

## WOMEN BIOLOGISTS AND THE "OLD BOY" NETWORK

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**Synopsis**—Women scientists continue to face exclusion from predominantly male "old boy" networks that provide access to important career opportunities. A small national sample of junior faculty in biology—women and men—was surveyed in the present study to determine how women were faring in terms of gaining entry to these networks and the networks' impact on their careers. Women's networks were found to be less effective than men's at providing friendship, especially with higher ranking men, and at helping them gain visibility as professionals. Married women were at an even greater disadvantage than single women. However, women did not perceive their networks to be less effective than men's. The long-range impact of these findings on careers is discussed and compensatory strategies women scientists can use to develop their networks are proposed.

The image of the scientist as a scholar in a laboratory engaged in a solitary pursuit of knowledge is no longer a reality. Modern science is dependent on a rapid exchange of ideas and information, often in their pre-published forms, among colleagues. Independent inquiry continues to be highly valued, but more and more often, the "cutting edge" of science is a product of collaborative efforts. An accurate image of today's scientist is that of a professional pursuing independent research while drawing on the findings of a vast network of colleagues nationally and internationally (Reskin, 1978). An undeniable fact of scientific life is that success depends on having active researchers as a reference group. Whom one knows can be easily as important as what one knows.

Women scientists are at a disadvantage in the context described above. Women still are "tokens" in the sciences, earning only 34% of the doctorates in the biological sciences, 21% in chemistry, 17% in earth sciences, 17% in mathematics, 9% in physics, and 9% in engineering (National Research Council, 1987). As tokens, they are outsiders, experiencing social isolation, sex role stereotyping, and more attention for being women than for their work (Kanter, 1977). Previous research indicates that men scientists often are not very responsive to their women colleagues. Anne Sayre's biography of Rosalind Franklin (Sayre, 1975) provides a case study of how

women are excluded from the social network of the sciences, to their detriment. Sayre illustrated how Francis Crick and James Watson, who received the Nobel prize for their research on DNA, used Franklin's isolation to deprive her of credit for discoveries that were essential to their findings.

Empirical research substantiates the claim that women scientists are denied access to men's informal networks. Women zoologists studied by Jesse Bernard (1964) reported being less likely to interact with fellow scientists than their male counterparts. Women Ph.D.s have reported it difficult to find someone with whom to have lunch or talk over ideas (Simon, Clark, & Galway, 1967) and have fewer men colleague friends and fewer higher status associates in their network than men faculty (Kaufman, 1978). Women microbiologists described receiving little encouragement from colleagues and little advice regarding their professional future (Kashet et al., 1974). Female medical students studied by Kutner and Brogan (1981) claimed they had been excluded from the informal networks of male students. Denmark (1980) also found that women psychologists have less direct access to high status professionals than men.

In my own research on the professional networks of assistant professors in psychology, I found no sex difference in network size, but discovered significant differences in the composition and career impact of the net-

work. Women had significantly fewer contacts from their graduate institution than men and had more women, including higher status women, in their networks. Women also rated their colleagues as significantly less effective than men's at enhancing their professional visibility, as less likely to have recommended their work to other colleagues, and as having expended less effort in helping them establish a network (Rose, 1985).

Gaining entry to the "old boy" network is extremely difficult for women in all male-dominated professions. Access is often granted via informal "clublike" interactions, occurring in contexts from which women are absent or uninvited, such as poker games, athletic events, or university clubs (Epstein, 1971). The "masculine" context of these interactions usually operates to the advantage of junior males, who only have to proceed about their normal daily business (such as urinating periodically) in order to become casually acquainted with senior males. Even if a junior man is reluctant to join the network, he is often coached to do so by his peers or superiors. A personal anecdote illustrates this point. A male psychobiology graduate student in my class complained bitterly to me about having been coerced by his male advisor into taking tennis lessons during his first year. He did not like the sport and resented spending the money for lessons, but was told it was crucial to his career to be able to participate in tennis, because all the major (male) researchers in his area did. He responded to the pressure and, at the time he told me the story, played regularly with the guys. According to my poll of his women peers, not one had been urged to learn tennis, and the one woman who already played well had never been invited to join the men.

