

2000

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The Woman Engineering Academic: An Investigation of Departmental and Institutional Environments

SHERRON BENSON MCKENDALL

The presence of women faculty in academia was virtually nonexistent until the onset of nondiscriminatory policies such as the Civil Rights Act of 1964 and the 1972 Title IX legislation stipulating the recruitment and hiring of women and people of color (Finkelstein, 1990; Moore & Sagaria, 1991). Although such legislation has resulted in a moderate increase, women are disproportionately represented in the lower ranks of the professoriate (Finkelstein, 1990; National Center for Education Statistics, 1993). The American Association of University Professors' (AAUP) 1988–89 annual report produced disturbing news for women faculty, specifically women of color, finding that “only 49 percent of female faculty held tenure, compared to 71 percent of male faculty. Though minority women’s share of faculty slots grew slightly during the eighties their chances for achieving tenure seemed to be lower than average” (Vandell & Fishbein, 1989, p. 3). Women of color are distinctly underrepresented given the fact that “only 2 percent of all tenured professorial positions were held by women of color” (Phillip, 1993, p. 42). Moreover, women faculty, including women of color, tend to be concentrated in the humanities and social science disciplines (Finkelstein, 1990).

Historically, women’s low representation in science and engineering was said to be due in large part to their lack of “ability, interest or both” (Horning, 1984). Although female participation in engineering and science increased during World War II (Petrides, 1996; Reynolds, 1992), their representation has remained minimal in both the industrialized and academic markets (Strober, 1992). Since engineering is still considered a “masculine” discipline, “the stereotypical views of female behavior often interfere with reality when female faculty are interviewed and evaluated. It is often presumed that family responsibilities will interfere with women’s professional activities” (Baum, 1989, p. 557). According to Baum, qualified women applicants are not given the opportunity to become engineering faculty because it is presumed that women will not have the time to serve as effective members of the professoriate given their family obligations. But it also may be

presumed that women engineers choose not to pursue the faculty route because of their desire to devote quality time to their family.

Baum notes that women who have acquired master’s degrees in science and engineering are not, for the most part, encouraged “to continue their own education leading to the Ph.D.” (1989, p. 557). The notion that women lack the talent to compete, or that their personal lives will interfere with their ability to excel in these areas, in addition to not receiving encouragement to pursue the Ph.D. has led to qualified women remaining a largely untapped pool of potential engineering faculty (Golladay, 1989).

The deliberate exclusion of women from engineering and the sciences is manifested in our social fabric.

As a nation we depend heavily on science and engineering for our economic well-being. Together, these two basic functions make science fields of fundamental importance to national life, and many people remain reluctant to leave such matters in the hands of women. (Horning, 1984, p. 32)

An engineer or scientist wields a degree of status and power that, historically, women have not possessed. Although there have been exceptions to the rule, traditionally such titles have been associated with White men (Aisenberg & Harrington, 1988). Therefore, if the woman engineer or scientist representation increases, this “implies a substantial acquisition of new power by women and also a substantial shift in power in the society at large” (Aisenberg & Harrington, 1988, p. 4).

Female faculty in engineering endure a “double-bind” in which they attempt to redefine the “male” image of professor as well as of engineer and are, oftentimes, the lone woman surrounded by a cadre of male academics (Baum, 1989; White, 1989). In 1986, women comprised less than 5% of the total engineering faculty (National Science Foundation, 1994, p. 574). According to the National Science Foundation and the Science Resources Studies (National Research Council, 1991), of the 51% of women academics employed in 1991, only 4.1% were represented in the engineering disciplines. Moreover, in 1992 female representation among full-time instructional engineering faculty had

slightly risen to 6.1% (National Center for Education Statistics, 1993) despite the number of Ph.D.s awarded to women rising from 6.7% in 1986 to 9.3% in 1992 (NSF, quoted in Wenzel, 1995, p. 8).

In essence, the number of women engineering faculty is minuscule when compared to their colleagues in science and mathematics, where women represented 20.1% and 27.5%, respectively, of the full-time natural and social sciences faculty in 1992 (National Center for Education Statistics, 1993). Given the low representation of women in the science and engineering disciplines, the focus of this research was to examine the current institutional and departmental climates of women engineering faculty at two national research universities as well as the networking systems developed for and/or by these individuals.

