

ARE “FEMINIST PERSPECTIVES” IN MATHEMATICS AND SCIENCE FEMINIST?^a

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IN RECENT YEARS the term “feminism” has often been used in a sense so different from the traditional one of “a theory of equality of the sexes” or “advocacy of equal rights”¹ that one wonders if even Susan B. Anthony would be considered a “feminist.” The phrases “feminist critiques” and “feminist theories” are often applied to a rather narrow set of views that include an emphasis on differences between the sexes or genders. I dislike this terminology because it tends to color the discussion so that anyone who disagrees is labeled as non-feminist, even if that person has worked hard for equity and advancement of women. Therefore, I will use the term “gender difference theory” to describe the viewpoint promulgated by such writers as Sandra Harding, Sue Rosser, and Sherry Turkle. Since I have made specific criticisms of some of their work elsewhere,² I will concentrate here on some general issues.

Not only do I frequently find errors and inconsistencies in the writings of the gender difference theorists, but I feel that they are “asking the wrong questions.” Here, I do not mean “wrong” in the sense of morality or some kind of “objective truth.” Rather, I believe that the gender difference theorists are focusing on certain issues in ways that, instead of contributing to the goal of increasing the contributions of women to science and mathematics, may exacerbate the problem. I will begin my development of this theme with a personal anecdote.

After graduate school, I held a postdoctoral position in theoretical physics in Switzerland in 1969, the year the Swiss finally gave women the right to vote in federal elections. However, it would be another ten years before women were allowed to join the Swiss Alpine Club. Although I found a number of other (dual-gender) groups to ski, hike, and climb with, I also joined the Club

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Suisse du Femmes Alpiniste and went with them on a week-long ski mountaineering trip. At that time, I was extremely well trained in terms of stamina and endurance, although I did not have the same mountaineering and ski skills as the Swiss women, who had been doing this all their lives. Our two male guides set a brisk pace up the mountain, as we followed laden with skis and gear for a week. After about an hour, I was the only one still keeping up with the guides, who stopped to let the others catch up. Almost fifteen minutes passed before the last two, who were somewhat older, came huffing and puffing up the mountain and practically collapsed as they dropped their packs. When they had finally recovered, both of them looked over at me and said with great concern, "Are you all right?" As the week progressed, the male guides and the other women accepted me as part of the group, realized my strength in stamina and my weakness in mountaineering skills, and gave me help and encouragement when I needed it, so that I could really enjoy the trip. However, despite blatant evidence to the contrary, these two elderly women remained convinced of—and regularly commented upon—my imminent collapse. This is an absolutely classic illustration of prejudice. Although bias by elderly Swiss women against visiting Americans is not a serious societal problem, this incident exhibited all the elements inherent in racial and sexual discrimination. I was being judged on the basis of their ideas of what American tourists are like and not on my own merits.

This, I believe, is the fundamental problem: our tendency to judge people by categories instead of by their individual attributes. Gender difference theory aggravates this problem because it focuses on specific gender characteristics within a group and gender differences between groups, rather than on people as individuals. It is entirely irrelevant whether or not, in particular circumstances, the attributes that are associated with a group are statistically valid, or whether the attributes are thought to be of biological or cultural origin. It is far more important to judge people as individuals. Despite our best efforts, most of us have hidden biases, not only about people's race, religion, and ethnicity, but about their height, marital status, hair style,³ etc. Focusing on group attributes is not the way to overcome our prejudices.

I realize this may sound suspiciously like something that many of us used to believe in but have now been disillusioned by—namely, that we should be completely gender neutral and do everything on the basis of pure merit. However, our biases are simply too ingrained for that. Instead, we have come to accept the need for some forms of affirmative action. For example, I have learned that you will rarely have women speakers at mathematics conferences unless you make an active effort. But when you do make that effort, you usually find half a dozen women who are at least as good as the men speakers, so that you can invite them on their merits after all.

Let me give another example to illustrate the importance of treating people as individuals. In recent years I have changed my own teaching style, so that I lecture less and the students participate more. This was partly a response to reports that women were much more successful in "cooperative learning" environments. My own approach is only to insist that the students do some work in class, although I encourage them to do this in groups. What I discovered

should not have surprised me, but it did. Many of the women dislike this intensely, because they feel, no matter how low-key I try to make it, that they are being put on the spot and tested immediately. However, even though this approach has not been very successful with female students, I have become so convinced that the students learn more, that I will not abandon it. Instead, I am trying to find ways to make it more palatable and effective for women. On the other hand, it has been more successful with the (extremely small number of) black students in my classes. In particular, two men who might very well have failed if taught in the traditional way earned strong B's. These two black men were quite different, the reasons why they might have failed were different, and the reasons why they responded positively were different. The only common thread was that because I interacted with students working in class, I was able to view each of them—not as “yet another poorly prepared black male sitting in the back of the classroom failing exams”—but as unique individuals with strengths and weaknesses. This led to interactions that did seem to work, in the sense that the students responded very positively and succeeded.

