Approach to school affects how girls compare with boys in math

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CHAMPAIGN, Ill. — More women are pursuing higher education and doctoral degrees than ever before, but women still are rare in the math-oriented professions. Yet, researchers say, girls perform just as well as boys on achievement tests and tend to earn better grades in math than do boys during the earlier school years.

A new study in the journal Developmental Psychology indicates that how girls and boys approach their schooling underlies the differences in math grades. It also suggests that although the girls’ approach to school may give them an edge in the grades they earn in math, it may not buy them much when it comes to math scores on achievement tests because girls are not more confident than the boys about their skills in math.

The study examined 518 boys and girls as they went through fifth and seventh grades in three primarily white, middle- to upper-class school districts in Illinois. Using children’s reports, researchers looked at how the children approached their schoolwork, including their goals and in-class behavior. The children also reported on how confident they were about their ability to do well in math. Researchers also reviewed the young students’ grades and achievement test scores in math.

In the classroom, girls outperformed boys at both time points of the study, with the girls’ grades rising over time, while the boys’ grades remained the same, said Eva Pomerantz, a professor of psychology at the University of Illinois at Urbana-Champaign. The study was part of the doctoral work done by Gwen A. Kenney-Benson, who now is at Allegheny College in Pennsylvania.

Concerns with outperforming others and engaging in disruptive behaviors while in the classroom, both of which characterized boys more than girls, were tied to lower grades in math by the
“This was due in large part to the fact that such competitive and disruptive leanings were associated with decrements in learning strategies such as preparing for tests, seeking help, and persisting even when things were challenging that led to higher grades,” Pomerantz said.

Girls consistently used these learning strategies more than the boys did, the researchers found. It appears that, in contrast to boys, girls are more concerned with learning than with outperforming their classmates. They also engaged in less disruptive classroom behavior. As a consequence, girls used more focused learning strategies, giving them an edge over boys in terms of grades, Pomerantz said.

The researchers noted that the differences in grades between girls and boys disappeared once children’s concerns with learning versus outperforming others, engagement in disruptive behavior and learning strategies were taken into account.

At achievement test time, however, girls’ lost their advantage in math; their scores were the same as those of boys. After examining various factors, what stood out, Pomerantz said, was children’s confidence in their ability to do well in math.

In the classroom, she said, children may be less likely to feel that they will be judged based on their gender, believing instead that their own behavior, knowledge and effort will determine their grades. Thus, she added, the girls’ approach to schoolwork will pay off in the classroom, while the boys’ approach will not. It also could be, the researchers theorized, that higher grades given to the girls reflect rewards from their teachers for better behavior.

During achievement tests, the researchers suggest, the environment changes. Removed for girls is the familiarity of the classroom, which is replaced with uncertainty and increased stress. In such a situation, confidence mattered more than in the classroom.

Because confidence was found to be a predictor of scores on math achievement tests, Pomerantz said, girls may not have kept the edge they had while in the classroom because confidence levels did not differ along gender lines.

It may be that while many girls are going on into higher education, they continue to steer away from “stereotypically masculine fields, such as science and engineering” because the “more competitive environment of these fields is not a good fit with how girls approach school,” the researchers wrote.

“Consequently, even if the topic is of interest,” Pomerantz said, “the girls’ more learning-oriented approach may not match the work environment, where the atmosphere in these fields may provide a better fit to boys' more competitive approach.”

Co-authors with Kenney-Benson and Pomerantz on the paper were Allison M. Ryan, a professor of educational psychology at Illinois, and Helen Patrick, a professor of educational studies at Purdue University in West Lafayette, Ind.
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