Towards Confidence and Connection: Key Directions for Women Scientists

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"What kind of work do you do?"
"I'm a scientist."
"You must be smart! I was never very good at science in school."

Sound familiar? As scientists, we spend our lives thinking in fields where many girls and women are taught they shouldn't and/or can't venture. When women in other lines of work meet us, out come their doubts about their own intelligence. Meet internalized sexism.

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Achieving gender equality in science requires effort on two fronts. The first, changing institutional policies and practices, is the subject of other chapters in this volume. Learning about examples of gender-equitable policies and successful intervention strategies inspires us to articulate a vision of what is possible. Second, changing attitudes is necessary to clear the way for deep and long-term change.

This essay focuses on this second front, in particular how women scientists' confidence and connection with others contribute to improving our personal responses to events and our ability to change our work conditions.

Sexism, Internalized Sexism, and Stereotypes About Scientists

Sexism is an institutionalized system where females and males are treated differently on the basis of gender. There is differential access to resources and to the power to make decisions about those resources. One gender is targeted for exclusion or exploitation, while the other gender implements or enforces this systematic mistreatment. None of us chooses our role in this system, but we are all socialized as we grow up to conform to gender roles. When this socialization includes misinformation about our abilities in science and mathematics, we can acquire distorted, gender-specific expectations. These expectations influence how we treat ourselves, those of the same gender, and those of the other gender in relation to science and math. These attitudes can result in internalized sexism in women (as members of the group targeted for exclusion or exploitation) and sexist attitudes and behavior in men (as the group assigned to implement the system).

An important aspect of internalized sexism for women scientists is the nagging doubts many of us have about our intelligence and competence, doubts that can persist despite all evidence to the contrary. Sheila Widnall (1988) documents studies showing that the self-esteem of women students in science sinks in college, while the self-esteem of men students rises. This occurs even though men's and women's self-esteem is comparable when they enter college, and their academic records and test scores are comparable through-

out. Studies summarized by Gloria Steinem (1992) indicate that this drop in self-esteem occurs for females relative to males in all fields. In high school and college, even when women's academic records are better than men's, men's expectations for themselves are higher (see Ruskai 1991). For further documentation of females' experiences in high school and college classrooms, see Weiler (1988); Hall and Sandler (1982); and Sandler (2002).

Steinem (1992) points out that one reason females may learn not to take themselves seriously is that teachers often do not take them seriously. Numerous studies show that

> boys are called on more often and talk more in their average response [than girls], yet [in one study] when [teachers were shown] films of classroom discussion in which boys out-talked girls by a ratio of three to one, the teachers — including feminists — still perceived the girls as talking much more. We are so culturally trained to think that females talk too much, that we should be good "listeners," that we seem to measure ourselves against those expectations, not reality (Steinem 1992, p. 120).

Such expectations are pervasive even among well-intentioned people (Dovidio and Gaertner, 1998), apply to females in science at all levels (Sonnert and Holten, 1996; Fox, 1999), and are a major reason for slow progress towards gender-equal institutions (Valian, 1998). Despite a narrowing of the gender gap during the 1990s in some areas of secondary school science and math achievement, a study published by the American Association of University Women (AAUW, 1999) reports that males seem to gain more than females from the use of computers. The report recommends both getting rid of gender stereotypes found in some computer software and training for secondary school teachers on gender equity.

Interesting complexities occur when stereotypes about scientists intersect with internalized sexism. One such stereotype is that scientists are more intelligent than other people. This belief, which has no basis in fact, keeps nonscientists convinced they are less than smart and powerful. A second stereotype is that scientists have less need or skill for close nurturing relationships than do other human

beings. This second piece of misinformation seems to affect men and women scientists in different ways. For men, it reinforces conditioning that they are supposed to be emotionally independent and that women think better than men about relationships. For women, something different happens. In our society, women are regarded as the nurturing sex. Indeed, some consider that the responsibility for nurturing is ours alone, and that only we can be successful at it. If women scientists are seen as being less nurturing and having less need for close relationships than women in other fields, however, we are set apart. This distance can contribute to the isolation we experience as female scientists.

