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Mentoring and Women in Academia: Reevaluating the Traditional Model

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Introduction

The proliferation of literature and research on mentors suggests that mentoring relationships provide a unique perspective on career development in a variety of fields and vocations. Much of this research seems to concur that having a mentor is an important component to successful career advancement and, conversely, that the lack of a mentor may hinder timely progression. However, much of this research has identified male career patterns and subsequently used those as a standard against which to measure women's experience. Such a practice can lead to the conclusion that women's approach to mentoring is deficient or inferior in some way. Instead it is useful to view women's career progression within the context of women's overall defined roles and social position. The question of interest here is, Does the traditional mentor-protégé model reflect women's experience? And if not, what does?

The research on mentors, primarily, has focused on the career progression of young adults as they are socialized into the world of business and management. In this body of literature, a mentor has generally been defined as an experienced adult who guides, advises, and supports an inexperienced protégé for the purpose of furthering his or her career (Burke et al. 1990; Clark and Corcoran 1986; Cronan-Hillix et al. 1986; Kram and Isabella 1985; Levinson 1978; Noe 1988; Wright and Wright 1987). There is evidence that this traditional mentoring model does not adequately mirror women's experience in academia.

Specifically, research on women's mentorship experience in academia has critical limitations. For example, peer mentoring may be an important source of support and guidance for women, but it has not been thoroughly evaluated (Kram 1985). Also, career interruptions related to family or caretaking roles may impede the formation of relationships according to the traditional mentoring model (Gerson 1987). And there is evidence that women who pursue careers in traditionally male-dominated fields, such as engineering, mathematics, and science, plan to interrupt or reduce their labor-force participation to accommodate their expected child rearing. Men generally do not incorporate family plans into their career

aspirations (Arnold 1993; Chandler et al. 1992). Finally, assigned gender roles and stereotypes as well as the power disparity between men and women interfere with the development and progression of typical male mentor-male protégé relationships when women are involved (Nevill and Schlecker 1988). These areas need to be investigated with respect to the development of women's mentoring relationships.

Even though women are slowly closing the gender gap in business and management, in academia women continue to be severely underrepresented in the higher-ranking faculty positions, especially in fields such as science and engineering. For instance, of all doctoral degrees awarded in 1992, 63 percent were awarded to men as contrasted with 37 percent awarded to women. Furthermore, in the physical sciences 80 percent of all doctorates were awarded to men in 1992; and in engineering, men earned 90 percent of the doctorates awarded in 1992 (U.S. Department of Education 1990).

These patterns also emerge when the number of men and women of different races and ethnicities obtaining doctorates each year is examined. For instance, there were a total of 5,309 doctoral degrees awarded in 1988 and 69 of them were awarded to black men and women (including U.S. citizens, permanent visas, and temporary visas). Of African American men and women, 32 earned doctorates in the physical sciences whereas 2,913 white men and women did so. Furthermore, 11 American Indian men and women and 69 Hispanic men and women (U.S. citizens) were awarded doctorates in the physical sciences in 1988 (National Research Council 1992).

It is possible that women's experience with a mentor or their lack thereof may provide some information on the discrepancy between men and women pursuing careers in academia. Nonetheless, research specifically investigating marginalized social groups' experience with mentors in an academic setting is scarce, even though academic journals that focus on the experience of persons of color anecdotally have identified mentoring relationships as vital to the recruitment and retention of students and professionals in higher education. In addition, research specifically focused on women's mentoring experience in science and engineering fields is insufficient, even though mentoring relationships may be an important factor in women's attainment of tenure in such male-dominated fields as science, math, and engineering.

This study attempts to understand more thoroughly the relationship between women and mentors by reviewing the pertinent body of literature about mentoring. Specifically, it attempts to identify the prevalent patterns in the literature on women's mentoring experiences in various academic careers, giving special attention to the current research on women of color and women in science.

Mentors in Professional Settings

Functions

Studies published in the business and management literature provide a two-pronged model of the developmental functions of mentoring relationships for employees. The first is a *career-enhancing function* that includes sponsorship (e.g., nominating a protégé for promotion), coaching (e.g., suggesting work strategies), facilitating exposure and visibility (e.g., bringing a protégé to meetings and conferences), offering challenging work, and protecting a protégé from criticism. All of these roles help the protégé establish credibility in the organization and prepare for advancement. The second prong is the *psychosocial function*, which involves the mentor as a role model, counselor, and friend and helps the young adult develop a sense of personal identity and competence (Burke 1984; Kram and Isabella 1985; Levinson 1978; Noe 1988).

In return, the mentor gains technical and psychological support, personal satisfaction, and respect from colleagues for successfully developing younger talent. The mentor relationship generally develops over time, changing to fit the evolving needs of the individuals (Kram and Isabella 1985; Moore 1982; Wright and Wright 1987).