DESIGN OF THE STUDY

Conceptual Framework

Given the absence of empirical studies examining the institutional and departmental climates and networking systems of female engineering faculty, the application of a woman-centered perspective is important. The woman-centered perspective takes into account a number of theoretical approaches. A case in point would be analyzing the strategies and styles women employ to solve problems as not deviant from men but as credible in their own right (Belenky et al., 1986; Eichler, 1980; Fishman, 1978; Gilligan, 1982; Statham et al., 1991). Within sociology and race relations, the Insider/Outsider phenomenon has received extensive discussion (Becker, 1963; Merton, 1972; Rose, 1990; Wilson, 1963). This theoretical framework was applied to analyze the institutional/departmental environments of female engineering faculty.

The Setting

Faculty from a Research I and a Doctoral I institution were studied. According to the dean's office of the Research I institution, the total number of engineering faculty employed by the institution (including the coordinated engineering program) is 127, five of whom are women.

Located in a small, family oriented town, the Doctoral I institution is a technological institution. The engineering disciplines are categorized by two umbrella programs: The School of Engineering and the Schools of Mines and Metallurgy. Since the School of Engineering comprises the traditional engineering disciplines (e.g., electrical, industrial, computer, mechanical), the female faculty in these areas was targeted for this study.

Participant Selection

A convenience sample of subjects was located by first browsing each department's Web site and then

telephoning those departments that did have female faculty. The dean's office was also contacted to verify the final list and to retrieve data on the total number of faculty in the engineering disciplines.

Data Collection & Methodology

Given that the engineering and science disciplines are male-dominated, these academic cultures are steeped in "male-dominated repertoires of knowledge, research methods, behaviors, attitudes, and values" (Moore & Sagarra, 1991, p. 227). In order to understand the departmental and institutional climate relative to women engineering faculty, it is necessary to emphasize how the participants have come to perceive and exist in the organization (Bogdan & Biklen, 1992). Therefore, the theoretical underpinnings for this data were derived from the participants' reflections on their experiences and perceptions of their departmental and institutional environments. The participants revealed a number of themes in which not only the feminist perspective but sociological/racial constructs emerged as well.

According to Erlandson, personal interviews can provide the researcher with an understanding of the issue from an "interpersonal, social, and cultural aspect" (1993, p. 85). Seven interviews were conducted and each was audiotaped for accuracy and clarity in the analysis process. Notes were taken during each interview and compared against the transcripts for accuracy. The interviews were semi-structured, between 45 minutes and one hour in length, and drew upon the participants' professional knowledge and personal experiences.

Data Analysis

For this study, grounded theory (Glaser & Strauss, 1964; Strauss & Corbin, 1990) provided the method for assessing the institutional and departmental climate of women engineering professors. Grounded theory is the process whereby the researcher utilizes the data to construct theoretical frameworks. Since the application of theory could result in the researcher not asking the right questions or imposing "their own sense of the world on their participants rather than eliciting theirs" (Seidman, 1998, p. 33), the purity of analysis as a result of the grounded theory approach is quite desirable. Essentially, the constant comparative method served as the methodological tool to look for common and recurring themes in the data. The process involves developing a coding system (themes) by searching "through your data for regularities and patterns as well as for topics your data cover, and . . . [writing] down words and phrases to represent these topics and patterns . . . so that the material bearing on a given topic can be physically separated from other data" (Bogdan & Biklen, 1992, p. 166).

Research Protocol

The following questions served as the basis for this study:

1. How did you become interested in the engineering discipline, and why did you choose academia as opposed to industry as a career choice?
2. How would you assess the departmental and institutional environment for women faculty in engineering (i.e., What is your level of comfort or acceptance vs. non-acceptance)?
3. What has been the most positive professional experience you have had since your arrival at the institution?
4. What has been the most difficult professional experience you have encountered since your arrival at the institution? How did you cope or deal with this experience?
5. Do you have an ally (mentor) in your department or at any level in the institution? How did this person(s) become your ally?
6. Do you or how often do you network with your female colleagues? If so, how do you network with those individuals (e.g., collaboration on research projects, weekly luncheons)?
7. How has the network assisted in your acclimation to the department and the institution?

Limitations

Since the number of participants in this study is small, the findings cannot be generalized to a large population. It can be further presumed that the stories of the seven participants are simply anecdotal and are not the experiences of the majority of female engineering faculty. Nevertheless, this study provides theoretical frameworks by which other studies can be replicated to either disclaim or substantiate the participants' experiences as generalizable.

