

Gender and Mathematics—Again

The president of Harvard stands up in a room full of women scientists and says that maybe women can't do first-rate science and math for genetic reasons. If this sounds like the start of a bad joke, it is: a bad joke that really happened.

So many women are doing mathematics and science at such high levels that we cannot imagine any meaningful interpretation of his comment. With about half of all U.S. undergraduate mathematics degrees and about one third of all U.S. mathematics Ph.D.'s going to women, you might think there's no problem anymore. You would be wrong.

Recently, one of us got an email which read in its entirety: "Women and mathematics remind me of Dr. Johnson's sally about women and preachers." (At Boswell's report of hearing a woman preaching, he said, "Sir, a woman's preaching is like a dog's walking on his hinder legs. It is not done well; but you are surprised to find it done at all.") Earlier, one of us heard an accomplished postdoc at another institution described offhandedly by a colleague as "the little girl." You do not have to be at Harvard to notice that women still are not entirely welcome or completely accepted. And Harvard is not the only place in the mathematical community where women faculty are absent or scarce.

Samuel Johnson's eighteenth-century comment is not only smug but unfortunately still relevant. The notion that women are an oddity is destructive to women and to mathematics. And this notion still exists. Talent needs nurturing—not coddling, but nurturing—and it is difficult to nurture people you regard as freaks.

What about the "little girl" comment? Remarks like this may seem innocuous, but they aren't, and potentially hurt feelings are only the tip of the iceberg. To explain this, we need to define the notion of gender schema. A schema is, roughly, a cluster of expectations. For example, one part of the "driver" schema is "stops for red lights". That is why we feel safe going when the light turns green.

As anyone who has studied calculus knows, the cumulative effect of small differences can be very large indeed. In her book *Why So Slow?* (MIT Press) Virginia Valian gives persuasive evidence of how the cumulative effect of small differences in treatment, differences resulting from gender schemas, has a major impact on women in supposedly male domains.

Consider the following scenario, which has recurred over the thirty-plus years each of us has been in mathematics. We meet a mathematically talented, enthusiastic young woman and think to ourselves, "YES! This one can't miss!" Her teachers encourage her and follow her career with interest. But a few years down the road something goes awry—maybe a lot, more often just a little, then a little more. Her work is fine, but somehow the men have passed her by. Questions and self-doubt appear. Maybe she loses energy. Why continue to bang her head against this particular wall?

Have you ever heard a grown man described in a professional context as a little boy? We thought not. Are little girls invited to give hour addresses? Again, we thought not. "Juvenile" is part of the common gender schema for women but not for men. So is "not worth listening to". (Read Valian's book for the evidence; it's extensive.) Many aspects of the schema "woman" essentially clash with schemas such as "professional" or "mathematician". Aspects of the schema "man" do not.

Women can lose momentum and heart as a result of the accumulation of reactions to them based on these schemas. Gross comments are bad enough, but accumulated microscopic inequities devastate. To persevere despite them takes a tough skin; to avoid being distracted by them—well, neither of us has figured that one out yet. Not many people have.

It is especially insidious that both women and men hold these schemas. A basic study, replicated often, sends the same vita or the same academic paper to some people under a male name, to other people under a female name. The "woman" is ranked lower when men do the ranking. And also when women do the ranking.

What can be done? We can become more conscious of our own gender schemas and the way they influence our judgments. Like Dracula, the more pernicious of these schemas tend to be destroyed by light. We can consciously increase the number of women—the talent pool is deep—in our departments, our conferences, the major committees of our professional organizations. The more women there are, the more normal their presence becomes, the more they become just people, and the easier it is for them to do their work.

We know this is true because there are institutions, both academic and nonacademic, even subfields of mathematics, in which women participate in sufficient numbers so that their presence is no longer remarkable, hence no longer remarked on. There are existence proofs. Next step: a universal quantifier.

Why bother?

Because it is right. Because it is just. Because it is dumb to discourage talented people simply because their genitals go in instead of out. Because a "mathematician" schema that does not include women turns off talented students. And because the profession is ill served by the ensuing waste of talent if we do not change.

As Barbara Grosz of Harvard said, "It's time to put solutions in place."

In this op-ed we have addressed the situation only for women. The situation for underrepresented minorities is even worse. The schemas they encounter are far more insidious. We hope the mathematics community will realize that Grosz's words apply to this situation as well and will move swiftly to action.

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