

## CO3.4: Literacy scores by gender at age 15

### *Definitions and methodology*

This indicator presents information on educational performance by gender at age 15. Data for the indicator come from the OECD's Programme for International Student Assessment (PISA), an international survey which provides cross-nationally comparable data on student performance in reading, mathematics and science. The survey started in 2000 and is conducted every three years, with one of the three education domains covered in depth in each round on a rotational basis. Reading was the primary assessment domain in 2000, as it also was in 2009. In 2003 and 2012 the focus was on mathematics, while in 2006 and 2015, the focus of study was on scientific literacy. The latest published results are those for 2015.

As a part of the survey process OECD PISA collects a range of contextual information that allow for student performance to be disaggregated by various demographic and socio-economic factors. These factors include family status, the educational level of parents, their labour market status and the presence or absence of household items important for material and educational well-being, such as books and other educational resources. In addition to cross-country mean average scores and gender differences in mean scores, this indicator discusses differences in mean PISA reading scores by family status (that is, between students that live with a single parent or with two parents), by the highest level of education of the student's parents (and specifically, differences between students with parents with a highest level of education at ISCED 1997 level 2 [lower secondary] and ISCED 1997 level 5a or 6 [theoretically oriented tertiary and post-graduate]), and by PISA's index of economic, social and cultural status (ESCS) (a PISA-specific composite index based on information about the students' home and background). Detailed definitions are provided below each relevant chart.

Importantly, as the OECD PISA surveys are based on probability samples, any differences in results between groups must be interpreted alongside measures of uncertainty in the difference. In OECD PISA, all estimates are accompanied by an associated standard error and all differences between groups by a test of statistical significance, that is, by a test of whether a given difference of a given size would be observed less than a certain number of times – here, less than 5% of the time – if there were no true difference between the groups in the overall population. When looking at differences in student performance between groups, the following highlights where differences in mean scores are statistically significant and where they are not. Any differences between groups that are not statistically significant should be interpreted with caution.

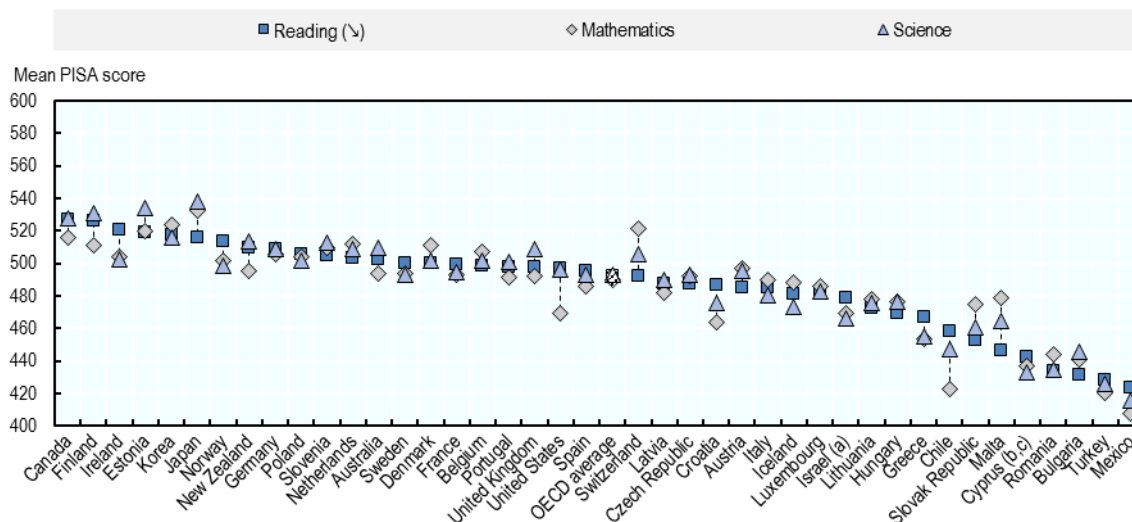
### *Key findings*

Literacy scores in all three domains vary widely across OECD countries in 2015 (Chart CO3.4.A). In reading, Canada and Finland have the highest mean scores at well above 520, while Turkey and Mexico have the lowest at less than 430. Mean scores in mathematics range from as high as just over 530 in Japan to as low as 408 in Mexico, while those in science vary from a mean of 538 in Japan to 416 in Mexico.