Benefits and Barriers for Women

The benefits of having a mentor for women's career advancement have been demonstrated (Burke 1984; Dreher and Ash 1990; Weiss 1981; Young, MacKenzie, and Sherif 1982). The studies that focus specifically on women and mentors show that mentors can provide support and reduce job stress for women who do not have a peer group in their organization (Nelson and Quick 1985). Also, Riley and Wrench (1985) found that women who had one or more mentors reported greater job success and job satisfaction than women who did not have a mentor. Other research indicates that having a mentor is an important factor for women of color who pursue careers as administrators in higher education (Ramey 1993). And finally, a panel of women academic leaders stressed the importance of support networks for women minority students as sources of assistance in often hostile environments (Morgan 1993). The need for facilitating mentorships for women in their professional organizations is evident (Bolton 1980; Clark and Corcoran 1986; Finkelstein 1984; Kram and Isabella 1985; Levinson 1978; Noe 1988; Speizer 1981). However, the question remains What type of mentoring relationship is supportive and productive for women?

Some empirical studies have investigated the type of support most commonly associated with women's mentorships. Dreher and Ash (1990)

investigated the relationship between mentoring experiences, gender, and career success among 440 business-school graduates. The only observed difference in mentoring experiences for men and women involved the psychosocial functions. Women were more likely to report that their mentors conveyed empathy for the concerns and feelings discussed with them than were men. Also, Burke (1984) studied eighty protégés in the early stages of their careers and found that female protégés reported greater supportive, personal mentoring than males reported and that female mentors were seen as providing this type of support more liberally than male mentors.

Similarly, Burke, McKeen, and McKenna (1990) studied mentor-protégé relationships of employees in high-technology firms. Analysis of sex differences between male and female mentors and protégés indicated that psychosocial functions played a larger role when women were involved. This effect was especially pronounced in female mentor-female protégé pairs (Kram and Isabella 1985; Burke, McKeen, and McKenna 1990).

The larger role played by concern and empathy when women are involved may be attributable in part to women's socialization as caretakers. Or women may be perceived as more likely to require this kind of support. Alternatively, concern and empathy may be the result of a feeling of camaraderie that develops in the face of the obstacles professional women commonly face. Together these findings suggest that psychosocial functions are an important element in women's mentoring relations and should be considered in further research.

Apart from the benefits associated with mentoring for women, there are aspects of the development of these relationships that can be especially problematic. Evidently, there are various individual and organizational factors that inhibit the prospering of mentoring relationships for women. For instance, women's career patterns often include late career entry, more interruptions, and fewer advancement opportunities, all of which are factors that impair the forming of a mentorship (Gerson 1987; Noe 1988).

Furthermore, women are at a unique disadvantage because there is a shortage of potential mentors in business, academia, technical fields, and other professions. Typically, mentors tend to associate with protégés who are similar to themselves in terms of gender, race, and social class; since white males generally hold the majority of upper-level positions in the professions, the number of possible mentors for women is limited (Noe 1988; Wright and Wright 1987). Thus women with mentors may be atypical in some respects.

Some research shows that recipients of mentoring are more likely to subsequently mentor other professionals (Wright and Wright 1987). However, this pattern may not be applicable to women. Moore (1982) found

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female protégés were reluctant to act as mentors because of their often distressing experience as a protégé. Women often reported that as a minority, they felt burdened with the additional performance demands associated with being the "only one" (Moore 1982).

Also the term "tokenism" is used to describe accomplished women or minority-group members who, once selected into a commonly white, male inner circle, become labeled as the "token" representative for their group. This status often can lead a protégé into feeling special or unlike his or her peers and, consequently, reluctant to encourage the success of others (Bolton 1980; Kanter 1977). As a result of these dynamics, women face a cyclical pattern of disadvantage in finding mentors.

Noe (1988) presents several barriers for women in forming cross-gender mentorships, such as lack of access to the information networks (e.g., men's clubs), tokenism, stereotyping, the social norms of cross-gender relationships, and reliance on inappropriate power bases. Furthermore, mixed-gender pairs submit themselves to the risk of gossip, jealous spouses, and sexual attraction or tension (Noe 1988; Wright and Wright 1987).

Burke, McKeen, and McKenna (1990) suggest that the power disparity in society at large creates a conflict in male mentor-female protégé pairs when the purpose of the relationship is to foster development and achievement that removes the original disparity. Nevertheless, there is some evidence that male mentors had a more positive impact on their female protégés' careers than on their male protégés' careers (Burke 1984). It is apparent that more research is needed in this area.

