Beyond Gender Schemas: Improving the Advancement of Women in Academia

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This report raises four issues: (1) why do so few women occupy positions of power and prestige in every field; (2) why might people fail to recognize that there is a gender equity problem; (3) how can gender equity be seen as a benefit to institutions; and (4) what can institutions do to increase gender equity?

Keywords: gender schemas / gender equity / women in academia / social-cognitive analysis

What the 2002 Iowa State conference and the experiences of the first cohort of National Science Foundation ADVANCE Institutional Transformation awardees make clear is that we are fortunate to be at the inception of a new discipline—the discipline of gender equity. There is a distinct subject matter here. We see that our understanding of obstacles to, and improvement in, gender equity will draw on concepts and methods from women's studies, sociology, statistics, economics, psychology, math, engineering, political science, and organizational structure and change, to name just a few fields.

We will need at least two types of explanation to account for the nature of equity problems and their ubiquity across the professions, and we will have to interweave these explanations and put them together in original ways. One type of explanation, which I develop here, is a social-cognitive analysis; it brings to bear research and data on gender schemas and the accumulation of advantage. The other is an organizational analysis that applies research and data on organizational structure and change. My particular target here is the paucity of women at the top of the professions, especially in academic science, engineering, and technology fields.

My explanation uses two key concepts: gender schemas and the accumulation of advantage. In brief, the application of gender schemas makes it more difficult for women than men to accumulate advantage.

Data Summary

Data from a range of sources lead to these conclusions.[1] There has been progress in gender equity: men and women make roughly equal starting salaries at similar rank (but science and engineering salaries remain a problem and there are signs of early rank differences in science and asso-

ciated fields). Nevertheless, problems remain in all fields: there is greater movement of women than men into part-time positions; advancement is slower for women than for men; women earn less money than men except at entry level; women are particularly underrepresented at top-tier institutions; women receive fewer national awards and prizes.

Gender Schemas

Schemas are hypotheses that we use to interpret social events (Fiske and Taylor 1991). Schemas are similar to stereotypes but the term *schema* is more inclusive and more neutral, and a more appropriate term because it brings out the proto-scientific nature of our social hypotheses.

Gender schemas are hypotheses about what it means to be female or male, hypotheses that we all share, women and men alike. Schemas assign different psychological traits to males and females (Martin and Halverson 1987; Spence and Helmreich 1978; Spence and Sawin 1985). We think of males as capable of independent action, as oriented to the task at hand, and as doing things for a reason. We think of females as nurturing, expressive, and behaving communally. In brief, men act while women feel and express their feelings. Our beliefs have support. In questionnaires, men endorse more "instrumental" characteristics and women endorse more "expressive" characteristics.

The main answer to the question of why there are not more women at the top is that our gender schemas skew our perceptions and evaluations of men and women, causing us to overrate men and underrate women. Gender schemas affect our judgments of people's competence, ability, and worth.

Experimental Data About Perceptions of Sex Differences

Experimental data demonstrate that we do not see other people simply as people; we see them as males or females. Once gender schemas are invoked they work to disadvantage women by directing and skewing our perception, even in the case of objective characteristics like height. In one example (Biernat, Manis, and Nelson 1991), the experimenters exploited the fact that our schemas include the—of course correct—information that men are on average taller than women. In this experiment, college students saw photographs of other students and estimated their height in feet and inches. The photos always contained a reference item, such as a desk or a doorway, so that height could be accurately estimated.

Unknown to the students who were doing the estimating, the experimenters had matched the photographs so that for every photograph of a

male student of a given height there was a female student of the same height. But the students were affected by their knowledge that men are on average taller than women. They judged the women as shorter than they really were, and the men as taller.

In this experiment, as is typically the case, there were no differences in how male and female observers perceived the others; we all have nonconscious hypotheses about males and females and we all use those hypotheses in perceiving and evaluating others. The important point about this study is that a genuinely objective characteristic—height—is not immune from the effects of gender schemas.

