

# What Psychologists Know That Feminists Won't Hear

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It is an honor to be here and to share a podium with three women I admire enormously. Each of us, I guess, concurs with the writer who described modern feminism as having taken leave of its senses. The current crusade for so-called gender equity is a perfect case in point.

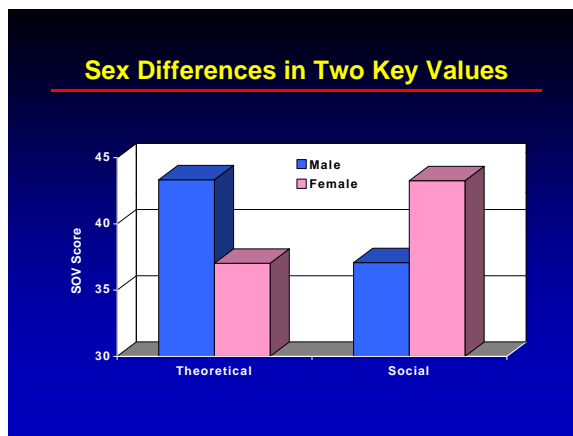
Today's gender activists remind me of what P.J. O'Rourke described as "America's loudest special interest--the Perennially Indignant." Even though females now outnumber males on college campuses by a 10-point margin, the perennially indignant insist that we have yet to attain equal educational opportunity. To bolster this obviously weak case, they cite the low participation of women in fields such as physics, engineering, and math.

Last year, for example, women earned but 13% of the doctoral degrees conferred in physics and engineering. This is admittedly a far cry from 50% -- the benchmark expected by those who define equality not in terms of opportunity, but outcome.

For those of us who study sex differences, the biggest problem with this expectation is that it has no factual basis. The notion that, absent discrimination, the sexes would be equally represented in these fields defies our cumulative knowledge in psychology and the neurosciences. Not incidentally, it also defies common sense.

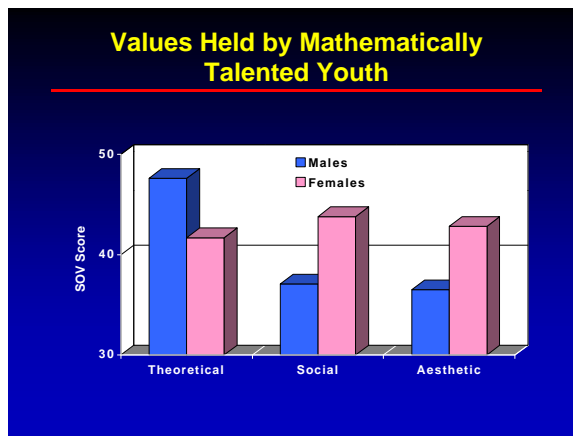
With our focus today on academic and career choices, vocational psychology is the place to start. Especially relevant is its Theory of Work Adjustment. Simply stated, it holds that positive outcomes in educational or occupational settings depend on a good fit between the individual and four factors. Three of these can be measured using time-honored psychological tests. They are values, interests, and abilities. We might expect half of all physical scientists, engineers, and mathematicians to be female if the sexes were identical on three factors. Let's see if they are.

The Study of Values is a time-honored psychological tool. Those with strong interests in the physical sciences tend to score high on its theoretical scale and low on the social one.



This pattern is characteristic of the average male, and wholly uncharacteristic of the average female.

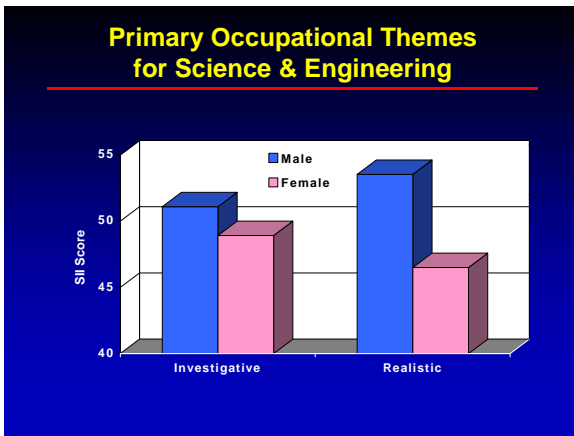
Strange as it may seem, this pattern is also atypical among females who are mathematically gifted. As a group, they score below the average male on the theoretical scale and above the average female on the social. (Please note that as used here, the term *social* refers to a concern for people--not to an outgoing personality.)



As with values, sex differences in interests are also well documented. The occupational themes most characteristic of physical scientists and engineers are investigative and realistic.

The average male scores higher on these two scales than the average female, though the magnitude of difference is much greater for the realistic

theme. In fact, of the six occupational themes, the realistic dimension shows the largest sex difference. It is also where those who are mechanically inclined (e.g., engineers) are likely to show high scores.



Once again, sex differences on these dimensions occur not only in the general population, but also in select groups.