Exclusion from the predominantly male social networks available in science has serious career consequences for women. Professional networks not only provide information about developments in the field prior to its formal communication in trade publications and journals; they also help individuals to establish a reputation by promoting her or his visibility within the field. Professional contacts, informal recommendations, and information about job or grant opportunities are often communicated by networks. In addition, networks are a source of friendships,

which because they are occupationally based, support the social and moral solidarity of the group. Lastly, networks act to socialize newcomers by conveying expectations about the norms, protocols, ethics, and ideals of the profession (Mitchell & Trickett, 1980).

Women scientists in academe are made especially vulnerable by a poorly functioning network. Recent reports indicate that as academic rank increases, the percentage of women scientists decreases. In 1985, women constituted 29% of assistant professors, but only 16% of associate and 8% of full professors in the physical and biological sciences (National Science Foundation, 1986). The system of tenure, which grants either permanent employment to a faculty member after a trial period or results in firing, pressurizes the work environment for women. Opportunities to form mentor and collaborative relationships with men and to enhance professional reputations are limited in the university community (Bruer, 1983), yet getting tenure depends on having just these opportunities. At most universities, tenure procedures involve outside evaluations by experts nationally known in the candidate's field. Being known professionally and personally by these established colleagues will enhance the likelihood of positive reviews and of getting tenure. Poor evaluations increase the chances of being fired.

Another factor which is likely to affect both a woman's professional network and her odds of success in academe is her marital status. Popular wisdom asserts that it benefits professional women to be single and professional men to be married. Evidence based on investigations of single and married professionals supports this view. Wives who are part of dual career couples in sociology, psychology, and law have less job rank, stability, and income than either husbands or single women and men, even when they are similar to those groups in terms of age, training, degree, and place of employment (see Betz & Fitzgerald, 1987, for a review).

The intent in the present study was to examine the networks of junior biologists to determine what effect gender and marital status had on composition and functioning of networks. Were newly graduated women Ph.D.s in biology being excluded from men's

networks? Did the increase in women biologists in the field mean women were now able to develop same-sex support networks? Were the networks helping women's careers as much as men's? Size of network, number of women and men, and number of higher status friends in the network were of special interest. Also investigated were how well the networks helped provide research news, professional visibility, career information, friendship, and socialization.

### THE BIOLOGISTS

I identified names of assistant professors in biology using departmental listings of faculty from the catalogs of 70 U.S. universities with graduate programs in biology. A seven page survey I had used to study psychologists' networks (Rose, 1985) was mailed to 230 potential participants (84 women, 146 men); 83 responded (36%). The response rate for women (48%) was higher than that for men (29%). Of those responding, 31 (37%) were no longer in assistant professor tenure-track positions. These people were excluded from the sample, resulting in a total sample size of 26 female and 26 male untenured Ph.D. assistant professors of biology.<sup>1</sup> The average age of the women biologists was 35, about two years older than the men. However, both women and men had received their degrees about four years earlier and had been at their present job almost three years, indicating that women had started graduate school at a later age than men but did not differ in terms of time in career. More women were married (73%) than men (58%).

One problem associated with studying networks is determining whether they are a cause or effect of professional success. For instance, networks can provide professional opportunities, but stature in the field also could help expand a network. Thus, increased professional visibility in terms of larger numbers of publications could be either a cause of network size, due to colleagues initiating contact with the author based on her or his reputation, or an effect of colleagues providing publication outlets or advice. Indeed, once a network is functioning, it is likely to operate both ways.

To help rule out the possibility that any observed network differences were due to dif-

fering performance by women and men, some rough measures of professional success were included in the survey, including size of university, number of journal articles published, and self-ratings of success. No significant differences between women and men were found: three women and two men were at universities with student populations of less than 10,000; ten men and ten women were at institutions with populations of 10,000 to 20,000 students; and fourteen men and thirteen women were at universities with over 20,000 enrolled. Both women and men had published an average of 7.5 articles and rated themselves as "very successful" given the expectations within their department for faculty at their year level. Although prestige of institution and of journals was not evaluated, these comparisons indicate that both sexes had achieved relatively equal success within four years of receiving their Ph.D.'s. Therefore, sex differences found here in network composition or functioning probably are not attributable to sex differences in career success.

### WOMEN'S AND MEN'S NETWORKS COMPARED

Responses to the survey indicated that women biologists were holding their own vis a vis men in terms of network size.<sup>2</sup> On the average, each sex named about 15 colleagues when asked to describe people with whom they had "an important colleague relationship." The typical network profile included about eight national contacts, four departmental colleagues, and three faculty from other departments. The top ranked function of a national network was "helping to establish a professional reputation."

