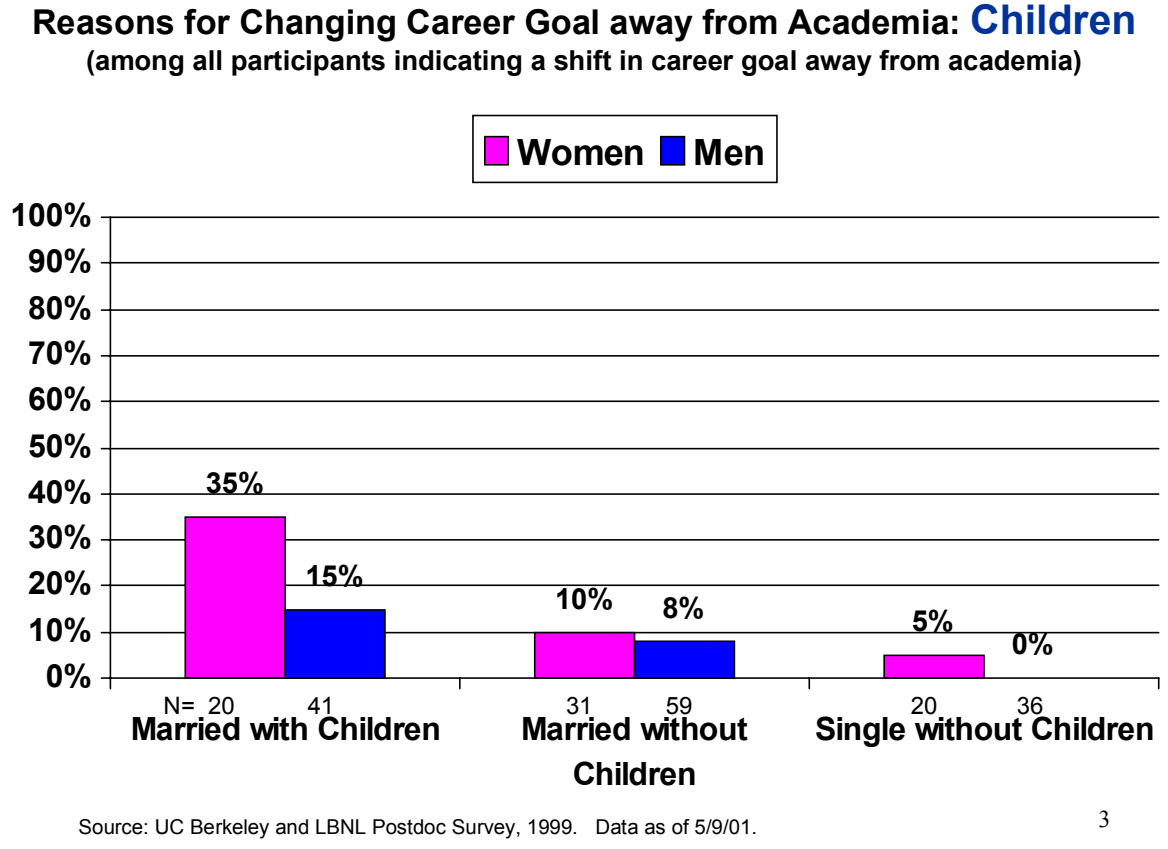


*Among all survey participants.

Source: UC Berkeley and LBNL Postdoc Survey, 1999. Conducted by Maresi Nerad, Joe Cerny, and Linda McPheron.

One of the most revealing question series asks them about whether they have shifted their career goal away from academia.

Fifty nine-percent of married women with children indicated they were considering doing so. And women with children were also far more likely than the other groups to cite children as one of the reasons they changed their career goal away from academia. Not surprisingly, on another question series asking about sources of high stress as a postdoc, women with children were the most likely to indicate that balancing career and family was a source of high stress for them (over ¾ cited this as a source of high stress).



On other indicators, women with children worked significantly fewer hours per week in the laboratory (averaging a little over 40 hour per week in comparison to more than 50 hours a week for the other groups) and presented research findings at far fewer national conferences (45% of married women with children did not present findings at national conferences in the last year in comparison to only 24% of other groups)

With these performance indicators you can imagine that their mentor, the professor or sponsor with whom they were working, would not be as likely to recommend them for research university positions.

Two-Career Issue

Married women without children, also expressed somewhat more ambivalence than their male counterparts about remaining in academia. Location was an important factor mentioned by many of them. In this question series, location worked as a proxy for the dual-career couple problem. Choices would have to be made regarding their spouses' location and career and these seemed likely to affect what career route they followed (e.g., Ferber and Hoffman, 1997).