Summary

Thus, in the business and management research, several issues surface. First, there is substantial evidence that mentors can be beneficial to women's careers, yet the most helpful qualities of the relationship have not been thoroughly identified. Several empirical studies have found that psychosocial functions are more salient when women are involved either as mentors or as protégés. Again, more research is needed to determine how much we can attribute to female socialization and how much to the possible solicitation of this type of support on the part of the protégé.

In addition, some notable problems with women's mentoring experience include careers interrupted by family responsibilities, the lack of potential mentors, and tokenism in male-dominated fields. Also there is evidence that cross-gender relationships can be problematic, especially in relation to gender-role expectations. More research is necessary to determine how these barriers affect the formation of women's relationships in a professional setting.

Mentors in Academic Settings

Functions

Mentors in an academic setting perform the same functions that we have examined in the business-management environment. The two components of their role include the transfer of marketable, discipline-based skills and the provision of the social and emotional support that makes the transfer of knowledge and skills possible (Redmond 1990).

Benefits and Barriers for Women

Stemming from the research on mentors in business and management have been more recent studies of the role of mentors in the academic community. The literature indicates that the benefits of the academic mentoring relationship to both the mentor and protégé include career enhancement, such as research collaboration and job placement, professional networking and development, and increased competence and self-esteem (Kram 1985; Moore 1982; Wright and Wright 1987).

There are, however, many conceivable difficulties with academic mentoring relationships. Certain conditions can be counterproductive to the mentor, to the protégé, or to both. Hazards include power struggles, exploitative relationships, professional stagnation, sexual harassment, and dependency problems (Wright and Wright 1987). There has been little research to determine how these dangers are distributed among same and cross-gender mentoring relationships in an academic setting.

Several empirical studies have, however, specifically looked at professional development and mentoring in an academic setting. Knox and McGovern (1988) surveyed the important characteristics of a mentor from the perspectives of both protégés and mentors and found no significant differences between mentors' and protégés' preferences. The following six characteristics of mentors were shown to be the most important: willingness to share knowledge, honesty, competence, willingness to let the protégé grow, willingness to give positive and negative feedback, and straightforwardness in dealings with the protégé.

Blackburn, Chapman, and Cameron (1981) considered the role of mentors from the perspective of the mentor. The "mentors" ($N = 62$), defined as highly productive professors who were mostly graduates and employees of prestigious institutions, were surveyed regarding their most successful protégé. Results indicated that mentors overwhelmingly see their most successful protégé as those whose careers were essentially identical to their own. Furthermore, the study found that a small number of senior faculty seem to be sought out by women students as particularly helpful and/or supportive (Blackburn, Chapman, and Cameron 1981).

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The relationship between mentors and career research success in academia has also been investigated (Cameron and Blackburn 1981). Financial support from and early collaboration with a senior faculty member were significantly correlated with four career-success variables (i.e., publication rate, grants received, collaboration, and professional network). The sex of the student was a predictor of career research success when it was measured by the extent of network involvement. Men established significantly more faculty associations than females, associations linked to greater career research success (Cameron and Blackburn 1981).

Similarly, Weiss (1981) studied how the socialization process of graduate students fosters or inhibits the development of professional-role commitment (measured by students' productivity and involvement). Using previously gathered data, 8,476 cases determined to be representative of American graduate students were examined. Frequent interaction with faculty members on an informal basis was significantly related to a high professional-role commitment and to the students' professional self-concept.

These studies provide evidence to support the following statements: (1) students and faculty generally agree on the qualities of a good mentor; (2) mentors tend to define successful protégés as those with career paths most similar to their own; and (3) frequent interactions with faculty can be very helpful and productive for a student's career pursuits. Further research is necessary to examine how each of these findings differs according to gender.

Some studies have specifically looked at gender as it relates to mentoring. In studying different measures of graduate-student success, one of the significant differences between men and women was the amount of interaction with faculty members (Berg and Ferber 1983; Clark and Corcoran 1986; Finkelstein 1984; Noe 1988; Wright and Wright 1987). Given the evidence that protégé-mentor pairs of the same sex interact most comfortably, female students are at a disadvantage in finding mentors (Berg and Ferber 1983). Also, with a disproportionate ratio of female faculty to female students in the physical and biological sciences, this type of an effect would be exacerbated.

Moreover, cross-gender relationships were analyzed in a study of graduate students' involvement in and perception of mentor relationships at the time of occurrence (as opposed to retrospectively). Of the ninety psychology graduate students surveyed, a moderate percent (53 percent) of the males and females in the sample had mentors, but only 13 percent of the students had female mentors. This disparity was attributed in part to the smaller number of female professors available (four women held the rank of full professor). Yet male students tended to avoid female mentors disproportionately after controlling for the number of female faculty (Cronan-Hillix et al. 1986).

