The Sex Difference Evangelists

MEDICAL EXAMINER: ENTRIES
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The Ghost of Larry Summers

By Amanda Schaffer

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No discussion of how men and women think can avoid a mention of Harvard's ex-president Larry Summers. When he speculated in 2005 that intrinsic cognitive differences might partly account for women's underrepresentation in the top tiers of math and science, Summers fanned a national debate that continues to fuel sex-difference evangelism.

Amanda Schaffer and Emily Bazelon discuss men's and women's differences in variability and spatial reasoning.

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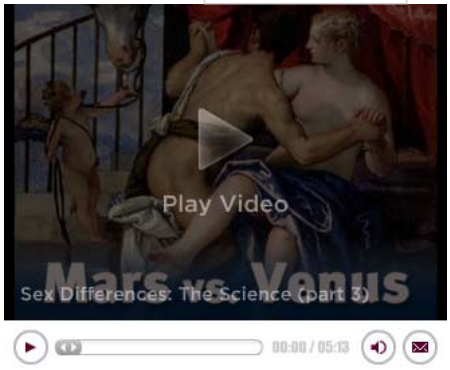

Susan Pinker treads lightly in Summersville, casting herself as a baffled bystander who couldn't understand the fuss. Still, she describes Summers' critics with subtle condescension. One of Summers' most ardent defenders was Steven Pinker, Susan's brother, who championed the case that intrinsic sex differences in aptitude and motivation may play a role in women's lesser representation. In a "showdown of the sexes" at the school's Science Center, Harvard psychologist Elizabeth Spelke bested Steven Pinker, in my view, with the case that social and cultural forces are the crucial ones. Still, Susan Pinker reprises several of the arguments that swirled in the Spelke-Steven Pinker debate, and these are worth revisiting because they still linger.

Summers argued, in part, that men vary more on cognitive measures than women—they're more likely to be at the high and low points on the relevant graphs or charts. He suggested this means that more men fall at the very high end of cognitive ability, from which top researchers are likely drawn. Steven Pinker defended this argument. And Susan Pinker takes it as a given: "Males are simply more variable," she writes. And: "The bell curve simply looks different for males, with more men at the tail ends of the distribution."

But that is not the whole story. In much of the pertinent research, male scores on cognitive measures do appear to spread more than female ones. But there are counterexamples. For instance, this cross-cultural analysis from 1994 suggests that in some countries, males' math scores are more variable, while in other countries, women's are. Strikingly, a new analysis of math data from 22 countries (not yet published but presented at several conferences) finds men with the expected spread in scores in many countries—but not in Lithuania, Germany, the Netherlands, Slovenia, or Denmark. In these places, female variability is either greater, or there's little difference between the sexes.

This analysis has statistical advantages over some older work, which makes it tough to dismiss, according to psychologist Steve Ceci, who has done an exhaustive review of the literature. Differences among countries shout out the role of social and cultural forces. These vary from place to place and seem to matter a lot in terms of shaping variability in math scores. Another recent analysis, in *Science*, also suggests that the math gap tends to narrow, or even disappear, in countries with more equality between men and women. This is true both for average scores and top-tier ones. More evidence for the importance of culture.

In the United States, much of the debate over whether boys have a high-end edge has focused on math SAT scores. For instance, widely cited research on mathematically precocious students found that more boys than girls tended to score in the very top tiers on the math SAT. But as Spelke points out, SAT scores may underpredict girls' academic math performance later on and should be viewed more critically than Steven Pinker and others do. Girls' academic success should not be discounted, either.

Susan Pinker also revisits the claim that males tend to perform better on certain tests of spatial reasoning. But even if that were so, a growing body of evidence suggests that spatial reasoning skills are malleable: the plasticity point again.

Spatial advantage is often cast as the smoking gun of cognitive sex difference. It's true that men tend to perform better on some tests, including those on which they must mentally rotate one object in space to see whether it resembles another. This is an area with a sizeable gender gap (though, if I need to say it, plenty of women excel at mental rotation, and women tend to perform better on some tests of spatial memory). Spelke suggests that men and women tend to approach certain spatial questions in subtly different ways, meaning that differences in strategy, rather than overall aptitude, may be what's really at play.

Some evidence suggests that innate factors like testosterone levels could help explain spatial reasoning differences. But the key point is that for both men and women, these skills can improve a lot with training. Researchers from the Spatial Intelligence and Learning Center, which brings together scientists from several universities, conducted a meta-analysis of more than 100 studies that have examined the effects on men and women's spatial-reasoning scores of everything from a few hours with a spatially oriented video game to weeks or months in a classroom to projects like dressmaking. Crunching numbers across the studies, the group found that training was associated with a substantial gain in spatial reasoning—comparable in size to almost a 10-point boost in IQ, according to Northwestern University researcher David Uttal.

These are not just weedy lab results—the gains may boost some women's

careers. Consider a program at Michigan Tech University. Since the 1990s, incoming engineering students have taken a test of spatial reasoning during freshman orientation. Students who score poorly are encouraged to attend sessions and do sample exercises to prepare them for an introductory graphics class in which they must visualize and mentally rotate objects. According to a longitudinal study, men and women who received the extra training got better grades in graphics compared with classmates who also did badly on the diagnostic test but did not get further help. What's more, women who got the extra teaching and encouragement were more likely to remain engineering majors: more than 75 percent, compared with less than 50 percent for women who didn't do the training. (For men, for some reason, the extra teaching didn't have this retention yield.)

Of course, when it comes to the diverse precincts of high-level science, spatial reasoning only gets you so far. Rock-star academics don't necessarily spend their days turning geometric figures around in their minds. Subfields of biology, chemistry, physics, and engineering vary in terms of the skills they require. And plenty of hard problems can be solved in multiple ways. Ultimately, no one really knows what makes a successful scientist. "Sure, mathematical and spatial ability may play a role, but so may creativity, diligence, communication skills, and intellectual risk-taking," says Ceci. Teaching spatial reasoning is a good thing. But overplaying its importance sells a lot of great scientists short.

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