In the case of professional competence, perceptions are similarly prone to error. We are likely to overvalue men and undervalue women. We can see why that would be the case: gender schemas play a large role in evaluations whenever (a) schemas make a clear differentiation between males and females, and they do for professional competence as much as for height; and (b) when evidence is ambiguous and open to interpretation, as is the case with professional competence. It is tempting to think excellence is straightforward, but it is not.

Experimental Data on Perceptions of Women as Leaders

Not only do schemas affect perceptions of competence, they also make it difficult for women to reap the benefits of their achievements and be perceived as leaders, as shown by three examples, in all of which there were no male-female differences among the observers.

In the head-of-the-table experiment (Porter and Geis 1981), college students were shown slides displaying five people seated around a table. The group was described as working together on a project. Two people sat at each side and one person sat at the head of the table. Sometimes all the people were male, sometimes they were all female, and sometimes the group included both males and females. The students were asked to identify the leader of the group. In same-sex groups, the man or woman sitting at the head of the table was always identified as the leader. In mixed-sex groups, a man at the head of the table was always identified as the leader. But if a woman was at the head, she was not reliably labeled as the leader; a man seated elsewhere at the table was labeled as the leader about equally as often.

As I indicated, there were no differences between male and female observers; both made the same judgments. There was no intention to discriminate. Nevertheless, the female leader who is sitting at the head of a table loses out compared to the male leader. The symbolic position of leadership carries less weight for a woman than a man. Women are less likely to obtain the automatic deference that marks of leadership confer

on men. Women are objectively hurt in such situations, even if observers intend no hurt. A woman has to work harder to demonstrate that her apparent position of leadership is a real position of leadership.

Not every person behaves on every occasion in accordance with gender schemas. Many different factors affect our evaluations and behaviors. But that variability should not distract us from what the odds are: the odds are that we will overrate men and underrate women, and we will see women as less capable of leadership than men.

Experiments investigating who looks at whom in a conversation show the effects of social dominance (Dovidio et al. 1988). When a subordinate and a superior are talking, the subordinate tends to look at his or her superior to the same extent whether the subordinate is talking or listening. Looking at your interlocutor while listening is a sign of deference. The social superior in that situation tends to look more while talking than listening, revealing and reinforcing a superior stance. When men and women talk (outside of a courtship setting), men look more while talking than listening, and women look the same amount whether talking or listening. The exception is if the topic is one that the woman has antecedently declared she knows a lot about and the man has antecedently declared he knows very little about. (Note how difficult it would be to recreate this laboratory situation in real life.) In that case, women look more when talking than listening.

Another set of experiments (Butler and Geis 1990) shows that women who adopt a friendly but assertive leadership role are responded to more negatively by both males and females than are men who adopt the same role. These experiments surreptitiously videotaped two naive participants reacting to two trained actors following a script. Men received more positive than negative facial expressions from the naive participants when they were leaders, but women received more negative than positive expressions. Again, there were no differences between male and female observers.

Accumulation of Advantage

Each example that I have discussed is a small thing. One might be tempted to dismiss concern about such imbalances as making a mountain out of a molehill. But mountains *are* molehills, piled one on top of another over time.

Small imbalances add up to disadvantage women. Success is largely the accumulation of advantage, exploiting small gains to obtain bigger ones (Merton 1968). A computer simulation (Martell, Lane, and Emrich 1996) showed the importance of very small amounts of bias. The researchers simulated an eight-level hierarchical institution, with a pyramidal

structure. They staffed this hypothetical institution with equal numbers of men and women at each level. The model assumed a tiny bias in favor of promoting men, a bias accounting for only 1 percent of the variability in promotion. After repeated iterations, the top level—which had been 50 percent male and 50 percent female at the beginning—was 65 percent male. Even very small amounts of disadvantage accumulate over time.

Summing Up the Causes of Women's Slow Advancement

What is responsible for women's lack of progress in the professions and in academia is the gender schemas through which we all—male and female alike—perceive and evaluate women. The small but systematic undervaluation of women culminates in women's smaller salaries compared to men's, and slower rates of promotion.

