



PROGRAMME FOR INTERNATIONAL STUDENT ASSESSMENT (PISA) RESULTS FROM PISA 2018

The Programme for International Student Assessment (PISA) is a triennial survey of 15-year-old students around the world that assesses the extent to which they have acquired the key knowledge and skills essential for full participation in society. The assessment focuses on reading, mathematics and science. Students' proficiency in an innovative domain is also assessed; in 2018, this domain was global competence.

Germany

Key findings

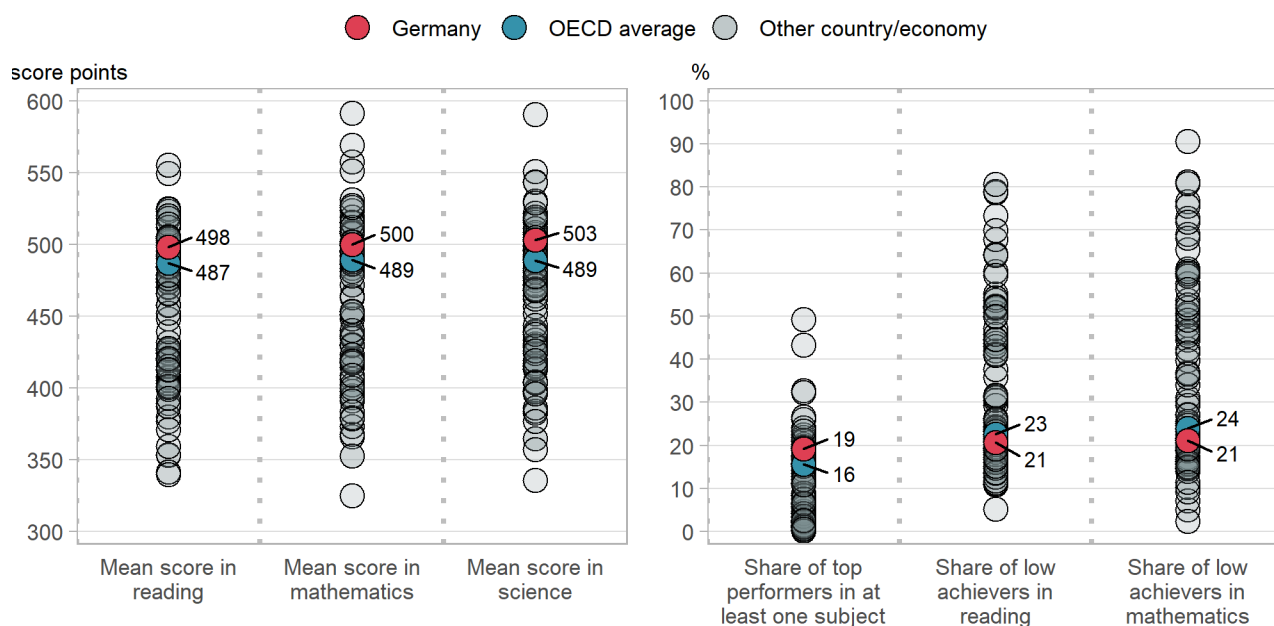
- Students in Germany scored above the OECD average in reading (498 score points), mathematics (500) and science (503). Germany's average performance in at least two of the three subjects was not statistically significantly different from that of Australia, Belgium, the Czech Republic, France, Ireland, New Zealand, Norway, Slovenia, Sweden, the United Kingdom and the United States. Germany's performance was lower in all three subjects in comparison with Beijing, Shanghai, Jiangsu and Zhejiang (China) (combined), Canada, Estonia, Finland, Hong Kong (China), Ireland, Korea, Macao (China), New Zealand, Poland and Singapore. Average reading performance in 2018 returned close to levels that were last observed in 2009, reversing most of the gains observed over the early period (up to 2012). In science, mean performance was below 2006 levels; while in mathematics PISA 2018 results lay significantly below those of PISA 2012.
- The gap in reading performance between advantaged and disadvantaged students in Germany is large and increased by nine score points since 2009. The 25% most socio-economically advantaged students outperformed the 25% most disadvantaged students by 113 score points – a difference 24 points larger than the OECD average of 89 score points. However, some 10% of disadvantaged students in Germany were able to score in the top quarter of reading performance, similar to the OECD average of 11%.
- The proportion of immigrant students in Germany grew by four percentage points between 2009 and 2018, from 18% to 22%. One in two immigrant students was socio-economically disadvantaged. The gap in reading performance between immigrant and non-immigrant students stood at 63 score points and remained relatively large (17 points) after accounting for students' and schools' socio-economic profiles. However, in spite of their relative socio-economic disadvantage, 16% of immigrant students scored in the top quarter of reading performance. In PISA, immigrant students are defined as students whose both parents were born outside the test country. Germany is considered a long-standing destination country with many settled, low-educated immigrants.
- Girls in Germany significantly outperformed boys in reading by 26 score points (compared with the OECD average gender gap of 30 score points). The gap was narrower than that observed in 2009 (40

score points). In Germany, girls scored 7 points lower than boys in mathematics, which is wider than the average gender gap in mathematics across OECD countries (5 score points). Girls and boys performed similarly in science.