Internalized sexism and the cumulative effects of unequal treatment have some particular effects on us as women scientists. In addition to compromising our self-confidence and our ability to remember our accomplishments, these attitudes can also impair our ability to see connections and shared commonalities with others, including other women scientists (Mierson and Chew, 1993). At a time when we believe we are isolated, and we doubt our competence, we tend to take difficulties personally. Any sense of isolation stems both from what we carry inside as internalized sexism and from without from our often low numbers and unequal status in science. Connecting with each other makes it easier to remember that many of the difficulties we face arise from something other than personal defects. Differential treatment from multiple sources (from intersecting identities as members of other groups that receive unequal treatment in our society, such as members of the working class, people of color, Jews, gays, or older people) can further reinforce isolation and undermine self-esteem (see, for example Malcom, Hall, and Brown, 1976, on scientists who are women of color). When we realize what we

have been up against, we can give ourselves full credit for persevering as women scientists.

The attitudes of sexism and internalized sexism reinforce science institutions' policies that disadvantage women relative to men in representation, status, and treatment. Changing institutional policies and practices is half the work; doing the internal work as well makes us less vulnerable, better able to respond effectively to any unequal treatment we encounter, and better able to connect to each other and to allies.

Claiming Our Intelligence, Confidence, and Femaleness

The reality is that both men and women flourish when they feel good about themselves, know they are smart, and have the close relationships they desire. Each of us is a smart, unique person, woman, and scientist. We can enjoy the full range of our human abilities, including our curiosity and intelligence, and have close relationships. The reality about women is that we can be fully contributing scientists and also be fully female humans.

We recommend four approaches to claiming our voices and assisting others to do the same:

1. Set up a regular meeting with a friend , in a place that allows some privacy. Get together once or twice each week; a half hour to an hour in person or by telephone is a good start. Agree to keep confidences. Each person takes a turn (10-25 minutes; we use a laboratory timer when we do this). When it's your turn to talk, focus on your achievements for that week, what's been satisfying and what's been challenging, and next steps for yourself in any area of your life. It is fine to talk about your feelings, laugh, cry, yawn, rage, sweat, and tremble. These are physical manifestations of emotional release, which will free you to be less overwhelmed by feelings and to think more clearly (Jackins 1978). When it's your turn to listen, do so attentively and supportively, and without interrupting with questions, comments, or advice. Give each person a chance to set her own agenda. At the end of each person's turn to talk, make sure her attention refocuses on some benign aspect of the present, such as counting how many items in the room are a certain color.

One piece of advice: If you drink alcohol, do so at another time. Physiological changes occur when you release feelings, resulting in clearer thinking. When alcohol is present in the body, these mechanisms function differently and with less benefit. In some cultures people have permission to show their feelings primarily when drinking, so this means giving ourselves permission to do so at other times.

This dyad format will help put you in charge of your decisions to choose, seek advice, and act. Other uses of the dyad format will be suggested below.

2. Write down or tell a friend your vision of a gender-equal workplace. Remember the times when you (or other women) actively resisted sexism and internalized sexism, either by standing up for yourself or by assisting others. This recounting of personal (and collective) history will remind you of your courage, passion, caring, generosity, and resourcefulness. It will remind you that you have been active, that you have chosen to stay and fight or negotiate, that you have persisted. This remembering sometimes elicits feelings, whose expression and release is to be encouraged as part of the emotional healing process. You may choose to use your turn in a dyad session on these topics.
3. If you teach, promote active participation by all students (for example, Mierson, 2000; Light, 2001; Chew, 1992). Engage shy students with eye contact. Request questions or responses from people who haven't spoken in class recently. Structure activities using student dyads to encourage reflection. In these "think-and-listen" activities, one student takes a turn for one or two minutes while the other listens; then they exchange roles. This approach is similar to the longer dyad described above, but usually the assignment focuses on a specific topic such as "What did I just hear that is new to me?" after which you can ask for questions. Expect the best from your students, even if their test scores in a large introductory course were lower than they would like. Expect that the females as well as the males will engage in challenging work, compete for scholarships or internships, and have high aspirations.

Your engagement with them as human beings counteracts stereotypes about women scientists.

A teacher's self-awareness is helpful in applying these approaches. Saul Slapikoff (1985) describes his discovery, through observations made by his colleague, Sara Freedman, of his own unconscious focus on men, despite the fact that his course included a major section on debunking scientific myths about sexism and that a slight majority of the students were women. For a discussion of how teacher support groups, similar to the above dyad format, increase self-awareness, see Julian Weissglass (1991).

