

# Challenging Gender Stereotypes in Math Classrooms

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## Our Focus:

The role of educators is crucial to the development of student self-concept. Therefore, educators must be cognizant of how gender stereotypes can impact students' self-concept, especially in regard to math. We believe it is the duty of a teacher to ensure that these gender stereotypes and biases are disrupted and that this issue is discussed critically and openly with students in an environment where students feel safe and comfortable to share their thoughts and ideas.

## What are Gender Stereotypes?:

Stereotypes are generalizations about a group of people based on a set of assumptions about that group. In reference to gender, there are differences between males and females in many of life's domains, but we need to analyze to what degree these differences reflect the way males and females essentially *are*, and to what extent they are the results of how we *believe* males and females differ from each other (Ellemers, 2018).



Shirt removed from a popular children's clothing retailer in 2013

## The Effects of Gender Stereotypes in Math:

- Students may enter school with pre-conceived notions of gender that may have a negative impact on the self-concept and subsequent performance of females in mathematics classes (Gunderson et al., 2012).
- In a 2011 study, students in second grade demonstrated their inheritance of the gender stereotype that math is a subject for males. Findings from this study suggest that gender stereotypes in math result in actual differences in math achievement (Cvencek, Meltzoff & Greenwald, 2011).
- In recent research, it was found that teachers often attribute the success of male students in math with natural ability, and the success of female students in math with effort, revealing an inherent gender bias that can be present within educators whether they are aware of these biases or not (Espinoza, Fontes & Arms-Chavez, 2014).
- There is a strong relationship specifically between female students with female teachers. Any negative attitudes or anxieties that is felt by these teachers in the subject of math is more likely to be transferred to their female students (Beilock et al., 2010).
- Females tend to have more negative math attitudes, self-concepts and anxieties than males. These internalized attitudes can play a crucial role in performance in math, course choices and entering math related careers (Gunderson, et al., 2012). These negative feelings around math can be a major contributing factor to the lack of females in mathematical professions (Beilock et al., 2010).
- Regardless of the origin or even effect of gender stereotypes, it has been proven that gender differences *do* exist in spatial abilities, *but* that spatial proficiency is improvable through interventions. (Reilly, Neumann & Andrews, 2016).

## How to Disrupt these Stereotypes:

- Encourage students to try different activities / use new materials in free play that might be outside of their comfort zone and embolden students to take risks.
- In order to promote equity among genders in math, many educational psychologists have argued that early education of spatial intelligence is necessary. They argue that, “it may offer substantial benefits for the later development of mathematical and scientific skills across all ability levels. Parents and caregivers can also encourage children by using spatial language, providing children with enrichment activities that offer spatial learning experiences” (Reilly, Neumann & Andrews, 2016).
- Encourage students of different genders to work together allowing them to support the co-construction of non-traditional gender roles (Gosselin, 2007).
- “When groups are labeled, treated or sorted differently, children come to conceptualize groups as different in meaningful ways and to show preferential bias toward their own in-group. Children are also likely to internalize the stereotypic beliefs explicitly communicated in their environment and to detect covariations between social groups and attributes that would have otherwise gone unnoticed” (Bigler & Liben, 2007).
- Understand your role as teachers in the gendering process and educate yourself on gender norms in the classroom and commit to destabilizing them (Lo, 2015).
- Encourage discussion and acknowledgment of gender stereotypes.

## Classroom Activity for Graphing Trends in Gender and Math:

**Curriculum Connections:** Grade 4, Data Management and Probability - *collect and organize discrete primary data and display the data in charts, tables, and graphs (including stem-and-leaf plots and double bar graphs) that have appropriate titles, labels (e.g., appropriate units marked on the axes), and scales (e.g., with appropriate increments) that suit the range and distribution of the data, using a variety of tools* (OME, 2005, p. 74)

**Goal:** Students will have the opportunity to anonymously provide data about their personal experiences with gender stereotypes. Students will be able to graph this data and have rich discussions about what this data tells us. By anonymously giving their answers, students can be honest and provide a more accurate depiction of their present gender stereotypes.

### Procedure:

1. Provide students with coloured markers and a sheet of paper with a line drawn in the middle. One side is labelled agree, one side is labelled disagree, with the middle representing neutral. There should also be a place for students to state which gender they identify as.
2. Explain that students will be read a set of statements. Each statement corresponds to a colour. Ask students to draw a circle on the paper in the colour that corresponds to the statement in the position that best suits their experiences from agree, neutral to disagree.
3. Choose statements based on what you feel is most pertinent to your class and read them aloud to students. We have provided some samples below that deal with math gender stereotypes:
  - I enjoy math.
  - I feel that I am good at math. \*
  - I was born good at math. \*
  - I have to work hard to improve my math skills. \*
  - I enjoy building things. \*
  - I prefer to play pretend. \*
  - I have felt left out of an activity or group of people because of my gender. \*
  - I would like to have a career related to math one day. \*
4. After reading each of these statements, collect the sheets. For each question, provide data sets of answers to small groups of students and have them graph the findings.
5. Have students present their findings from the data collected, and interpret the graphs as a class, discussing what implications this may have in regard to gender and mathematics.

\*\*\* Relates to student self- concept

\*\* A 2009 study showed that girls prefer pretend play and boys prefer construction activities

\* Can open discussion to encourage gender-mixed groups of students to work together and why it is important

\* Relates to a 2012 Gunderson study that women’s math anxieties can play a role in choosing math related careers