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Math and gender: Is there a link?; The performance gap is negligible, so we should encourage boys and girls to resist stereotypes

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The relationship between gender and mathematics in North American culture is a complicated thing.

"Men are from Mars, women are from Venus"-style stereotypes are often unquestioned, confessing to being bad at math is socially acceptable, and unmediated math anxiety is common, particularly among women. With few exceptions, people who are good at math are portrayed in popular media as nerdy, hypercompetitive, socially inept males with pocket protectors.

My own daughters, ignoring the indisputable evidence of their parentage, point out to me that math just isn't very attractive. But, it seems that with the popularity of the TV show Numb3rs, and the recent success of the best-selling book Math Doesn't Suck by TV star and mathematician Danica McKellar (Winnie from The Wonder Years), math does seem to be losing some of its stodgy image -- perhaps not soon enough to sway my daughters and their friends, but maybe for a younger generation.

Like many of their peers, my daughters are capable young women who do well in math and exhibit the kind of curiosity and intellectual drive that would make them successful mathematicians. But for some reason, they just aren't interested in pursuing it as a career.

Although we have come a long way since the days of gender-tracking students' educational options, in countries like Canada and the U.S., fewer women than expected end up pursuing advanced degrees in fields like math, engineering and computer science. While the historic gender performance gap in mathematics is now negligible, women remain under-represented in the field. The study "Culture, Gender, and Math" published in the journal Science last year, underscores this fact. Using data from 40 OECD (Organization for Economic Cooperation and Development) countries, it shows that in societies with high levels of gender equality, "girls perform as well as boys in mathematics and much better than them in reading."

But, in another large-scale study of 44 industrialized or industrializing countries, researcher Karen Bradley observed that, "gender gaps in attitudes toward math and math careers was greater in advanced industrial societies, despite the smaller math achievement gap."

This attitude gap is what mystifies me. With competitive quantitative skills and superior reading abilities, girls, in many ways, are in a better position to succeed than boys. Categorically, boys tend to perform slightly better than girls in geometric or spatial testing, but with practice there is nothing girls can't learn and excel.

Yet instead of confidence, many young women seem to internalize self-doubt, and distance themselves from pursuing the quantitative knowledge that will open up dozens of highly rewarding and interesting career paths. Be it from parental attitudes, teacher cues, the media or their peers, oftentimes girls don't think they're supposed to be good at math, or, if they are, that it will make them less feminine. Some girls are still getting the message that it's okay to be smart, but just not too "math smart." What they believe about themselves is critical to their ability to succeed in math.

A fascinating study by University of B.C. researchers Ilan Dar-Nimrod and Steven J. Heine published in Science in 2006 showed that "women who read of genetic causes of sex differences performed worse on math tests than those who read of experiential causes."

The reason for this result, they suspected: "If individuals share the same genetic foundation at the base of the stereotype, they might feel that the stereotype applies to them . . . people might react differently if the origins of the group differences were perceived to rest on the specific experiences that people's groups have had. People may reason that their own experiences are different or that they can resist the effects of their experiences."

While research into math and gender issues will continue to expand, we know enough right now to encourage our girls and our boys to resist stereotyping themselves or others, and to take interest in the many exciting places that mathematics can take them.

--Arvind Gupta is a mathematician and scientific director of MITACS, a national research network focused on connecting university-based math researchers with companies and other organizations to solve real-world challenges. For more information on MITACS, visit www.mitacs.ca.

(Vancouver Sun)

MATH TIPS FOR PARENTS WITH YOUNGER CHILDREN:

Give your sons and daughters early math and science experiences. Visit a local science museum or look for math and science camps.

Make a conscious effort to avoid gender stereotyping when you buy toys for your children. Don't forget that girls and boys can both enjoy spatial games and building toys like blocks, K'Nex, and Lego (and if it has to be pink, the Lego website has a section of recommended products for girls). Fun board games such as Labyrinth, Rush Hour, and Tipover encourage spatial abilities.

Find out what your child is doing in math and science at school or in the child care setting. Does your child come home excited about an interesting activity or experiment he or she did that day? Talk about it.

Whenever you encounter a gender stereotype, remind both boys and girls that they can become anything they want to be -- including a mathematician, engineer or scientist.

As schools have become increasingly attentive to the educational needs of girls, author and counsellor Barry MacDonald reminds us not to leave boys behind in his best-selling book Boy Smarts: Mentoring Boys for Success at School. (www.mentoringboys.com)

With middle school and high school students:

As children plan for high school, encourage both boys and girls to take math and science.

And don't forget the great new books Math Doesn't Suck and Kiss My Math (for middle school math and pre-algebra respectively) by Danica McKellar formerly of the hit TV show The Wonder Years.

The books have companion websites, www.mathdoesntsuck.com and www.kissmymath.com.

Definitely worth a look.

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