Other cross-gender effects are evident in students' evaluations of faculty. In academic settings, female students have a higher regard for their female professors. For example, in one study of teacher effectiveness, female students rated female faculty much higher than male students rate the same faculty, and significantly higher than they rated male faculty (Ferber and Huber 1975). Interestingly, in one study based on a sample of students in graduate school, those students with same-sex advisers published significantly more research than those with opposite-sex advisers (Speizer 1981).

Summary

In an academic community, for students with a high level of interaction with faculty and who are actively networking, mentors are associated with significantly enhanced career success for students. Again, however, women are at a disadvantage simply because of the scarcity of potential mentors. Other problems include exploitative relationships and the tension that stems from gender stereotypes and power struggles. However, issues of family responsibility, career interruptions, and perceived gender-role expectations have not been explicitly studied and may account for some of the barriers mentioned.

Women of Color

The circumstances that *all* women face in professional academic careers are compounded for some women by factors such as race, ethnicity, class, sexual orientation, and age. Some researchers have addressed the barriers faced by "women and minorities" with regard to mentoring but have then failed to differentiate among the many populations that fall into these two general categories (e.g., Matczynski 1991). The issues that women face may vary depending on their social position. For example, women of different historically marginalized groups may have different needs and expectations from a mentor than other women may have. Research on women's experiences in academia needs to expand beyond the white middle-class model.

Given the projected rates of mortality and retirement of current faculty, opportunities in academia for a diverse population of women should be promising. However, institutions are not effectively attracting ethnic-minority men or women to this career path (Wheeler 1992). For instance, in 1991 in the United States, there were 143,049 white women who held full-time faculty positions as compared with 11,460 black women, 6,029 Asian women, 4,069 Hispanic women, and 638 American Indian women. Of tenured female faculty in 1991, 88.2 percent were white, 6.6 percent

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were black, 2.7 percent were Asian, 2.3 percent were Hispanic, and .3 percent were American Indian (U.S. Equal Employment Opportunity Commission 1991).

Traditionally underrepresented in academia overall, minority groups such as African Americans and Latinos are severely underrepresented in science, mathematics, and engineering fields. For example, in 1988, of the 60,347 full-time regular faculty in the natural sciences, 1 percent of those were black and 2 percent were Hispanic. Furthermore, in 1988 of all doctorates awarded in engineering in the United States, blacks earned twenty-nine, Hispanics earned thirty-six, and American Indians were awarded three. For those African Americans who earned master's degrees in engineering, 328 were men and ninety-one were women.

If we are to increase the number of women faculty of color, more racially diverse students need to go to graduate school and complete their doctorates. Reid and Wilson (1993) found social support to be very important in retaining ethnic minority students. Students who do not complete doctoral programs commonly cite isolation and feelings of inadequacy as deciding factors. Persons of color may find the graduate-school environment very isolating because they are often the sole representative of their culture or ethnic group. Also, students of color frequently report feelings of inadequacy in their programs and lack confidence in their ability to succeed as professionals, a problem intensified by the scarcity of role models (Reid and Wilson 1993).

Furthermore, there is evidence that mentoring for minority students who persevere in higher education is severely lacking. Wheeler (1992) posits that university administrators and faculty often do not know how to interact with or how to teach persons of color; there are so few minority men and women faculty that role models are virtually nonexistent. Even basic academic advisers can help minority students feel welcome and part of the community, yet they often fail to do so either out of neglect or on account of budgetary constraints (Phillip 1993a). There is general agreement among female academic leaders that in order to survive, women students of color need to form networks to help socialize each other and prepare each other for the realities they will face (Morgan 1993).

From the perspective of the faculty, the obligations that the few minority professors do face can be overwhelming. The productivity level of faculty varies according to gender and ethnicity—a disparity that cannot be fully explained by seniority. Research on over 4,000 faculty members has found that the greatest variance between demographic groups was the number of hours the professors spent advising students each week (Konrad 1992). These findings suggest that women faculty members, and especially women of color, are pressured to provide the counseling and advising in support of their student counterparts, particularly on campuses that lack diversity (Wiley 1992a).

Furthermore, the added responsibilities that women faculty members of color are expected to assume, including the roles of counselor, mentor, and guardian for minority students, often give the white faculty an edge in writing, conducting research, and working for tenured positions. Minority faculty are torn between supporting and investing in the minority students and the demands of a competitive academic community. Besides devoting added time to their students, minority faculty are pressured to serve on various minority-related committees. These faculty often become the sole sources of support for minority students, yet at the same time they do not have anyone to mentor them or offer assistance during the tenure process (Phillip 1993b). For these reasons as well as family responsibilities, working for tenure can be especially difficult for white women faculty and nearly impossible for women of color.