FINDINGS

The data revealed several theoretical constructs which are the Insider/Outsider doctrine and Gender-centrism. Several participants revealed experiencing either micro-inequities or macro-inequities. Thus, the Insider doctrine and Gendercentrism operate by way of micro-inequities and macro-inequities, which produce the Outsider phenomenon, as noted by several participants in this study. Finally, the contextual/female-centered perspective served as a tool for analyzing the coping strategies of the participants.

The participants range in age from late twenties to late forties. Four of the subjects are assistant professors, two are associate professors, and one is a visiting professor. All of the women are White, with the exception of the visiting professor who is African American. One of the women also revealed that she is a closeted lesbian.

One of the key questions asked in this study was why they chose an academic career as opposed to one in industry. Many expressed strong parental support and involvement in their career choice. Four of the women had worked in industry prior to receiving their Ph.D. and returning to academia. Four specifically stated that their fathers were engineers or had an engineering background and, as a result, they were "following in Dad's footsteps." In their study of female engineers, McIlwee and Robinson found that 48% of women who had fathers who were engineers were "more likely to become engineers" (1992, p. 32). They suggest that "girls growing up in these families would be more oriented toward technology, more comfortable dealing with it, and more likely to have had early mechanical experience than women in non-engineer families" (p. 32). For example, one assistant professor of industrial engineering revealed that her father was an industrial engineer in the airforce. She further stated that she comes from a "long line of engineers" on her father's side and "a lot of school teachers" on her mother's side. Thus, an engineering academic career was "a good match" with her interests.

All the participants indicated that they had a natural interest or talent in science and mathematics and also were encouraged by either teachers or friends of the family to pursue a career in engineering. For example, one participant said:

When I was in high school I had a math teacher who was very influential and recommended that I apply to MIT so I did and I got accepted. . . . And of course when you go to MIT everybody's majoring in engineering.

The talent for math and science is an important factor for women pursuing engineering careers. McIlwee and Robinson (1992) found that 80% of women engineers were good at math or science. Essentially, many of the women were encouraged to pursue this nontraditional path once it was discovered that they had a natural talent for these disciplines.

Another factor that contributed to their choosing an academic career is family. One third-year assistant professor expressed this sentiment: "family is very important to me and I figured academia would be a little more flexible versus industry." The part-time associate professor further validates the importance of family in determining her career choice:

It seemed like a very good schedule to have when you have children because your summers are more flexible. You have a long Christmas vacation and so on. So it worked out real well family wise to go into the academic world.

Although their commitment to family played a role in their career choice, several researchers suggest that the academy does not understand or is nonresponsive to the

effects of family responsibilities on female faculty (Finkel & Olswang, 1991; Hensel, 1991).

When asked what their most positive experience was as a professor, the majority expressed that it was either teaching or working with students or the support of their department chair. The responses ranged from "I enjoy working with students and I like teaching so academia seemed to be a great place for me" to "I really like teaching and interacting with students." One participant recalls an encounter with a female student (a senior), who made an "unsolicited comment about how nice it was to have a woman as a professor finally." This woman relates that this was one of the "coolest" or most positive experiences she has encountered. Another assistant professor describes a successful course she designed and implemented, which resulted in the recruitment of graduate students to the department who wished to pursue research with her.

Besides having positive experiences as teachers or with students, other women expressed having a supportive department chair as a positive experience. One woman reveals that "this [the chair's support] hasn't been because I am a woman, it's because he's very supportive of young faculty in general." Despite the positive experiences derived from teaching, working with students, and the supportive environments created by department chairs, there were also equally disturbing negative experiences—some that are based on the participants' gender and others that illustrate the experiences of tenure-track faculty regardless of gender.

The Insider/Outsider Perspective

The Insider/Outsider doctrine purports that in order to understand what is worth knowing, one must be a member of the group that has access to that knowledge. Essentially, one's social position, gender, race, and the like can serve as the passport into the inner circle of collegiality (Merton, 1972). The Insider doctrine is deeply ingrained into the fabric of one subject's (the visiting professor's) departmental environment. She indicated that,

They are quick to take advantage of the fact that I am not regular faculty and use that every chance they get to diminish what I'm trying to do and what I have done or could do. There are three faculty members who have been very pleasant and very up front and actually treat me as a peer. The rest of them consider me a glorified graduate student.