We would like to think that our genuinely held egalitarian and meritocratic beliefs and ideals would buffer us from the effects of gender schemas (Lerner 1975). But our evaluations and reactions occur unintentionally and outside awareness. Indeed, our belief in our own good will can make it difficult for us to see what we are doing. That does not mean that we cannot institute remedies. We can, but we need to understand that good intentions are not enough. We need to understand how gender schemas work and the importance of the small daily inequities in our treatment of our colleagues.

Impact of Gender Schemas on Women's and Men's Self-Perceptions

Let us turn now to examples of the impact of gender schemas on a woman's perception of herself and a man's picture of himself. To be successful in academia, and in other areas, it is important to negotiate effectively. To do that, one must have a feeling of (at least moderate) *entitlement*; but women tend to be low in entitlement and men tend to be high. A number of experiments (e.g., Major 1987) show that women and men differ in how entitled they act: women work harder and more efficiently than men for the same pay, and accept as fair less pay for the same work.

An example from real life comes from tennis. In 1991, Monica Seles argued for equal prize money for men and women in tennis tournaments. Two other players responded publicly. Steffi Graf was quoted as saying "We make enough, we don't need more," and Mary Joe Fernandez was quoted as saying, "I'm happy with what we have; I don't think we should be greedy" (Bailey 1991, B9). In this example, equality is being perceived as greed. In 1995, Seles, Graf, and other top players wrote a letter to the

Australian Open, protesting their decision to substantially increase the size of the men's purse for 1996, so that the men's purse was $390,000 more than the women's (Gallo 1996). But while the players protested, they also pledged not to boycott the tournament—for the good of the game. Not surprisingly, the Australian Open organizers saw no reason to equalize the prize, and the women played for less money.

One way that gender schemas affect women, then, is in women's perception of themselves as worth less and entitled to less; schemas conversely affect men, leading them to see themselves as worth more and entitled to more. Women also, through the chores they are given to do in childhood, become accustomed to acting for others' good, to laboring for love; men become accustomed to being recompensed for their labor.

Women's lack of entitlement, and people's expectations that women will not behave in an entitled manner, influence the jobs that women are called upon to do and accept doing: institutional "housework" and institutional "labors of love." These are usually low-visibility, low-power, low-reward, and labor-intensive tasks. Entitlement also plays a role in who teaches what. In one science department, a man and a woman in similar specialties had entered the department within a year of each other. They each taught two courses per term. The man taught the same introductory course in his specialty every term, plus a more advanced course in his specialty. There were many advantages to such an arrangement: the instructor needed minimal preparation time for the introductory course; he learned who the interested and talented undergraduates in his field were and could suggest to them that they work in his laboratory; in his seminars he taught the topics on which he was currently doing research. The woman taught many different introductory courses, not all in her specialty, and seldom taught an advanced course in her specialty. The disadvantages of such an arrangement were obvious: the instructor was always planning and developing a new course, frequently outside her specialty; she seldom met interested and talented undergraduates in her area; she seldom taught the topics on which she was currently doing research. A senior woman in the department spoke to the chair about the uneven division of labor between the two younger faculty. The chair said that the male faculty member would have put up a big fuss if he had tried to give him the same set of courses that he gave the woman. He also thought that the male faculty member would do a less conscientious job of teaching outside his specialty than the woman would.

It is not surprising—if lamentable in this case—that department chairs will take the path of least resistance. Entitled men will put up more resistance than unentitled women. It is difficult for others to take women seriously, and it is difficult for women to take themselves seriously. It is hard for everyone to see women as professionals who are entitled to a good salary and to a promotion; as people whose time is valuable. That makes it

difficult for women to think they deserve, let alone negotiate successfully for, valuable resources such as time, space, and money.