Women did not fare as well as men in terms of numbers of colleague friendships, however. First, on the average, men designated four people in their national network to be "close personal friends," compared to two for women. Second, although both sexes had listed an average of nine higher ranking colleagues (seven of whom were men) as part of their network, men reported that three or more of the higher ranking men were also close personal friends. (See Table 1.) Women counted less than two higher ranking men as friends. Third, married women appeared to

Table 1. Average number of higher ranking colleagues and friends by sex

Higher Ranking	Women's Networks	Men's Networks
Men colleagues	7.2	7.2
Close men friends	1.8	3.3*
Women colleagues	2.2	.8*
Close women friends	.7	.1*

\* $p < .05$ .

be at a disadvantage in terms of cultivating men colleagues overall. They averaged nine men per network, compared to 14, 12 and 14 men per network for single women, single men, and married men, respectively. On the positive side for women, they generally had two or more higher ranking women in their network than men, one of whom was a friend. Men usually had at most one higher ranking woman in their network and no higher ranking woman friend.

These results indicate that men appear to have a career advantage in terms of network composition. Their national networks were stronger because they were more likely to be consolidated with friendship as well as professional ties. National networks are more crucial to the development of a professional reputation than departmental or university networks. They play an important role in providing opportunities for professional visibility; it is these colleagues who invite junior scientists to present their work at symposia, attend an invitation-only conference, provide informal reviews of grants and manuscripts, and write letters of recommendation.

The presence of a small same-sex network for most women biologists indicates they were not without support. Having one higher status woman as a friend provided some potential for mentoring. With so few women in higher ranking associate or full professor roles nationally, however, women clearly had fewer chances to build a same-sex support network as strong as the men's.

The women surveyed had done as well as men at preserving ties from previous institutions. Each sex counted three to four colleagues from graduate school or postdoctoral appointments as part of their national network. These ties are believed to provide valuable support during the graduate student to

assistant professor transition. This result is in contrast to previous research showing that women have weaker ties with their academic sponsors than men (Bayer, 1970; Rose, 1985), perhaps because women have more difficulty establishing peer relations with former teachers (Reskin, 1978). Apparently, the women in this sample had found successful methods of maintaining or replacing valuable contacts.

In terms of national network functioning, sex differences were found that confirmed the conclusions drawn above.<sup>3</sup> Significantly more men had collaborated on research with colleagues from their national network and had done so more often (five to ten times) than women (two to five times). In addition, more men had been invited by colleagues to review grant proposals (50%) and journal articles (58%) than women (23% and 34%, respectively). These activities have long range career benefits for scientists: (a) collaboration because it provides research experience, (b) grant review because it familiarizes reviewers with what is regarded as fundable research, and (c) journal review because participants learn what is publishable. Involvement in these latter two activities also enables evaluators to become "gatekeepers" by defining what (and who) is worthy of funding and publication. The only activity in which more women (27%) than men (8%) had been invited by colleagues to participate was to serve on a professional task force or committee at the state or national level. These results indicate that when colleagues do think of recommending women scientists, it is more likely to be in the context of professional service than research-related issues.

Despite the sex differences found above in objective measures of network functioning, women subjectively did not perceive their national network to be less effective than men's. Women and men alike rated their networks as providing "very much" research news, career advice, friendship, visibility, and information about career opportunities. Perhaps the discrepancy between actual and perceived effectiveness is due to women's lack of awareness about how much their male counterparts are sought out by colleagues. Or maybe the women had other ways of promoting themselves, instead of waiting for colleagues to do so. Even so, it

seems that the women probably had to work harder to obtain the same experiences that were readily being extended to men.

Marital status affected several aspects of network effectiveness, but not in precisely the way predicted. Married men were expected to fit in the "old boy" network much better than married women. However, single men and women reported themselves as better off on several measures of network functioning, rating colleagues as more often helping them in five ways: (a) suggesting that someone they (the colleagues) knew professionally contact her or him concerning her or his research, (b) recommending that she or he contact someone they knew personally in the field, (c) introducing her or him to someone who was now part of her or his network, (d) introducing her or him to someone who was useful later professionally, (e) advising her or him about how to approach certain peers in the department. Although these results indicate marriage was equally detrimental to women and men on these measures, women were disproportionately affected, because more women were married (73%) than men (58%).