This participant expresses a systematic exclusion from the *modus operandi* of the department and is "excluded in principle from gaining access to the social and cultural truths" (Merton, 1972, p. 15). The first of the four female subjects (a third-year assistant professor) to be recruited to the Research I institution said,

the only time I started feeling like a freak was when I got here and people started pointing out the fact that you

know you're the only one and that there are differences. It was interesting to me, you know a lot of things I would tend to just take on that I am not being treated different because of my gender but just because I am new or whatever else. But, it makes me wonder now what was really there.

Although this woman attempted to categorize this treatment because of her status as a new professor, she realized that her experiences may be based on her status of non-male, which translates into the Outsider within. This same woman described a sense of "floundering" during her first two years as a new professor:

The most difficult experience was trying to figure out what my job was, what my responsibilities were and how I should go about pursuing the different aspects. There's no big support structure . . . that I found within the department, within the college at all for new faculty regardless of gender. So, there's like no direction from the department chair, little or no help, unless you go out and seek it from the faculty. So, just figuring out, it took me about two years to accept my job, I wouldn't even say I like my job yet but at least I accept it. . . . I just finally came to the conclusion that I'm on my own.

The final words of this subject suggest problems in her pursuit of tenure. In essence, she stated that she did not have anyone to talk to, and related that if she had had "someone to talk to maybe I wouldn't have had some of the problems to begin with." Her unsolicited disassociation from the department places her in a truly volatile situation, especially with regards to the tenure process. As a result of her disassociation from the department, she remains an Outsider who

has neither been socialized in the group nor has engaged in the run of experience that makes up its life, and therefore cannot have the direct, intuitive sensitivity that alone makes emphatic understanding possible. Only through continued socialization in the life of the group can one become fully aware of its symbolism and socially shared realities; only so can one understand the fine grained meanings of behavior, feelings, and values; . . . unwritten grammar of conduct and the nuances of cultural idiom. (Merton, 1972, p. 15)

Given the rarity of women engineering faculty, they may experience Gendercentricism. Gendercentricism derives from the ethnocentric model where "one's group is the center of everything and all others are scaled and rated with reference to it" (Sumner, quoted in Merton, 1972, p. 15). Essentially, Gendercentricism is the incessant proclivity toward overt and/or covert mechanisms of subjugation by an individual or organization on the basis of the sex factor or characteristic. Although certain organizations cannot legally discriminate on the basis of one's gender, Gendercentricism, nevertheless, continues to

covertly and in some cases overtly operate within sub-groups of an institution or organization in the form of micro-inequities and/or macro-inequities. The concept of *micro-inequities*, first presented by Mary P. Rowe in 1977, is defined as follows:

everyday interchanges . . . behaviors that are often so small that they go unnoticed when they occur. Micro-inequities refer collectively to ways in which individuals are either *singled out*, or *overlooked*, *ignored*, or *otherwise discounted* on the basis of unchangeable characteristics such as sex, race, or age. (Sandler, 1993, p. 177)

One subject, a seven-year veteran, recounted a blatant form of Gendercentricism manifested by a micro-inequity: "one faculty member was showing some prospective students around the department and he passed me in the hall and he said oh, this is one of our lady professors, you know." Her colleague's reference to her as a "lady" professor implies that her being female affects her status as a real professor in the department; otherwise, he would not have felt the need to emphasize gender. Therefore, despite her rise to the rank of associate professor, she nevertheless remains an Outsider within.

This assistant professor of Civil Engineering related an incident that created both the Outsider phenomenon and the micro-inequity effect:

The engineering college has a senior recognition convocation. . . . The department heads and the deans are up on stage in academic regalia, and then as they have each student come up and get their diploma and shake everybody's hand and walk across the stage and they invite the departments up—faculty and staff—to stand and shake all the students hands. . . . Faculty do not wear academic regalia. You know, first of all I just thought that was really strange (laughs) because its always been a very big deal and you have always assumed that as a faculty member that's one of your obligations. But . . . this idea of going up with the other faculty members and departments (as well as) staff, everyone in that audience, unless they're going to know for certain, are going to assume that I'm a secretary.

As the only woman faculty in her department, she believed it necessary to identify herself as faculty by wearing academic regalia; otherwise, both the audience and her colleagues in other engineering disciplines might have believed she was a member of the staff. She further notes that it "was really strange" that faculty did not wear academic regalia; however, there was not a tangible need to distinguish the faculty from staff because traditionally the faculty makeup had been entirely male. Therefore, her gender presents a problem of which only she, as the lone woman, is cognizant.