Overall, the two-career dilemma is more of a problem for women more than men, since most women academics are married to academic men and most academic men are not married to academic women. This fact has been established in other studies than this survey (e.g., Cerny & Nerad, 2000).

Single Women

Single women without children were also more likely than men to be considering a career direction away from academia. There was less of a predictable pattern here, but some of these women mentioned social isolation as a negative factor. Bench laboratory science, the chosen specialty of most of these postdocs, can be very isolating—postdocs may meet few people outside of their laboratory. This is the group of women that is most likely to achieve tenure; but they are also more likely than other groups to remain single.

All three groups expressed concerns about mentoring. The postdoc experience is very dependent upon the relationship with a single professor. A higher percentage of women than men indicated dissatisfaction with this relationship (32% of women were dissatisfied in comparison to 18% of men).

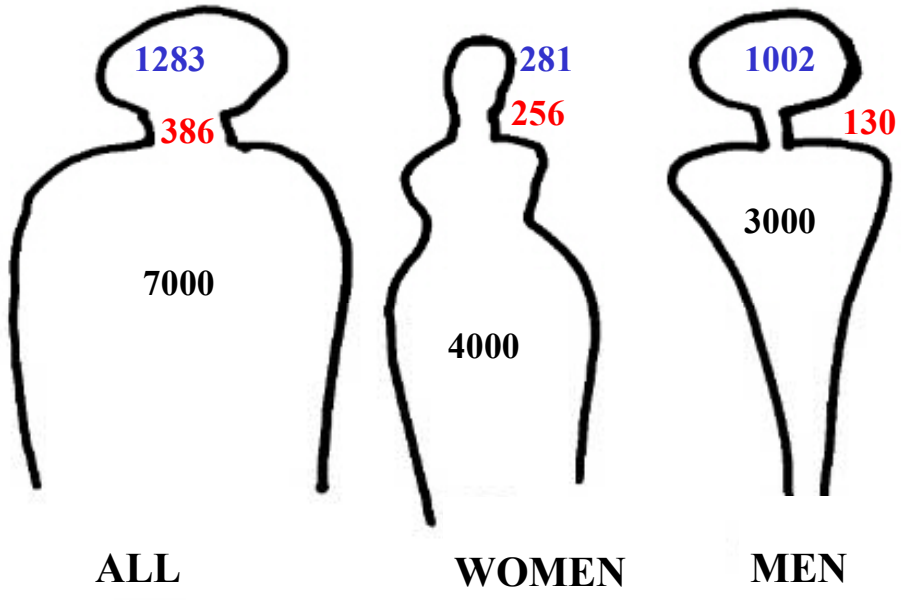
POLICY CONSIDERATIONS

What do these findings mean for graduate students and for young faculty in their years of family formation? Do they tell women that men can have babies, but women can't? And that babies, particularly early babies, are the kiss of academic death? And do they tell men that it is good for their career to have children early?

There is a danger that these findings could help to revive the old saw that ruled the academy for most of history "Don't waste your time on women graduate students—they will only have babies and drop out. Large numbers of academic women are clearly already getting that message—they are not marrying and they are not having children, while men are.

We have done a much better job of opening up the competition to women than we have in leveling the playing field. Merely opening up graduate education is clearly not enough to assure equal opportunity in the long run for those women who choose to have children.

Employment Patterns of the University of California, Berkeley



Policy recommendations must focus on all three levels of the body: the faculty head, the part-time and adjunct neck and the staff torso. While the recommendations are different for each body part, the common theme is TIME.

Raising children takes time and only an accommodation to that basic fact can allow women to ultimately achieve their career goals.

Recommendations for Head (ladder-rank faculty) Problems

Faculty are the major concern for most academics and most institutions. Recently, the AAUP offered an important revision of the cherished Redbook, *the Statement of Principles on Academic Freedom and Tenure*, which has served as the bible of the academy. The revisions are part of the work of the Subcommittee on Academic Work and Family (AAUP, 2001); they express a concern for the fact that women with families are having a hard time in the probationary period before tenure—the six or seven years of struggle as an assistant professor; the time period in which many women have early babies.

RECOMMENDATIONS FOR HEAD (LADDER-RANK FACULTY) PROBLEMS

I. AAUP RECOMMENDATIONS

a. Pregnancy-disability leave
b. Family-care leave
c. Emergency-care and other short-term leave
d. Longer-term leave for child rearing or other family responsibilities
e. Active service with modified duties
f. Stopping the tenure clock for childbirth
g. Child care
h. Elder and other family care
i. Flexible work policies and schedules

Most of these recommendations deal with time issues. It is not news that children, particularly babies, are very time consuming. But this basic fact does not get recognition in the academic workplace.