The ranking of countries is fairly similar across the three domains (Chart CO3.4.A). The two East Asian OECD countries perform well across all three, with Canada and Finland also consistently near the top of the rankings. At the lower end, Mexico and Turkey have the lowest score in the OECD in all three domains. On occasion a country performs exceptionally well in just one domain – Switzerland, for instance, had the third highest score in mathematics but the 22nd and 12th highest scores in reading and science, respectively. Generally though, countries with a high mean score in one domain also tend to have a high mean score in the other domains, and vice versa for those with low mean scores.

Other relevant indicators: CO3.1: Educational attainment by gender and average years spent in formal education; CO3.2: Gender differences in university graduates by field of study; CO3.3: Literacy scores by gender at age 10; CO3.5: Youths not in education or employment; and, PF1.2: Public spending on education.

**Chart CO3.4.A. Student performance in reading, mathematics and science, 2015**  
 Country mean average PISA scores



Note: Countries are ranked in descending order according to mean student performance in reading

a) The data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

b) Footnote by Turkey: The information in this document with reference to « Cyprus » relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognizes the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of United Nations, Turkey shall preserve its position concerning the "Cyprus issue";

c) Footnote by all the European Union Member States of the OECD and the European Commission: The Republic of Cyprus is recognized by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

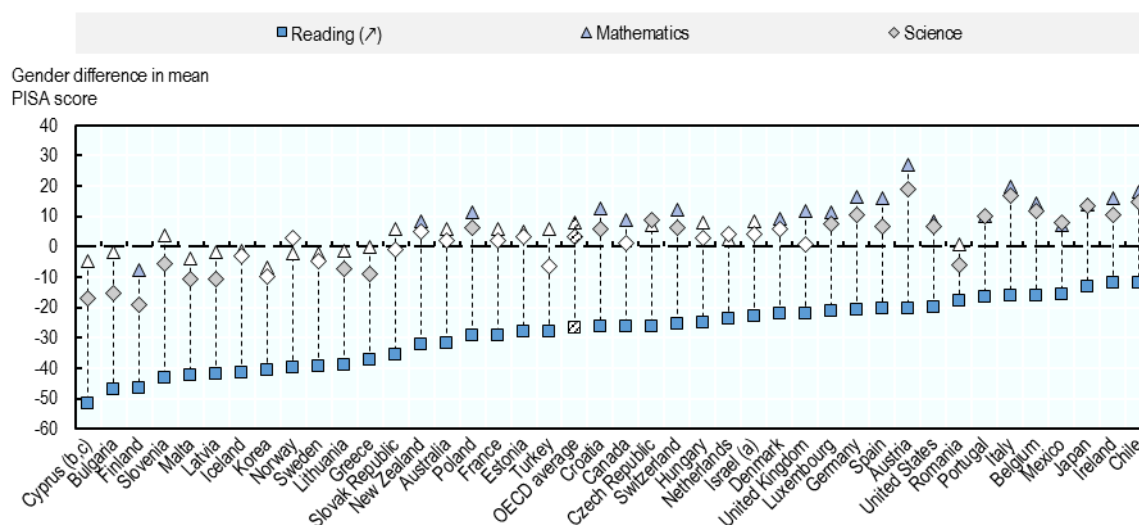
Source: [OECD Programme for International Student Assessment \(PISA\) 2015](http://www.oecd.org/pisa/data/pisa2015/)

Chart CO3.4.B shows how country mean PISA scores in reading, mathematics and science differ by gender across countries. Gender differences are calculated as the male score in the given domain less the female score, so that a positive score indicates a gender difference in favour of boys and a negative score a gender difference in favour of girls. Markers that are shaded represent statistically significant gender differences, while those that are white are not statistically significant differences.