The part-time associate professor remembers an encounter when she first came to the department:

when I first arrived, I was put with an officemate [who didn't] like the idea of women in this field. He was doing things like not speaking to me for the entire day, even when I said good morning, he wouldn't say anything back because he had been—he got offended because I had hired a student. A student came to me looking for a summer position and I hired the student . . . apparently this other guy was trying to recruit the student for a summer position and I didn't realize it. He thought I knew it and did it intentionally and so he decided that he was never going to speak to me again. Very immature. So that was probably my most difficult situation was having to share that office space with this man for another several months.

Her officemate's reaction implies that he believed she not only usurped his space, but that she robbed him of resources to which she did not have a valid claim. Her presence was unwanted and he attempted to show her that she was an Outsider in the sacred grove by not acknowledging her presence (Aisenberg & Harrington, 1988).

The women also discussed the "ridiculous expectations for service," which can have adverse effects on their workload. Oftentimes, women who are the first in the engineering departments are asked to do an inordinate amount of service, which was the case of this associate professor: "After a couple of years I was on so many committees and doing so many things that I wasn't able to spend anytime on my research and not as much time on my teaching as I would like."

The counterpart of micro-inequities, macro-inequities, may or may not occur as everyday interchanges but are more conspicuous in nature. Thus, a macro-inequity may be defined as abhorrent behaviors that do not go unnoticed—behaviors that relish in the same tenor as a Ku Klux Klan lynching or the Holocaust. To illustrate, the visiting professor bluntly stated that her department was openly hostile, revealing the blatant form of Gendercentricism manifested in her departmental environment. A macro-inequity is more apt to receive immediate and focused attention; whereas the micro-inequity is allowed to manifest itself and is, oftentimes, tolerated or ignored by both the organizational leadership and those who experience it. The visiting professor, an African American woman, recounts an incident where she was literally stripped of decision-making privileges:

My department, prior to my becoming a faculty member, had a male visiting professor or instructor. . . . And whether or not he was considered a member of the faculty or treated as a member of the faculty was never an issue. The one time I was late for a faculty meeting, one of my colleagues took the opportunity to decide that they had to vote on whether or not I could vote as a member of the faculty, that they needed to suddenly develop a policy for visiting professors . . . and with the exception of two of

them present, I understand that they voted that I could not vote. And when I got to the meeting they had already done this and nobody mentioned it. My department chair mentioned it to me as an aside after the meeting because it would be in the minutes of the meeting. But, I found it very telling that we suddenly needed to write a policy for visiting appointments because it was a she and a minority and they never had that policy before. It wasn't an issue with the gentlemen who had been here previously.

Although two of her colleagues had not entertained this idea, the remainder had made a concerted effort to strip her of the power she possessed in the department. The message is quite clear—you are an Outsider—your opinion is not valued and your voice will be muted. Another assistant professor remembers an incident where the chancellor openly expressed his thoughts on the presence of women on campus:

We had a woman of the year banquet [two or three years ago], the first year . . . the Chancellor said, "We have too many women on campus." He then realized from the reaction that he had put his foot in his mouth.

The assistant professor of Civil Engineering narrates an experience where she was given the cold shoulder by the College of Engineering when she attempted to create a networking system for the women faculty in the college:

I called the Dean's office and said . . . do you think you can organize something like this for us, you don't have to foot the bill but if you could just organize it for us to get together once a month or so. . . . [In a mocking tone she states the response] Well, we have more important things to do here than to organize a lunch for you and your—you know.

Despite the initial setback, the women at the Research I institution were able to successfully organize the network. However, such disappointments, when accumulated, result in the attrition of women faculty, and, given their often lonesome journey through the academy, particularly female engineering faculty.

Bernice Sandler noted that "too often people may relate to women in terms of sexuality rather than as professionals or students" (1993, p. 186). This assistant professor recalls the following experience:

We had a college engineering reception in the fall. . . . I was in line and they had a sort of receiving line with the deans and their spouses. . . . I dodged out of line to say hello to somebody and walked back up and I had been in front of one of the chairs of another department and said—oh, you know can I sneak back in line here and he made a comment—oh, well, for such a beautiful woman of course. And you know it's in a work setting—I just felt that that was not entirely appropriate you know and you sort of feel like well he would never make the equivalent comment to one of his male colleagues.