Why Many Doubt There Is a Gender Equity Problem

The gender schemas analysis has implications for how to justify the need for remedies and for what remedies to propose. Schemas operate largely below the level of awareness; further, many people sincerely espouse meritocratic beliefs and perceive themselves as acting in concert with those beliefs. That makes it difficult for people to imagine that anything could seriously be wrong with their practices. In addition, people are distracted by exceptions: the fact that there are a few successful women misleads us into thinking that there is no problem. But an exception is just that: an exception to a general rule.

People rely on four common explanations for the gender disparities that exist in science, engineering and technology fields: (a) it is a pipeline problem; (b) women's child-care responsibilities (which at best could be ameliorated via day care provisions) preclude their having enough time for research; (c) women and men have different values and preferences (which cannot and should not be tampered with); and (d) it is an acculturation problem, with women not being socialized to play by men's rules. Each of these explanations obviates the need for change. According to the first explanation, equity is a problem that will take care of itself once more women enter scientific fields. According to the second and third, the differences in men's and women's responsibilities and natures dooms attempts to eliminate the disparities. According to the fourth, women simply need to learn the rules and then play by them.

Is it a *pipeline* problem? It is true that relatively few women obtain Ph.D.s in the natural sciences, computer science, mathematics, and engineering. But the science pipeline selectively leaks women, as the decline in the percentage of women from undergraduate to graduate to professorial status shows (see NSF 2000; MIT *Faculty Newsletter* 1999). The problem is really a leaky-pipeline problem, and it is likely to be caused in part by gender imbalances in the professoriate and by the practices that produce these imbalances. An equally important point, however, is that even in the biological and social sciences, where women receive a large proportion of Ph.D.s, women fare worse than men. Numbers help, but they will not, by themselves, cause disparities to disappear.

Is it a *child care* problem? Few working fathers do their share of child care or housework and few institutions supply high-quality day care to their faculty. When child care is seen as women's work rather than humans' work, there is a clear cost to women, to science, and to society. Women with children are much more likely to become part-time workers

than are women without children or than men, in science and in other fields (Long 2001). We train and educate young people—an expensive undertaking—with the intention that they will increase the pool of people performing high-quality science. If we do not simultaneously keep those people in the full-time labor pool, we undercut our intentions.

But child care is only part of the story. There is a clear cost to women of simply being female: women without children do not progress at the same rate as their male peers. For example, men in the sciences are more likely than women to be tenured, even after controls are introduced for years since degree, discipline, parental status, and a host of other variables (Long 2001).[2] Institutions do better at developing their male faculty compared to their female faculty, even when both groups have mostly the same characteristics.

Is it a *values* problem? This is harder to evaluate. Survey data suggest that, by and large, men and women want the same things from their jobs. Yet it is probably true that men are more willing than women to forgo a balanced life in order to have a successful scientific career. What we need to question is whether it is a wise policy decision to have those who forgo a balanced life (regardless of their sex) dominate science and other institutions. They are likely to, simply because they are more visible. But the domination may be an undesirable side-effect of visibility. Some data suggest that women emphasize quality in publishing over quantity, while men focus more on quantity than quality (Sonnert and Holton 1995, 1996). It may be a coincidence that the same people who focus on quality are leading a balanced life, but there may also be a causal relation. If we continue to emphasize and reward always being on the job, we will never find out whether leading a balanced life leads to equally good or better scientific work. In addition, of course, people who live a balanced life provide other benefits to an institution, benefits which add value but are insufficiently recognized and compensated.

The fourth common explanation for sex disparities is that it is an *acculturation* problem. If women only learned what was required for success and played by those rules, they would be successful. It is true that women receive less information about how to be successful than do men, especially the more formal information, and that access to information about how success works is important for everyone to have equally. But the phrasing of the explanation presupposes that the rules and standards for success are good ones. What the fact of sex disparities offers us is the opportunity to question habits and practices that we have taken for granted. Speaking confidently, for example, is not the same as having something to say. We need to distinguish between someone who expresses a good point tentatively and someone who expresses a bad point confidently, listen to the former more than the latter, and reward the former more than the latter.

