

# Women's choices, not abilities, keep them out of math-intensive fields

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The question of why women are so underrepresented in math-intensive fields is a controversial one. In 2005, Lawrence Summers, then president of Harvard University, set off a storm of controversy when he suggested it could be due partly to innate differences in ability; others have suggested discrimination or socialization is more to blame. Two psychological scientists have reviewed all of the evidence and concluded that the main factor is women's choices—both freely made, such as that they'd rather study biology than math, and constrained, such as the fact that the difficult first years as a professor coincide with the time when many women are having children.

Psychological scientists Stephen Ceci and Wendy Williams of Cornell University set out to understand the differences between men and [women](#) in math-intensive fields such as physics, electrical engineering, computer science, economics, and chemistry. In the top 100 U.S. universities, only 9% to 16% of tenure-track positions in these kinds of fields are held by women.

But girls' grades in [math](#) from grade school through college are as good as or better than boys', and women and men earn comparable average scores on standardized math tests. However, twice as many men as women score in the top 1% on tests such as the SAT-M. Clearly, the picture is complex, Ceci and Williams decided. Their analysis and conclusions appear in *Current Directions in Psychological Science*, a journal of the Association for Psychological Science.

Williams and Ceci also reviewed research on sex [discrimination](#) and decided that it is no longer a major factor. In fact, one large-scale national study found that women are actually slightly more likely than men to be invited to interview for and to be offered tenure-track jobs in math-intensive STEM fields.

Instead, Williams and Ceci think the problem is that women actually choose not to go into math-heavy fields, or drop out once they have started. "When you look at surveys of adolescent boys and girls and you say to them, 'What do you want to be when you grow up,' you never see girls saying, 'I want to be a physicist or an engineer,'" Ceci says. That doesn't mean they're rejecting science, but they're more likely to want to be physicians or veterinarians.

And those preferences persist. Studies of college students find that women are more interested in organic and social fields, while men are more interested in systematizing things. And indeed, more than half of new medical doctors and biologists are women today—and in veterinary medicine, women are more than 75% of new graduates.

Also, women drop out of mathematics-heavy careers paths. Almost half of undergraduate math majors in the U.S. are women. A smaller percentage of women go into graduate school in math, and in 2006, women earned 29.6% of math PhDs. Women are also more likely to drop out after they start a job as a professor, often because they are unable to balance childcare with the huge workload required to get tenure. Young male professors are more likely than their female counterparts to have a stay-at-home spouse or partner who takes care of children.

"You don't see nearly as many men with doctorates in physics saying, 'I won't apply for a tenure-track position because my partner wants to practice environmental law in Wyoming and I'm going to follow her

there and help take care of the kids," Williams says. Fair or not, women are more likely to prioritize family needs. "I don't think we should try to persuade a woman who's going to be a physician, veterinarian, or biologist to instead be a computer scientist."

On the other hand, women shouldn't have to drop out because the tenure schedule conflicts with their fertility schedule. "Universities can and should do a lot more for women and for those men engaged in comparably-intensive caretaking," says Williams. Coming up with alternative schedules for parents of young children who are seeking tenure, for example, or finding other ways to ease the burden on parents or young children, could help women stay in academic careers—and not only in math-intensive fields.

Provided by Association for Psychological Science

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