

Girls Need Confidence, Good Scores to Pursue Physics

Interest in math is all it takes for teenage boys to consider physics careers, while teenage girls need to score well on exams to think about going for jobs in the math-heavy field, a study finds.

By [Gaby Galvin](#), Staff Writer | Dec. 21, 2016, at 1:30 p.m.



A recent study looks at why women aren't entering some STEM fields. (HERO IMAGES/GETTY IMAGES)

Teenage girls are more likely to express interest in careers involving biology, while teenage boys aspire to more math-heavy physics careers, according to a study published this month in [Sex Roles](#).

The study examined how teenagers' math interest, skill, self-confidence, importance and mothers' perceptions affected their interest in different [STEM](#) careers. Though there was little difference in test scores, interest and self-confidence for boys and girls, boys were much more willing to consider physics as a career, the study found.

Female students placed more weight on actual or perceived mathematical skill, while male students looked to their interests to guide them in their career paths. To consider physics-related careers in 12th grade, teenage girls needed to do well on math exams in 10th grade. Test scores had little bearing on male students; they were willing to pursue physics careers in 12th grade if they expressed an interest in math in 10th grade.

The [2016 U.S. News/Raytheon STEM Index](#) indicates that high school interest in every STEM subject -- except math -- increased in 2015 and that young men expressed more interest in all STEM subjects than

did young women over the past year. Still, the difference in math interest between male and female high school students was one of the smaller margins. By contrast, the starkest difference in interest was for [engineering](#).

"In terms of math performance, girls score as well as boys from elementary school through high school and, in the U.S., earn roughly half of the undergraduate degrees in mathematics," Janet Hyde, one of the study's authors and the co-director of the longitudinal Wisconsin Study of Families and Work, said via email. "The gender gaps are in physics, computer science, and engineering ... Only a minority of students take physics in high school -- a big mistake -- and girls are less likely to take physics courses than boys are."

[Gender stereotypes](#) may foster teenage girls' insecurity or doubts about success in math and physics careers, the study said. Teenage girls may need encouragement to pursue math careers and be assured that they score as well as their male counterparts on standardized math exams in order to boost their self-confidence.

It may also contribute to why more girls turn to biology rather than the math-heavy physics. Math interest, test scores and self-confidence do not play a role in either male or female students' interest in pursuing a career in biology, the study found.

Researchers found no significant gender differences in chemistry career intentions.

Both male and female students with more interest and self-confidence in their mathematical abilities scored higher on standardized math exams. What the students' mothers thought of their math skills was also critical to their interest, self-concept and test scores, regardless of gender.

"In the family, we know that parents estimate their sons as having higher math ability than their daughters, even though the data show that girls perform as well as boys in math," Hyde said via email. "In our study, we found that mothers' perceptions of the children's math ability in seventh grade predicted the adolescent's math self-concept in ninth grade. Parents' belief in you is a powerful force."

Researchers analyzed previous data on 298 adolescents who participated in Hyde's longitudinal Wisconsin Study of Families and Work. The students attended 144 different high schools across 13 states. The study, titled "Mathematics — a Critical Filter for STEM-Related Career Choices? A Longitudinal Examination among Australian and U.S. Adolescents," also looked at Australian students, pulling data from the Study of Transitions and Education Pathways (STEPS), which included 331 students.

In Australia, the study's findings were more extreme. A teenage girl's self-confidence in her math ability influenced not only whether she would consider a physics career, but whether she was willing to pursue any major science field, the study found.

In the future, STEM fields must be differentiated from one another in research on gender and STEM, according to the study. It will also be critical to understand why young women opt in to some fields, rather than focusing primarily on why they choose not to pursue others.

"The nation's future economic success depends on innovations in science and technology; we can't afford to waste half of our talent -- women -- when we are in a global economic competition," Hyde said via email. "We have to figure out why women aren't entering some STEM fields. This study gives us

some answers ... It tells us how math motivation in 9th grade predicts interest in STEM occupations at the end of 12th grade."

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