

TEACHER-FACILITATOR MATERIALS FOR CORNELL INSTITUTE FOR

WOMEN IN SCIENCE VIDEO SERIES

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In this video, Nicole states that girls should not be discouraged by their performance in a math class in middle or high school. She says that the math students learn in school is unlike the math they learn in college (and beyond), because the latter is more visual and creative, and less focused on numbers. Why do you think she raised this issue?

One reason might be because there has been a huge debate about why females are in short supply in most math-heavy fields, such as computer science, engineering, physics, economics, and mathematics. To some people, the reason for the shortage of women in these fields is that women do not perform as well as men on math tests. But is this true? It depends on how you measure performance.

On standardized tests of mathematical aptitude such as the SAT-Mathematics, there is no difference in the **average scores** of males and females. However, there are about twice as many boys among the top 1% of scorers as there are girls. But does a person need to be in the top 1% to become an engineer? Some say a person needs even more than this—to be in the top 1 in 10,000 (or .01%). However, there is no strong evidence for this claim; no one has ever asked professional engineers, mathematicians, etc., what their SAT-M scores were. Perhaps it is enough to be in the top quarter on tests such as the SAT-M? No one knows.

One thing that we do know is that SAT-M scores under-predict how well females do in college math classes: females who have the same scores as males get higher grades in math classes than do males. In a study of 67,000 college calculus students, males who received grades of Ds and Fs had SAT-M scores that were equal to females who received grades of B (see Wainer & Steinberg, 1992).

So, if grades are viewed as the outcome we wish to predict, then females are actually doing better than males. And nearly half of college mathematics majors are females (48%)! Maybe the shortage of women in mathematics is related to some factor other than math ability. What do you think may be the cause(s)?

One possibility is sex differences in career interests – perhaps there are some fields that appeal to females more than others, and the math-heavy fields are not among them. In their book, *The Mathematics of Sex*, Steve Ceci and Wendy Williams review much of the evidence for this statement.

Another possibility is that females self-handicap themselves when it comes to mathematics. They tell themselves that they aren't as good as males and then they underperform on math tests because of this belief. There is a large scientific body of

evidence relating to this claim, which is called “stereotype threat,” and googling this term results in hundreds of studies showing that females do much better on math tests when they do not focus on their gender. Here is one bit of evidence: Females who marked the box corresponding to their gender *after* completing the SAT Advanced Calculus test scored significantly higher than those who checked it *before* starting. Identifying gender *after* the AP exam would add nearly 3,000 women eligible to begin college with advanced credit for calculus, according to Davies & Spencer (2005), presumably because directing attention to gender at the start of the exam causes women but not men anxiety that impedes their performance.

What do the students think about all these issues?

Recommended Reading:

Danaher, K., & Crandall, C. S. (2008). Stereotype threat in applied settings re-examined. *Journal of Applied Social Psychology, 38*, 1639–1655.

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