

### 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 that provides cross-nationally comparable data on the performance of 15-year-old students 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 2018, focusing on reading literacy and global competence – their ability to understand and appreciate the perspectives and worldviews of others.

Data on student performance in the PISA tests are presented here through two main measures:

- *Country mean average PISA scores in reading, in mathematics, and in science*
- *Gender differences in country mean average PISA scores in reading, in mathematics, and in science, with the gender difference calculated as the male mean average score minus the female mean average score*

In addition to these main measures, two further measures capture differences in PISA reading scores across socio-economic groups:

- *Country mean average PISA reading scores by the highest level of education attained by the students' parents, or more specifically country mean average PISA reading 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)*
- *Country mean average PISA reading scores by students' scores on PISA's index of economic, social and cultural status (ESCS), or more specifically country mean average PISA reading scores for students who score in the top and bottom quarters of the ESCS. The ESCS is a PISA-specific composite index based on information about the students' home and background*

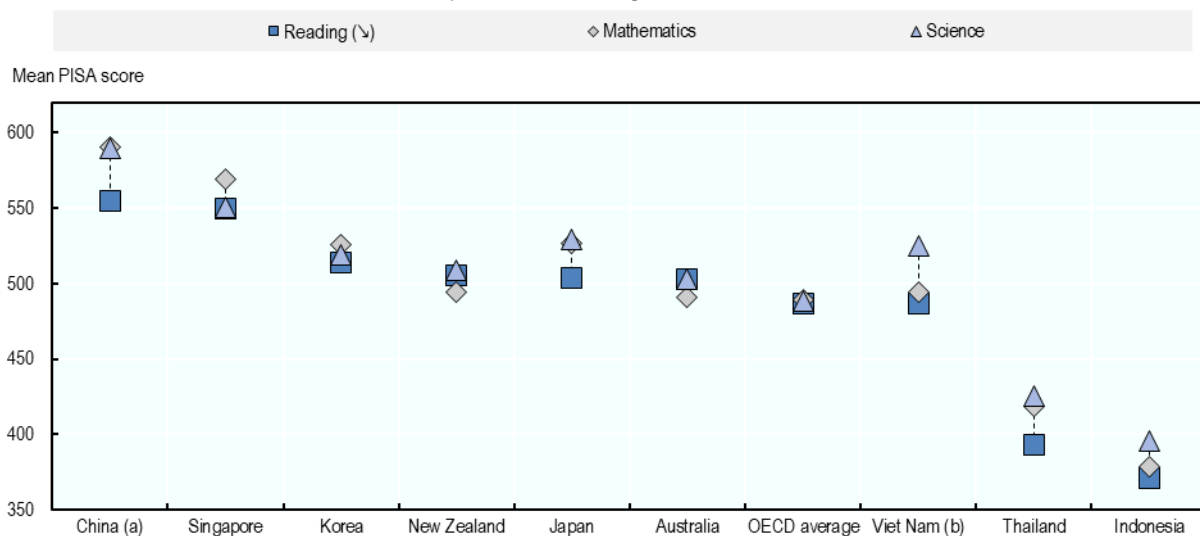
Importantly, as the OECD PISA surveys are based on probability samples, any differences in results between groups must be interpreted alongside measures of uncertainty in the difference. In OECD PISA, all estimates are accompanied by an associated standard error and all differences between groups by 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.

<i>Other relevant indicators:</i> CO3.1 Educational attainment by gender; CO3.3 Literacy scores by gender at age 10; CO3.6 Proportion of immigrant students and their educational outcomes
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### Key findings

In most of the covered Asia/Pacific countries, students tend to perform relatively well on the PISA reading, mathematics and science tests (Chart CO3.4.A). Except for average scores by students in Indonesia and Thailand, students in the Asian countries covered in the OECD PISA perform better across all three subjects than students in the OECD, on average. Student performance is highest in China, particularly in mathematics and science. It is lowest, by some margin, in Indonesia and Thailand.

Chart CO3.4.A. **Student performance in reading, mathematics and science, 2018**  
 Country mean average PISA scores



