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Science Gender Gap: Five Reasons Women Trail Men In Science

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Though women now receive half the doctorates in science and engineering in the United States, they make up only 21 percent of full science professors and a measly 5 percent of full engineering professors.

This gender gap is the subject of hot debate, as illustrated in 2005, when then-Harvard president Larry Summers argued that differences in science aptitude between men and women explained most of the problem.

But research has found the root of the problem may be the clash between [career and child-rearing](#), especially given that the long road through graduate school, postdoctoral research positions at universities and tenure-track professorship meanders through a person's 20s and 30s, a time when a woman is disproportionately more likely than a man to have childbearing and child care responsibilities.

A [new series of articles](#) in the journal Nature tackles these issues, examining the causes of the science gender gap and highlighting solutions that work.

"We are not drawing from our entire intellectual capital," Hannah Valentine, the Stanford School of Medicine's dean of leadership and diversity, told Nature. "We've got to put on the accelerator to evoke social change."

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1. Women drop out faster than men

Summers' claims about innate ability aside, women seem to have no trouble meeting the rigorous demands of a Ph.D. The genders are approximately equal in number of doctorates gained in the United States. The problem, Nature's Helen Shen writes, is that women drop out of the science pipeline more than men after getting that Ph.D.

Shen cites one 2006 survey of chemistry doctoral students in the United Kingdom that illustrates the pattern. In the first year of their doctoral programs, 70 percent of the female students said they planned a career in research. By year three, that number dropped to 37 percent. Meanwhile, 59 percent of third-year men still planned to become full-time researchers. [[The 10 Most Surprising Sex Statistics](#)]

The issue seems to involve work-life balance. Women in science have fewer kids than their male colleagues, and have fewer children than they'd like to have, according to a 2011 study in the journal PLOS ONE.

Another analysis, published in the March/April issue of the magazine [American Scientist](#), found that before having children, women careers comparable to men in science. But the challenges of child care and the demands of running a research lab are often seen as incompatible. Women who plan to have children in the future drop out of the academic research race at twice the rate of men, the authors found.

Women are hit hard with [family responsibilities](#) just when they need to meet research goals to secure tenure, which is the right to not have one's job terminated without cause. Most institutions provide only a limited amount of time a professor can work without tenure, meaning there is a great deal of pressure to achieve. Part-time tenure-track positions could balance out the gender gap, the American Scientist researchers suggest.

2. It's not just academia

The academic female brain drain might not seem so dire if those women who left academia found cushier jobs in the private sector. But those sorts of moves don't seem to be common.

Women do make up more than 25 percent of research scientists in industry, according to Nature's Alison McCook, but they earn only 40 percent of the patents compared with men and start businesses only half as often. Even worse are the numbers of women on scientific

advisory boards, which help steer the science of biotech startups and other companies. Researchers from the University of California, Berkeley, and the University of Maryland have found that from the 1970s to today, the proportion of women on scientific advisory boards has topped out at only 10.2 percent.

Scientific advisory board positions are invited by company founders, making it likely that a "boy's club" atmosphere keeps women out, McCook wrote. Women report being invited much less frequently than men. [\[Busted! 6 Pervasive Gender Myths\]](#)

3. Everyone is biased

The tricky thing about discrimination is that it isn't always intentional. Researchers use a task called the Implicit Association Test to determine how [unconsciously biased](#) a person is. In the case of women and science, people might be asked to very quickly associate words like "woman" or "wife" with terms like "astronomy" or "physics."

Across 34 countries, 70 percent of people are quicker to associate male terms with science than female terms, according to a study published in 2009 in the journal Proceedings of the National Academy of Sciences. This unconscious bias may suppress the hiring of women in scientific careers, writes Stanford University neurobiologist Jennifer Raymond in a Nature op-ed.

Indeed, culture plays a major role in girls' interest in science. A 2009 study also published in Proceedings of the National Academy of Sciences found that the [lower the gender equality](#) in a nation, the [larger the math aptitude gap](#) between boys and girls, suggesting that culture, not biology, is to blame. A 2012 study published in the same journal found [biases](#) against female scientists among science faculty members.

It takes work to first acknowledge and then overcome these biases, Raymond wrote. But conscious strategies such as gender-blind hiring and efforts to mentor women can work, she said.

"By enabling more women to succeed, despite the existence of unconscious bias, this will gradually eliminate the stereotype of the successful scientist as male, which is the root of gender bias," she wrote. [\[The 10 Most Destructive Human Behaviors\]](#)

4. Quotas may not help

The European Commission, the governing body of the European Union, has instituted quotas to try to even out the academic gender gap in Europe, where only 18 percent of full professors are female. For example, the commission is requiring 40 percent of the members of the advisory boards for the EU's 2014-2020 research-funding program to be women.

But such [quotas may harm more than they help](#), writes Isabelle Vernos, a research professor at the Center for Genomic Regulation in Spain. The European Research Council, a major funding agency, has not found any increase in the number of research grants offered to women when there are more women on advisory boards, Vernos writes in Nature. Meanwhile, there are relatively few female scientists, meaning that a small pool of women will face even more [demands on their time](#) by serving on the funding boards.

5. Some reforms are successful

The pitfalls of quotas don't mean institutions shouldn't act on science gender gaps, however. Some programs do work, argue Brigitte Mühlenbruch, president of the European Platform of Women Scientists, and Maren Jochimsen of the University of Duisburg-Essen in Germany. Gender-equality guidelines instituted at the German Research Foundation that require transparency on gender equality and use incentives to get there have worked by supporting flexible working schedules, [child care facilities](#) and unbiased hiring procedures, Mühlenbruch and Jochimsen write in Nature.

Meanwhile, the European Science Foundation encourages consideration in the funding process for researchers who have taken time off for family reasons, they write. Germany has also instituted a Program for Women Professors that funds universities for promoting women to tenure-track positions. The program has created 260 new female professorships since 2007. Muhlenbruch and Jochimsen also see some benefit in quotas, they write.

"Motivation and participation are the basis of high-quality results in research — not biased evaluation criteria, job insecurity and glass ceilings," they write. "An academic culture that is transparent, democratic and sensitive to gender and diversity will benefit all scientists."

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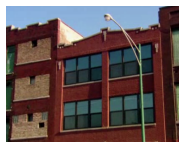
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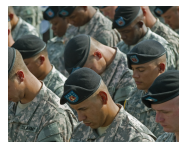
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