Another assistant professor narrates a classroom incident where she and female students were exposed to explicit and degrading jokes referring to a female's genitalia. The jokes were posted on a Web page project constructed by male students in this professor's class. When she took the jokes to the Vice Chancellor of Student Affairs, his response was "Oh well, Freedom of Speech." Her response was "Bull-sh-t, sexual harassment, this made a hostile work environment for myself and female students. This is inappropriate and this is illegal. This cannot be happening!" Although the students who constructed the Web page had not realized that one of the links was to Playboy and apologized to the class, the vice chancellor did not believe he needed to speak to the young men directly. Instead, he sent them to his female assistant who had been employed by the institution for only three weeks, placing her in an awkward situation. In essence, the leadership in this Doctoral I institution displayed a naive and apathetic attitude toward creating a nonhostile working environment for female faculty and students.

Women often must contend with being addressed by "social terms such as 'sweetie,' 'dear,' 'Mrs.' or 'young lady'—words which undercut a woman's professional identity—especially if her male colleagues are being addressed as 'Dr.' " (Sandler, 1993, p. 186). Women faculty also endure male colleagues and students using their first name as opposed to their professional title. This woman's experiences reveals the extent to which micro-inequities have been allowed to seep into the core of academia:

I know there is just a lack of understanding . . . students, I don't know if it's because they don't see enough women in the classroom, will tend to address me and some other people I talk to as Mrs. W. or Ms. W. and they leave off the title Dr. where they don't do the same with the men so there it's assumed they're a Dr.

Researchers such as Stanley and Wise (1983) argue that the mundane, everyday, taken-for-granted experiences of women should be considered when analyzing their experiences. These everyday experiences often send the signal of acceptance or nonacceptance by one's colleagues. This associate professor recounts an experience in which a colleague made a "typical male" comment:

We were interviewing for a chaired position in Computer Engineering . . . a woman faculty candidate from another school . . . she and I were actually in my office . . . and we were running late . . . she was asking me about the female climate in our department—and I was telling her everything here is great. . . . And then one of the other faculty members came up to my office to find out where she was and made some off-hand comment about two women gabbing.

Another participant explains that she thinks

they [male colleagues] want to be accepting and so to a certain degree they are accepting, but I don't know if they are aware of the difficulties faced by women in engineering, just being one of a different gender and the minority on most campuses. So, I don't think they thought of the different issues such as parenting. . . . I think you get stepped on a little bit more, just cause they're unaware . . . maybe they want to be [aware], they just don't know how to quite get there yet.

These micro-inequities or lack of awareness on the part of male colleagues and superiors "help to perpetuate female subordination" (Statham et al., 1991, p. 13). Thus, Stanley and Wise argue that "changes must address this sphere" or the subjugation will continue its ceaseless cycle (p. 13).

Unlike their colleagues in the humanities, social sciences, and even the sciences, female engineering faculty can stick out like a sore thumb, particularly when meeting in public places. An assistant professor discusses the reaction from male colleagues when women faculty first established monthly luncheons:

When they [the female engineering faculty] first started the group, [the women] would go out of town for lunch because enough disparaging comments were made that they [the male engineering faculty] were scared to see women together and there were times that [the men] would joke—males would see three or four of us at lunch and say "Oh, are y'all plotting an overthrow?" . . . They [the men] can't understand why we are together and they're scared sh-tless when we are.

The proverb "there is power in numbers" is significant with respect to women engineering academics. Since engineering is one of the last of the masculine disciplines to which women have gained entry, there is an obvious phobia toward these women from their male colleagues.

The Balancing Act

In her examination of gender equity in higher education in terms of the balance between career and family, Hensel contends that despite acquiring "equal educational backgrounds and equal access guaranteed by law . . . women did not anticipate the intensity of the conflict between work and family when they began seeking career status equal to that of men" (1991, p. 43). According to Finkel and Olswang (1991), the conflict between family and career has deep historical roots because the traditional role of women is wife and mother. Thus, when women began to take on nontraditional roles, such as professors, they found themselves in awkward positions.

Further analysis of the status of women faculty confirms that higher education institutions have failed to address the impact of family responsibilities on the lives of academic women. According to this fifth-year assistant

professor, the women thought that they would finally get day care services after the vice chancellor's wife had a child. However, this was, as she said, no big deal because they were able to hire a live-in nanny. In essence, "when it seems like opportunity for improvement, there isn't any."

