as of hiring. A research associate, her
was her exposure to students and the
is. She felt that these consequences of
her status had delayed her professional
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so one’s standing to have the lever or
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identified is marrying a man in the
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phical constraints. When the woman
can in a circumscribed region (Max,
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t up, ‘Science isn’t everything.’

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 colleagueship, 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 constricting 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
depreciating 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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against, female scientists are possibilities of minority status in to take on more tasks within and nle equals, because of their status callly, this role enjoins that an e she is different, become visible

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 childcare 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
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. Accommodation 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,
Il time.' In this instance, the pay level, normally high about an effort in the Senate of her for women with children and in the debate suggested that it bars in fringe benefits, or that it that therefore it was too costly its that the academic system is n's needs. This is not a call for a er expectations of achievement to accommodate the significant g to forgo family and children expect significant numbers of goal is to substantially increase vel academic science, a female spate of an alternative career women in faculty slots in the reng relevant role models for a its. structure by reducing the 'time iger as arguments in behalf of elections on women's scientific innovation to their needs, the term have maintained their 91]. One female professor has r of extending the time before. She sees this recommendation as pressing for reducing the might jeopardize their status ien with children cannot be could be made gender-neutral, 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].