The first step in justifying attention to equity, then, is to neutralize the faulty reasoning behind reluctance to begin equity efforts. The second step is to show how the institution will benefit.

Why Gender Equity Is Desirable, Above and Beyond Fairness

Equity maximizes the chances of hiring the best new faculty by increasing the candidate pool. The larger the pool, the greater the choice and the higher the likelihood of finding well qualified candidates. Also, women job candidates are likely to be slightly more talented than men, given their difficulties in accumulating advantage.

By modeling diversity, equity demonstrates to women and underrepresented minority students that they have a future—a good future—in academia and the professions. And if they do not have a future, why are we educating them? Students do not need to see people exactly like themselves among the faculty. But a faculty composed of a variety of social groups should have two effects. First, diversity suggests that there is room for the student: where there is a lot of variety it is plausible to think that there is room for more. Second, and relatedly, diversity will make the role of scientist one which is not sex- or race-specific (Heilman 1980). It will thus make it easier for everyone to make accurate judgments of the qualifications and value of nontraditional scientists.

Equity increases the likelihood of innovations in teaching, scholarship, and research. Innovations arise from diverse groups of people with diverse perspectives. It is not that people reason differently as a function of their sex or race, but that they will have somewhat different interests and experiences which in turn give rise to different ideas. (For example, as women and underrepresented minorities entered psychology, new areas of the discipline were developed.) Further, the acceptance of innovations is more likely among a diverse group of people than in a homogeneous group.

Solving an equity problem can lead to solving a problem unrelated to equity. For example, a discovery that women receive computer support more slowly than men can lead to a more systematic and effective way of handling all computer help requests. Another example: the discovery that women receive less information about how to succeed can lead to better overall faculty development procedures. Thus, gender can be a window to institutional effectiveness.

Gender equity in salary, promotion, and access to resources maximizes the number of people who will receive the power and resources they need in order to do their best work. It also reduces the possibility that some people are prospering at the expense of others.

Equity creates a stronger and more viable institution via a reputation for fairness. Demonstrations of fairness, and concern for fairness, build loyalty from within, attract interest from outside, and increase the attractiveness of the institution to underrepresented groups.

Equity improves students' experiences and leads to better job opportunities. Students leave college, in most cases, for the world of work. In that world, students will work for and with women and people of color (though fewer of each than we would like!). Students must learn, while they are still students, that authority figures and colleagues can come in any sex or race. Colleges and universities can reassure recruiters that their students have learned to accept and respect diversity.

What Institutions Can Do to Increase Gender Equity

In their efforts to improve the status and experiences of women, and to achieve gender equity, institutions of higher learning need to embrace several principles.

- Know the data; know the theory. In colleges and universities, everyone—students, faculty, staff, administrators—should know how gender influences evaluations and rewards.
- Accept the fact that there are no one-time fixes. Equity requires consistent and constant effort.
- Install accountability from top to bottom.
- Take an experimental approach, in which failure leads to redesign. Relatively little is known at present about how to fine-tune equity efforts.
- Treat equity as a subject matter. Equity is not a matter of trying everything, but of trying strategies that are motivated by theory and past data.
- Choose a strategy: meet the national average *or* be the best. The second is more likely to lead to a superior outcome.
- Make as many procedures as possible a matter of routine. If a routine tells people what to do, their unwitting biases have less room to take over.

The remaining portion of this report elaborates on two of the principles: increasing accountability and improving (search) procedures.[3]

Accountability

One way to achieve gender equity is to create accountability up and down the organizational ladder. That, in turn, requires creating a public measurement system. It should become part of standard practice to publish an annual review of equity benchmarks (tabulated by an institution's office

of institutional research), such as salary, tenure rates, time in rank, and so on. In addition, departments should be rated by their current status with respect to gender equity (and diversity more generally) and by steps taken to improve gender equity.