- In Germany, as on average across OECD countries, 67% of students reported that they are satisfied with their lives. Some 92% of students in Germany reported sometimes or always feeling happy and about 4% of students reported always feeling sad. By contrast, 23% of German students reported that they are exposed to bullying at least a few times a month (OECD average: 23%).

What 15-year-old students in Germany know and can do

Figure 1. Snapshot of performance in reading, mathematics and science



Note: Only countries and economies with available data are shown.

Source: OECD, PISA 2018 Database, Tables I.1 and I.10.1.

- Students in Germany scored higher than the OECD average in reading, mathematics and science.
- Compared to the OECD average, a larger proportion of students in Germany performed at the highest levels of proficiency (Level 5 or 6) in at least one subject; while a similar proportion of students achieved a minimum level of proficiency (Level 2 or higher) in all three subjects.

What students know and can do in reading

- In Germany, 79% of students attained at least Level 2 proficiency in reading. The OECD average stood at 77%. These students can identify the main idea in a text of moderate length, find information based on explicit, though sometimes complex criteria, and can reflect on the purpose and form of texts when explicitly directed to do so.
- Some 11% of students in Germany were top performers in reading, meaning that they attained Level 5 or 6 in the PISA reading test (OECD average: 9%). At these levels, students can comprehend lengthy texts, deal with concepts that are abstract or counterintuitive, and establish distinctions between fact and opinion, based on implicit cues pertaining to the content or source of the information. In 20 education systems, including those of 15 OECD countries, more than 10% of 15-year-old students were top performers.

What students know and can do in mathematics

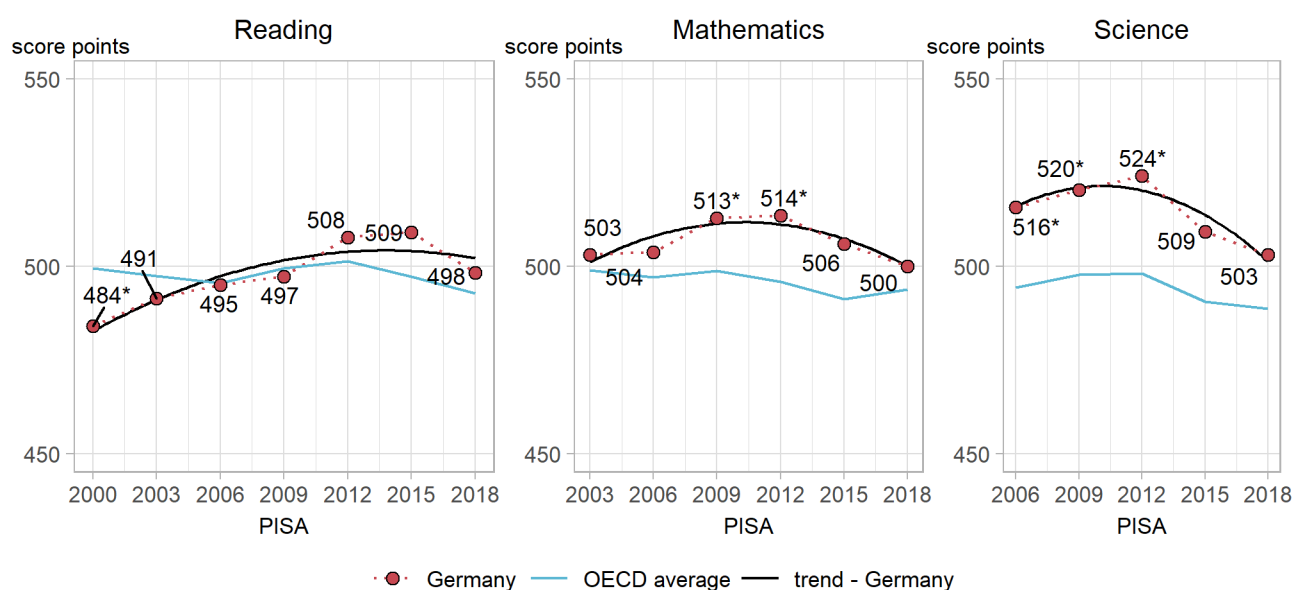
- Some 79% of students in Germany attained Level 2 or higher in mathematics (OECD average: 76%). These students can interpret and recognise, without direct instructions, how a (simple) situation can be represented mathematically (e.g. comparing the total distance across two alternative routes, or converting prices into a different currency). The share of 15-year-old students who attained minimum levels of proficiency in mathematics (Level 2 or higher) varied widely – from 98% in Beijing, Shanghai, Jiangsu and Zhejiang (China) to just 2% in Zambia, which participated in the PISA for Development assessment in 2017. On average across OECD countries, 76% of students attained at least Level 2 proficiency in mathematics.
- Some 13% of students in Germany scored at Level 5 or higher in mathematics. Six Asian countries and economies had shares ranging between just over 44% in Beijing, Shanghai, Jiangsu and Zhejiang (China) and 21% in Korea. On average across OECD countries, 11% of students scored at this level, with largest proportions observed in the Netherlands (18%), Switzerland (17%) and Poland (16%). These students can model complex situations mathematically, and can select, compare and evaluate appropriate problem-solving strategies for dealing with them.