Across all OECD countries, girls performed significantly better than boys in reading in 2015 (Chart CO3.4.B). The size of the gender difference varies between countries – in Finland, Slovenia, Latvia, Iceland, Korea, for example, the female mean score in reading was over 40 points higher than the male mean score, while in Japan, Ireland and Chile the difference was less than 15 points. But in most OECD countries the gender difference was at least 20 points, with the OECD average gender difference 27 points.

By contrast, in many OECD countries boys tend to perform significantly better than girls in mathematics (Chart CO3.4.B). Gender differences in mathematics are a little more inconsistent than those in reading – in sixteen OECD countries there was no statistically significant difference between male and female performance (Australia, Czech Republic, Estonia, France, Greece, Hungary, Iceland, Israel, Korea, Latvia, Netherlands, Norway, Slovak Republic, Slovenia, Sweden, Turkey), while in Finland there was a significant difference in favour of girls – and, where they were significant, the size of the difference in terms of PISA score points tended to be comparatively small. Nonetheless, many OECD countries showed a statistically significant difference in mathematics in favour of boys, with the gap in most somewhere between 10 and 20 points.

**Chart CO3.4.B. Gender differences in student performance in reading, mathematics and science, 2015**  
 Male-less-female country mean average PISA scores



Countries are ranked in ascending order according to gender differences in student performance in reading.

Note: shaded markers represent statistically significant gender differences and white markers non-statistically significant gender differences

a) See note a) to Chart CO3.4.A

b) See note b) to Chart CO3.4.A

c) See note c) to Chart CO3.4.A

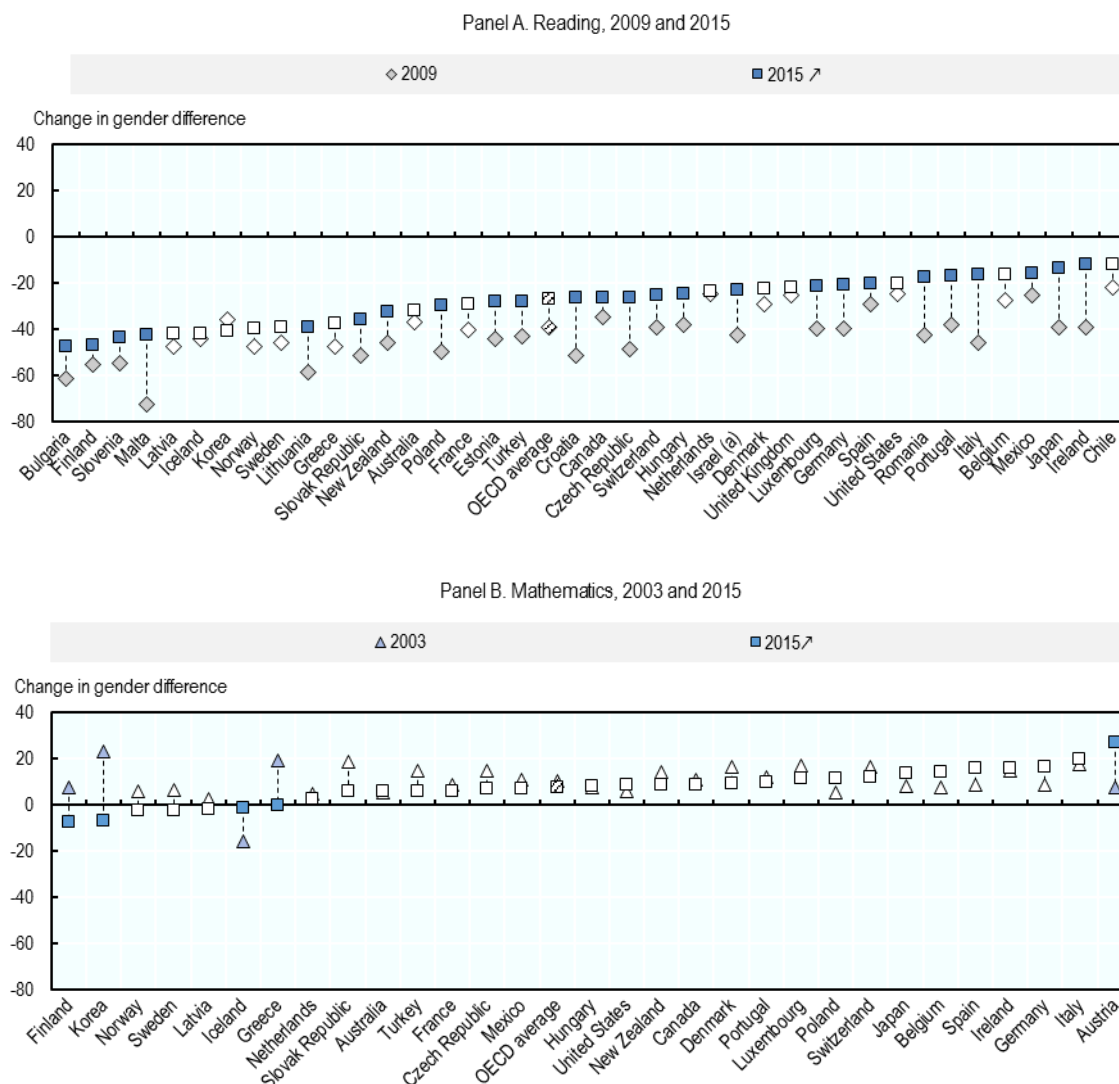
Source: [OECD Programme for International Student Assessment \(PISA\) 2015](http://www.oecd.org/pisa/data/pisa2015/)