A department's equity status can then be used as a criterion for allotting space and resources to departments and as a criterion for giving departments permission to search for new hires. The senior administration can reward departments that demonstrate equity in practice and allocate fewer resources to departments where credible evidence exists of bias, discrimination, harassment, or insufficient attention to gender equity. To increase the willingness of people to work for gender equity, the institution can provide release time or other benefits to faculty who are working on improvement of equity.

Leaders must *lead*: leaders have power. They must use it—and be seen to use it—to create equity. Leaders create other leaders by vouching for them. Leaders are responsible for placing other people into positions of power. By placing a diverse group of people into leadership positions, leaders show a commitment to equity.

Search Procedures

Improving hiring practices is an important step in creating equity. Institutions where women are underrepresented usually provide two reasons for the small representation of women: there are no qualified women, and women choose not to come (or do not even apply).

Are there too few qualified women? What this claim frequently reduces to is that there are few women at the top-tier institutions from which the institution in question prefers to hire. Top-tier institutions in particular do not want to hire people from lower-tier institutions. Since women are overrepresented at lower-tier institutions, that reluctance reinforces the status quo. Institutions could instead use the knowledge that location creates productivity as much as or more than productivity creates location (Long and McGinnis 1981) and use an additional search strategy: identify women who are publishing more than is typical for their location; they are likely to do well at the new institution.

Do women choose not to come or fail to apply? A paucity of female or minority candidates means that the institution has already failed. It is a sign that something is wrong with the institution, the search process, or both. If women and members of minority groups are not applying, the institution needs to make an extra effort to attract them. Women and minority group members do not want to apply for jobs they are certain they will not get or to be at places they are certain will not welcome them. Thus, institutions need to go out of their way and use different strategies to attract faculty from underrepresented groups. For example, institutions

can search for couples: couples want to live together and are willing to give up other benefits in order to do so. Search committee members can personally contact people at schools that have graduated larger than average numbers of women or minority group members in order to make clear their institution's commitment to gender equity and diversity.

If underrepresented group members reject job offers, the institution must determine whether it has offered an insufficient start-up package or an unattractive teaching schedule. People usually accept good offers.

Institutions should make it clear that they are willing to entertain nontraditional candidates for senior positions; women and minority group members are less likely to fit the traditional profile of experience because they are less likely to have been chosen for leadership positions.

Search committees should be instructed on where they are likely to go wrong. For instance, women faculty candidates may be more likely than men to do interdisciplinary work. A narrow job description, based on replacing already existing faculty specialties, will inadvertently rule out those in interdisciplinary work. Further, people working in traditional areas may be unable to evaluate work in interdisciplinary areas, as new work is likely to be at variance with the methods and findings with which these people are most comfortable.

Who writes the job description determines who is searched for. Typically, it is the people with power who write the job descriptions. The people with power are unlikely to be women and minority group members. Thus, spreading the power to write the job description and to create the short list will result in a wider range of applicants.

Finally, the interview is a crucible at both ends. Insufficient welcoming of women and minority group members as well as insensitive or inappropriate comments—no matter how few—will reduce a candidate's interest.

Conclusion

Gender schemas, guiding our perceptions and evaluations, make it harder for women to succeed than men. Since schemas operate covertly, it is difficult for people to see that they are putting women at a disadvantage. To be successful, gender equity strategies must take into account what we know about how gender schemas work.

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Notes

1. For data sources, see Valian (1998), Long (2001), National Science Foundation (2000), the annotated bibliography and numbers sheet at www.hunter.cuny.edu/genderequity, and Tutorial 1 at Tutorials for Change: Gender Schemas and Science Careers, available at www.hunter.cuny.edu/gendertutorial.

2. See also the slides on child care in Tutorial 1 at www.hunter.cuny.edu/gendertutorial.

3. Documents on analyzing and solving a wide range of visible and hidden gender equity problems can be found at the Hunter College Gender Equity website, www.hunter.cuny.edu/genderequity.

