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PISA IN FOCUS 49

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What lies behind gender inequality in education?

- While PISA reveals large gender differences in reading, in favour of 15-year-old girls, the gap is narrower when digital reading skills are tested. Indeed, the Survey of Adult Skills suggests that there are no significant gender differences in digital literacy proficiency among 16-29 year-olds.
- Boys are more likely to underachieve when they attend schools with a large proportion of socio-economically disadvantaged students.
- Girls – even high-achieving girls – tend to underachieve compared to boys when they are asked to think like scientists, such as when they are asked to formulate situations mathematically or interpret phenomena scientifically.
- Parents are more likely to expect their sons, rather than their daughters, to work in a science, technology, engineering or mathematics field – even when their 15-year-old boys and girls perform at the same level in mathematics.

Over the past century, OECD countries have made significant progress in narrowing or closing long-standing gender gaps in many areas of education and employment, including educational attainment, pay and labour market participation. This one fact implies another: that aptitude knows no gender. Given equal opportunities, boys and girls, men and women have equal chances of achieving at the highest levels.

But new gender gaps in education are opening. Young men are significantly more likely than young women to be less engaged with and at school and have low skills and poor academic achievement. They are also more likely to leave school early, often with no qualifications. Boys in OECD countries, for example, are eight percentage points more likely than girls to report that school is a waste of time. Meanwhile, in higher education and beyond, young women are under-represented in the fields of mathematics, physical science and computing. In 2012, only 14% of young women who entered university for the first time chose science-related fields of study, including engineering, manufacturing and construction. By contrast, 39% of young men who entered university that year chose to pursue one of those fields of study.

Underachievement among boys

PISA finds that 15-year-old boys are more likely than girls of the same age to be low achievers overall. In 2012, 14% of boys and 9% of girls did not attain the PISA baseline level of proficiency in any of the three core subjects measured in PISA - reading, mathematics and science. In fact, six out of ten students who did not attain the baseline level of proficiency in any of those subjects were boys. There are many possible reasons for boys' poor performance in school, and many of them are connected with differences in behaviour between boys and girls. For example, boys spend one hour less per week on homework than girls – and each hour of homework per week translates into a 4-point higher score in the PISA reading, mathematics and science tests. Outside of school, boys spend more time playing video games than girls and less time reading for enjoyment, particularly complex texts, like fiction. Reading proficiency is the foundation upon which all other learning is built; when boys don't read well, their performance in other school subjects suffers too.

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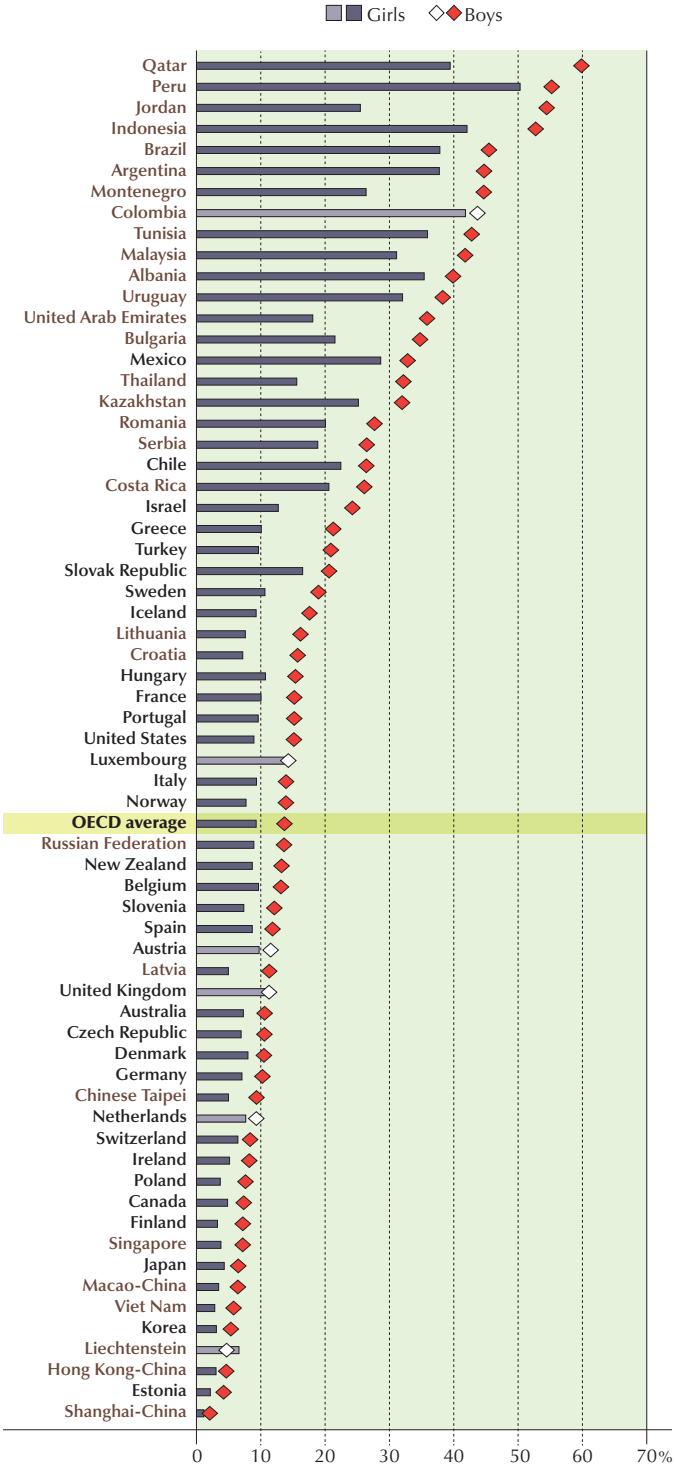
Boys are more likely to fail to make the grade in all of the three core PISA subjects