Gender differences in science performance, meanwhile, are mixed (Chart CO3.4.B). In four OECD countries (Finland, Greece, Latvia and Slovenia) girls perform significantly better than boys, while in fifteen others (Austria, Belgium, Chile, Czech Republic, Germany, Ireland, Italy, Japan, Luxembourg, Mexico, Poland, Portugal, Spain, Switzerland, United States) boys perform significantly better than girls. In the remaining OECD countries any gender differences are not statistically significant. The countries with significant gender differences in science literacy scores in favour of girls also tend to be those with the largest gender differences in reading, while those with a significant difference in science scores in favour of boys tend to be those with the smallest significant differences in reading. In other words, girls perform better in science where they are also further ahead in reading, while boys perform better where the gap in reading is slimmest.

Gender differences in reading, mathematics and science are generally fairly stable over time, or at least fairly stable across the years since OECD PISA began. Chart CO3.4.C shows changes in gender difference in student performance for reading between the years 2009 and 2015 (panel A) and for mathematics 2003 and 2015 (panel B). Results for science are not shown but are available in the [associated .xls file](#). Again, any statistically significant changes in gender differences are shown by the shaded markers, with the white markers representing non-statistically significant changes.

Chart CO3.4C, Panel A shows there were statistically significant changes in the gender difference in reading literacy scores in twenty OECD countries (Canada, Czech Republic, Estonia, Finland, Germany, Hungary, Ireland, Israel, Italy, Japan, Luxembourg, Mexico, New Zealand, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Turkey) between 2009 and 2015. In all twenty cases the significant change was a decrease in the size of the gender difference – in other words, in these twenty countries the gender difference in PISA reading scores reduced significantly between 2009 and 2015. In the remaining OECD countries there was no significant change in the gender difference in PISA reading scores.

**Chart CO3.4.C. Changes in gender differences in student performance in reading and mathematics**  
 Change in male-less-female mean average PISA scores over time



Countries are ranked in ascending order according to gender differences in 2015.

Note: shaded markers represent statistically significant changes in gender differences and white markers non-statistically significant changes in gender differences

a) See note a) to Chart CO3.4.A

Source: [Programme for International Student Assessment \(PISA\) 2015](http://www.oecd.org/pisa/data/pisa2015/)

