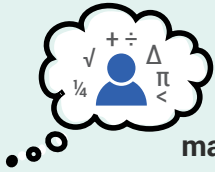
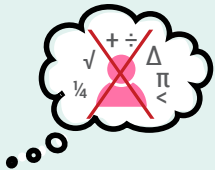


# The Development of Implicit Gender Stereotypes

**Implicit stereotypes** are **automatic** and **involuntary associations** that people make between a **social group** (i.e. "boys") and an **activity** (i.e. "science" or "math").<sup>1</sup>



By age **six**, North American **children** have implicit stereotypes associating **math** more strongly with **boys** than **girls**.<sup>2</sup>



This has been replicated in other countries.<sup>3,4,5</sup>

## Effect on Math Self-Concept

**Math self-concept** is the degree to which **children** identify with math (e.g. math = me).

It can predict children's **math achievement**<sup>8</sup> and **interest**.<sup>9</sup>

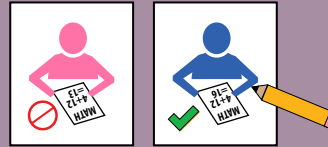
The **more** girls **associate math with boys**, the **weaker** their **implicit math self-concept**.<sup>3,5,8, 10</sup>



It is important to **combat these stereotypes** in order to help **girls** to develop a **strong math self-concept**.

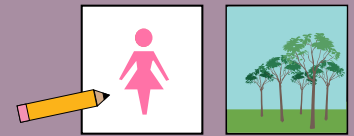
## Effect on Math Performance

Girls perform **worse** on math assessments when they are reminded of **gender stereotypes** by colouring a picture of:



A girl **incorrectly solving a math problem** instead of a picture of a **boy correctly solving** the same problem.<sup>7</sup>

Or even when reminded of their gender by colouring a **girl** instead of a **landscape**.<sup>6</sup>



These studies show that it is **imperative to break this negative cycle** of stereotypes undermining girls' math performance.

## Implications

It is important to change these **stereotypes** as **early in development** as possible to help prevent girls from **underperforming** in and **disidentifying with math** in early elementary school.

**Early math abilities** form the foundation for later math skills and interest. To encourage **more girls to enter math-related fields** like engineering or computer science, **caregivers and educators** need to ensure they start their math careers on an **equal footing** to boys.

## What Can Parents & Guardians Do About These Stereotypes?

Enroll girls in STEM and math programs

Expose children to role models <sup>10,11</sup>



Explain the value of math in everyday life <sup>12,13</sup>

Avoid gendered language <sup>14,15</sup>



Learn more about implicit gender stereotypes, what you can do to combat them, and the research in our white paper series on our website: <http://successinstem.ca/>

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## About Project CLIMB

How can we best teach young children that girls as well as boys can be good at math and science? Project CLIMB (Changing early learning of implicit math biases) tests programs that counteract early learning of implicit gender bias. Grades 2-7 are an important period for acquiring foundational math and science skills. Exposing kids to positive role models can change these biases and boost girls' math performance, without adversely affecting boys. Project CLIMB will test the impact of long-term contact with positive role models on girls' STEM engagement. Working with community partners, we will identify several interventions that are effective in changing gender bias and susceptibility to stereotype threat among boys and girls aged 7-12.

Learn more at: <http://successinstem.ca/projects/climb>

## About Engendering Success in STEM (ESS)

Engendering Success in STEM (ESS) is a research partnership focused on evidence-based solutions. The shared goal of our research is to foster women's inclusion and success in STEM (Science, Technology, Engineering, and Math). We bring together social scientists, STEM experts, and stakeholders in STEM industry and education to use an evidence-based approach to break down the biases girls and women face on their pathway to success. Funded by the Social Sciences and Humanities Research Council.