

Math Anxiety and Girls: Is It All in Her Head?

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Is Math Anxiety More Prevalent in Girls?

- Widely reported – whether it is true or not
 - Develops in primary school
- An increase in math anxiety = decrease in math performance for boys and girls
- Research indicates that there is no gender difference in math performance
- Some connection to test anxiety
 - Control for test anxiety and math anxiety can decrease

Why are girls math anxious?

- The world says they should be
- The world says math is hard for girls
 - Stereotype threat adds to stress load
- Girls trained to please, don't want to disappoint parents or teachers
- Female brains are connected, cross-modular function, optimized for interhemispheric communication
 - Findings may explain rumination

Emotional Differences

- Fight or flight – adrenalin
 - Purpose is action
 - Result is movement and decision making
- Tend and befriend – oxytocin
 - Purpose is protection
 - Result is inaction (freezing)
 - Develop network of friends who may enable

Stress + Cognition = Anxiety

- Obsess with getting correct answer
 - They don't want to disappoint
 - Fear of failure compounds the situation
- Overthink solution paths
- Can make every choice correct
- Since girls tend to believe that effort is the path to success, they can't work hard enough
- “Catch” it from each other

How to help girls cope

- Start early – before enter school
- Educate parents, teachers & students
 - Girls do as well in math as boys
- Provide 3-D learning opportunities early and often
- Embed math in other subjects
- Give students lots of practice with using errors to build knowledge
- Provide role models

What girls can do

- Identify math vs test anxiety
 - Is math the problem, or is fear of failure driving the syndrome
- Learn to manage their stress
 - Breathing and exercise are key
- Acquire problem solving skills
 - Logic problems
 - Chess/Bridge
 - Active lessons based on real situations

Classroom strategies

- Use dimensional pedagogical approaches
 - Cuisenaire rods
 - Clay, sculpture, dioramas
- Map skills
 - Have students make maps and follow maps
- Encourage students to draw figures and to use graphics in answers
- Focus on language in math
 - How do you say - **4** ?
 - Is “divide by” and divide into” the same?
 - How about “times” and “multiply”

Decision Making

- Girls want to please so their focus is on doing something the way the teacher wants it done
 - Problem is that leads to unimaginative and rote work
- Give students problems to solve rather than solutions to follow
 - How would you frame the answer?
 - What information do you need?
 - What is the answer going to look like?
- Require non-prose answers such as graphs or cartoons
- Teach girls how to answer multiple-choice questions

Active Problem Solving

- Make problem solving intentional
- Games and Challenges
 - Destination ImagiNation, Odyssey of the Mind, Bridge Design Competition
 - Math puzzles, Sudoku, 24
- Reality projects
 - Work in groups, present to class
 - Investment club, architectural and interior design, budget management

Conclusion

- Girls CAN do math and they need to believe it.
 - Conviction that math is doable for them
 - Acquire knowledge and experience with math
 - Numbers are their friends
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