

## Professional Resources

### Article

#### Gender Stereotypes About Math Develop as Early as Second Grade

From *Washington University*

Children express the stereotype that mathematics is for boys, not for girls, as early as second grade, according to a new study by University of Washington researchers. And the children applied the stereotype to themselves: boys identified themselves with math whereas girls did not. The “math is for boys” stereotype has been used as part of the explanation for why so few women pursue science, mathematics and engineering careers. The cultural stereotype may nudge girls to think that “math is not for me,” which can affect what activities they engage in and their career aspirations.

The new study, published in the March/April issue of *Child Development*, suggests that, for girls, lack of interest in mathematics may come from culturally-communicated messages about math being more appropriate for boys than for girls, the researchers said.

But the stereotype that girls don’t do math was odd to lead author Dario Cvencek, who was born and raised in the former Yugoslavia. “We didn’t have that stereotype where I grew up,” said Cvencek, a postdoctoral fellow at the UW Institute for Learning & Brain Sciences. “People there thought that math went with girls just as much as it did with boys.”

Cvencek and his co-authors wanted to examine whether American children have adopted the cultural stereotype that math is for boys during elementary-school years, and if so, whether they apply that stereotype to themselves.

Math self-concept – how much youngsters identify themselves with math, as in “math is for me” – has been left out of previous studies of the math-gender stereotype. Even though other studies using self-report measures show that boys and girls alike make the “math is for boys” linkage, the studies don’t distinguish between whether girls simply know about the math-gender stereotype but aren’t fazed by it, or are instead applying it to themselves so that it affects their identity, interests and actions.

The researchers used a computer-based categorization test, the Implicit Association Test, to assess how school children link math with gender. In adults, the test can



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predict actual math performance and real-world choices. The adult test, developed by UW psychology professor Anthony Greenwald, also a co-author of the research, probes implicit self-concepts, stereotypes and attitudes. It captures stereotypes by measuring, for example, how strongly respondents associate various academic subjects with either masculine or feminine connotations. The stronger the stereotype is, the faster the response.

The UW researchers adapted the adult Implicit Association Test for children and used it to examine three concepts:

- Gender identity, or the association of “me” with male or female.
- Math-gender stereotype, or the association of math with male or female.
- Math self-concept, or the association of “me” with math or reading.

The kids, 247 children (126 girls and 121 boys) in grades one through five in Seattle-area schools, sat in front of a large-screen laptop computer and used an adapted keyboard to sort words into categories.

In the math-gender stereotype test, for example, children sorted four kinds of words: boy names, girl names, math words and reading words. Children expressing the math-gender stereotype should be faster to sort words when boy names are paired with math words and girl names are paired with reading words. Similarly, they should be slower to respond when math words are paired with girl names and reading words are paired with boy names.

As early as second grade, the children demonstrated the American cultural stereotype for math: boys associated math with their own gender while girls associated math with boys. In the self-concept test, boys identified themselves with math more than girls did.

The researchers also used self-report tests and on all three concepts found similar responses to the Implicit Association Test.

“Our results show that cultural stereotypes about math are absorbed strikingly early in development, prior to ages at which there are gender differences in math achievement,” said co-author Andrew Meltzoff, a UW psychology professor and co-director of the UW Institute for Learning & Brain Sciences. Meltzoff holds the Job and Gertrud Tamaki Endowed Chair at UW.

Parental and educational practices aimed at enhancing girls’ self-concepts for math might be beneficial as early as elementary school, when the youngsters are already beginning to develop ideas about who does math, the researchers said.

“Children have their antennae up and are assimilating the stereotypes exhibited by parents, educators, peers, games and the media,” Meltzoff said. “Perhaps if we can depict math as being equally for boys and girls, we can help broaden the interests and aspirations of all our children.”

The research was funded by a National Science Foundation grant to the LIFE Science of Learning Center.

UW Institute for Learning & Brain Sciences:

<http://ilabs.washington.edu/>

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2011

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