Teacher gender bias is real and has lasting effects on students' marks and study choices

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Credit: Julia M Cameron from Pexels

Two important patterns in education are true world-wide. First, females outperform males in most subjects, and boys do not outperform girls in high school math and physics. Second, more females than males enroll in

higher education. However, female enrolments in science, technology, mathematics and engineering (STEM) degrees are disproportionately low.

My research with Professor Victor Lavy has shown teacher gender bias at least partly explains these low enrolments. We measured this bias in an innovative way based on how teachers graded different sets of students. We tracked the effects over many years, showing this bias distorts students' grades in school and their post-school study choices.

We also found an association with teaching quality: the most effective teachers have a gender-neutral attitude.

What did the study look at?

There is evidence that beliefs about a specific group can determine individuals' behaviors toward members of that group. And these behaviors, whether conscious or unconscious, may affect outcomes for the individuals exposed to them. So we explored the question: if you have a pro-boy math teacher, how does it affect students' performance in the subject a year later and their likelihood of enrolling in a math degree two years later?

To answer this question, we used administrative data from Greece that match students, teachers and classrooms. Our study sample included more than 400 teachers from 21 high schools over eight years. The data record the progress of students from grade 10 through to grade 12, and are linked with university admission.

Thus, we can see students' trajectory, including results in tests in year 11, standardized high-stakes exams in grade 12, attendance, the quality of the tertiary institution they enroll in, as well as degree choices.

How was teacher bias measured?

To measure teacher gender bias we exploited the difference between two tests that every student takes in all subjects in grade 11. One test is external, graded by an external examiner, and student names and thus gender are concealed. For the other test, graded by a school teacher, student names and their gender are revealed.

These tests cover the same curriculum and examine the same skills. Both tests are high-stakes, because results count for university admission two years later.

We calculated gender differences in outcomes in the two tests for each class a teacher taught in the sample. This measure shows whether teachers do consistently give higher or lower grades when they know the genders of students (compared to the external assessors who do not know this). In this way, we could identify a teacher's gender biases in grading.

We were able to track outcomes for teachers over the eight years to get a persistent measure of their bias in different classes with different sets of students. We found teacher gender biases exist and are persistent. A teacher who acts in one class in a pro-boy way is very likely to act in the same way in a different class even seven or eight years later.

Our findings indicate these biases are deeply rooted in teachers' attitudes and behaviors. Only 15% of teachers were gender-neutral in their behavior.

Many teachers favored boys, and many teachers favored girls, with these behaviors varying by subjects. For instance, there was more pro-boy grading behavior by teachers in algebra rather than in history or ancient Greek.

> Boys will be boys? How schools can be guilty of gender bias. (Too many teachers think boys can't do as well as girls, says the teacher on a mission to change attitudes.)https://t.co/H0HxNhY1sq
>
> — Dr. Michael Flood (@MichaelGLFlood) April 23, 2019

Teacher biases affect students a lot

We then investigated the impacts of these biases on students' math grades in high school and on university admission. We found lasting effects. Male students who had a pro-boy math teacher in grade 11 did better in math in grade 12. The opposite happened to female students in their math class—they did significantly worse the next year.

Studies from France and Israel found a similar pattern. However, these studies used a weaker definition for teacher gender biases and could not follow the same teacher over time.

Using detailed student attendance data, we also found students with teachers biased in favor of their gender are less likely to miss classes without a reason and less likely to be expelled from the class. This suggest students exposed to biased teachers might be less motivated to attend class or less engaged with learning.

After school, teacher biases continue to have a significant effect on students' probability of enrolling in tertiary education, quality of university and study program. These effects are similar for males and females.

However, only for female students do teacher biases have a significant effect on the chosen field of study. Female students who had pro-boy teachers in math or physics in grade 11 were less likely to enroll in

university math or physics courses two years later. Teacher gender biases seem to have little effect on male students' degree choices.

This could be partially explained by a discouragement effect on girls that lowers their self-confidence and their beliefs in their abilities and prospects of success.

The impacts are long-term

Teacher gender biases seem to have longer-term implications for females, affecting their career prospects and earnings.

In Australia, only 35% of university degrees in STEM disciplines are awarded to women. Although 58% of students in higher education are females, the rates are much lower in STEM subjects: 40% in architecture and building, 17% in information technology and 16% in engineering and related technologies.

These STEM degrees are associated with high salaries. This means women are underrepresented in high-paying occupations. This trend is true for most OECD countries.

Gender-neutral teachers are more effective

Our final important finding is that the most effective teachers have gender-neutral attitudes. This suggests less effective teachers can harm their students twice: first by being ineffective and second by discriminating against one of the genders.

From a policy perspective, training that improves teacher quality will also likely reduce gender discrimination in schools.

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