What students know and can do in science

- Some 80% of students in Germany attained Level 2 or higher in science, compared with 78% on average across OECD countries. These students can recognise the correct explanation for familiar scientific phenomena and can use such knowledge to identify, in simple cases, whether a conclusion is valid based on the data provided.
- Some 10% of students in Germany (7% on average across OECD countries) were top performers in science, meaning that they were proficient at Level 5 or 6. These students can creatively and autonomously apply their knowledge of and about science to a wide variety of situations, including unfamiliar ones.

Performance trends

Figure 2. Trends in performance in reading, mathematics and science



Note: *indicates statistically mean-performance estimates that are significantly above or below PISA 2018 estimates.

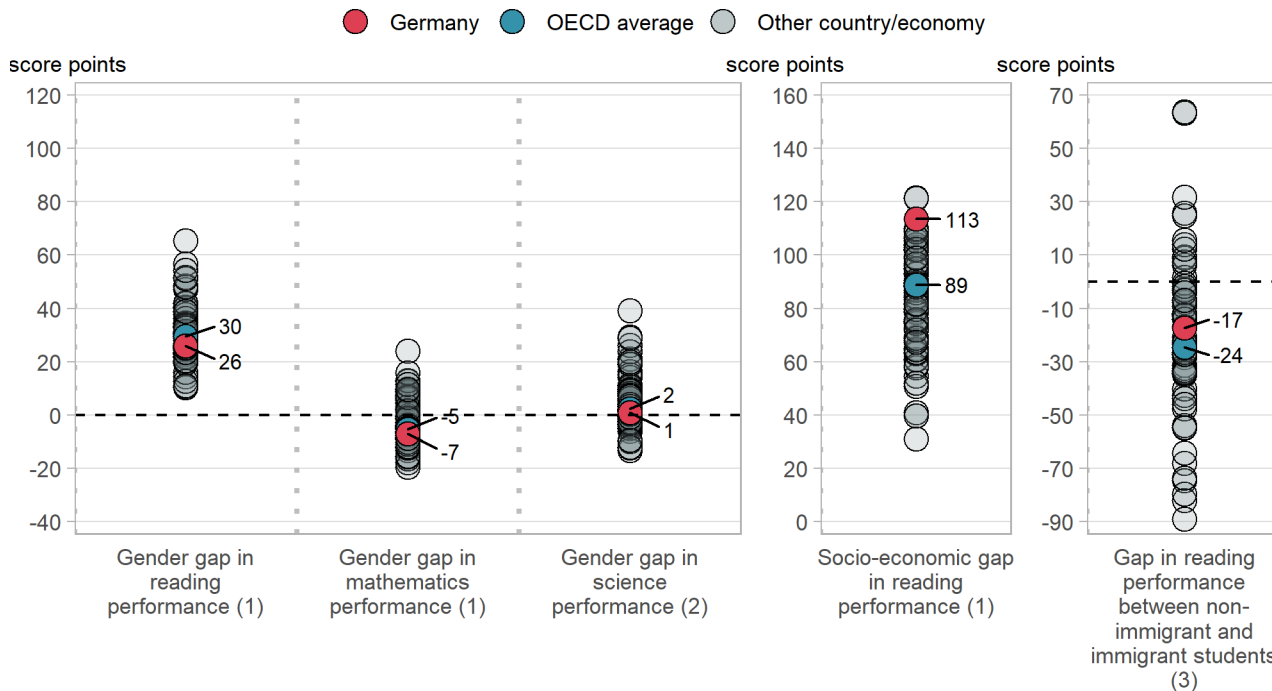
The blue line indicates the average mean performance across OECD countries with valid data in all PISA assessments. The red dotted line indicates mean performance in Germany. The black line represents a trend line for Germany (line of best fit).

Source: OECD, PISA 2018 Database, Tables I. B1.10, I. B1.11 and I. B1.12.