My attitude is that you should treat people as individuals. It may well be true that more girls need encouragement than boys. But our attitude should be to identify and encourage those students whose confidence level is such that they need it. If it turns out to be 95% girls, fine; if it is 60% girls, fine; if it is only 20%, fine. We should respond to the needs of the student, keeping aware that what works for most people in one group does not necessarily work for everybody.

One point on which I agree with the gender difference theorists is that the background and viewpoint from which one comes to a subject is important. For example, Karen Johnson made a convincing case⁴ that Maria Mayer's Nobel prize work on the nuclear shell model was a direct consequence of her previous work in atomic and molecular calculations, which gave her a different viewpoint from most of the (male) nuclear physicists. In my own work, I was recently involved in a multinational collaboration in which I was the only mathematical physicist interacting with probabilists, statisticians, and mathematical biologists. I was able to “smell” the solution to one of our unsolved problems in a paper that I found rather technical and hard to understand. In response to my needs, one of the probabilists translated the relevant material into operator theory language so that our entropy equivalence question was reduced to one about the equivalence of eigenvalues of certain matrices. From this he felt it was intuitively obvious that they were not equivalent and that we should search for a numerical counterexample. As an operator theorist, I took one look at his notes and in two more lines used the max-min principle to prove that they actually were equivalent. Our backgrounds were very important to our different insights. But in both of these examples, it was scientific background, not gender, that made the difference. I have not yet seen a convincing case for gender-based perspectives providing important scientific insight except in those cases, such as hormone research, in which gender is itself intrinsic to the subject being studied.

There is another point to be made here. As soon as I communicated my ob-

ervation, my colleague changed his position and agreed. This would appear to support the perception (often the result of deficient elementary education) that mathematical problems have only one correct solution. By contrast, both mathematics educators and some gender theorists have begun to emphasize that some mathematics problems have more than one correct answer, and most problems can be solved in more than one way. What may be confusing to nonmathematicians is that recognizing the validity of multiple approaches is not inconsistent with conviction that questions have right and wrong answers. Creativity and rigidity are not incompatible. A similar situation arises in music: the fact that everyone tunes their instruments to a standard pitch does not restrict musical creativity, but allows musicians to play together. That most questions have definite answers does not make mathematics unfeminine or uncreative, either. On the contrary, many women mathematicians find this feature of their discipline an equalizer. I do not know of any cases in mathematics in which someone has alleged that a theorem is wrong because a woman proved it. If someone wants to downgrade a woman's contributions, they will question the importance of her result or her role in the proof. But if a result is right, it is right.

Let me conclude by returning to the point that characterization by gender reinforces conformity, while what is needed is an appreciation of diversity. In some of the gender-difference literature the arguments seem to me particularly flawed because they define feminine in terms of certain well-known, common characteristics. They also define science in terms of other characteristics (sometimes of questionable validity, such as noncreative and nonintuitive) that they consider masculine. If one points out that there are many examples of women who do not fit this stereotype, the response is that the paradigm is cultural rather than biological, so that the women who do not fit are masculine and the men who do fit are feminine. To a mathematician this sounds suspiciously like "assuming what you're trying to prove."

One of the oft-told stories about the great mathematician Emmy Noether is that because she was so successful at mathematics, which in her culture and generation was considered unfeminine, she was often referred to as "der Noether," using the German masculine pronoun. Sometimes when I read the "feminist theory" or "gender difference" literature, particularly the stereotypes and the remarks about women scientists who work in science in the traditional way, I feel that they are simply calling us all "der."

NOTES

- 1 *Webster's New Collegiate Dictionary*.
- 2 Mary Beth Ruskai, "Gender and Science"; "How Stereotypes about Science Affect the Participation of Women"; "Why Women are Discouraged from Studying Science."
- 3 Ruskai, "Stereotypes about Science."
- 4 K. Johnson, "Maria Goeppert Mayer: Atoms, Molecules and Nuclear Shells."

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