



# Girls Good at Math, But Teachers May Make Them Anxious About it

## Math-Phobic Teachers May Convince Girls That They Are Bad At Math Too, Study Finds

By LAUREN COX  
ABC News Medical Unit  
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Elementary school teachers who are nervous about doing math in public may be unintentionally grooming young girls to think they are bad at math—even if they are just as capable as the boys in their class—a small study suggests.

Psychologists tested 17 female [elementary school teachers](#) on a widely-used Mathematics Anxiety Rating Scale to see how comfortable the teachers felt doing math in public situations. The researchers also measured the ability -- [and self confidence](#) -- of 52 boys and 65 girls starting in the first or second grade.

In the first few months of the school year, there was no measurable [difference between boys' and girls' math capabilities](#). But by the end of the year, girls who had math-anxious teachers were more likely to do worse on math achievement tests than boys in their class -- and worse than girls who were in classrooms with teachers who felt confident in math.

"The more anxious a teacher is in the situation, the more likely girls are going to pick up on this," said Sian Beilock, lead author of the study published yesterday in the journal Proceedings of the National Academy of Sciences.

### *Teacher's Math Anxiety and Stereotypes*

As the year went on, girls in classrooms with a math-anxious teacher were also more likely to express the attitude that "girls are good at reading, boys are good at math." The more [a girl stereotyped herself as bad at math](#), the worse she usually performed on the test by year's end.

However, Beilock and her colleagues noted that the [gender differences in the study](#) "although significant, are small," and that other influences in the children's lives likely shaped their attitudes about math.

"Basically what we showed for boys, regardless of the stereotype, is they performed the same in math," said Beilock, a professor of psychology at the University of Chicago.

Beilock said the difference in boys and girls reactions to an anxious teacher didn't surprise her.

### *Why Did It the Math Anxiety Transfer to the Girls Only?*

"There are stereotypes in this society that girls are worse in math," said Beilock. "We also know that that children at that age tend to pick up on and model attitudes and behaviors of adults of the same gender."

Beilock theorized that if a teacher's anxiety about a subject didn't fit into a stereotype in society -- for example art -- then children would not likely adopt the social cues. Beilock focused on female teachers and girls they may influence because more than 90 percent of early elementary school teachers in the United States are female.

Experts in math education also say there is also evidence that teachers' attitudes about math transform the way young children -- boys or girls -- view the subject.

"Research generally shows few math ability differences, if any, between boys and girls from preschool age and into the first few years of school," said Herbert Ginsburg, professor of psychology and education at Teachers College Columbia University.

"So if the girls do worse after this point, the cause is likely not to be some ability difference, and instead is likely to involve some kind of socialization," he said.

In fact, Ginsburg said, most children of both sexes show interest in math and are already learning concepts before they arrive at school.

### *Boys and Girls Start School With Equal Footing in Math*

"There is a lot of evidence that showing that very early on in the preschool years kids are doing informal everyday math," said Ginsburg. "They learn how to count, they learn about concepts of 'larger than' and they do informal addition."

Ginsburg said children respond happily if they are taught math in interactive ways, or ways that demonstrate concepts such as the base 10 number system.

But, Ginsburg said, "in general, schools train kids not to like math," by forcing meaningless memorization or showing negative attitudes about the subject.

### *School May Change Children's View of Math*

"What happens is that these kids who are naturally little mathematicians get to school, and the school introduces them to this boring stuff," said Ginsburg.

Both Ginsburg and Beilock said studies have shown early elementary school teachers favor reading and writing over teaching math. But that doesn't mean children of either gender prefer math before they get to school.

"If the women teachers transfer these anxieties to the kids, that makes a lot of sense to me," said Ginsburg.

But exactly how or even if the teachers transfer an anxiety is unclear.

Donna Pincus, of the Center for Anxiety and Related Disorders at Boston University, said anxiety can be contagious under the right conditions.

People can inherit an anxious predisposition from a parent. And certain life experiences -- such as watching a person being bit by a dog or suffering from fear of flying -- can transfer a specific fear.

But Pincus points out the study didn't measure whether the children were becoming anxious about math, developing a phobia or simply becoming bored with it.

"It would have been interesting to see if kids felt more anxious about math," she said.

The study also didn't observe the teachers in the classroom, making it impossible to say whether the children saw a nervous teacher during math class or just a bored one.

"We don't know how the teachers are translating it (math avoidance) to the girls in this case," said Beilock. "We would like to just go in and observe teachers in the classroom and observe exactly what they're doing when they teach math -- or they don't teach math."