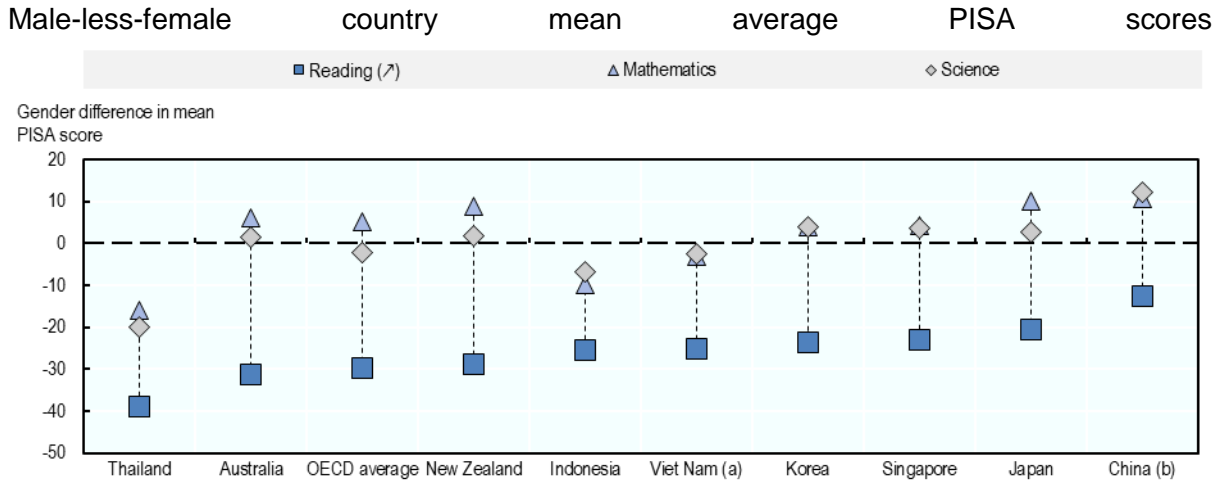
(a) Data for China refers to the four PISA-participating China provinces: Beijing, Shanghai, Jiangsu and Guangdong. (b) Data for Viet Nam refers to 2015 result.

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

In Asia/Pacific countries as also across OECD countries, girls tend to perform much better than boys in reading but sometimes slightly less well at mathematics and science (Chart CO3.4.B). In all selected countries girls perform significantly better than boys on the PISA reading tests, with the gender difference being largest in Thailand and smallest in China. Gender differences on the PISA science tests are mixed – in Australia, Japan, Korea, New Zealand, Singapore and Viet Nam, differences are non-significant, while in Indonesia and Thailand there is a gender gap in favour of girls, and in China, a gap in favour of boys. China, Japan and New Zealand also record boys performing significantly better than girls on the PISA mathematics tests, with all other gender differences in mathematics scores being non-significant.

Gender differences in PISA scores have not changed much in Asia/Pacific countries in recent years (Chart CO3.4.C). Chart CO3.4.C shows changes in gender differences in PISA reading scores (Panel A) and PISA mathematics scores (Panel B) since 2009 (changes in gender differences in PISA science scores are not shown but are available in the associated .xlsx file). For reading, five of the countries (Indonesia, Japan, Korea, Malaysia and Singapore) have seen the gender gap decline since 2009. For mathematics, only one country (Thailand) has seen a significant change in the gender gap during the period.

Chart CO3.4.B. **Gender differences in student performance in reading, mathematics and science, 2018**

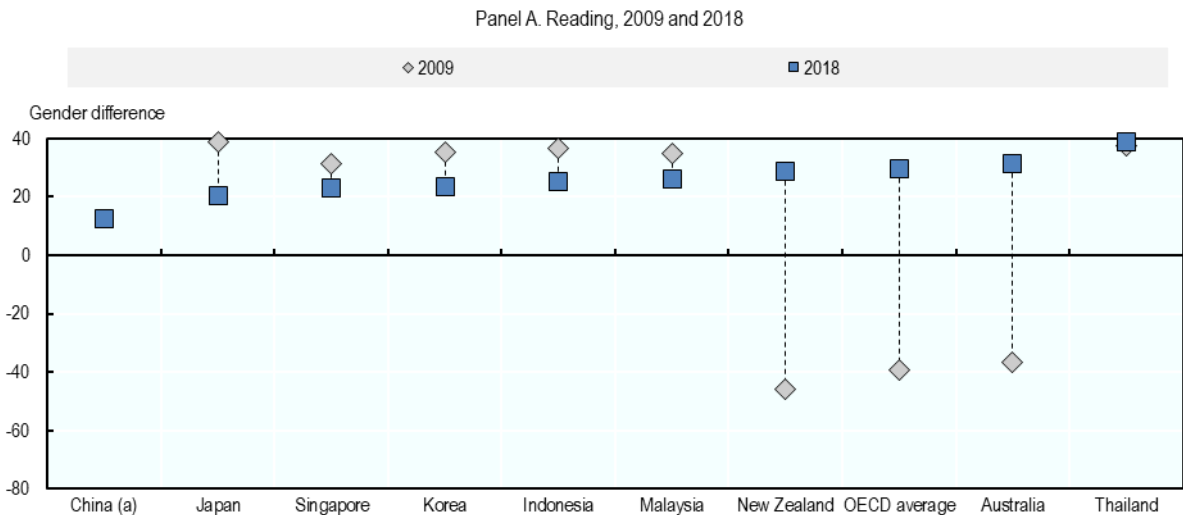


Note: Countries ranked in ascending order according to the gender difference in mean scores in reading. Shaded markers represent statistically significant gender differences and white markers non-statistically significant gender differences.