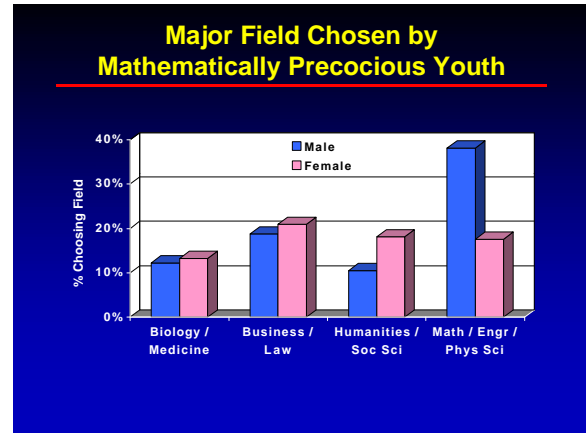
Rank	Boys	Girls
1	Physical Science	Literature
2	Biology / Medicine	Art
3	Sports	Social Service
4	Hunting / Fishing	Biology / Medicine

The next slide shows the interests of 10<sup>th</sup> graders who scored in the top 1% of mathematical ability. Obviously, the interests of these similarly talented young people differed significantly by sex. We know that these differences persist beyond high school because we have information on the educational attainment of participants in summer enrichment courses for highly gifted young adolescents.

As the next slide shows, females who participated in math enrichment programs were much less likely than males to earn their highest degree in the physical sciences or related fields.

Even more dramatic than the findings on the slide are sex differences at the doctoral level. Of female participants, fewer than 1% sought a doctoral

degree in the physical sciences, engineering, or math. Their male counterparts were eight times as likely to do so. This is a striking difference considering that all of these participants had scored in the top 1% of mathematical ability.



Our last factor is ability. Often, the notion of sex differences in abilities is dismissed on grounds that differences between the average male and average female are at most modest. This is true enough. However, there is a notable exception. It is an ability area that encompasses the spatial, mechanical, and practical skills important in engineering and certain physical sciences. Here, the difference between the average male and average female is large, and of course, favors males.

However, talking about averages tends to confuse this issue. Physicists, engineers, and mathematicians are rarely people of average ability. They are far more likely to come from the top of the ability curve than the middle.

Subject	Ratio of M to F	
	top 10%	top 5%
Arithmetic reasoning	2:1	2:1
Electronics information	8:1	11:1
General science	3:1	7:1
Mechanical reasoning	8:1	11:1

In the technical areas that predict success in these fields, males outnumber females at the top of the range, often by a large margin. This is due to

their higher average ability in these fields as well as their general tendency to be more variable than females. As a result of their greater variability, males are overrepresented at both extremes of many ability curves. (The numbers on the slide are based on the Armed Services Vocational Aptitude Battery, the test required for enlistment in the military. The ratios will vary somewhat depending on the test used.)

In my mind, the combined effect of sex differences in the values, interests, and abilities that predict success in physical sciences readily explains the so-called gender gap in these fields. A contrary view is that these differences are culturally imposed and therefore could be eliminated by changes in socialization practices. I have my doubts about this argument, but it deserves an answer rooted in scientific evidence. Fortunately, we have plenty of it.

Multiple lines of evidence suggest that the sex differences in question have a biological basis. The first is the *universality* of certain differences. The familiar pattern of female superiority in certain verbal tasks and male superiority in spatial tasks seems to be the standard in every society studied. Is it possible that all societies just happened to decide to socialize their members the same way? In theory, yes, but it would require a coincidence of extraordinary proportions.

Another clue is the *early onset* of behavior showing that females preferentially attend to people and males to physical cues. Research finds that girls pay more attention to faces and voices even in the first weeks of life. As infants, they are more sensitive than males to another baby's crying. During their second year of life, girls are also more likely to ask 'what's wrong' when someone looks sad. Boys, by contrast, pay more attention to non-human stimuli such as three-dimensional objects, blinking lights, and geometric patterns from about the fourth month of life. I don't see how this can be the result of socialization. We have no concept of socially acceptable behavior in the first months of life.

*Similarity with other species* provides yet another line of evidence. Sex differences in behavior are widespread in the animal kingdom. It is common for the males of many species to prefer rough-and-tumble play and for the females to engage in more grooming behavior. Even sex differences in ability have been observed. In animals, navigational skill is somewhat analogous to human spatial ability. Sex differences in navigational skill occur in a number of

species and generally favor males. That male rats have more navigational ability than female rats can hardly be blamed on a conspiracy of the male power elite.

Finally, we have *clinical evidence* showing that sex hormones affect a range of cognitive abilities, including spatial ability and verbal fluency. Administering estrogens to male-to-female transsexuals, for instance, has increased verbal fluency and reduced spatial ability. Research shows changes in women's abilities over the course of their monthly cycles. My own conclusion from this literature is that most females have estrogen levels far above the range that permits the kind of spatial ability characteristic of great physical scientists.

If there is someone to blame for this situation, it is not society. Nor is it parents, teachers, or television. It is Mother Nature. She does not fret about the overrepresentation of males in aerospace engineering. She wants us to reproduce. And she has figured out that we do that best when males and females are hormonally different. No report, no demonstration, no lawsuit, and no perennial indignation is going to change her mind. Sex differences are here to stay. We would be well served to enjoy them.