- In Germany, mean reading performance in 2018 returned close to levels that were last observed in 2009, reversing most of the gains observed over the early period (up to 2012). In science, mean performance was below 2006 levels; while in mathematics PISA 2018 results lay significantly below those of PISA 2012.
- The recent trajectory of mean reading performance could be partly related to the changing composition of the student population in terms of their demographic characteristics (gender, immigrant status, quarter-year of birth). The change in student demographic profile between 2015 and 2018 accounted for a difference of five score points in reading proficiency between 2018 and 2015. However, demographic changes accounted only for a small part of the larger negative trends observed in mathematics and science since 2012.
- Over the most recent period, performance trends in Germany differed by gender. Between 2015 and 2018, girls' performance in mathematics and science remained stable, while mean scores amongst boys declined by 11 points in mathematics and by 12 points in science. In mathematics, while there was no overall trend in mean performance over the full 2003-18 period, the trend was negative amongst the highest-achieving students (those at the 90th percentile).

Where All Students Can Succeed

Figure 3. Differences in performance and expectations related to personal characteristics



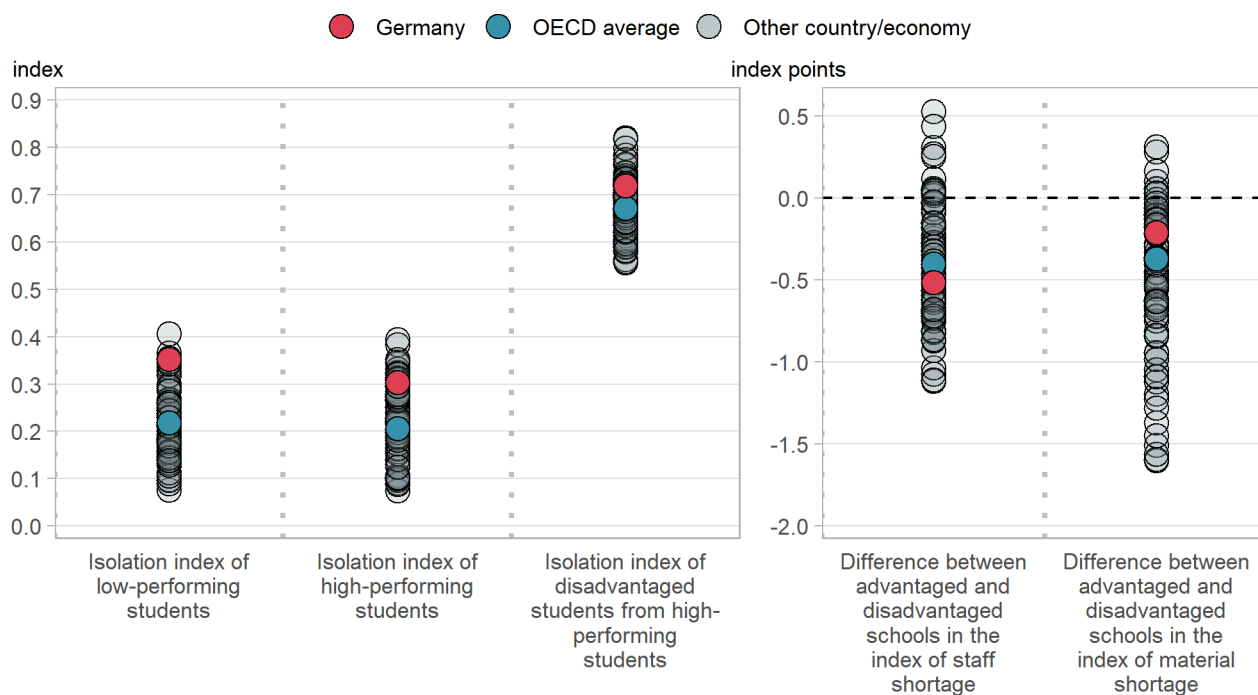
Note: Only countries and economies with available data are shown. (1) Girls' minus boys' performance; (2) Advantaged minus disadvantaged students' performance; (3) Immigrants' minus non-immigrants' performance in reading; after accounting for students' and schools' socio-economic profile.

Source: OECD, PISA 2018 Database, Tables II.B1.2.3, II.B1.7.1, II.B1.7.3, II.B1.7.5 and II.B1.9.3.