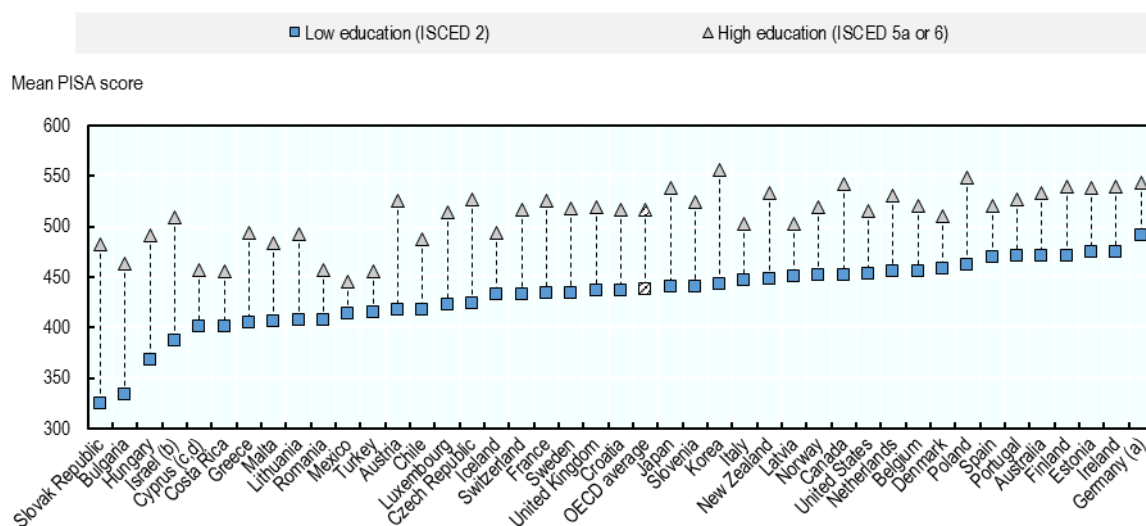
For gender differences in mathematics, Chart CO3.4C, Panel B shows statistically significant changes in six OECD countries (Austria, Finland, Greece, Iceland, Korea, Slovak Republic) between 2003 and 2015. The direction of the statistically significant changes was mixed – in Finland, and Korea the difference shifted in favour of girls, while in Austria, the gap increased in favour of boys. For most OECD countries though there was again no significant change in the gender difference in OECD PISA mathematics scores, with gender gaps generally remaining constant in favour of boys.

Across OECD countries, students perform significantly better in reading when at least one of their parents is highly educated (Chart CO3.4.D). On average across OECD countries, the mean average PISA reading score for students with at least one parent with a highest qualification equal to ISCED level 5a or 6 (theoretically oriented tertiary and post-graduate) is, at 517 points, about 78 points higher than mean average for students with parents educated at most to ISCED level 2 (lower secondary) (439 points). The

gap is significant in all OECD countries, and is largest Hungary and Israel (123 points and 122 points, respectively) and especially the Slovak Republic (158 points).

**Chart CO3.4.D. Differences in student reading performance by highest level of education of parents, 2015**

Mean average PISA scores for students with parents with a highest level of education at ISCED 1997 level 2 (lower secondary) and ISCED 1997 level 5a or 6 (theoretically oriented tertiary and post-graduate)



Countries are ranked in ascending order according to the mean average PISA reading score for students with parents with a highest level of education at ISCED 1997 level 2 (lower secondary)

Note: shaded markers represent statistically significant differences between groups at  $p < 0.005$ , and white markers non-statistically significant differences between groups at  $p < 0.005$ .

a) For Germany, for children with parents with a highest level of education at all levels, the item response rate is below 85 percent. Missing data have not been explicitly accounted for.