Although this woman's colleague (an associate professor) does not believe the lack of day care is directly related to her job, she does realize the impact it could have if she and her husband were unable to "afford good day care." Nonetheless, there are women faculty who cannot afford or find quality child care near their work environment (Hensel, 1991). Although finding quality child care for their children may be a concern for men, historically, women have taken on the role of locating these services (Hensel, 1991). Thus, these individuals remain hopelessly caught between providing their children with a nurturing environment and work responsibilities.

An associate professor explains that her male colleagues do not understand the responsibilities of the woman academic. She recalls instances where she was not able to take advantage of professional roles:

engineering tends to be very traditional, a lot of men here are older; they have wives who stayed at home and took care of their children such that they were able to put in 15 hour days if they needed to, would work on the weekends, or travel extensively. They sometimes don't appreciate the juggling that's required.

According to another participant:

the lack of awareness is an issue, [but] I don't know how to make it an issue. . . . What you really need to do is just transplant them for about a month to somebody else's body to experience the differences . . . because they have never been a victim of harassment and/or discrimination because they're all majority Protestant white males, affluent, . . . they haven't experienced what a lot of people do. They have no clue as far as women's issues.

The experiences of women engineering faculty are not unique to the professoriate, but their experiences have more impact because of their low representation. Most of the participants endure environments that do not consider the problems and issues they encounter. Some of the women are constantly "trying to figure out which battles are worth fighting." Although "universities discourage most of the more obvious forms of discrimination against women" (Horning, 1984, p. 41), women are forced to contend with the micro-inequities because the battle may be too small to fight.

The Contextual/Woman-Centered Perspective

The premise of the contextual perspective is that gender must be reconceptualized where it is "viewed as a

'variable variable' and not a set of rigid traits and behaviors inherent in the individual (cf. Broverman et al., 1970)" (Statham et al., 1991, p. 11). The contextual perspective asserts that "one behaves differently according to the specific demands of the situation . . . gender is regarded as a continuously constructed social identity that can be separated from sex both conceptually and empirically" (Gerson & Piess, quoted in Statham et al., 1991, p. 11).

The women in this study revealed different coping mechanisms when encountering problems. This visiting assistant professor describes how she confronts a problem, which might be characterized as a masculine response:

My response is I tend to be more in your face . . . I've never been accused of being shy. I'm a very vocal person. I'm a very opinionated person . . . so that sort of tends to be my response to say okay if that's what you think, let me show you what else I've got.

Although another assistant professor was aware of the possible repercussions of writing letters to the local newspaper defending homosexuality, she forged ahead and sent letters under her own name. Since gender is a social construction and sex is a biological product, conventional feminine characteristics may be displayed by men just as traditional masculine characteristics may be employed by women when in certain situations, as exhibited by the above informants (Statham et al., 1991). Unlike the visiting professor and the assistant professor previously mentioned, this associate professor has decided to take a less volatile approach when encountering male colleagues:

I have tried to steer clear of being known as a militant woman. . . . I don't think its for me anyway politically a good idea . . . to be known as a militant female. My feeling on this is that it's far better to just be a good role model than to be militant because then people . . . will accept me and appreciate my contributions rather than if I take the in-your-face kind of approach. They kind of then get ruffled up and immediately don't like you. Whether or not you deserve it.

Unfortunately, this woman believes that if she serves as the "faculty advisor for the society of women engineers or . . . gets very involved in some of the minority engineering programs" she will be an Outsider within her department. Rather, this associate professor has played by the established rules of the white male social structure that has resulted in her recognition via "a couple of faculty excellence awards."

Another assistant professor compares her coping strategy with that of her female engineering colleagues:

M. C. puts blinders on, cranks down and works her butt off . . . she doesn't deal with this. She is in the lab, she is working hard. N. H.'s coping strategy is more of I got my family, my children are here, my parents are here . . . cut back once she got tenure and isn't playing the game and

isn't fighting the fight and is kind of playing by her own rules now that she's got tenure. N. M. is following M. C.'s approach. My approach was attack-windmill and bang-your-head-against-the-wall and last year I kind of let go, this isn't doing any good, this isn't any fun. So that's kind of how people have coped.

Yet another assistant professor reveals that

a lot of times, and again I don't know if its gender related or just myself, you tend to internalize the problem and say it's your fault for not asking the right questions or not knowing what to do and then you just let go.

A final coping mechanism for some of the women is the networking system. One participant asserted that the networks keep her "sane and sober" and another stated that it gives her the opportunity to "talk with people who are not hostile and who have some of the same interests and same problems that you do." Primarily, the networks serve a social function, but the women are also "sounding boards" for each other, providing much needed advice—a form of strategy that is centered around building relationships and attachments to others (Gilligan, 1982).

