

WOMEN IN SCIENCE

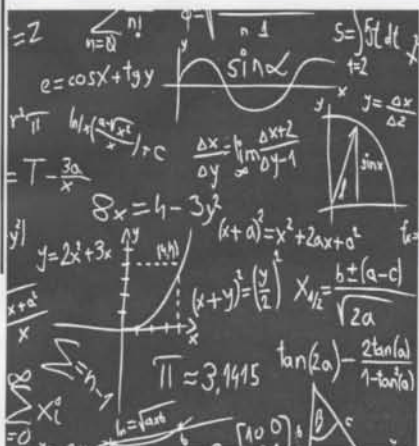
Preferences and Penalties Differ

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Two groups of people should care about the underrepresentation of women in math-intensive fields: academics and everyone else. In *The Mathematics of Sex: How Biology and Society Conspire to Limit Talented Women and Girls*, Stephen J. Ceci and Wendy M. Williams provide a valuable resource for both audiences. For academics, their book may help diffuse political tension inimical to the goals of the academy.

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Currently, the issue of underrepresentation is a political lightning rod, and scholars are virtually guaranteed to attract abundant criticism for posing and testing any hypothesis explaining gender disparities among scientists in different fields. Such criticism is not always confined to the scientific merits of its recipient's work, and junior scholars, in particular, may jeopardize their careers by pursuing research agendas speaking to the relative scarcity of women in mathematically oriented fields. An intellectual climate more conducive to self-censorship than the pursuit of knowledge seems unlikely to help explain the issue of underrepresentation, much less address it. In other words, the academy has painted itself into a corner, and it needs help getting out. In this sense, *The Mathematics of Sex* is a lifeline.



But why should everyone else care about the underrepresentation of women in fields such as mathematics, physics, chemistry, computer science, and engineering? One reason is that this gender imbalance does not exist in a vacuum. Recall, for example, that women are overrepresented in elementary-school teaching and nursing while men tend not to share equally with women the burdens of child and elder care. Especially when women are the primary breadwinners for 40% of households (1), failing to wonder whether cultural expectations, the education system, and workforce policies safeguard inequity, limit opportunity, and perpetuate poverty represents something like civic negligence. And it seems fair to expect that the best available explanation for women's underrepresentation in math-intensive fields, which tend to be highly remunerative, should inform urgent public policy questions (e.g., health care reform). In this sense, Ceci and Williams's account raises timely questions.

Another reason to care about the paucity of women in mathematically oriented disciplines is that many of the challenges facing us all in the 21st century are arguably math-intensive. Thus, to the extent that women do not take up careers in these fields for reasons other than their ability to grapple with science, technology, engineering, and mathematics (STEM) subjects, society may be shooting itself in the foot.

The Mathematics of Sex affords all concerned a chance to step back and weigh comprehensively the extant evidence pertaining to the underrepresentation of women in math-intensive fields. Ceci and Williams (developmental psychologists at Cornell University) draw on their detailed critique [previously published with colleague Susan M. Barnett (2)] of over 400 publications spanning at least seven fields. They explain that the research bases supporting the two dominant schools of thought—nature and nurture—are decidedly problematic.

Readers looking for support of the view that women are innately less capable than men of wrestling with STEM topics will be disappointed. Similarly, those looking to blame the underrepresentation of women in STEM careers squarely on cultural expectations enforced by parents, schools, and other institutions will be challenged to consider a more complex view. The evidence for the biological and socialization explanations is fraught with inconsistency and contradictions, and much of it does not jibe with the major inroads that women have made in math-intensive fields in recent decades. Readers will be left fairly convinced that, although more research is needed, gender per se and differences in how boys and girls are socialized should be relegated to the status of secondary factors.

Aware that few readers are comfortable with the jargon of psychology, sociology, economics, education, endocrinology, cognitive neuroscience, and genetics, the authors have taken pains to make their discussion of relevant evidence accessible to nonspecialists. Furthermore, they employ two strategies to humanize the material. First, they lace the text with dry, occasionally sardonic wit. Consider this summary of a finding that undermines the socialization position: "An observer from another planet, scanning the evidence, might think that boys must sur-

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by Stephen J. Ceci and
Wendy M. Williams

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mount negative stereotypes about their poor math ability that accrue from years of witnessing girls outperform them in math classes."

The authors' second strategy is to contextualize select scientific points with anecdotes from their experiences as parents and profes-

sors. This practice, which is anathema to research literatures, may infuriate professional scientists, but it does not affect the authors' treatment of evidence speaking to the biological or socialization arguments. The authors' reported experiences do, however, resonate with their preferred explanation of the underrepresentation of women in math-intensive professions. Namely, many mathematically capable women choose to work in non-STEM areas, and those who do enter STEM areas choose to leave them at twice the rate of men. The authors comment that because women are "far more likely to be equally talented in both math and verbal domains," they have more options for entering nonmath fields than do men. In addition, Ceci and Williams note that women pay a greater professional penalty for having children than do men, which makes them more susceptible to work-family conflicts.

This "choice" hypothesis is appealing. It does not lend itself to the victim narrative and paternalistic responses that poison debate, and it suggests that the remedy to women's underrepresentation in mathematically oriented fields may be largely a matter of getting the incentives right. From a public policy perspective, that is good because the focus of investigation shifts to money. This shift raises completely new questions. For instance, is there a relationship between the scarcity of women in particular STEM areas and the fact that an enormous proportion of resources, especially taxpayer dollars, in those fields is bound up in the research, development, and construction of weapon systems? We don't know, but the answer to this question may matter a great deal. In any event, *The Mathematics of Sex* provides reasons enough to turn away from the many minor distinctions that have to this point dominated inquiry into the underrepresentation of women in math-intensive careers.

References

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2. S. J. Ceci, W. M. Williams, S. M. Barnett, *Psychol. Bull.* 135, 218 (2009).

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