Family Math as an Antidote to Math Anxiety

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Like many other nations, the United States has a problematic relationship with mathematics. Math is often the butt of jokes, as in "I hate this so much I'd rather be doing math," and the New York Times describes Sudoku as a "numbers game, minus the math" to reassure readers it will be fun. Sadly, it is possible to purchase a t-shirt that says "I'm too pretty to do math," and the statement "I'm just not a math person" is part of common social interactions.

These ideas about math have broad roots and are influenced by a range of cultural factors, but underlying the attitudes of many citizens is a strong level of worry, or anxiety, about math. Recent studies that focus on math anxiety have made clear just how pervasive and detrimental it is. **Family math – the ideas and activities that celebrate and encourage families' joyful use of math and acknowledgement of its positive role in their lives – holds promise as a treatment for this ailment.**

About Math Anxiety

Math anxiety is commonly defined as "…feelings of apprehension and increased physiological reactivity when individuals deal with math, such as when they have to manipulate numbers, solve mathematical problems, or when they are exposed to an evaluative situation connected to math."[1] It is associated with an increased heart rate, clammy hands, an upset stomach, and lightheadedness. When people report experiencing math anxiety, scans show activation of networks in their brains associated with both fear and pain.[2]

The effects of math anxiety, unfortunately, are powerful, long-lasting, and affect both performance and learning in multiple ways. High schoolers with higher math anxiety perform worse on international assessments of math achievement, and adults with math anxiety have greater difficulty with calculation tasks .[3] These effects on immediate performance are troubling, but math anxiety also affects long-term behavior and impedes future learning. People with high math anxiety are more likely to procrastinate on math tasks or find ways to avoid them entirely. They tend to avoid studying science, math, and engineering, creating a dearth of candidates for important STEM work.[4] Troublingly, math anxiety has been shown to impede the learning of new math ideas among children as young as 6 years old.[5]

We are still learning about how math anxiety develops, but we do know that adult math activities and anxieties impact children. Here are some examples from the research:

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[1] (Luttenberger, et al., 2018, p. 312).
[2] (Luttenberger, et al., 2018),
[3] (OECD, 2012); (Storozuk, et al., 2023)
[4] (Luttenberger, et al., 2018)
[5] (Tomasetto, et al., 2021)

- One study showed that when teachers had higher math anxiety, girls in those classrooms were more likely to endorse the stereotype that “boys are good at math and girls are good at reading.” This difference arose even when students did not differ in their math anxiety at the start of the school year. Girls who believed this also demonstrated lower math achievement than those who did not.[6]
- These findings have recently been replicated with a larger, nationally-representative sample, and unfortunately researchers found these effects not only for girls, but also for boys. [7] That is, boys whose teachers had higher math anxiety had lower math achievement by the end of the school year.
- When parents have high math anxiety and frequently help with math homework, by the end of the school year their children also show increased math anxiety and worse academic performance. And, when high math-anxiety parents do not participate in math homework as much, the negative effects on students disappear.[8]
- But it’s not all bad news. It’s also been found that parental involvement can be beneficial. Preschool and kindergarten children of parents who reported doing things like offering math challenges in the car or using math in everyday home routines showed higher math achievement scores overall.[9]

How can family math help?

The evidence shows that when parents interact with their children around mathematics and provide them with more positive mathematics-related activities and talk, children have higher mathematics outcomes regardless of their families’ levels of income or education.[10] For these reasons, efforts to support family math are guided by particular beliefs that separate them from many school math-related experiences and help address anxiety.

- **Family math happens everywhere.** That is, it’s part of sorting laundry, party planning, and Yahtzee. It happens at the playground and the grocery store. In these ways, family math is powerfully meaningful to children–not abstract, disembodied, or anxiety-inducing.
- **Family math is fun.** Family math is often described as explicitly focused on the experience of joy. Whether through playing card games and doing puzzles, or while sorting laundry for washing, family members are encouraged to slow down and focus on pleasure. By keeping enjoyment high on the priority list, family math keeps anxiety at bay.
- **Family math builds relationships.** Family math is by necessity a social activity: it is enacted together, within relationships with loved ones. By embedding math thinking in relationships, its learning is inherently supported by the energies and experiences of

[6] (Beilock, *et al*., 2012)
[7] (Schaeffer *et al.*, 2021)
[8] (Maloney, *et al*., 2015)
[9] (Huntsinger, 2016)
[10] (DeFlorio & Beliakoff, 2015; Galindo & Sonnenschein, 2015; Levine *et al*., 2010, McCormick *et al.*, 2020)

others; in family math, no one is trying to solve a problem on their own, making anxiety less of an issue.

What can you do to use family math as an antidote to math anxiety?

Just as the idea of family math helps us see how much meaningful math is embedded in everyday life, it also demands more of the adults in children's lives to create new kinds of math learning opportunities that build and boost confidence. Here are some things you can do to enable more family math as a way to lessen the effects of math anxiety:

As a family member:

- **Acknowledge the math in your day.** Talk with your children about the math that is part of everyday activities, like judging how much tinfoil is needed to cover a pan, or how to figure out what time you need to leave the house if you want to get to a movie theater by 2:30 pm.
- **Make math fun.** Play cards and dice games that help children get comfortable with small sums. For very young children, consider reducing your card deck to only the numbers 1-10, or even 1-5.
- **Own math for yourself and the children in your life.** NEVER say "I'm just not a math person." Help your child learn that we are ALL math people.

As an educator:

- **Help children see the math in their world, and not just at school.** Share children's books in class that show different types of families talking about math in their daily lives; try to make sure your students can see themselves and their families in these books.
- **Provide easy opportunities for families to engage in math.** Send home ideas for card and dice games that can support the math you are teaching in school. If needed, send them home translated to the languages children use with their families.
- **Own math for yourself and your students.** NEVER say: I'm just not a math person." Help your students learn that we are ALL math people.

Committing to family math has the potential to combat math anxiety and support children's confidence in math learning. By shifting our narrative toward meaningful math, joy, and doing math together, we can do a lot to "cure" our math anxiety.