4. Support your colleagues by noticing when they do things well. Tell your colleagues when you learn from their seminar presentations or from their questions at seminars and meetings. Tell them when students compliment their teaching. Nearly everyone, male and female alike, has been consistently told, "You haven't done enough." What a boost to them when someone notices they've done something well! You will probably find that others tend to notice and appreciate your work in return. Others may consult you more often and more openly. Your network and sphere of influence may expand.

Building Our Connections to Others

Historically, women who have successfully challenged oppressive institutions and policies have usually been aided by allies — men and a few women in high places. Because allies can often exert powerful influence to change external conditions, our goal is to persuade every person in a leadership role to become an ally. Since potential allies have been socialized to gender roles and leadership roles in institutions, it may be tempting to see them as enemies to progress. We observe, however, that mostly they are good people doing the best they can given the pressures the system puts on them, who could use a more inclusive view of scientists and sci-

ence, and who could benefit from a larger picture of their own significance. We recommend three ways to make connections with potential allies:

1. Sincerely appreciate what they have done well; it gets their attention. Your engagement with them as human beings counteracts stereotypes about women scientists. Use your support system and dyad sessions to remember that these potential allies are good people who may retreat to "obeying the rules" when challenged and thus can benefit from reminders of their own power. Use your dyad sessions to remember the times when allies acted on your own behalf, or when you acted as an ally to someone else, and to express any feelings that arise. This will help you remember that you actually want to cultivate a connection with someone who seems more "powerful" than you are.
2. Listen to potential allies' thoughts. Challenge them to consider ideas that reflect gender equality. Brainstorm with them about more imaginative ways to implement policy. Remind them that a gender-equal system includes females in its design from the outset. Challenge the system without blaming them, positioning yourself as loyal opposition rather than as an adversary. This activism keeps you hopeful and powerful. Use your support network and dyad sessions to process feelings that come up when you assert yourself, to review what went well in these interactions, what you might have done differently, and what your next steps might be.
3. When you are with people in high places, women or men, remember yourself and remind them that they are good, caring human beings. Once you have built trusting relationships with them, you can help them personally commit to achieving gender equality, despite whatever pressure they may experience to maintain the status quo. Here are a few suggestions to do that:
   (a) Elicit from them their vision of a gender-equal workplace.
   (b) Encourage them to remember times when they resisted pressure to exclude others (for example, resisting a dare to taunt another child at school).
   (c) Encourage them to remember the times that they and people like them took risks to act on behalf of others, and times that other people came to support them. These

memories (b and c) sometimes elicit strong feelings, whose expression and release you can encourage.

(d) Remind them that human beings make mistakes and can often correct them.

(e) Let them know that they get to make a difference in this area.

(f) Help them understand the power of supporting people in this way.

Towards Gender Equality

People in high positions are subject to special isolation and pressures. If we aspire to leadership we will be similarly vulnerable unless we actively work to stay connected to others and to claim our own intelligence and voice. For this reason, continued work on the feelings — in the context of a support network — is a good way to prevent the burnout that we might otherwise experience as we become more visible.

Science developed within societies that were and are sexist. A large body of literature documents the persistent inequality of representation and status of women in science (for example, Nelson, 2001; Hopkins, 1999 and 2002; National Research Council, 2001). Despite persistent reference to biological determinism in describing women's abilities in science and math, even by contemporary academic leaders such as Harvard University president Lawrence H. Summers (Traub, 2005), available data show that numerous social factors contribute to the achievement gap between men and women (Xie and Schauman, 1998, 2003). We risk repeating a century-old mistake confusing cause and effect with respect to race (Pierpont, 2004). The achievement gap with respect to gender is a product rather than source of sexism.

As female scientists, we have much to contribute to science — once we get the opportunity to do so. Our individual initiatives strengthen our self confidence. Our collective initiatives contribute to attitude changes in the field (Hopkins, 1999). As inclusion becomes part of the culture of scientists, everyone wins. As Widnall (1988) points out about graduate schools in science, improving the professional and human climate of our scientific institutions benefits all concerned — women and men.

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