b) See note a) to Chart CO3.4.A

c) See note b) to Chart CO3.4.A

d) See note c) to Chart CO3.4.A

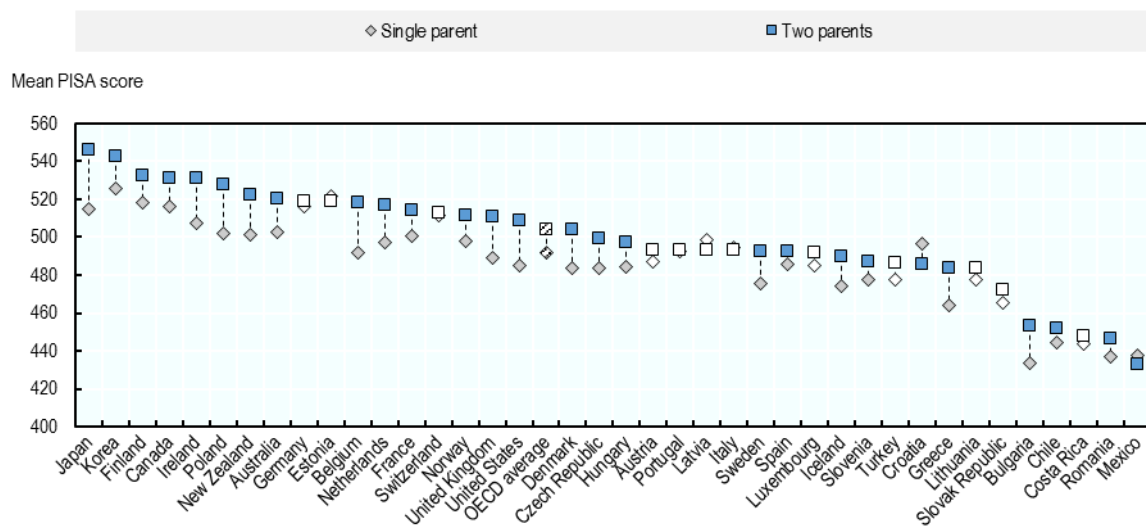
Source: [OECD Programme for International Student Assessment \(PISA\) 2015](http://www.oecd.org/pisa/data/pisa2015/)

In many OECD countries, students living with two parents also tend to perform better in reading than students living with a single parent, though in many cases the actual size of the difference is only comparatively small. Chart CO3.4.E shows mean PISA reading scores for students living with two parents and with a single parent in 2012 (data for 2015 are unfortunately not available). In all but ten OECD countries (Austria, Estonia, Germany, Italy, Latvia, Luxembourg, Portugal, Slovak Republic, Switzerland and Turkey) gaps in reading scores between students living with a single parent and with two parents are significant, and in all of these bar Mexico the gap is ‘in favour’ of those living with two parents – in other words, students living with two parents score significantly better. In most cases, however, the actual size of the gap is only fairly small. On average across OECD countries, the mean score for students living with two parents (504 points) is only 13 points higher than the mean for students living with a single parent (492 points), and the largest gap, in Japan, is only 32 points.

The PISA assessment provides a composite index of student’s economic, social and cultural status (ESCS) by combining information on (i) the ISCED level of parents, (ii) the occupational status of parents, (iii) household possessions. The index is designed in such a manner that students with highly educated parents, many household possessions and high-earning parents score high in the index, while students whose parents have limited educational attainment with few material possessions and low earnings score low in the index.



**Chart CO3.4.E. Differences in student reading performance by family status, 2012**  
 Mean average PISA reading scores for students living with two parents and with a single parent



Countries are ranked in descending order according to the mean average PISA reading score for students living with two parents

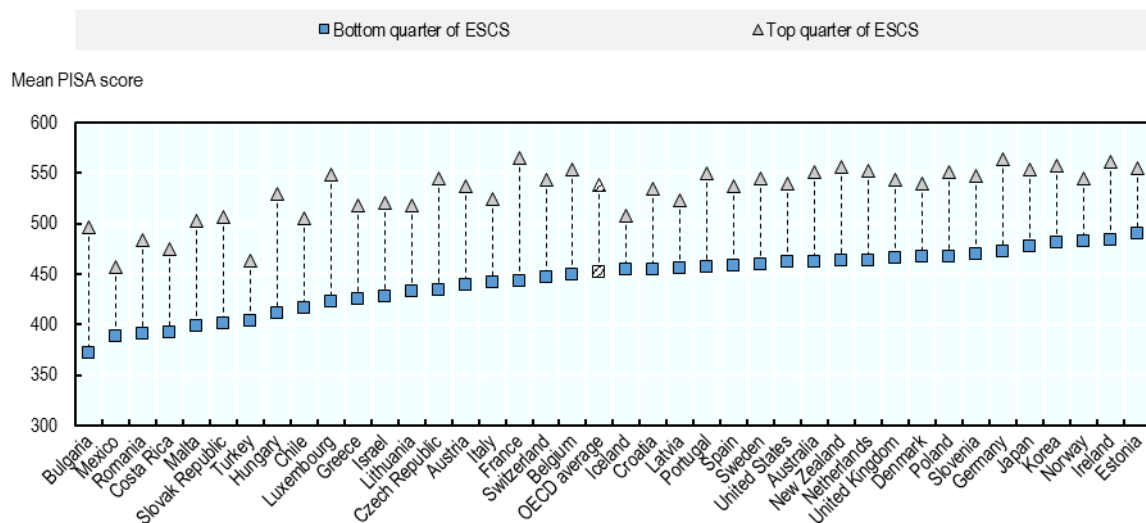
Note: shaded markers represent statistically significant differences between groups at  $p < 0.005$ , and white markers non-statistically significant differences between groups at  $p < 0.005$ . Students living with a "single parent" are those who are living with only one of the following: mother, father, male guardian, female guardian. Students living with "two parents" are those who are living with a father or step/foster father and a mother or step/foster mother. Data for students living with no parents not shown.

