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II Differences between women in science

Overlying the differences between the male and female scientific worlds is another split, one within the female realm, that mirrors and refracts the larger gender division. Women scientists' perception of the obstacles in their path, and their response to them, create two dichotomous camps. One group is predominantly made up of an older generation of resilient women who stress a highly competitive, individualistic style that mirrors the traditional male stereotype. In contrast, younger up-and-coming junior and newly tenured women faculty members emphasize a more relational, collaborative approach within their research groups. We call the first group of women 'instrumentals', and the second 'relationals', reflecting their respective work styles. Notwithstanding such important differences, women faculty members who have thrived appear to have in common two significant characteristics. Firstly, they all identify sufficiently positive relationships with their own graduate school advisors as crucial to their past and present level of self-confidence, perseverance, and success. Secondly, although each is influenced by their own perception of a scientific style, all of these dedicated women labor to interpret an appropriate role as advisor to their female students.

Inescapable tensions exist for all successful women scientists, regardless of personal philosophy, around the role of advisor. The perceptions, attitudes and values which comprise a 'style' of advising and doing science are frequently a product of, or a response to, an earlier powerful relationship with one's mentor. The attitudes and values of the mentor-advisor are internalized by the apprentice and become the core structure by which an individual comes to form, and perhaps later

modify, their own identity as a scientist. The tension between the relational and instrumental styles of women faculty reflects not only a generational shift among women scientists, but also the changing values of a new generation of male scientists. Influenced by attitudinal changes on gender issues experienced in their own personal lives, their relationships with women, and perhaps the feminist movement, some of these (usually) younger men have taken up a relational style. The differences among female academic scientists emerge most clearly in their role as advisors to students.

THE CONTRADICTIONS OF BEING AN ADVISOR

There is an increasing recognition that serving as a role model is complex and requires more than just 'being there' as a physical presence. Especially for younger tenured and non-tenured female faculty no issue presents more conflict or is filled with more angst than that of the role of advisor. How one advises, and particularly how one advises women graduate students, can become the very locus of self-definition. Not only can it bring forth the difficult issues and related feelings of being a woman in science, but it can produce a sense of responsibility for the next generation. Thus the needs that were or were not adequately filled as a student, or now as a faculty member – issues around birth and child care, balancing work and an outside life – will all be evoked through this role.

For men who have not been directly affected by these difficult issues, the role of advisor is not laden with these subjective meanings nor is it as emotionally charged. Women faculty tend to be deeply affected by their impact on their students, particularly on the women. This emphasis on relatedness and wish of many women faculty to nurture their students is more than simply a consequence of cultural 'socialization'. It may also be part of the dynamic of female adult development and the importance placed upon personal attachments and connections that transcend utilitarian motivations (Chodorow, 1978). At the same time, there is also a counter-pull on personal resources deriving from their own need for professional survival. As

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BEING AN ADVISOR

It is not that serving as a role model is just 'being there' as a physical presence. For tenured and non-tenured female scientists, the role is filled with more angst than for male scientists. It is how one advises, and particularly how one can become the very locus of self-worth through the difficult issues and related tensions, but it can produce a sense of tension. Thus the needs that were or were not met as a student, or now as a faculty member – balancing work and an outside life –

are deeply affected by these difficult issues, and these subjective meanings nor is it that all faculty tend to be deeply affected by these issues, particularly on the women. This is the result of many women faculty to nurture themselves, which is simply a consequence of cultural changes. The tension of the dynamic of female adult life is placed upon personal attachments and needs, and utilitarian motivations (Chodorow, 1975). It is also a counter-pull on personal needs and a need for professional survival. As

competitive players in a competitive business, women faculty members find a tension often builds up between their needs and the needs of others, particularly when they strongly identify with the issues faced by their female students. For the majority, it is a role not taken lightly nor is it without internal conflict.

The role of advisor is a complex task, requiring a great deal of emotional and intellectual energy. Women advisors constantly struggle with a varied range of issues, including finding a balance between acting for their students and becoming viable professionals themselves. On one hand, female faculty members must negotiate a competitive and judgmental environment and cannot afford to make themselves vulnerable. On the other, there is confusion as to what kind of relationship to establish with female students and what role to play in both their scientific and emotional lives. As one scientist summed up the dilemma, 'I've been asked to do a lot. To talk to undergraduates, graduate students, women's groups, all sorts of things. But if I'm not here in three years, then I'm not going to do anybody any good. So I can only do so much because I'm more worried about my retention. I try to do what I can. I think one of the reasons I wanted to go into academia was to be able to have an impact in one way or another on women's issues. I really want to, but I really can't do much better.' Accepting realistic limits on the time they can devote to women's issues is an especially hard lesson for female scientists committed to advancing the cause of women in science.