One recommendation is that department heads and personnel directors provide mentoring for these overburdened faculty members and encourage them to limit their responsibilities. At the same time non-minority faculty members need to share advisory responsibilities so that minority students do not suffer from lack of support (Wiley 1992b). Another recommendation is that current faculty be rewarded for efforts to recruit and retain minority faculty to help lessen the burden on existing minority faculty as well as to help meet goals for a diverse campus community (Rodriguez 1993).

Finally, one study investigated women administrators in higher education to determine the salient characteristics associated with their success. The results of the survey indicated that mentoring was a key element in contributing to the success of the respondents and especially for women of color. Interestingly, the women who had mentors were more ambitious than other women and aspired to be university presidents more often than the others (Ramey 1993).

So while mentoring seems to be important for those culturally diverse students and faculty who persevere and succeed in academia, there are barriers to such relationships that mirror the barriers women face overall: At most predominantly white institutions there are too few minority faculty and graduate students, they are given the job of providing the "minority voice" on various campus committees, and they are expected to take on the responsibility of the recruitment and retention of minority students without sufficient support for their own career advancement.

More research is necessary to explore the various needs of women of color in mentoring relationships and how these needs can be addressed. Nonetheless, the research indicates that in order for minority faculty to thrive rather than simply survive, mentorships should be actively promoted at every level in the academic community from student to administrator.

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Women and Science

The common obstacles women face in academia are also magnified in fields that have been traditionally dominated by men, such as science and engineering. These fields most often are high in status and prestige, high in pay and security, and overpopulated by men, particularly at the upper echelons. Whereas colleges and universities could be supportive environments in which individuals become excited about learning and are encouraged to pursue challenging careers in science and engineering, in reality this environment may act more effectively as a fortress against diversity.

Despite the influx of women in professional careers, women remain disproportionately underrepresented in science and engineering. For example, in 1960 women earned 4 percent of all masters' of business administration, but by 1990 women earned just over one-third (34 percent) of all MBAs; however, in 1960 women earned .4 percent of all doctorates awarded in engineering and by 1990 they earned 9 percent of them. Because the total number of women engineers is so small, the percent change is deceptively high. In 1992, there were 503 women who earned doctorates in engineering (U.S. Department of Education 1990). The numbers for the physical and life sciences are slightly better for women. In the physical sciences 5,212 men and 1,282 women earned doctorates, and in the life sciences 4,314 and 2,794 women did so in 1992 (National Research Council 1992).

Interestingly, minority women seem to fare better than nonminority women in some science and technology fields. For instance, in 1991, 26.1 percent of the minority engineering graduates were women, whereas 14.8 percent of the nonminority engineering graduates were women (National Action Council for Minorities in Engineering, as cited in Hayes 1993). Minority women made up 12.1 percent of all women graduating with degrees in engineering, and only 6.3 percent of the graduating men were minority (Hayes 1993). Nonetheless, minority women accounted for only 1.9 percent of the graduates in engineering, and 14 percent of the college-age population (Hayes 1993).

In addition, women of color face obstacles similar to those faced by white women when entering a career in science or engineering, yet various cultural differences may lead to ethnic or racial minority women having qualitatively unique experiences in such fields. In other words, it is not sufficient to say that women of color suffer the disadvantages of white women plus some others. Research is necessary to investigate the diversity of women's experiences with a mentor—or lack thereof—to help understand why women do not pursue careers in science and engineering at the same rate as they do in other fields.

Traditionally women have been ignored as contributors, participants, or simply viable beings where science is concerned. So while other fields are gradually seeing the gender gap get smaller, in science the changes are less perceptible. Explanations for this phenomenon vary. Some studies have investigated the way science is taught in grade school and secondary school (Sandler 1980); other research has identified socialization factors and the achievement motivation of boys and girls (Eccles 1987). There is also evidence that a career in science or engineering is perceived to be incompatible with women's dual role as caretaker and professional, so that women opt for other fields (Arnold 1993). Could science and engineering be substantially more adversarial to women than other fields? Is a career in science and engineering too incompatible with raising a family? Or is the essence of science constitutionally in opposition to the socially assigned roles and definition of women?

The reasons for which women are not pursuing careers in science and engineering and subsequently persevering in such careers may go beyond social influences and a lack of role models. The inherent characteristics of science and engineering as well as the historically defined concept of woman may in fact be to blame. That is, women have been defined as fundamentally incompatible with rational, methodological thinking.

A developing body of literature, often described as feminism and science or gender and science, has critically examined science as an institution that has historically and systematically marginalized women. Accordingly, science is defined as a social construct conceived predominantly by white men, from *their* perspective of reality (Shahn 1990). With a self-appointed monopoly on knowing, "science" legitimizes one perspective as constituting absolute knowledge and truth (Hubbard and Lowe 1979).