Equity related to socio-economic status

- In Germany, advantaged students outperformed disadvantaged students in reading by 113 score points in PISA 2018. This is larger than the average difference between the two groups (89 score points) across OECD countries. In PISA 2009, the performance gap related to socio-economic status was 104 score points in Germany (and 87 score points on average across OECD countries).
- Some 28% of advantaged students in Germany, but only 3% of disadvantaged students, were top performers in reading in PISA 2018. On average across OECD countries, 17% of advantaged students and 3% of disadvantaged students were top performers in reading.
- Socio-economic status was a strong predictor of performance in mathematics and science in all PISA-participating countries. It explained 18% of the variation in mathematics performance in PISA 2018 in Germany (compared to 14% on average across OECD countries), and 19% of the variation in science performance (compared to the OECD average of 13% of the variation).
- Some 10% of disadvantaged students in Germany were able to score in the top quarter of reading performance, indicating that disadvantage is not destiny. On average across OECD countries, 11% of disadvantaged students scored amongst the highest performers in reading in their countries.
- In Germany, low- and high-performing students are clustered in certain schools more often than the OECD average. This is due to early selection and tracking into various school forms.
- School principals in Germany reported more staff shortage and greater material shortage than the OECD average; and school principals of disadvantaged schools more often reported staff shortage than principals of advantaged schools. In Germany, 70% of students enrolled in a disadvantaged school and 34% of students enrolled in an advantaged school attend a school whose principal reported that the capacity of the school to provide instruction is hindered at least to some extent by a lack of teaching staff. On average across OECD countries, 34% of students in disadvantaged schools and 18% of students in advantaged schools attend such a school.
- According to school principals in Germany, 85% of teachers in advantaged schools and 94% of teachers in disadvantaged schools are “fully certified”. The proportion of teachers with at least a master’s degree is similar in advantaged and disadvantaged schools. In Germany, 21% of teachers in disadvantaged schools and the same proportion of teachers in advantaged schools have less than five years of professional experience.
- Many students, especially disadvantaged students, hold lower ambitions than would be expected given their academic achievement. In Germany, two in three high-achieving disadvantaged students – but about one in four high-achieving advantaged students – do not expect to complete tertiary education. However, in Germany, certain professions that would require a tertiary education degree in other countries can be accessed through the vocational track. Thus, students who do not hold an ambition to complete higher education might still have ambitious professional plans.

Figure 4. School segregation, and gap in material and staff shortage between advantaged and disadvantaged schools



Note: Only countries and economies with available data are shown.

Source: OECD, PISA 2018 Database, Tables II.B1.4.1, II.B1.4.8, II.B1.5.13 and II.B1.5.14.

Equity related to gender

- In all countries and economies that participated in PISA 2018, girls significantly outperformed boys in reading – by 30 score points on average across OECD countries. In Germany, the gender gap in reading (26 score points) was smaller than the average gap (30 score points). The gap was narrower than that observed in 2009 (40 score points), although boys' performance remained stable over the period.
- In Germany, boys outperformed girls in mathematics by 7 score points, which is wider than the average gender gap in mathematics across OECD countries (5 score points). Girls and boys performed similarly in science due to a decline in boys' performance.
- Amongst high-performing students in mathematics or science, about one in four boys in Germany expects to work as an engineer or science professional at the age of 30, while only one in eight girls expects to do so. About one in four high-performing girls expects to work in health-related professions, while fewer than one in ten high-performing boys expects so. Only 7% of boys and 1% of girls in Germany expect to work in ICT-related professions.

Equity related to immigrant background

- In 2018, 22% of students in Germany had an immigrant background, up from 18% in 2009. Amongst these immigrant students, fewer than one in two were socio-economically disadvantaged. Germany is considered a long-standing destination country with many settled, low-educated immigrants.
- The difference in reading performance between immigrant (both first- and second-generation) and non-immigrant students in Germany was 63 score points in favour of non-immigrant students. The difference shrank to 17 score points after accounting for students' and schools' socio-economic profile. The difference between first- and second-generation immigrants is 21 score points in favour of the latter.