Current funding pressures increase the tension between the wish to be a mentor and provide support, and the need to remain productive and competitive. The competitive push sometimes makes it 'easy for me to forget that I had support.' However, inner conflict frequently arises when one knows the kind of advisor one wishes to become, but cannot afford to be, particularly around attempts to meet the child-care needs of graduate women. Although sensitive and responsive to the needs of one of her students, this biologist describes the inescapable inner turmoil provoked by her own needs: 'I'm trying to help her, but I feel like an ogre. It's a difficult one for me. I'm trying to be as supportive as I

can, but then the work's not getting done fast enough.' The conflict between the demands of scientific productivity and family life requires adjustments in the organization of science in the university that transcend the advisor-advisee relationship.

Some advisors feel caught between wanting to meet legitimate needs and wishing for students to be assertive and competitive in order to succeed. 'Faculty have an ambivalent relationship with their graduate students. They want them to be one way for their own needs, as well as they want them to be a certain way because that would be good for [the student's] career.' Some faculty members guard against repeating the destructive characteristics of their own advisor since many are aware that 'you do as was done to you . . . sometimes the way I treat my group I'm shocked because I sound exactly like my advisor.'

Moreover, some women despair of being able to play any significant role for women students because they feel helpless to change the academic structure to make it more amenable to combining work and family. As one female academic analyzed the emerging female graduate student perspective on future faculty life, 'they see [my colleague] under all this incredible stress. She's trying to have a baby and these guys [male faculty members] give her a terrible time. So even when students get along with their advisor, when they look at her life, they don't like what they see.' The difficulties that female graduate students see their female professors encounter make them think twice, if they do not deter them entirely from undertaking an academic career at a high-powered research university.

Many faculty worry about how candid they should be with female students about their own difficulties in science. Concerned that they will frighten them, many say nothing at all. At the core there is an aura of helplessness as to how to not be discouraging. For instance, this advisor felt 'grateful' that a younger colleague had her baby at 30 rather than at 40 like herself so that her students would not become disheartened. She said, 'The students look at me and think, I would do anything other than have a life like she has. I admit that I communicate my difficulties, and I don't know how positive that is for encouraging

done fast enough.' The conflict between productivity and family life requires science in the university that ship.

In wanting to meet legitimate needs, a supportive and competitive environment is essential in order to have a relevant relationship with their advisor. One way for their own needs, but a certain way because that would be the way faculty members guard against criticism of their own advisor since it is close to you . . . sometimes the way sound exactly like my advisor.' In being able to play any significant role, they feel helpless to change the environment. Unable to combine work and family, they analyzed the emerging female model of faculty life, 'they see [my advisor] trying to have a baby . . . [and] give her a terrible time. So even my advisor, when they look at her life, the difficulties that female graduate students encounter make them think differently from undertaking an academic career at university.

What did they should be with female students in science. Concerned that they are not doing at all. At the core there is an aura of discouraging. For instance, this colleague had her baby at 30 rather than 25. If other students would not become mothers, they would look at me and think, I would do the same. I admit that I communicate in a very positive that is for encouraging

other women. I worry a lot about it.' Again, the issue for the advisor is to find an appropriate balance between realistically depicting the barriers that women in science encounter, so that female students will be prepared to deal with them, and avoiding turning them away from scientific careers.

Some female faculty members, who heretofore did not take women's issues into account, have come to question their effectiveness as role models in the past. This reconsideration of previous practice often leads to new attempts to advise differently. A 42-year-old tenured woman acknowledges, 'It never occurred to me [at that time] that there were differences in men and women. In retrospect, I can see a thousand of them. When I got my first job they questioned me closely about whether I was serious about science, was I going to have kids. At the time I left there and came here, I never thought about these issues. I was moderately successful and I believed that the best thing that I could do for women was to be a successful professor. A lot of women still believe that.' The notion that it is sufficient to do good science to pave the way for future generations of female scientists is increasingly questioned.

When women students drop out, even female scientists who previously stood apart from women's issues may begin to re-interpret the advisory role. More attuned to the negative experiences of their students, they become more self-aware: 'I've been successful and something of a loner, and somewhat independent. Now that I have students of my own I'm worried. It's not unusual for successful and independent women to start out thinking they don't need anybody. But then they see the young women they care about and realize they might need support.' This realization has led some female scientists who previously adhered to the 'male model' to rethink their position.

Lastly, without collegial interactions to help understand similar experiences, young faculty members are left to re-invent how best to manage, supervise, role model, mentor, and do research . . . even when a critical mass of female colleagues is present. Since younger academics highly value interpersonal effectiveness, when problems arise they can be experienced as personal failure. Many young

professors discuss the importance of relationships in their labs: 'Nobody trains you how to be an advisor. They don't teach you how to teach either. I found human problems are the most difficult part of this work. Science is easy in comparison.' In another context, at a Cold Spring Harbor conference on the biotechnology industry, seemingly completely apart from issues of women in science, a female scientist noted how useful a course on lab management would have been as a part of her graduate training. Long past that stage, she had to learn it on her own.

