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How do gender stereotypes impact girls' interest in science?

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Abstract

Has anyone ever said that you couldn't or shouldn't do something because of one of your traits? If so, you've probably been the victim of a stereotype. A stereotype is a set of shared beliefs based on a trait or the identity of a group. A common stereotype is that women are not as good at or interested in science as men. This can result in fewer women participating in the sciences.

We wanted to know if and when these gender stereotypes about science affect children and adolescents. We also wanted to know if stereotypes cause girls to be less interested in and take part less in these fields. To find out, we conducted surveys and laboratory experiments.

We found that very young students believed these gender stereotypes. Girls were less interested in participating in computer science and engineering if they believed the stereotypes. So, teachers and schools should try to generate interest in these fields at an early age.

Introduction

Stereotypes are prevalent in society. They can cause a lot of damage to individuals and groups of people. A common kind of stereotype is the belief that one group is better at a task or a subject than another. This is called an **ability stereotype**. Another kind of stereotype is an **interest stereotype**. This is the belief that one social group is more interested in a topic than another group. Interest stereotypes can change the way people see themselves. They can also influence a person's motivations and their **sense of belonging**.

In the United States, the number of women in science, technology, engineering, and math (STEM) varies. Even when women take part in these fields, gender stereotypes are common. An example is the idea that men are more able or interested in STEM compared to women. This is a gender stereotype favoring men. Computer science and engineering have the largest **gender disparities**. This means that women are less likely to have these jobs. This can lead to discriminatory practices like paying women less than men. And that could increase the **wage gap**.

We were curious about STEM gender stereotypes in children and adolescents. At what age do they show up? Do gender-ability or gender-interest stereotypes have a bigger impact on girls? Do these stereotypes actually cause girls to be less interested in these fields? Do they change girls' desire to take part? We decided to find out!

A woman at the Women's March on Washington, 2017.
Photo Credit: Dina Fine Maron

Methods

We designed a survey about gender-interest stereotypes favoring boys in computer science. We asked students in grades 3-7 if:

- they believed boys were more interested in computer science than girls.
- they thought boys were better at computer science than girls.
- they felt like they belonged in the field.
- they were actually personally interested in computer science.

Then we gave a similar survey to a more diverse set of students (grades 1-12, various races/ethnicities). This survey included questions about engineering, too!

We also ran an experiment where we gave students (8-9 yrs old) two activities in the laboratory. One activity stated that "girls are much less interested in this activity than boys". This made a link between the activity and the stereotype. The other stated that "girls and boys are equally interested in this activity". So, that activity didn't have a link to the stereotype. We presented the activities in a random order for each student. We then asked students if they were interested in the activities and which activity they would choose to take home.

Results

We found that a diverse set of students believed gender-interest stereotypes favoring boys in computer science and engineering. Students developed these stereotypes at a very young age (Fig. 1).

We also found that:

- Gender-interest stereotypes were stronger than gender-ability stereotypes.
- Girls who believed the stereotypes were actually less interested in participating in computer science and engineering.
- Girls who felt they did not belong in these STEM fields were less interested as well.