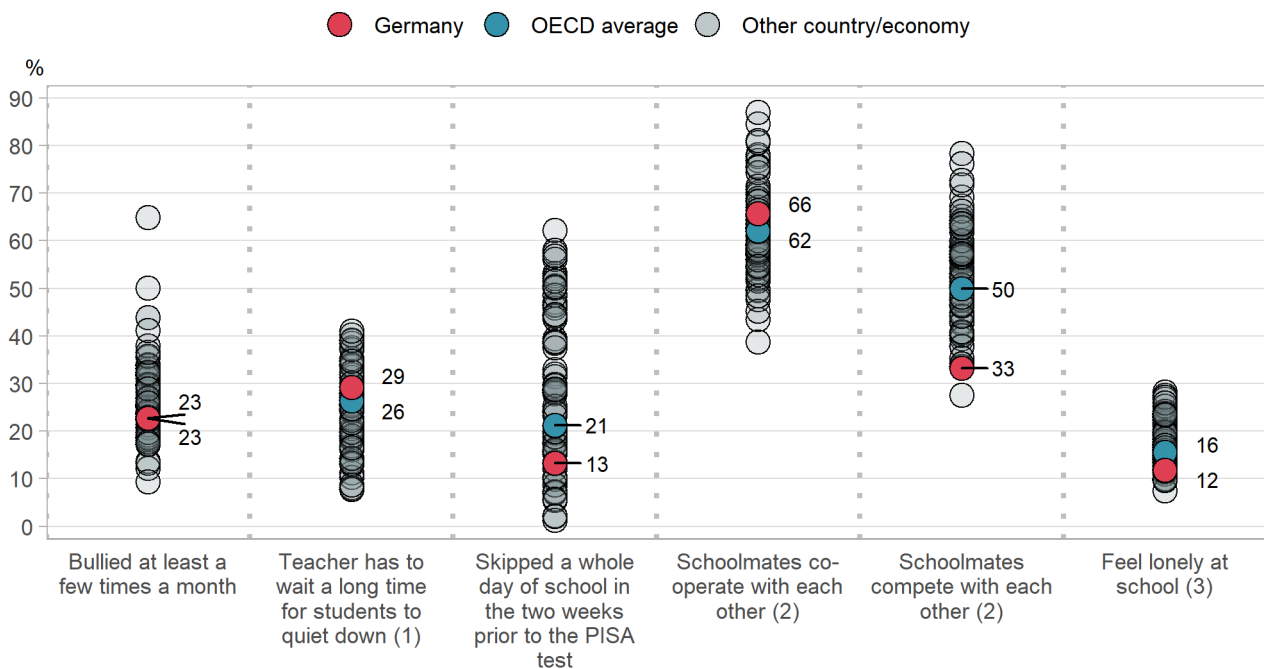
- Even though immigrant students tend to be disadvantaged, some are able to attain academic excellence. Some 16% of immigrant students scored in the top quarter of reading performance in Germany. Across OECD countries, 17% of immigrant students performed at that level.

What School Life Means for Students' Lives

How is the school climate in Germany?

- In Germany, 23% of students reported being bullied at least a few times a month, compared to 23% on average across OECD countries. Yet, 86% of students in Germany (and 88% of students on average across OECD countries) agreed or strongly agreed that it is a good thing to help students who cannot defend themselves.
- Some 29% of students in Germany (OECD average: 26%) reported that, in every or most language-of-instruction lessons, their teacher has to wait a long time for students to quiet down. In Germany, students who reported that, in every or most lessons, the teacher has to wait a long time for students to quiet down scored 19 score points lower in reading than students who reported that this never happens or happens only in some lessons, after accounting for socio-economic status.
- On average across OECD countries, 21% of students had skipped a day of school and 48% of students had arrived late for school in the two weeks prior to the PISA test. In Germany, 13% of students had skipped a day of school and 46% of students had arrived late for school during that period. In most countries and economies, frequently bullied students were more likely to have skipped school, whereas students who value school, enjoyed a better disciplinary climate, scored higher in the reading assessment and received greater emotional support from parents were less likely to have skipped school.
- Some 72% of students in Germany (OECD average: 74%) agreed or strongly agreed that their teacher shows enjoyment in teaching. In most countries and economies, including in Germany, students scored higher in reading when they perceived their teacher as more enthusiastic, especially when students said their teachers are interested in the subject.
- In Germany, 66% of students reported that their schoolmates co-operate with each other (OECD average: 62%) and 33% reported that they compete with each other (OECD average: 50%).
- Some 12% of students in Germany (OECD average: 16%) agreed or strongly agreed that they feel lonely at school.

Figure 5. School climate



Note: Only countries and economies with available data are shown. (1) In every or most language-of-instruction lessons; (2) Very or extremely true; (3) Agreed or strongly agreed.

Source: OECD, PISA 2018 Database, Tables III.B1.2.1, III.B1.3.1, III.B1.4.1, III.B1.8.1, III.B1.8.2 and III.B1.9.1