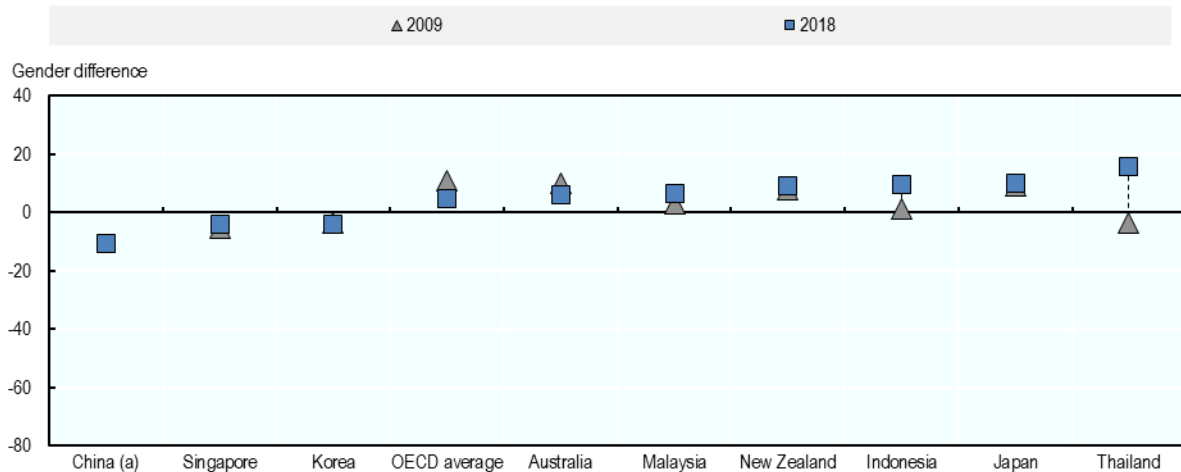
(a) Data for Viet Nam refers to 2015 result. (b) Data for China refers to the four PISA-participating China provinces: Beijing, Shanghai, Jiangsu and Guangdong.

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

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



Panel B. Mathematics, 2009 and 2018

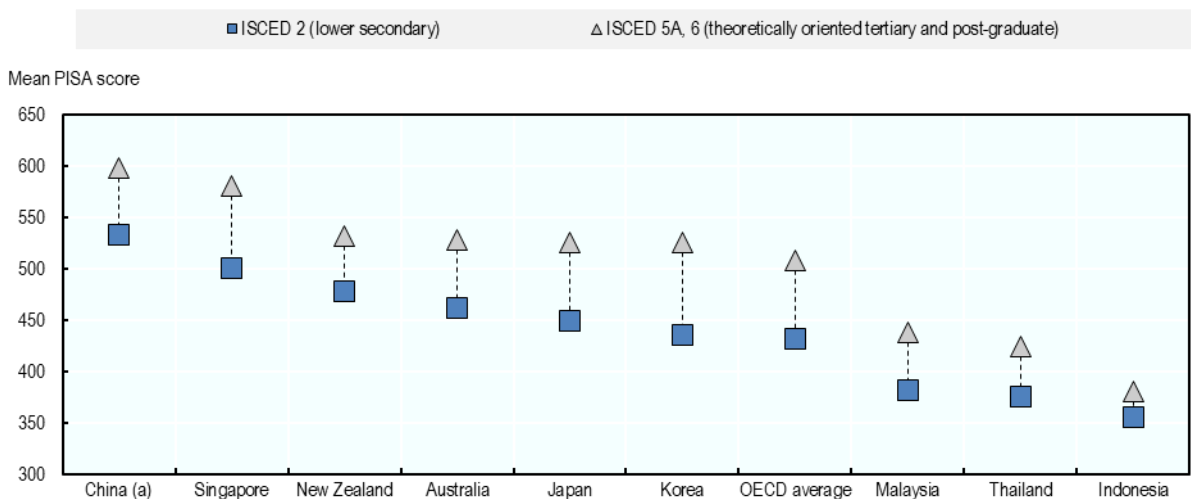


Note: Countries ranked in ascending order according to the gender difference in 2018.  
 (a) Data for China refers to the four PISA-participating China provinces: Beijing, Shanghai, Jiangsu and Guangdong.  
 Sources: [OECD Programme for International Student Assessment \(PISA\)](#)

Across Asia/Pacific countries, as in OECD countries, students perform significantly better in reading when at least one of their parents is highly educated (Chart CO3.4.D). In China, for example, 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 598 points, about 65 points higher than mean average for students with parents educated at most to ISCED level 2 (lower secondary) (533 points). In Korea, this gap is as big as 90 points.

