

## **Items of interest and summer reading:**

### The Effect of Female Teachers' Math Anxiety on Girls' Achievement

In this intriguing study from *The Proceedings of the National Academy of Sciences*, University of Chicago researchers Sian Beilock, Elizabeth Gunderson, Gerardo Ramirez, and Susan Levine report that elementary-school girls with female teachers who had a high level of math anxiety did less well in math – but boys in these same teachers' classes were unaffected.

The authors describe math anxiety as low self-efficacy beliefs with respect to math, avoiding math whenever possible, and performing below one's actual capabilities. For example, math-anxious people underperform when they are asked to do a problem at the chalkboard, take a math test, or calculate a restaurant bill. "When worries and self-doubt occur," say the authors, "thinking and reasoning can be compromised."

The study looked at 17 experienced female teachers in five urban schools and their 117 first- and second-grade students. The researchers measured teachers' math attitudes and knowledge by having them take the Mathematics Anxiety Rating Scale and the Elementary Number Concepts and Operations subtest of the Content Knowledge for Teaching Mathematics assessment. They gave students beginning- and end-of-year math tests and measured their attitudes about math by asking them to draw a person who was good at reading and a person who was good at math and noting the gender of the drawings. Here are the results of the study:

- The more math-anxious a female teacher was, the lower her female students' math achievement was at the end of the year. Boys in their classes did not suffer a decline in math achievement.

- This effect seems to have occurred because girls, watching their math-anxious teachers in action throughout the year, increasingly espoused traditional gender stereotypes about academic proficiency – i.e., that boys are good at math and girls are good at reading

- The math-anxious teachers' negative impact on girls' math achievement had nothing to do with teachers' actual ability as math teachers – as demonstrated by teachers' scores on the math

assessment and the fact that only girls experienced a decline in achievement.

What would happen in classrooms with math-anxious *male* teachers? Would boys also do worse in math? Would girls be unaffected? The authors aren't sure, but they note that more than 90 percent of elementary teachers are female and girls are more socially sensitive than boys in early elementary years. The authors doubt that math-anxious male teachers would have any impact on the achievement of girls because students "model behaviors they believe to be gender-typical and appropriate. Thus, it may be that first- and second-grade girls are more likely to be influenced by their teachers' anxieties than their male classmates, because most early-elementary school teachers are female and the high levels of math anxiety in this teacher population confirm a societal stereotype about girls' math ability. This match between teacher math anxiety and societal norms would not hold for male teachers exhibiting math anxiety."

What is to be done? The authors believe that math anxiety can be reduced through math training and education. "If the next generation of teachers – especially elementary school teachers – is going to teach their students effectively," they conclude, "more care needs to be taken to develop both strong math skills and positive math attitudes in these educators."

"Female Teachers' Math Anxiety Affects Girls' Math Achievement" by Sian Beilock, Elizabeth Gunderson, Gerardo Ramirez, and Susan Levine in *Proceedings of the National Academy of Sciences*, February 2, 2010 (Vol. 107, #5), spotted in *The Education Gadfly*, May 20, 2010; the full article is available at <http://www.pnas.org/content/107/5/1860.full.pdf+html>.