References

Bailey, Sandra. 1991. "Some Women Faulting Demand for Equal Pay." *Washington Post* 2 June, B9.

Biernat, Monica, Melvin Manis, and Thomas E. Nelson. 1991. "Stereotypes and Standards of Judgment." *Journal of Personality and Social Psychology* 60(4):495–502.

Butler, Dore, and Florence L. Geis. 1990. "Nonverbal Affect Responses to Male and Female Leaders: Implications for Leadership Evaluation." *Journal of Personality and Social Psychology* 58:48–59.

Dovidio, John F., Steve L. Ellyson, Caroline F. Keating, Karen Heltman, and Clifford E. Brown. 1988. "The Relationship of Social Power to Visual Displays of Dominance between Men and Women." *Journal of Personality and Social Psychology* 54:233–42.

Fiske, Susan T., and Shelley E. Taylor. 1991. *Social Cognition.* 2nd ed. New York: McGraw-Hill.

Gallo, Bill. 1996. "A Grand Slam against Women." *Denver Westword* 31 January, 47.

Heilman, Madeline E. 1980. "The Impact of Situational Factors on Personnel Decisions Concerning Women: Varying the Sex Composition of the Applicant Pool." *Organizational Behavior and Human Performance* 26:386–95.

Lerner, Melvin J. 1975. "The Justice Motive in Social Behavior: An Introduction." *Journal of Social Issues* 31:1–19.

Long, J. Scott, ed. 2001. *From Scarcity to Visibility.* Washington, D. C.: National Academy Press.

Long, J. Scott, and Robert McGinnis. 1981. "Organizational Context and Scientific Productivity." *American Sociological Review* 46:422–42.

Major, Brenda. 1987. "Gender, Justice, and the Psychology of Entitlement." In *Sex and Gender: Review of Personality and Social Psychology*, Vol. 7, edited by Phillip Shaver and Christine Hendrick, 124–48. Newbury Park, CA: Sage.

Martell, Richard F., David M. Lane, and Cynthia Emrich. 1996. "Male-female Differences: A Computer Simulation." *American Psychologist* 51:157–8.

Martin, Carol Lynn, and Charles Halverson. 1987. "The Roles of Cognition in Sex Role Acquisition." In *Current Conceptions of Sex Roles and Sex Typing: Theory and Research*, edited by D. Bruce Carter, 123–37. New York: Praeger.

Merton, Robert K. 1968. "The Matthew Effect in Science." *Science* 159: 56–63.

MIT *Faculty Newsletter*. 1999. Special edition: A Study on the Status of Women Faculty in Science at MIT. XI(4).

National Science Foundation (NSF). 2000. *Women, Minorities, and Persons with Disabilities in Science and Engineering: 2000*. Appendix, Table 5–24. Arlington, VA: National Science Foundation.

Porter, Natalie, and Florence L. Geis. 1981. "Women and Nonverbal Leadership Cues: When Seeing is not Believing." In *Gender and Nonverbal Behavior*, edited by Clara Mayo and Nancy Henley, 45–63. New York: Springer Verlag.

Sonnert, Gerhard, and Gerald Holton. 1996. "Career Patterns of Women and Men in the Sciences." *American Scientist* 84:63–71.

Sonnert, Gerhard, and Gerald Holton. 1995. *Gender Differences in Science Careers: The Project Access Study*. New Brunswick, NJ: Rutgers University Press.

Spence, Janet T., and Robert L. Helmreich. 1978. *Masculinity and Femininity: Their Psychological Dimensions, Correlates, and Antecedents*. Austin: University of Texas Press.

Spence, Janet T., and Linda L. Sawin. 1985. "Images of Masculinity and Femininity: A Reconceptualization." In *Women, Gender, and Social Psychology*, edited by Virginia E. O'Leary, Rhoda K. Unger, and Barbara S. Wallston, 35–66. Hillsdale, NJ: Erlbaum.

Valian, Virginia. 1998. *Why So Slow? The Advancement of Women*. Cambridge, MA: MIT Press.