**Chart CO3.4.D. Differences in student reading performance by highest level of education of parents, 2018**

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)

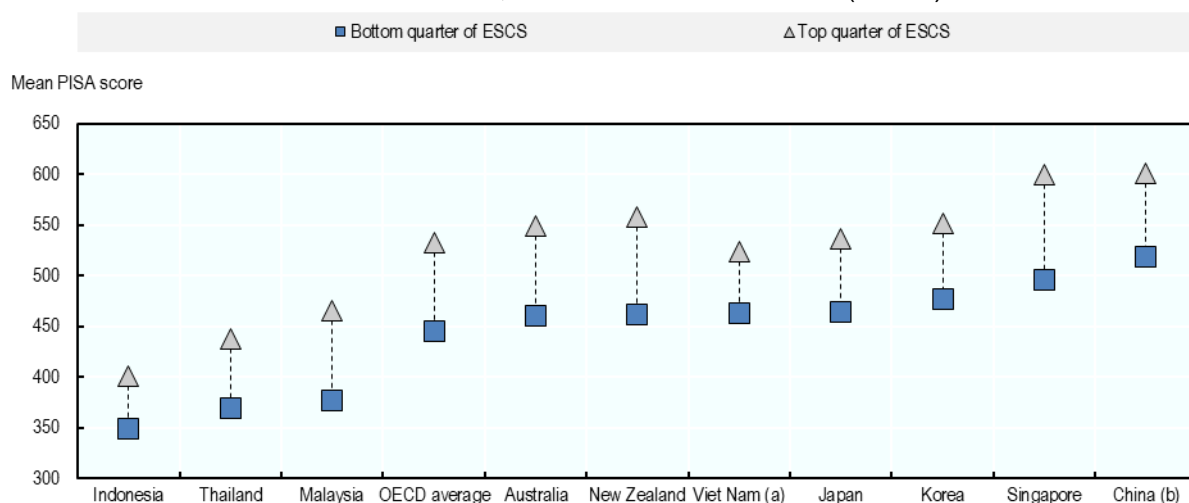


Countries are ranked in ascending order according to the mean average PISA 2018 reading score.  
 Note: shaded markers represent statistically significant differences between groups at  $p < 0.005$ , and white markers non-statistically significant differences between groups at  $p < 0.005$ .  
 a) Data for China refers to the four PISA-participating China provinces: Beijing, Shanghai, Jiangsu and Guangdong.  
 Sources: [OECD Programme for International Student Assessment \(PISA\)](#)

Students also tend to perform significantly better on the PISA reading tests when they score higher on the PISA index of economic, social and cultural status (ESCS) – a composite index that combines information on (i) the ISCED level of parents, (ii) the occupational status of parents, (iii) household possessions (Chart CO3.4.E). All countries see students in the top quarter of the ESCS score significantly better than students in the bottom quarter of the ESCS. The largest differences are recorded for New Zealand and especially in Singapore where, at 599 points, the mean PISA reading score for students in the top quarter of the ESCS is 104 points higher than the mean score for those in the bottom quarter (495).

**Chart CO3.4.E. Differences in student reading performance by socio-economic status, 2018**

Mean average PISA reading scores for students in the top and bottom quarters of the PISA index of economic, social and cultural status (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 (2019) PISA 2018 Results (Volume II): Where all students can succeed (<https://doi.org/10.1787/b5fd1b8f-en>).

(a) Data for Viet Nam refers to PISA 2015 result.

(b) Data for China refers to the four PISA-participating China provinces: Beijing, Shanghai, Jiangsu and Guangdong.

Sources: [OECD Programme for International Student Assessment \(PISA\)](#)

### Comparability and data issues

The OECD PISA assessment programme devotes substantial efforts and resources to achieving cultural and linguistic balance in the assessment materials, so as 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 600,000 students across 79 countries were assessed for the 2018 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 (2019) and the [OECD PISA](#) website.

Data collected by PISA for China refer to the four PISA-participating China provinces and municipalities (Beijing, Shanghai, Jiangsu and Guangdong) only, and not to the whole country. As a consequence, results for China (Beijing, Shanghai, Jiangsu and Guangdong) should be taken as representative for students in these four provinces and municipalities only, but not as representative for 15-year-old students across the country as a whole.

*Sources and further reading:* OECD (2019), *PISA 2018 Assessment and Analytical Framework*, OECD Publishing, Paris. DOI: <https://dx.doi.org/10.1787/b25efab8-en>; OECD (2019), *PISA 2018 Results (Volume II): Where all students can succeed*, OECD Publishing, Paris. DOI: <https://doi.org/10.1787/b5fd1b8f-en>