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## 10 Dual male and female worlds of science

Two scientific worlds, one male, the other female, emerge from the faculty interviews. These dualities were expressed in the key moments of an academic science career such as setting up a lab and preparing for the tenure decision. The question of how to act as an advisor to female graduate students was also fraught with tension. With respect to these various issues, the female experience in academic science was typically far more difficult in contrast to the well-connected male. Lacking a satisfactory conduit for information, a junior faculty woman reported that she and her peers would 'sit and discuss for hours and hours what to do, then we walk away not knowing if we should do it because we are too young. We are brand new in this department and we don't know if that is the way to do it.' Even having peers did not necessarily help, for they were equally clueless.

For others, the separate and unequal experience was one of invisibility and denied professional identity. A new woman faculty member may be mistaken for a secretary, student, or technician by hostile older men, or considered inauthentic: 'I really don't know what they think [about me] because I interact with them so rarely. I mean I'm the only woman among 42 faculty members, so they don't know what to make of me, period. Most of the faculty here are used to treating women as wives and secretaries, or both.' Bereft of connection, there is an inability to check on day to day tasks as basic as 'people to talk to so that I could compare labs', and no mechanism for reassurance which would occur 'if everyone had a chance to talk to somebody. Then it would be okay. They could see things can work out.' Without such collegueship, one's science is depleted.

The impact of a first experience of professional and personal ostracism is heightened because it is unanticipated at this level of achievement. Echoing the astonishment of many women graduate students who suddenly find themselves socially excluded upon entry into a Ph.D. program, this successful woman scientist describes her awareness of her own social emptiness when she reflects that 'I'm not on bad terms with these people. I'm on no terms. On every superficial level I have something in common with them, but I have no relationships. Everywhere I've been in my life, I've made friends. Here it is a black hole.' Another faculty woman reflects that 'I was never aware of any gender-based discrimination when I was a graduate student or post-doc. It's something I'm only aware of now that I am interacting with an older generation . . . I'm just coming to grips with the fact that there really is a problem. I've now seen enough people to know there is a problem.'

Neglect by colleagues can also hurt the development of a sense of professional identity. For the first time, reflects this junior woman, 'you begin to notice things you probably never noticed . . . I started the same time as my husband and his office partner. We're all about the same age. Everybody [on faculty] kept coming up to me when I first got here asking "oh, so who are you working for?" That never happened to those guys. These colleagues probably feel more comfortable, so they ask the guys to do things. So it gets lonely. A lot lonelier as you move up because you have no peers to talk to.' After being introduced at a party to welcome new faculty, a woman faculty member recounted that 'one organic chemist said to me, "Oh, I really respect women in science. You know women just aren't mechanically inclined, so I'm really impressed when I see one in science."' At first you think it's an isolated incident and then it happens time after time after time, and you realize these people have a problem.' Women often face the constriction of supportive professional networks and collaborations, as helpful to achievement in science as in other endeavors.

Exclusion is also experienced as devaluing and undermining female faculty members' opportunities for scientific success. After a brilliant

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graduate school experience, one young electrical engineering professor recalled the feelings of abandonment and anxiety during her first year in the department while she attempted to relocate, set up her lab and teach: 'The department treated me like shit. The one guy who brought me up here, he didn't do a damn thing. It took eight months before my name showed up in the front. No one ever told me I could get a phone charge card, so for two years I've been paying for the calls myself. Before I got here the former chair said, "We'll put you up for a PYI" [Presidential Young Investigator]. I had been here three days and he said, "Maybe we won't put you up for it this year. Go out and get some teaching experience, go to some conferences and get to know some people in your field." Nobody told me about something I was responsible for until a week before it was due. It was my first proposal. They never appointed a mentor . . . a man or woman, it wouldn't have mattered. At the end of my first year I got extremely depressed. It was very bad. It took a hell of a lot out of me. I was very anxious.' Not only was the scientific potential of this young faculty member harmed, the department hurt itself by not encouraging all its members to achieve and thus advance the collective academic reputation.