Our findings suggest additional recommendations for ladder-rank faculty both earlier and later in their careers. A large proportion of women, particularly those with early babies, drop away before taking on a tenure-track job. They need to be counseled and supported much earlier, in their graduate student days, where they are making difficult decisions. Also, women with children face difficulties after

achieving tenure as well. The majority of their career life will be post-tenure and they need support in taking full advantage of opportunities presented and in moving into leadership roles.

These additional recommendations include two important new suggestions. First, as noted, women with Ph.D.s are far more likely to marry men Ph.D.s than are men and that in the early child-raising years women are far more likely to defer to a husband's career (Nerad & Cerny, 2000). Therefore, accommodating two career couples becomes an important "family friendly" policy.

A second, more radical recommendation is to both provide a part-time track with re-entry rights to full-time for early child-raising years and to discount "resume gaps," which indicate the candidate has been largely inactive for few years based on motherhood demands. Both of these require a very different look at the linear career clock that has persisted, almost unchanged, in the face of the radical demographic gender shift.

RECOMMENDATIONS FOR HEAD (LADDER-RANK FACULTY) PROBLEMS (continued)

II: OUR RECOMMENDATIONS BASED ON FINDINGS

a. Mentoring of graduate students and postdocs regarding family/career conflicts
b. Stopping the clock and other leave policies for graduate students and postdocs
c. Accommodating two academic career couples
d. Faculty support groups for family issues
e. Part-time track with re-entry rights
f. Discounting the "resume gap"

Recommendations for Neck (part-time and adjunct faculty) Problems

Almost all the debate about family-work conflict has focused on ladder-rank faculty. As our findings show, there is a large proportion of women with children who are in a non-ladder rank position. Virtually every four-year institutions is supported in part by this cadre of mothers. More and more they are teaching the undergraduate classes. Their temporary name cards can be found on office doors

throughout the academy; yet, for the most part, they are treated as if they are invisible.

The second-tier issue is difficult because we would all like it to disappear. In the ideal academic world, all faculty are fully-employed, perhaps with a flexible or reduced schedule, ultimately fully secure with tenure and fully benefited.

But we also know that those part-time and adjunct faculties are not going disappear at least not in our career lifetimes. The economics of the university dictate that the second tier is indispensable to most institutions.

Rather than ignoring the second tier, there are policy measures that would greatly relieve neck problems; a very large proportion of whom are women with families. Part-time and adjunct faculty often choose this track because it does provide them the flexibility and the TIME that ladder-rank faculty are not offered. And for some, it would be an acceptable career track if the problems of security and participation could be resolved. Security of employment and of benefits is a major labor force concern in all arenas. In addition, becoming a visible participant in the framing of the curriculum they are asked to teach, and in the overall departmental and university community is of great importance to many.

RECOMMENDATIONS FOR RELIEVING NECK PROBLEMS

a. Fully benefited positions of at least 50% time
b. Security of employment (by long-term contract) after a number of years
c. Participation in faculty and departmental affairs
d. Recognition of research and publication efforts
e. Family-leave benefits equivalent to faculty members
f. Regularized standards of appointment, review and retention

Recommendations for Torso (staff) problems

University staff have not been in the scope of this study, but we do know that staff are more likely to be female and we can guess by observation that they may be more likely to be mothers than the tenured-faculty women.

Efforts at developing a family-friendly university should also include staff, the infrastructure upon which institutions function. Staff are better protected in many

ways than second-tier faculty. Usually they have full pay and benefits and fairly good protection against arbitrary dismissals. But they do not have some very important benefits that faculty and part-time women do. They do not have flexibility. During the holidays, for instance, most academics will have a month or more when they do not have to be at the university and can attend to their family. Summer is similar. Staff get days, not months off from work. They share the lack of childcare with faculty, but they have no ability to organize their work lives around their children's school schedules. Staff with families in universities and in all other institutions need more flexibility and more economic support for family matters.

RECOMMENDATIONS FOR RELIEVING TORSO PROBLEMS

a. Paid parental leave for childbirth and family illness
b. Flexible hours
c. Subsidized childcare

Finally, it is important to observe that the body problems, which have been introduced in this article, are not unique to academia. The same small head, thick neck, and large hips would represent women's relative representation in most institutions; we know it looks like most large law firms and hospitals, but further analysis would probably show that it also represents the FBI, the CIA, and the armed forces.

This article focuses on a very large social issue; how to deal fairly with the great majority of working women who are also mothers. The academic world has some particular twists to it; its up-or-out system of tenure and the fact that academics, more than most workers, cannot choose a place to live—they must go where the job is. But overall these issues are not unique to the academic world. The academic world, however, in its role as the purveyor of enlightened ideals, is in a position to provide a new model for the successful balance of work and family.

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