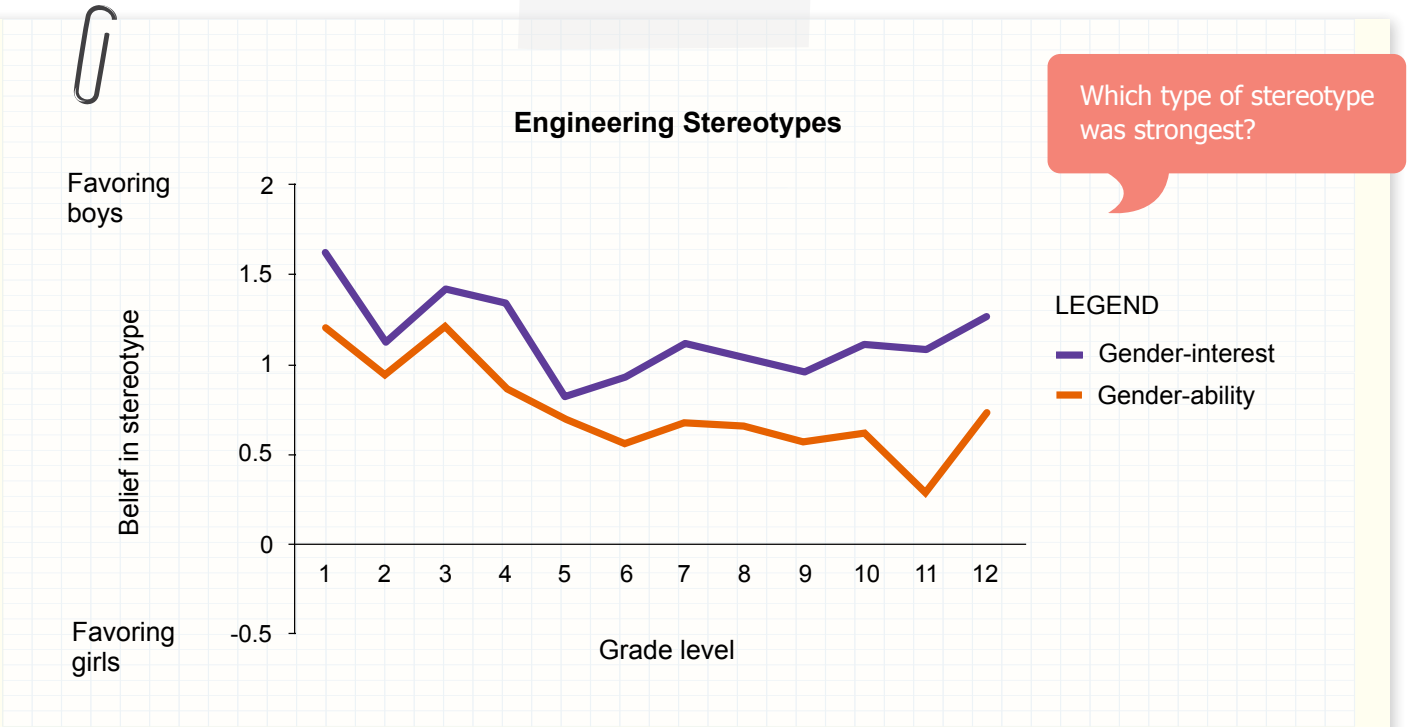
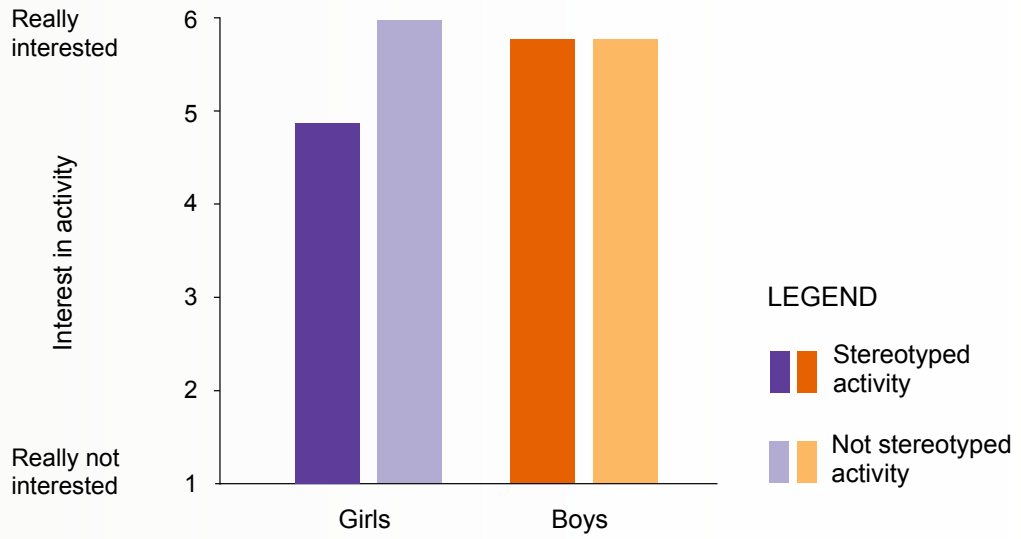


Figure 1:
Gender-interest and gender-ability stereotypes about engineering by grade. Positive values indicate students believed that boys were more interested or more able than girls. Any stereotype favoring girls would show **below** the 0 line.

In our laboratory experiment, we found that girls were less interested than boys in the activity described by the gender-interest stereotype favoring boys (Figure 2). Girls chose to take those activities home less than activities with the gender equal description.

Figure 2:
Student interest in activities with and without gender-interest stereotyped descriptions.



Discussion

Gender-interest stereotypes can cause changes in girls' interest in STEM. Girls are less likely to take part in STEM activities if they feel like they don't belong. Beliefs in these gender stereotypes at a young age could widen gender disparities in STEM in the future.

Our research suggests that:

1. Girls should start to take part in computer science activities in early elementary school. This is before gender-interest stereotypes about computer science become common.
2. Teachers should find and use language that can increase girls' interest in STEM classes and activities.
3. The design of STEM programs and activities should actively fight gender-interest stereotypes.

We still have many questions to address in the future. How long do these gender stereotypes last? What impact will they have on the future careers of students? Does experience in STEM change students' belief in gender stereotypes? If we can understand and address these gender stereotypes, we can improve gender disparities in STEM.

Conclusion

The sciences are for everyone. Give computer science and engineering a try! Ask your parents and teachers for help finding classes and activities. You never know what you might like.

Tell your teachers you want to learn about successful women in STEM like NASA scientist Katherine Johnson, Internet pioneer Radia Pearlman, or computer scientist Grace Hopper. You can also learn more online – why not check out a project like Girls Who Code?

And if you feel comfortable, speak up when you hear others using gender stereotypes. The more you correct others now, the less they will use gender stereotypes in the future.

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Glossary of Key Terms

Ability stereotype - The belief that one group is better at a task or in a field than another. This could be based on intelligence or based on skills. An example of a gender-ability stereotype is that boys are better at computer science.

Gender disparity - The difference in access to resources, status, and well-being between boys and girls or men and women. Some examples of things that cause gender disparities are unequal access to: education, jobs, medical care, legal protections, and social and political representation.

Interest stereotype - The belief that one social group likes, enjoys or wants to participate in a topic more than another group. An example of a gender-interest stereotype is that girls are less interested in engineering.

Sense of belonging - Feeling like you fit in and are similar to other people.

Stereotype - A widely held belief about a particular trait or group of people.

Wage gap - The difference between monetary compensation for women and men who are working.

Check your understanding

1. What is the difference between ability and interest stereotypes?
2. What negative consequences could there be in believing gender stereotypes in STEM fields?
3. The researchers used both surveys and laboratory experiments. What different information did they get from each type of research process? Why do you think they did both?
4. What are three ways you can think of to help get rid of gender-interest stereotypes related to STEM fields in your school?

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