Without full membership in the scientific community, a deprecating sense of self-consciousness appears to permeate the female scientific experience. Not only are the professional linkages missing for basic information and career building, but feelings of alienation give rise to vigilance, guardedness against rebuff and the need to 'prove oneself.' The outcome is a reluctance to 'climb the ladder to get something I want. I try to do it on my own. On my own capabilities,' as this woman biologist described. Ultimately, lack of full membership in scientific activity creates uncertainty and self-protectiveness. A protective response sometimes takes the form of niche work or perfectionism, finding an out-of-the-way research field to cultivate on one's own with such a degree of certainty that it could not be subject to attack. This is the obverse strategy of identifying a 'hot topic' that leading figures in a field cluster around simultaneously in a race to be first with a brilliant hypothesis or a definitive finding.

Since women faculty constitute only a tiny minority in many departments, generational discrepancies in values and scientific style among women themselves can further isolation. A young female faculty member expressed the feelings of many of her contemporaries whom we interviewed, 'One of my biggest problems here is gender bias from the older faculty. I never have worries like that from people of my own age. I really think it is a generational problem.' A female chemist who had a close collegial relationship with her advisor in graduate school, a contemporary, was unexpectedly stunned when she spoke in a faculty meeting: 'I got this guy so riled up that he sent a memo around saying it was totally inappropriate for junior faculty to speak at faculty meetings.' Experiences such as these help explain why the minuscule number of an earlier generation of women may have been left with no alternative but to adopt a style that would make them more acceptable to their male colleagues.

The effects of negative treatment of female scientists carry over from within the university to the external professional world. Women, for example, become reluctant to introduce themselves into informal groups at scientific conferences and meetings. A tenured biologist still feels '... very isolated. It starts to cycle in: I start to withdraw, the more withdrawn, the more isolated. It gets more and more difficult to be there. My perception has been that it's a boy's club. It's hard to break in on them, especially if you are a young woman. My male friend says, "It's hard for me too," but then I point out to him that you may feel awkward, but you always walk over and when you do they separate, and there you are. I can't even walk over and I don't know what would happen if I did.' Isolation begets expectations of isolation in a spiraling fashion.

Even as they are discriminated against, female scientists are expected to assume the official responsibilities of minority status in academia. Women will be asked to take on more tasks within and outside the department than their male equals, because of their status as 'the token woman'. Paradoxically, this role enjoins that an individual who is invisible because she is different, become visible

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because she is different. It is, of course, an additional stressor in what is  
 already an inordinately stressful new situation: 'When I first got here I  
 was asked to be on a lot of university committees and [male] colleagues  
 at the same level weren't asked. So I realized pretty quickly that it was  
 because I was the only woman in the chemistry department and a lot of  
 these committees want to have representation by women. So when the  
 Dean's office called me up once I said, "Look, you're only asking me  
 because I'm a woman, so give me a break and let me do my research.'"'  
 Of course, in declining, one runs the risk of being considered a 'bad  
 citizen', even though it is in a Republic of Science where she is often  
 not accorded full citizenship.

#### TENURE

The contradiction between the tenure clock and the biological clock,  
 for women, illustrates the taken for granted compatibility of the career  
 structure of science with traditional assumptions of male youthful  
 achievement. Despite the paucity of evidence that youth is associated  
 with scientific achievement (Merton, 1973), the U.S. academic system  
 is geared toward a forced march in the early years, allowing a slower  
 pace later. This is exactly the opposite of the structure that would be  
 preferable for most women. Until it is changed, there is little prospect  
 of attracting a significant number of women to careers at the highest  
 levels of academic science.

The incompatibility of the seven-year race for tenure with the  
 biological clock for child-bearing has obvious negative consequences  
 for women's participation in high-powered academic science. A male  
 faculty member told us that if women would wait until after age 35 to  
 have children, there would be no problem. They would be able to  
 pursue tenure single mindedly without interference from other  
 obligations. He recognized that most women were unwilling to delay  
 having children that long and thus saw no answer to this dilemma.