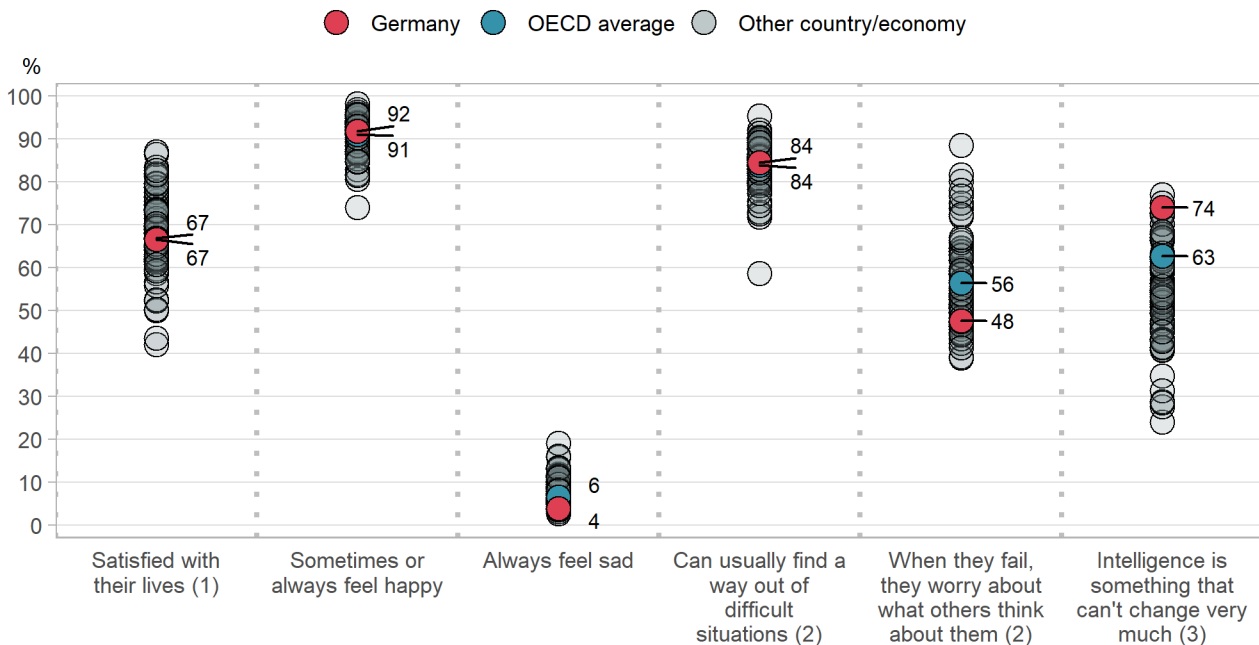
How do students in Germany feel about their lives?

- In Germany, 67% of students (OECD average: 67%) reported that they are satisfied with their lives (students who reported between 7 and 10 on the 10-point life-satisfaction scale).
- Some 92% of students in Germany reported sometimes or always feeling happy and about 4% of students reported always feeling sad. In most countries and economies, including Germany, students were more likely to report positive feelings when they reported a stronger sense of belonging at school and greater student co-operation. Students were more likely to express sadness when they were bullied more frequently.
- In Germany, 84% of students agreed or strongly agreed that they can usually find a way out of difficult situations (OECD average: 84%), and 48% agreed or strongly agreed that, when they fail, they worry about what others think of them (OECD average: 56% of students). In almost every education system, including in Germany, girls expressed greater fear of failure than boys, and this gender gap was considerably wider amongst top-performing students.

Do students in Germany hold a growth mindset?

- A majority of students across OECD countries holds a growth mindset (they disagreed or strongly disagreed with the statement "Your intelligence is something about you that you can't change very much"). In Germany, 74% of students hold a growth mindset.

Figure 6. Student well-being and growth mindset



Note: Only countries and economies with available data are shown. (1) Between 7 and 10 on the life-satisfaction scale; (2) Agreed or strongly agreed; (3) Disagreed or strongly disagreed.

Source: OECD, PISA 2018 Database, Tables III.B1.11.1, III.B1.12.1, III.B1.12.2, III.B1.13.1, III.B1.13.2 and III.B1.14.1

Key features of PISA 2018

The content

- The PISA 2018 survey focused on reading, with mathematics, science and global competence as minor areas of assessment. PISA 2018 also included an assessment of young people's financial literacy, which was optional for countries and economies. Germany did not participate in the assessments of global competence and financial literacy.

The students

- Some 600 000 students completed the assessment in 2018, representing about 32 million 15-year-olds in the schools of the 79 participating countries and economies. In Germany, 5 451 students, in 226 schools, completed the assessment, representing 734 915 of the 15-year-old students (99% of the total population of 15-year-olds).

The assessment

- Computer-based tests were used in most countries, with assessments lasting a total of two hours. In reading, a multi-stage adaptive approach was applied in computer-based tests whereby students were assigned a block of test items based on their performance in preceding blocks.
- Test items were a mixture of multiple-choice questions and questions requiring students to construct their own responses. The items were organised into groups based on a passage of text describing a real-life situation. More than 15 hours of test items for reading, mathematics, science and global competence were covered, with different students taking different combinations of test items.
- Students also answered a background questionnaire, which took about 35 minutes to complete. The questionnaire sought information about the students themselves, their attitudes, dispositions and beliefs, their homes, and their school and learning experiences. School principals completed a questionnaire that covered school management and organisation, and the learning environment.
- Some countries/economies also distributed additional questionnaires to elicit more information. These included: in 19 countries/economies, a questionnaire for teachers asking about themselves and their teaching practices; and in 17 countries/economies, a questionnaire for parents asking them to provide information about their perceptions of and involvement in their child's school and learning.
- Countries/economies could also chose to distribute three other optional questionnaires for students: 52 countries/economies distributed a questionnaire about students' familiarity with computers; 32 countries/economies distributed a questionnaire about students' expectations for further education; and 9 countries/economies distributed a questionnaire, developed for PISA 2018, about students' well-being.