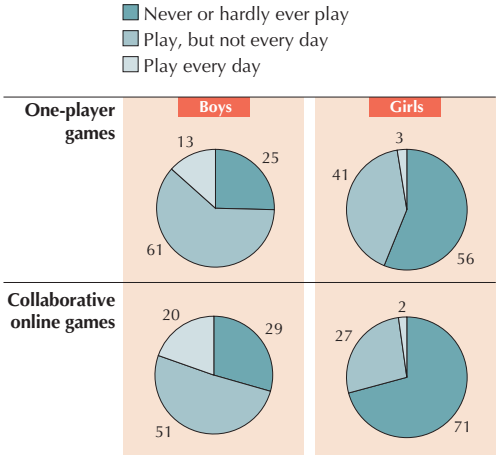
Gender differences in the percentage of boys and girls who perform below proficiency Level 2 in reading, mathematics and science



Note: Gender differences that are statistically significant are marked in a darker tone.
Countries and economies are ranked in descending order of the percentage of boys who are low performers (below PISA proficiency Level 2) in reading, mathematics and science.
Source: OECD, PISA 2012 Database.

Gender differences in playing video games outside of school are striking

Percentage of students, across OECD countries



Source: OECD, PISA 2012 Database.

Lack of self-confidence among girls

In the large majority of countries and economies that participate in PISA, among high-performing students, girls do worse than boys in mathematics; in no country do they outperform boys at this level. In general, girls have less self-confidence than boys in their ability to solve mathematics or science problems.
Girls are also more likely to express strong feelings of anxiety towards mathematics and this is true even among high-achieving girls. On average across OECD countries, the score-point difference in mathematics performance between high-achieving girls and boys is 19 score points. However, when comparing boys and girls who reported similar levels of self-confidence in mathematics and of anxiety towards mathematics, the gender gap in performance disappears.

PISA reveals that girls tend to do better when they are required to work on mathematical or scientific problems that are more similar to those that are routinely encountered in school.
But when required to "think like scientists", girls underperform considerably compared to boys.

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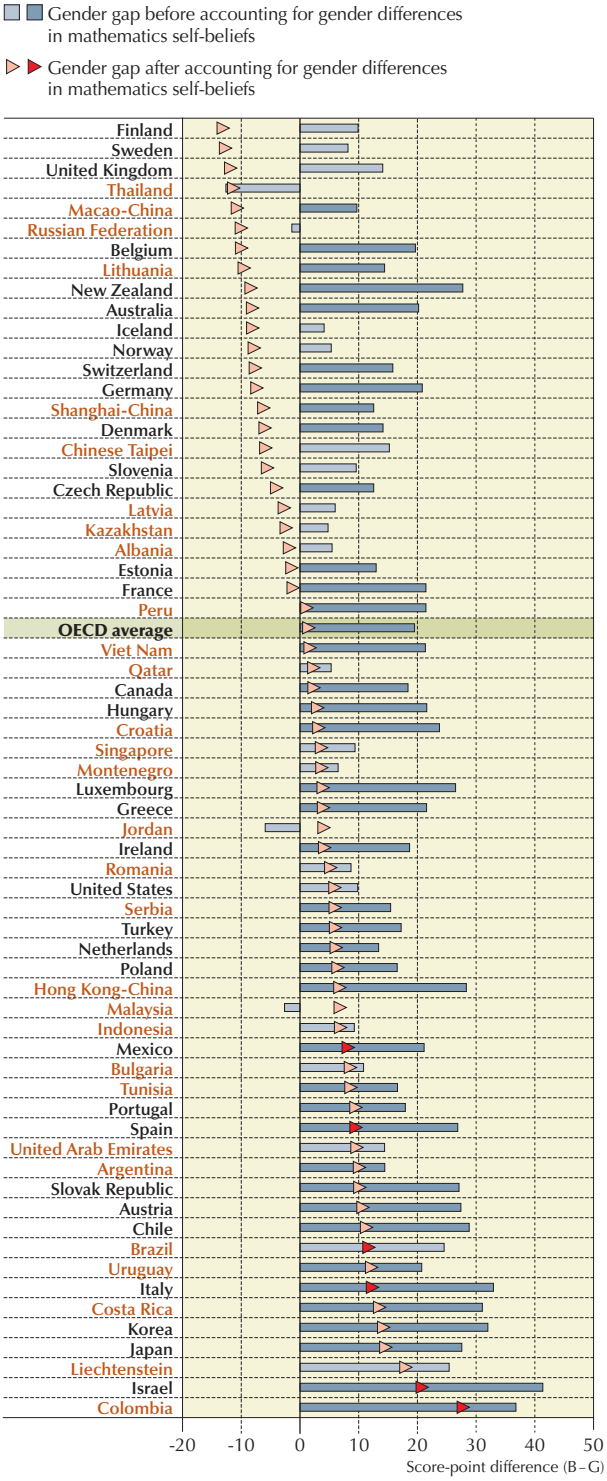
When boys and girls are equally confident in their abilities, the gender gap in mathematics performance narrows