A graduate, now a professor at another university, reflected upon the  
 relationship between the biological and tenure clocks. In discussing  
 her plans for children she said: 'I take every day as it comes. It would be

outrageously difficult. I would feel much more confidence if I had tenure but I would be 38 and I don't choose to have a child that late.' A faculty member's tenure review has caused an added measure of anxiety. She said: 'When it comes to the real facts that's when you feel discrimination. The pregnancy worries me. It's the wrong moment, always the wrong moment. It puts you on a slower track. Maybe they do see it like that. Maybe I've ruined my chances. They want you to sacrifice something. If the baby hadn't shown up, I would have pushed for an early decision. Now I will wait.' Career disruptions are often caused by the inability of the academic system to easily allow a modest reduction in workload. A supposedly temporary withdrawal is often the only option, but the expected return sometimes does not happen.

Departmental and university-wide efforts to make workplace child-care facilities more widely available would help. An infant care center in a neighboring school, discovered by one female graduate student, helped several women with children in one of the departments studied to carry on their graduate work virtually without interruption. The center, caring for children from ten weeks to three years of age, was an experimental site with a capacity of eight children. Although there were a few other facilities for older children affiliated with the university or located in the neighborhood, child care is still a major concern for parents. It has received more attention from companies than universities in recent years (NRC, 1993).

#### RESISTANCE TO CHANGE

If the objective is a significant increase in the number of women pursuing high-powered scientific careers, institutional accommodations will have to be made for women who wish to combine family with career. Accommodation is currently made for faculty members, typically men, who found corporate firms or research centers; however, these time conflicts usually occur after tenure has been attained, whereas women's time conflicts involving family responsibilities tend to occur earlier in their career trajectory, prior to

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tenure, placing them at risk. While time conflicts at later career stages  
 may affect colleagues' views of a department member, they seldom if  
 ever damage the career.

To achieve equality it is not just a matter of opening up opportunities  
 but of changing the structure of the academic system. Simply put,  
 women are more vulnerable than men prior to tenure. Accommo-  
 dation for time conflicts must be made for women faculty members  
 with children. Women who wish to pursue traditional female roles  
 along with a scientific career must be accommodated by allowing a  
 longer time span before the tenure decision. This accommodation had  
 been promised to one faculty member in our sample but subsequently  
 was not allowed.

Even under the best of circumstances the academic structure is  
 resistant to accommodating family needs. A female faculty member in  
 another department was able to arrange a modest reduction in official  
 time commitment involving a reduced teaching load. She reported  
 that, in her department, 'The faculty have been very supportive of me  
 having children. After my review I've had people say, "How can you do  
 that and have children too?"' This professor adopted the strategy of  
 reducing her work load and lengthening the time period before the  
 tenure decision.

She said that, 'The university policy allows you to work part-time to  
 have children . . . that part-time work stops the tenure clock for the  
 percentage of time you are not working. Because of tenure, I didn't  
 want to cut my [research] back by 50%, so I made an arrangement to  
 work 70% and cut the teaching load. Everybody assumed, including  
 the chair that this time off would not count for tenure. A year before I  
 was supposed to come up for tenure the chairman brought it up to the  
 provost because [it was found that] the clock was still running. If it had  
 stopped, I should have had an extra year before I was up for tenure so I  
 would have more time to publish and get my research done. I decided  
 not to fight it because I was concerned how going through a fight would  
 affect the tenure decision. I was quite worried when the case went  
 before the engineering school who are all older men who were all

looking at me not having worked full time.' In this instance, the outcome was favorable but the anxiety level, normally high about tenure prospects, had been raised even further by the difficulties that the academic structure had in recognizing the presence of children in her life.

A few years later she was involved in an effort in the Senate of her university to make reduction in work load for women with children an official option. Some of the participants in the debate suggested that it should be among a list of limited choices in fringe benefits, or that it should be equally available to men and that therefore it was too costly to be made available at all. This suggests that the academic system is still resistant to accommodating women's needs. This is not a call for a 'mommy track', with different and lower expectations of achievement and rewards, but a serious effort to accommodate the significant number of women who are not willing to forgo family and children prior to tenure. It is unrealistic to expect significant numbers of women to follow the male model. If the goal is to substantially increase the participation of women in high-level academic science, a female model will have to be legitimated. Acceptance of an alternative career model is crucial both to placing more women in faculty slots in the immediate short term and to providing relevant role models for a broader range of female graduate students.