Women's emphasis on the role they wish to play in behalf of younger women cannot be underestimated. The empathy for students' difficulties with self-esteem and self-confidence comes from their own experiences as women in science, and mentoring around these issues evokes painful feelings and creates vulnerability. The most profound struggle is whether to permit the close connection wished for by both student and advisor, or to sustain what is a psychologically protective distance for the self. As described by a biologist:

I struggle with the issue of how strongly I model for other women. It seems that enabling young women to express what they think and how they feel is an important goal. When I think, would I do that . . . that would be hard. I'm starting to cry because there's a part of me that really wants to maintain a certain amount of distance because I identify so completely with them that I almost become overwhelmed.

This inner debate about what it means to be a woman in science is matched and modeled by an exterior debate between proponents of two opposing world views about how to conduct oneself as a female scientist.

THE INSTRUMENTAL STYLE

Many older women scientists who have conformed to the traditional 'instrumental' male model find themselves confused by their relationships with a new generation of young women who seek change

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in the social relations of science. While these older women faculty recognize how the support of their own advisors was crucial to their development, they become confused and sometimes frustrated by new demands that women students make of them. Their students wish them to engage with them on a personal as well as a scientific level and, most importantly, to advise them about how to combine the roles of science and family. Instrumentals are forced to defend old beliefs in the face of new demands, admitting, as did this woman physicist, 'I have behaved like a man. If I got one of these [women's] surveys, I would throw it away . . . I don't discuss women's issues. I don't have time to get involved. I'm not involved. I went to their meeting and the women wanted to talk about day care. I don't have time. It's enough to keep on going.' Thus, many older women find themselves in a conundrum in which the notion of support is highly valued, but the demands made upon them to attend to issues of importance to female students seem alien, uncomfortable, and unprofessional.

This older generation of women faculty typically received support and strategic assistance from male advisors who were intensely competitive and individualistic. These men exclusively focused on their science, and expected and rewarded the same in their students. Even to consider having a family before tenure would impede such super-human efforts. Child-bearing and child-rearing during the early stages of a scientific career were declared non-issues. As this physicist recalled, 'My advisor sat down with me and said "No babies during graduate school . . ."' The senior generation of female scientists never denied the reality of gender bias, but their only solution was to work harder and become a superstar in order to 'prove' it fallacious.

THE RELATIONAL STYLE

As a new cohort of female faculty has entered the scientific arena, they have brought with them a more collaborative experience with their relatively younger male advisors. These men are frequently married to professional women, often with young families of their own. Not only are effective interpersonal relationships viewed by these younger men

as an important strategic component to production within their labs, but issues of family, childbirth, and sensitivity to gender bias are treated as valid and often informally incorporated into the mentor relationship as relevant for strategic planning. As women assume junior faculty positions, they must evaluate how they will preserve and transmit these values while safeguarding their tenuous status within the department.

Whether tenured or not, women exemplifying the 'relational' approach emphasize collaboration and community within their own groups. Relationships among the members of the lab are important to research strategy, as faculty members treat each student as an individual with different needs and strengths. As an electrical engineering professor described her laboratory:

We are all creating and taking and sharing responsibilities and experiments so we can interact together and contribute the expertise of each student so that they can feel like they are valuable . . . when I add people to the group, even if they are a 6.0 student [that is, off the measurement scales], if the chemistry is not right I will not add them in. We do things together . . . that make us know each other on a social scale. Then to reinforce the group activity in the lab, we have a buddy system . . . we will rotate the buddies so that everyone is working together . . .

The social organization in such a lab is lateral, in contrast to the traditional hierarchical model of the faculty member operating through a 'lieutenant', typically a post-doctoral fellow, in supervising each graduate student's work.

In contrast to the more singularly focused, instrumental women faculty, these younger women empathize with their female graduate students around issues of pregnancy and child-rearing, sometimes sharing the same dilemmas and even looking to their students for insight. For many senior women, however, obstacles such as these only exist subjectively; if you buy into them, you view yourself as a victim and cloud your scientific focus with extraneous concerns.

To the younger generation, prejudice and obstacles are not only perceived as real but are further exacerbated by conflicts over the compatibility of science with family and other roles. These contrasting modes of being a woman in science frequently give confusing signals to young women who seek role models whom they can emulate and who will provide them with the necessary 'truths' in order to succeed.

SUMMARY

In our analysis of women's graduate school and faculty experiences, we have focused on women's exclusion and disappointment within the structures of organizations where women are recruited, trained, and evaluated (Baron and Bielby, 1980). Our arguments focused on how the organization of science, particularly at the department and university level, differentially *treats and disadvantages* women and illustrated how women with human capital and career aspirations equal to or greater than their male peers are disadvantaged in their graduate school careers. We also noted how the women's conflict over balancing their family and professional lives creates unique needs because societal norms and routine practices work against women's careers even as men and society benefit from the traditional structures.

It is through this experience that the number of girls who pursue science decreases as children progress through the school system, while the loss of women increases. We may ultimately come to view women's withdrawal from science as a wholesomely adaptive response to marginality, based on such destructive experiences. We may also come to understand better the mechanisms used by an older generation of women in order to persevere, as well as appreciate a new generation of scientists who have begun to re-interpret science as a genderless and collaborative endeavor.