While social institutions often reflect the changing mores of a society, science claims exemption from social changes because of its license on objectivity, positivism, and truth. Therefore, scientists can conveniently dismiss questions about science's integrity as spurious theorizing. This study will not pursue a philosophical exploration of science as essentially opposed to the societal definition of woman. Instead it will focus on the structural barriers that women encounter in science and other male-dominated fields.

According to Finkelstein (1984), women academics tend to be disproportionately concentrated in "traditionally female" fields, at the lower ranks, and at the less prestigious institutions. Also, women tend to be promoted more slowly, to earn about 20 percent less than their male colleagues of the same rank, and to have a lesser role in administration.

There are competing explanations for these findings. One study suggests that differences in the training and educational experiences of men and women result from subtle patterns of discrimination that have af-

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affected women throughout their academic careers. For instance, women were found to be half as likely to have held research assistantships and two-thirds as likely to have held teaching assistantships—positions that are highly conducive to advancement in the academic community, especially in science and engineering fields [Freeman 1977].

Furthermore, the restrictive socially defined roles for women may explain some of the underrepresentation of women in certain fields. For instance, the issue of "tokenism" (Kanter 1977) was explored to help identify the coping strategies of women in predominantly male departments. According to Law's (1975) analysis, token women must alternate between competent professional behavior and a subordinate, "feminine" role in order to survive and succeed in academia. This demand for flexibility of behaviors across situations, according to Laws, requires women to find a mentor who will help socialize her into the token role.

Family responsibility, which still rests mainly with women, may also influence women's presence in science and engineering fields. In looking at men's and women's concerns about graduate training, Maines (1983) found that female mathematicians were more likely than males to mention the personal and familial sacrifices for their career, whereas men expressed concern over factors unrelated to family, such as their reputation and status in the company of their peers and colleagues. This finding suggests that women consider familial concerns in relation to career decisions, although this may not be the case for men.

DiBenedetto and Tittle (1990) examined men's and women's preferences with respect to jobs and children. They found that women's career-development choices are made as a function of their work, parental, and partner roles. Men view their commitment to work and to parenting as independent of each other (DiBenedetto and Tittle 1990). In other words men do not see themselves as having to make a choice between the two. Women, by contrast, saw their job and their desire for children as a trade-off.

Several studies support the finding that the demands of parenting, in addition to the values of parenting, are related to career decisions, at least among women. In looking at time allocation for working men and women, we find that women distribute their time across family and career, whereas men are more apt to focus their time on their careers (Goff-Timmer, Eccles, and O'Brien 1985). Even with advanced professional degrees, women are less likely to work, and if they do, they are more likely to work part-time (Eccles and Hoffman 1984; O'Connell, Betz, and Kurth 1988).

O'Connell, Betz, and Kurth (1988) analyzed women's work-involvement plans in traditional versus nontraditional fields. Women were considered to be pursuing traditional careers, for example, if they were art teachers, social workers, home economists; and nontraditional careers if

they were accountants, engineers, physicians, and so on. Work-involvement plans were similar for women in traditional and nontraditional fields, but there were significantly more women committed to full-time work among those pursuing nontraditional careers than among those pursuing traditional careers. In all fields, traditional and nontraditional, women were similarly inclined to interrupt work when children were young; they foresaw more difficulty in balancing family and career in nontraditional fields (O'Connell, Betz, and Kurth 1988).

To summarize, it appears that women with families must make a series of decisions when considering a career. Family commitments are likely to be a salient concern in rapidly changing and demanding careers such as science and engineering. Women may in fact choose to enter nonscience fields on the basis of their expected parental involvement. Men have often been reported as viewing their role as a parent as separate from their role as a professional, so it is less clear if their degree of parental involvement will affect their choice of a science or nonscience career. The role of mentorship in the career and family conflicts that often arise during women's graduate training and professional development needs to be examined.

Women's different choices concerning family life and careers (or the assumption by senior male colleagues that this choice exists for women) may contribute to the perception of women as less committed scientists, and in turn, potential mentors may focus their efforts on men in hopes of a better return on their investment. Clark and Corcoran's (1986) analysis of academia's social stratification specifically investigates the mentoring process as it is experienced by women through qualitative interviews with women scientists. Experiences with advisers ranged from very helpful to relatively unhelpful and even sex-biased. One problem women commonly encountered was not being taken seriously by their adviser. For example, one graduate student said, "We were treated as though we had no gender what so ever. And yet I could see that there was a big difference in the institution in terms of what happened to women and what happened to men" (Clark and Corcoran 1986, 31).