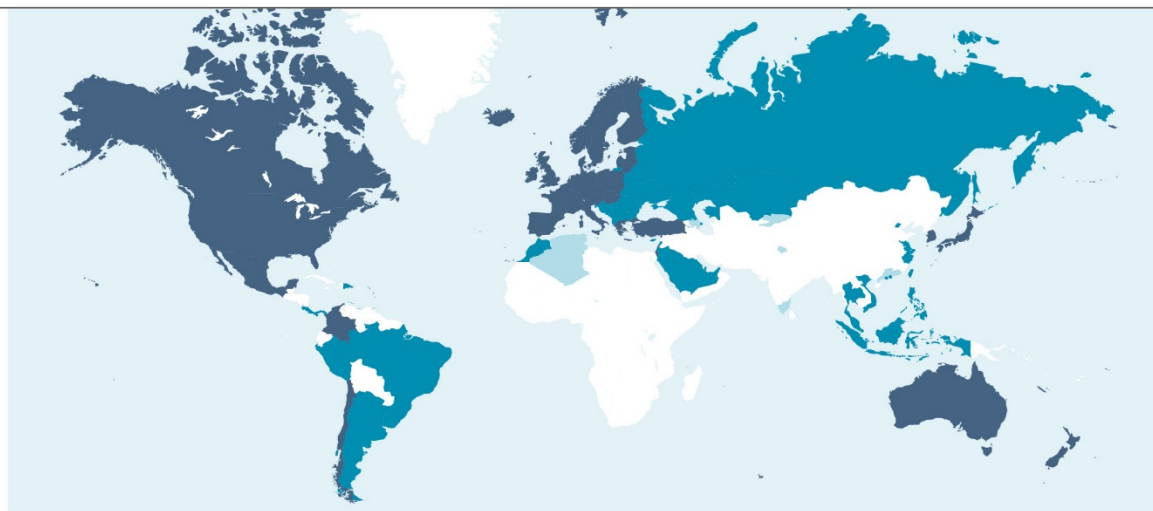
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Map of PISA countries and economies


OECD member countries

Australia
Austria
Belgium
Canada
Chile
Colombia
Czech Republic
Denmark
Estonia
Finland
France
Germany
Greece
Hungary
Iceland
Ireland
Israel
Italy
Japan
Korea
Latvia

Lithuania
Luxembourg
Mexico
Netherlands
New Zealand
Norway
Poland
Portugal
Slovak Republic
Slovenia
Spain
Sweden
Switzerland
Turkey
United Kingdom
United States*

Partner countries and economies in PISA 2018

Albania
Argentina
Baku (Azerbaijan)
Belarus
Bosnia and Herzegovina
Brazil
Brunei Darussalam
B-S-J-Z (China)**
Bulgaria
Costa Rica
Croatia
Cyprus¹
Dominican Republic
Georgia
Hong Kong (China)
Indonesia
Jordan
Kazakhstan
Kosovo
Lebanon
Macao (China)

Malaysia
Malta
Republic of Moldova
Montenegro
Morocco
Republic of North Macedonia
Panama
Peru
Philippines
Qatar
Romania
Russian Federation
Saudi Arabia
Serbia
Singapore
Chinese Taipei
Thailand
Ukraine
United Arab Emirates
Uruguay
Viet Nam

Partner countries and economies in previous cycles

Algeria
Azerbaijan
Guangdong (China)
Himachal Pradesh (India)
Kyrgyzstan
Liechtenstein
Mauritius
Miranda (Venezuela)
Tamil Nadu (India)
Trinidad and Tobago
Tunisia

* Puerto Rico participated in the PISA 2015 assessment (as an unincorporated territory of the United States).

** B-S-J-Z (China) refers to four PISA 2018 participating Chinese provinces/municipalities: Beijing, Shanghai, Jiangsu and Zhejiang. In PISA 2015, the four PISA participating Chinese provinces/municipalities were: Beijing, Shanghai, Jiangsu and Guangdong.


1. **Note 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 recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the "Cyprus issue".

Note by all the European Union Member States of the OECD and the European Union: The Republic of Cyprus is recognised 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.

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Data can also be found on line by following the *StatLinks*  under the tables and charts in the publication.

Explore, compare and visualise more data and analysis using: <http://gpseducation.oecd.org/>.

Questions can be directed to:

PISA team
Directorate for Education and Skills
edu.pisa@oecd.org

Country note author:

T. Mostafa and M. Schwabe
Directorate for Education and Skills
Tarek.MOSTAFA@oecd.org