The Exception to the Rule

Although six of the participants encountered problems exhibiting qualities of micro-inequities and/or macro-inequities, one assistant professor of Computer Engineering Computer Science stated, "I have certainly never gotten any feelings or attitudes from other professors that I am not as accepted as the men." She continues:

I think the academic scene has a lot of competitive factors to it in terms of things like publications, and students, and money that you bring in and all those sort of factors that I think that you are accepted based on those things not whether you're a man or woman or some sort of superficial on-the-surface type of criteria.

Despite her beliefs, she does note that "for a good portion of my career I . . . worked in essentially a male-dominated environment so maybe I have become sort of desensitized in some sense . . . and maybe there is something going on that I'm not noticing." It is quite possible that she has been socialized by the male-dominated paradigm; however, her departmental environment could also be very supportive.

The visiting assistant professor speaks about the above-mentioned assistant professor's departmental chair who introduced himself to her. According to the visiting assistant professor, this department chair is "always wandering around talking with his faculty" and inquiring about their needs. Furthermore, he introduced

the visiting professor "to other members of his department that he thought [she] might be interested in doing some research with." In contrast, the visiting professor of Electrical Engineering relates that her department chair is "very uncomfortable speaking to me. He sits in his office, he sends e-mail. He doesn't want to deal with confrontation. He doesn't like to deal with me." In essence, the visiting professor believes the chair controls the dynamics and climate of the department, possessing the power to perpetuate or eliminate micro- and/or macro-inequities at the departmental level.

CONCLUSIONS AND IMPLICATIONS FOR PRACTICE

The theoretical frameworks that emerged from the data served as the lenses for analyzing the experiences of the participants in this study. The majority of the participants revealed that at some point they have experienced isolation or singling out because of their gender. Although male and female faculty oftentimes endure an isolated existence, the peripheral status of these women is magnified because they are the only female faculty in their department. Many revealed being singled out based on sexual insinuations or when female engineering faculty attempted to form networks among themselves. As a result, some women have attempted to "fit in" or to "not draw attention" to themselves, which may serve as a source of anxiety inhibiting their success as academicians. However, the participants who perceived their chair as fostering a receptive departmental environment did not feel as isolated or singled out.

Given their solitary existence, some participants grapple with trying to discern whether a problem they encounter is real or imagined. Essentially, they may find themselves asking these and similar questions "Have my male colleagues experienced what I am experiencing?" or "Am I overreacting or being paranoid?"

Finally, the women who have families and children must perform a balancing act between the roles of mother/wife and professor. This provides another source of anxiety that is not unique to the professoriate; however, as the only woman in their department, some may feel inclined to be "superwoman" in terms of publishing, teaching, obtaining grants, and service in their quest to prove themselves worthy of their position.

A variety of coping mechanisms or strategies were employed by the participants. Some women took an attack stance, others a more agreeable or political approach. One tenured professor simply "refuses to play the game or fight the fight" of gender politics. Others rely on the networking systems, which includes male and female colleagues, as a source of advice for combating problems. Further, one participant admitted to "internalizing" or "self-blaming" when confronted with disagreeable or uncompromising situations.

Although raising awareness cannot be realistically achieved by "transplanting" men into women's bodies, as suggested by one participant, tangible recommendations for improving departmental and campus climates for women engineering academics were provided by the participants. The women recommended institutional as well as individual initiated activities to improve the institutional and departmental climates of women engineering faculty:

- The dean should visit faculty meetings periodically in order to assess the departmental dynamics. However, this suggestion would only be effective if the dean is free from biased, sexist, stereotypical perceptions.
- Create a listserv or discussion group that could foster dialogue among female faculty to discern how others deal with some of the differences and to share some of the problems specific to women in engineering and the sciences.
- Create sensitivity classes to make men aware of the differences because it impacts them in not only working with their colleagues, but with students in the classroom.
- Diversify the faculty and administration.
- Provide a formal setting where women across campus can interact (possibly a monthly seminar series or luncheon).
- Provide day care services.
- Increase the number of women in engineering.

The women also indicated that on an individual basis, female professors should create informal contacts, join organizations, or connect with organizations (e.g., Society of Women Engineers) of which they are members. According to them, informal networks and organizational memberships are excellent sources for retrieving information vital to one's success in the academy.

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