a) For Germany and Mexico, the item response rate is below 85 percent. Missing data have not been explicitly accounted for.

Source: [OECD Programme for International Student Assessment \(PISA\) 2015](http://www.oecd.org/pisa/data/pisa2015/)

**Chart CO3.4.F. Differences in student reading performance by socio-economic status, 2015**

Mean average PISA reading scores for students in the top and bottom quarters of the PISA index of economic, social and cultural status (ESCS).



Countries are ranked in ascending order according to the mean average PISA reading score for students in the bottom quarter of ESCS

Note: shaded markers represent statistically significant differences between groups at  $p < 0.005$ , and white markers non-statistically significant differences between groups at  $p < 0.005$ . The PISA index of economic, social and cultural status (ESCS) is a PISA-specific composite index based on information about the students' home and background. It is derived from several variables: parents' education, parents' occupations, a number of home possessions that can be taken as proxies for material wealth, and the number of books and other educational resources available in the home. For more information see OECD (2016) PISA 2015 Results (Volume I): Excellence and Equity in Education (<http://dx.doi.org/10.1787/9789264266490-en>).

Chart CO3.4.F shows mean PISA reading scores for students in the bottom and top quarters of the ESCS index. Across all OECD countries, students with high scores on the ESCS index perform significantly better than students with low scores, with the OECD average gap in PISA reading scores standing at 86 points. Differences are particularly big in France and Luxembourg, where the gap in mean reading scores between students in the top and bottom quarters of ESCS exceeds 120 points.

### *Comparability and data issues*

The OECD PISA assessment process devotes substantial efforts and resources to achieving cultural and linguistic balance in the assessment materials, to provide students with equal chances of successful performance. Stringent quality assurance mechanisms are applied in translation and data collection, and sample sizes are large – more than 540,000 students across 72 countries were assessed for the 2015 wave. If countries fail to meet sampling size requirements they are omitted from the published international comparisons (e.g., the Netherlands in 2000 and the United Kingdom in 2003).

Because the structure and stages of education differ across countries, OECD PISA targets students of a specific age – between 15 years and 3 months and 16 years and 2 months at the time of assessment – rather than students at a specific grade or point in the education system. This allows for a better comparison of student performance internationally and ensures that across countries students are at a relatively similar stage of cognitive development. Similarly, to ensure that cross-national differences in education systems do not influence results, OECD PISA samples students from all and any types of institution (including public or private schools and foreign schools) and students on various types of course (academic or vocational, full-time or part-time). For a more detailed discussion of the methodology used, see OECD (2014) and the [OECD PISA](#) website.

Sources and further reading: the PISA website [www.pisa.oecd.org](http://www.pisa.oecd.org) has all information relating to the programme including an interactive database, copies of the questionnaires and all associated publications and reports. For information on The International Standard Classification of Education (ISCED), see OECD Education at a Glance 2016 (<http://www.oecd.org/education/skills-beyond-school/education-at-a-glance-19991487.htm>); OECD (2016) PISA 2015 results: <http://www.oecd.org/pisa/pisa-2015-results-in-focus.pdf>; OECD (2015) *PISA 2015 Results: Volume I: Excellence and Equity in Education Volume II: Policies and Practices for Successful Schools*