This type of treatment has cumulative effects on women's careers in the sciences. As Jonathan Cole has written:

By virtue of being in top graduate departments and interacting with influential and brilliant scientists, some scientists have a social advantage in the process of stratification. . . . The one who is strategically located in the stratification system may have a series of accumulating advantages over the one who is not a member of the elite corps. . . . Potentially, this process can influence the careers of women scientists. If for one reason or another they do not attend superior training centers, do not apprentice for master scientists, do not have facilities to carry out their research ideas, their chances for recognition and esteem are diminished. . . . [It] is the cultural forces that lead women to select

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This excerpt clearly explains how women are systematically subordinated as professional scientists; it does not, however, offer constructive suggestions for doing away with the social tiers one encounters in science. Reinventing mentoring relationships for women may provide a vehicle for substantial change.

Sandra Harding points out other structural barriers in her book *Whose Science? Whose Knowledge?* (1991). She writes:

The devaluation of any work known to have been done by women, the exclusion of women from men's informational networks, the obstacles put in the path of women's attempts to find safe and reliable mentors (and later to be perceived as such mentors themselves)—these and other informal discriminatory tactics give us increased appreciation for those women who have managed to persist. (29)

This passage touches on a factor that may support the need for a distinct mentoring model for women. That is, if women are not perceived as serious, competent scholars in their fields—and they often are not, even now—their options for finding a mentor and becoming a mentor are severely limited. This phenomenon may help explain women's scarcity in various fields in science and engineering.

At this point there is evidence that women of color encounter benefits and barriers similar to those encountered by nonminority women in mentoring relationships. However, the dearth of research on women of color's experience calls for thorough examination before any parallels can be applied to various cultural identities. The relationship between women and science appears to vary among ethnicities as well. While women may be historically marginalized by science as an institution and as a culture defined and confined by white patriarchal values, this review is focused on the structural barriers women face in entering nontraditional fields such as science and engineering. The most prominent barriers include women's family and child-care responsibilities and society's reluctance to perceive of women as competent scholars in scientific fields. These barriers provide two critical reasons why women need some type of mentoring relationship to thrive in a professional career in science, math, or engineering.

Discussion

Existing research in business and management supports the premise that having a mentor is beneficial to women's careers and that psychosocial functions play an important role in mentoring when women are

involved as either mentor or protégé. From this research, common problems with women's mentoring experience were found to include the lack of potential mentors, the lack of access to information networks, and tokenism in male-dominated fields. Also, there was evidence that cross-gender relationships can be problematic, especially because of gender-role expectations.

In the academic community, the research generally has concurred that mentors are associated with the significantly enhanced career success of students who have a high level of interaction with faculty. Common problems for women include, again, the scarcity of potential mentors, the lack of frequent faculty-protégé interaction, and the tension that stems from traditional gender-role expectations.

Several issues that have not been sufficiently addressed in the current literature on mentors also emerged during the course of this study; it is apparent that the traditional mentoring model does not account for women's experience in the following areas: (1) women's and men's different social roles, which interfere with the formation of nurturing relationships in a professional setting (i.e., for cross-gender pairs); (2) family and child-care responsibilities often leading to career interruptions for women; and (3) society's reluctance to perceive of women as competent scholars, especially in scientific fields. It is important to note that the current literature describes mentors as beneficial to women's career development, but there has been little research as to what specific characteristics are helpful.

Given the difficulties associated with the formation of supportive, caring relationships between men and women in a professional setting, peer mentoring may be an important source of support—for women as students and as professionals. That is, nonhierarchical support networks, not based on disparate status as in the traditional mentoring model, may embody a more feminist construct for promoting women in academia. Women simply may be more likely to find support from their peers than they are to find a supportive mentor. Also peer mentoring avoids the notable problems associated with the traditional mentoring model. When two people seek mutual support and advice, the need to maintain a power differential is diminished. Also, peer mentoring may be more likely to withstand the stress of career interruptions and family responsibilities, because the pressure on a mentor to continually encourage and advance the career of a young protégé would not be a factor. Finally, two colleagues at relatively similar levels of professional achievement may be more apt to understand the common professional demands they are both subject to. This mutual understanding may effectively reduce the conflict and tension found in traditional mentoring relationships. Peer mentors, for example, may be more likely than established professionals to treat women as viable contributors to antagonistic fields such as science and engineer-

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ing. Potential problems associated with peer mentoring include the competitive position that peers often find themselves in, lack of experience, and the difficulty that may arise if their careers advance at different rates. Nevertheless, peer mentoring in academia needs to be investigated further.