Efforts at reforming the academic structure by reducing the 'time bind' for women are fraught with danger as arguments in behalf of change are often turned into negative reflections on women's scientific abilities. Even in the absence of accommodation to their needs, the relatively few women in the system have maintained their productivity (Zuckerman and Cole, 1991). One female professor has spoken up in faculty meetings in favor of extending the time before tenure review for women with children. She sees this recommendation as a double-edged sword, however, as pressing for reducing the demands made on women with children might jeopardize their status by supporting the notion that women with children cannot be productive. Of course, the extension could be made gender-neutral,



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with the same provisions offered to men with extensive responsibilities for child-rearing. Nevertheless, in practice, this would likely be seen as a measure to accommodate women. Without structural reform, barriers to entry and achievement will deter all but a highly persistent few.

#### TENURE STRESS

The definitive goal for all junior faculty members is the attainment of tenure. Its real and representational meanings cannot be minimized, so, it is relentlessly anxiety-provoking. The subtle and not so subtle differences around professional acceptance of women, as well as the unique stressors with which they cope, arouse and heighten anxiety for women, leaving them wary and overly self-observing.

As pioneers in departments which previously had no female faculty, for many there are no signposts by which to get a bearing. In an unreliable environment, a chemist describes how she looks 'and sees that there are no women around and I know tenure doesn't come easy. The faculty are older. Perhaps the younger ones see things differently. I can't ever know for sure what's in the back of their minds.' A young engineer is careful what she says, noting, 'They've never tenured a woman in this department. So it is tricky approaching senior people and not have them get offended by what you say when you're waiting for your tenure decision.'

Between colleagues, the strain and fear around tenure decisions manifests itself in one other significant way. To protect themselves from feelings of disappointment, loss and possibly anger directed at the department if a junior woman is denied tenure, some tenured women who wish to reach out and befriend junior faculty self-protectively avoid forming such relationships. Two tenured colleagues in the same chemistry department, now closest of friends, describe avoiding any social interactions before they received tenure. One admits that she 'didn't want to take the risk of seeing her go if she didn't get tenure.' Considering the detrimental affects of isolation for those solitary women without female peers, tenure is experienced as so uncertain

that it can impede much-needed relationships and connections where they are possible.

It is near or at the point of tenure that some of the most disturbing indications of different treatment of women by the power structure occur. These range from remarks by a chair implying that a woman physicist should not worry whether she was granted tenure or not because 'you have two salaries. You have a husband' to an emerging picture that some young professors suffer reprisals for being too proactive on behalf of women students, resulting in denial or postponement of tenure. After learning that the chair had postponed her tenure decision, and had laid out a plan for the coming year that 'sounded like a thirty-year career plan', this activist faculty member finds herself wondering 'if he resented that I was serving as a faculty advisor. Did he resent my role as an advocate for the students? Did that have to do with being a woman, or a bit of a rabble-rouser?'

In a highly competitive academic environment gender differences in faculty experience are often ascribed to the normal workings of the system, even by some of the women who are discriminated against. There may be a simple lack of awareness of unequal treatment when some parameters are equal. For example, a committee representing senior female faculty members at the Massachusetts Institute of Technology recently found, to their initial shock, that they had lower salaries and smaller offices than their male counterparts.

When confronted with these findings, MIT President, Charles Vest, broke with long tradition of academic denial of gender discrimination. He pledged the full weight of his office to redress these specific grievances and undertook a commitment to broader change. However, more than a decade ago, a committee of graduate women in the electrical engineering and computer science department at MIT produced a report detailing their similar experiences of gender discrimination (Goldberg, 1999; Spertus, 1991; Female Graduate Students and Research Staff, 1983).