Note: Score-point differences between boys and girls that are statistically significant are marked in a darker tone.
Countries and economies are ranked in ascending order of the score-point difference after accounting for gender differences in mathematics self-beliefs.
Source: OECD, PISA 2012 Database.

For example, girls tend to underachieve compared to boys when they are asked to formulate situations mathematically. On average across OECD countries, boys outperform girls in this skill by around 16 PISA score points – the equivalent of nearly five months of school. Boys also outperform girls – by 15 score points – in the ability to apply their knowledge of science to a given situation, to describe or interpret phenomena scientifically and predict changes. This gender difference in the ability to think like a scientist may be related to students' self-confidence. When students are more self-confident, they give themselves the freedom to fail, to engage in the trial-and-error processes that are fundamental to acquiring knowledge in mathematics and science.

What these results mean for students' futures

PISA has consistently found that, in general, girls have higher expectations for their careers than boys; but on average across OECD countries, less than 5% of girls contemplate pursuing a career in engineering and computing. In virtually all countries, the number of boys thinking of a career in computing or engineering exceeds the number of girls contemplating such a career.

By contrast, boys seem to be better prepared to enter the work force or to look for a job than girls. PISA finds that the share of 15-year-old girls who reported that they had not learned how to prepare for a job interview is more than 10 percentage points larger than the share of boys who so reported. And larger proportions of boys than girls reported that they had participated in such "hands-on" activities as internships and job shadowing.

As boys mature and become young men, they also acquire, at work and through life experience, some of the reading skills that they hadn't acquired at school.

Results from the 2012 Survey of Adult Skills, a product of the OECD Programme for the International Assessment of Adult Competencies, finds that there are no significant gender differences in literacy proficiency among 16-29 year-olds. Among workers in their 30s, 40s and particularly those in their 50s and 60s, men appear to be considerably more likely than women to read, write and use problem-solving skills at work.

How to narrow – or close – the gender gaps in education

Parents can give their sons and daughters equal support and encouragement for all of their school work and aspirations for their future. PISA results show that this doesn't always happen. In all countries and economies that surveyed the parents of students who sat the PISA test, parents were more likely to expect their sons, rather than their daughters, to work in a science, technology, engineering or mathematics field – even when their 15-year-old boys and girls perform at the same level in mathematics.

Teachers can help by becoming more aware of their own gender biases that may affect how they award marks to students. They could also receive additional training in how to provide extra support to socio-economically disadvantaged students, since PISA finds that boys are more likely to underachieve when they attend schools with a large proportion of disadvantaged students. In addition, teachers can use teaching strategies that demand more of their students, since students, and particularly girls, tend to perform better in mathematics when their teachers ask them to try to solve mathematics problems independently.

In some of the top-performing countries and economies in PISA, such as Hong Kong-China, Shanghai-China, Singapore and Chinese-Taipei, girls perform on a par with their male classmates in mathematics and attain higher scores than all boys in most other countries and economies around the world. Similarly, while in all countries and economies boys underperform in reading compared to girls, and by a wide margin, boys in the top-performing education systems score much higher in reading than girls elsewhere.

The bottom line: PISA shows that gender gaps in academic performance are not determined by innate differences in ability. A concerted effort by parents, teachers, policy makers and opinion leaders is needed if both boys and girls are to be able to realise their full potential and contribute to the economic growth and well-being of their societies.

For more information

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See *The ABC of Gender Equality in Education: Aptitude, Behaviour, Confidence*, PISA, OECD Publishing, Paris.

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