Another way in which the traditional mentoring model fails to incorporate women's experience concerns family and career conflicts, conflicts that may be more prominent in science and engineering than in other fields. There is evidence that women may be more inclined than men to make their family responsibilities a priority when making career decisions. It is reasonable to believe that an older, more experienced professional will devote more of his/her time to cultivating the skills of a young protégé that can devote all of his/her resources to his/her career. This factor combined with the sheer scarcity of women at the higher levels in academic institutions makes it very difficult for women to develop a traditional mentoring relationship. More research is necessary to determine if men also mention this conflict when discussing their early career progression. Also, it is vital to determine what types of support systems have been successful for women in the past.

In addition to these limitations, the mentoring experience of women of color deserves special consideration. This review would suggest that women of color may need to be especially active in seeking out mentors specifically to meet their needs. Without doing so, many women of color may be at a serious disadvantage. Spontaneous mentoring most often occurs between persons who feel most comfortable with each other; students most unlike the predominantly European-American male are least likely to benefit from such serendipitous contacts (Redmond 1990). Some race and gender theorists consider women of color to be the antithesis in terms of their social and historical position of Euro-American men. This leaves women of color at a distinct disadvantage, one that may be different in kind and degree from the disadvantage at which white women find themselves (Harris 1992).

It is imperative that women of color create ways to overcome feelings of isolation and that they cease to be the sole representatives of their ethnic group. Specifically, junior faculty and graduate students need to actively make up for the support systems that departments fail to provide. Students/faculty at other institutions, friends outside of one's field, and certainly classmates/colleagues could be a source of guidance. Furthermore, for all women, and specifically for women of color, departments need to provide tangible professional rewards for services that often fall disproportionately on the shoulders of women of color, such as advising students and supporting student committees. Feminism has long demanded recognizing the value of traditionally nonvalued work. Empirical research on women of color's experience with mentoring is necessary to

help describe the support needs of women of color throughout their professional development.

Finally, my study was intended to serve exploratory purposes and to indicate directions for further research. Results suggest several questions that need to be addressed, including:

1. What type of model best describes women's mentoring relationships? Is having a mentor associated with doctoral attainment in various fields?
2. Does the traditional mentoring model reinforce traditional gender roles? What is the role of peer mentoring in academia?
3. What type of mentoring relationships are most helpful to women of color?
4. What role does family life play in women's and men's career development and particularly in their relationships with a mentor?
5. Are there significant differences in women's mentoring experiences in the sciences versus the nonsciences?

All of these issues need to be probed by way of qualitative as well as quantitative research if we are to identify the diversity of women's experiences in academia.

Conclusion

If women merely wanted to assimilate into the academic world, the goal would be to get "connected"; that is, women would need to be admitted into the network of collaboration with senior professors, learn the unwritten rules, and abide by gender expectations. This strategy would mean adapting to the male model in the hope of reaping benefits comparable to those received by men. Alternatively, there are ways in which academia could create an environment more conducive to the success of a diverse group of students and faculty. What follows is a feminist algorithm for improving the departmental community for women faculty and graduate students:

Name the Problem: Recognize the disparate circumstances women face and specify the types that are prevalent. For example, departments could document the availability of mentors, work/family time constraints, the unique pressures on women of color, and gender-role expectations.

Raise the Consciousness Level: Provide a means for discussing the various experiences of women in the department; that is, departments need to get feedback on departmental culture and what it feels like to be there. Also, departments need to find out if women of color are facing a unique environment that is particularly hostile and encourage open dialogue about these issues.

Provide a Voice: Communicate concerns about the status of women and the objectives for improving support systems to faculty/graduate students; develop reasonable and appropriate means for students and

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faculty to express their concerns. For example, it is the department's responsibility to provide a clear policy prohibiting sexual harassment with appropriate avenues for reporting and redress.

Be an Activist: Initiate programs to provide guidance and mentoring support to women graduate students and faculty and make a commitment to creating a diverse environment. For example, departments should consider formalizing an advising or mentoring plan for junior faculty with appropriate demands. Orientation for new faculty and graduate students should include a directory with information on support resources in the community, provide the university policies and procedures on sexual harassment and workplace violence, and possibly offer incentives or professional acknowledgment for recruiting ethnically diverse female junior faculty and students. Also, departments should consider limiting the number of committees on which first-year professors can participate. Taking it one step further, subsidized child care for the university community would aid in balancing the family responsibility that is disproportionately women's.

Not everyone will be a good mentor, or provide helpful support, but steps can be taken that will have an effect. Gradually more and more women with positive experiences will infiltrate the upper ranks until there is a representative distribution of men and women of various cultures at all levels. Most important, academia must make a commitment to addressing the concerns of women not because it is mandated for funding or demanded by university administrations but because it will improve the working conditions of men and women and promote a richer, more supportive environment for faculty and students thereby improving the quality of work, teaching, and the quality of life of its community.

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