In conclusion, the results of the network survey indicate that junior women in the biological sciences, particularly married junior women, are more poorly connected to the "old boy" network than junior men. The differences were most evident in the areas of establishing close friendships with higher status men and developing a professional reputation. These findings have serious long-range career consequences for women biologists working to earn tenure. The gap found here between women and men by their third year at a tenure-track job is likely to widen by the sixth, or tenure, year, because a better functioning network yields increased professional opportunities and visibility. Consequently, evaluations of women's performance by nationally known reviewers may be affected adversely—evaluations which are often critical in determining tenure decisions. Because a similar evaluation process is repeated during promotion from associate to full professor, the ever-increasing gap in professional visibility is likely to negatively affect women's chances for promotion then, too. The process guarantees that few women scientists will achieve tenure or full rank.

## STRATEGIES FOR WOMEN SCIENTISTS

The results of the present study indicate that women biologists believe they are doing better at developing a professional network than they actually are. How can this situation be improved? Is it possible for women to gain access to the "old boy" network in the sciences? At least two factors affect the odds of women's being welcomed. First, according to Kanter (1977), the sex ratio of the profession influences the amount of isolation and discrimination women experience. She predicts that fields with more than 15% women will be more responsive to them. In biology, women comprise about 18% of tenured and tenure-track faculty, indicating that the ratio of women to men is probably high enough to reduce some problems associated with being a token, but not all. In fields where there are fewer women, such as the physical sciences, mathematics, and engineering, women will have even more difficulty gaining access to the male network than were found here. In addition, minority women in any field will experience isolation due to their small numbers.

Second, regardless of the sex ratio, women scientists must contend with a societal norm of homosociality that operates against cross-sex networking. Homosociality refers to the preference for same-sex social interactions, reinforced by childhood sex-segregation, which guarantees that most men will feel more at ease with other men, and women with women. The power differential between women and men encourages greater homosociality among men, because men have more to gain in terms of power, prestige and resources by associating with men rather than with women (Lipman-Blumen, 1976).

Short of drastic changes in the numbers of women in science, childhood sex-segregation patterns, or distribution of resources between men and women, the results found here suggest that women scientists need to develop some short-term networking strategies. Two that would be effective are (a) to pursue individual solutions, and (b) to develop stronger networks with other women. Some individual solutions might include deliberately paying attention to developing long-term ties while in graduate school and consciously working to build new contacts

during the crucial pre-tenure years. For example, networks can be enhanced by frequent visibility as a presenter at national conferences, active service in professional organizations, and intentional contact with experts in the field. A number of other individual solutions for getting tenure are presented in *Career Guide for Women Scholars* (Rose, 1986).

The second solution, developing women's networks, was already being done by most of the women biologists studied. Though there are limits on the size and status of this network due to the small number of women in the field, these same-sex networks provide important moral support and mentoring. Consciously strengthening bonds with women has helped women in other disciplines develop a strong power base. For instance, the Association for Women in Psychology and the Association for Women in Sociology have had a strong impact on their national associations, guaranteeing that women were represented in all levels of the organization (e.g., Walsh, 1985). However, women in the natural sciences in the United States have been slower to identify themselves as a special interest group, preferring the label of "scientist" to that of "woman scientist." This may be changing. In 1987, the American Institute for Biological Scientists held its first meeting for women in science, and it was very well attended. (Interestingly, it was organized by women graduate students.) If the willingness to identify as a group continues, women scientists will be taking a huge step toward challenging the "old boy" network.

## ENDNOTES

1. To guarantee that responders and nonresponders did not differ significantly, twenty nonresponders (10 women and 10 men) were contacted by telephone and asked their age, present position, years since receiving the Ph.D., and years at present position. Comparisons, within sex, between responders and nonresponders on these variables indicated the samples were similar; therefore, the population studied appeared to be representative of young Ph.D. biologists in their first tenure-track position.

2. Only results which were found to be statistically significant at the  $p < .05$  level using analyses of variance are reported here.

3. A statistical test called a chi-square was used to determine whether the numbers of women and men re-

porting having done an activity differed statistically at the  $p < .05$  level.

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