Measuring up: Canadian Results of the OECD PISA 2018 Study

The Performance of Canadian 15-Year-Olds in Reading, Mathematics, and Science

cmec

Canada

Programme for International Student Assessment (PISA)

Findings from PISA 2018

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Council of Ministers of Education, Canada

Conseil des ministres de l'Éducation (Canada)

PISA 2018 international report

- Three volumes available on December 3, 2019:
  - Volume I – *What Students Know and Can Do*
  - Volume II – *Where All Students Can Succeed*
  - Volume III – *What School Life Means for Students' Lives*

- Three additional volumes will be published in 2020:
  - Volume IV – Financial literacy (May 7)
  - Volume V – School organization (June 9)
  - Volume VI – Global competence (October 19)

PISA 2018 Canadian report

- The international and Canadian reports released at the same time
- The Canadian report provides:
  - results in reading, mathematics, and science by performance level and achievement scores
  - information at the Canadian and provincial levels
  - breakdown by language of the school system and gender
  - contextual analysis for reading results
- Two additional reports will be published in 2020–21:
  - Financial literacy
  - Global competence

PISA 2018 by the numbers

Over 600,000 15-year-old students

79 countries and economies

47 languages

37 OECD countries

PISA 2018 in Canada

Over 22,000 15-year-old students from over 800 schools

Partnership between provincial ministries and departments of education, CMEC, and ESDC

Administered in English and French

10 provinces

What is in a PISA test?

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- A two-hour computer-based test
- Selected-response and short open-response questions
- 35-minute background questionnaire
- UH (Une-Heure or One-Hour) test designed for students with special education needs
- Multi-stage adaptive testing in reading

- Major domain: Reading
- Minor domains: Mathematics, Science
- Innovative domain: Global competence
- Optional domain: Financial literacy
- National options: Attitudes towards trades, French immersion programs, Indigenous self-identity, Educational attainment expectations

Canadian students continue to perform well in a global context.

Canada performed above the OECD average in reading, mathematics, and science.

Number of countries and/or economies performing better than Canada

	All countries and economies (79)	**OECD countries (37)**
Reading	3 B-S-J-Z (China), Singapore, Macao (China)	0
Mathematics	9 B-S-J-Z (China), Singapore, Macao (China), Hong Kong (China), Chinese Taipei, Japan, Korea, Estonia, the Netherlands	4 Japan, Korea, Estonia, the Netherlands
Science	5 B-S-J-Z (China), Singapore, Macao (China), Estonia, Japan	2 Estonia, Japan

PISA 2018 proficiency levels

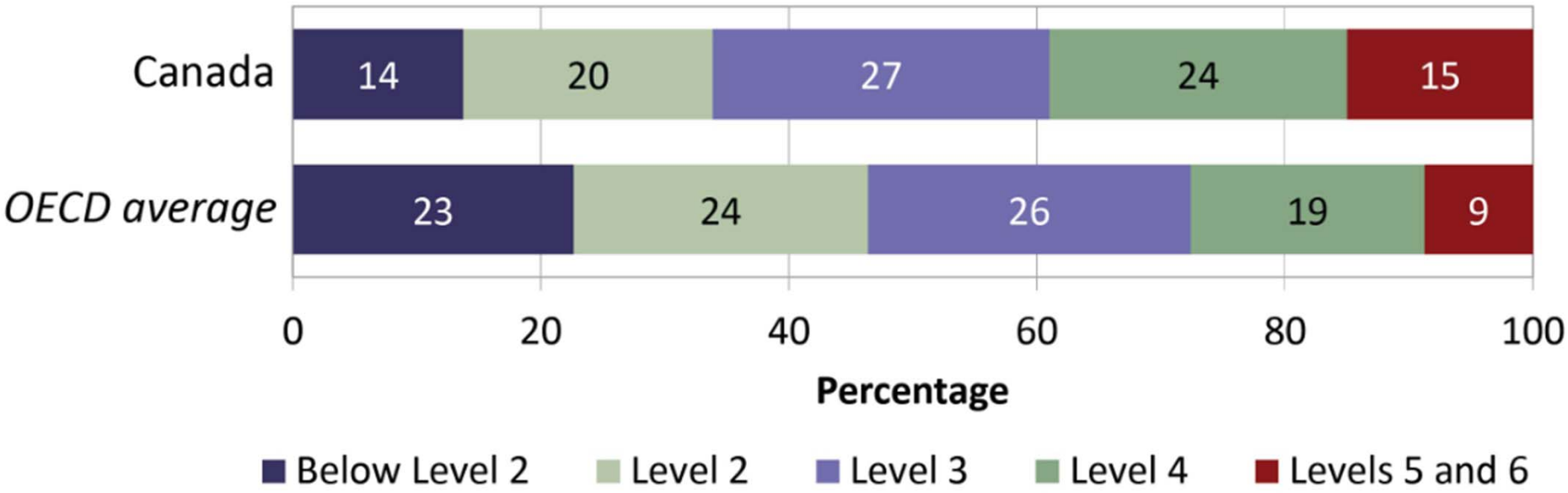
PISA has eight proficiency levels for reading

- Proficiency scales describe student performance as well as the difficulty of the tasks.
- The higher a student scored on the scale, the stronger he or she performed in that particular domain.
- Level 2 is considered the baseline level of proficiency required to take advantage of further learning opportunities and to participate fully in modern society.
- In the context of the United Nations Sustainable Development Goals, Level 2 proficiency has been identified as the “minimum level of proficiency” that all children should acquire by the end of secondary education.
- Top performers are students who attained Level 5 or 6.
- PISA 2018 introduced additional tasks to describe what students who perform at lower proficiency levels (Levels 1a, 1b, and 1c) are able to do.

For mathematics and science, there are fewer proficiency levels below Level 2.

PISA 2018 Reading results by proficiency level

- 86 per cent of Canadian students performed at or above Level 2 in reading compared to 77 per cent in OECD countries
- 15 per cent of Canadian students performed at the highest levels of achievement (Levels 5 and 6)



PISA 2018 Reading results by proficiency level

Top performers

- Canada has more high performers (Levels 5 and 6) in reading than most other countries.

Higher percentage than Canada	The same percentage as Canada
Singapore, B-S-J-Z (China)	Macao (China), United States, Estonia, Sweden, Korea, Hong Kong (China), Finland

Low achievers

- 14 per cent of Canadian students did not reach the baseline Level 2.
- More than 60 countries had a higher proportion of students performing below Level 2 compared to Canada.

PISA 2018 Reading results by proficiency levels

At the Canadian level, 86 per cent of students achieved at or above the baseline level of reading proficiency for their age.

Across provinces, between 78 and 88 per cent of students achieved at or above the baseline level.

Province	Level 2 or above (%)
Newfoundland and Labrador	85
Prince Edward Island	82
Nova Scotia	85
New Brunswick	**78**
Quebec	88
Ontario	87
Manitoba	**80**
Saskatchewan	**83**
Alberta	88
British Columbia	85
Canada	**86**

Bold font denotes a significant difference compared to Canada

PISA 2018 Reading results by achievement scores

In the Canadian report, countries and provinces are grouped to show those with similar results, as well as comparisons to the Canadian and OECD averages. The focus is not on ranking.

Table 1.3

Achievement scores in reading

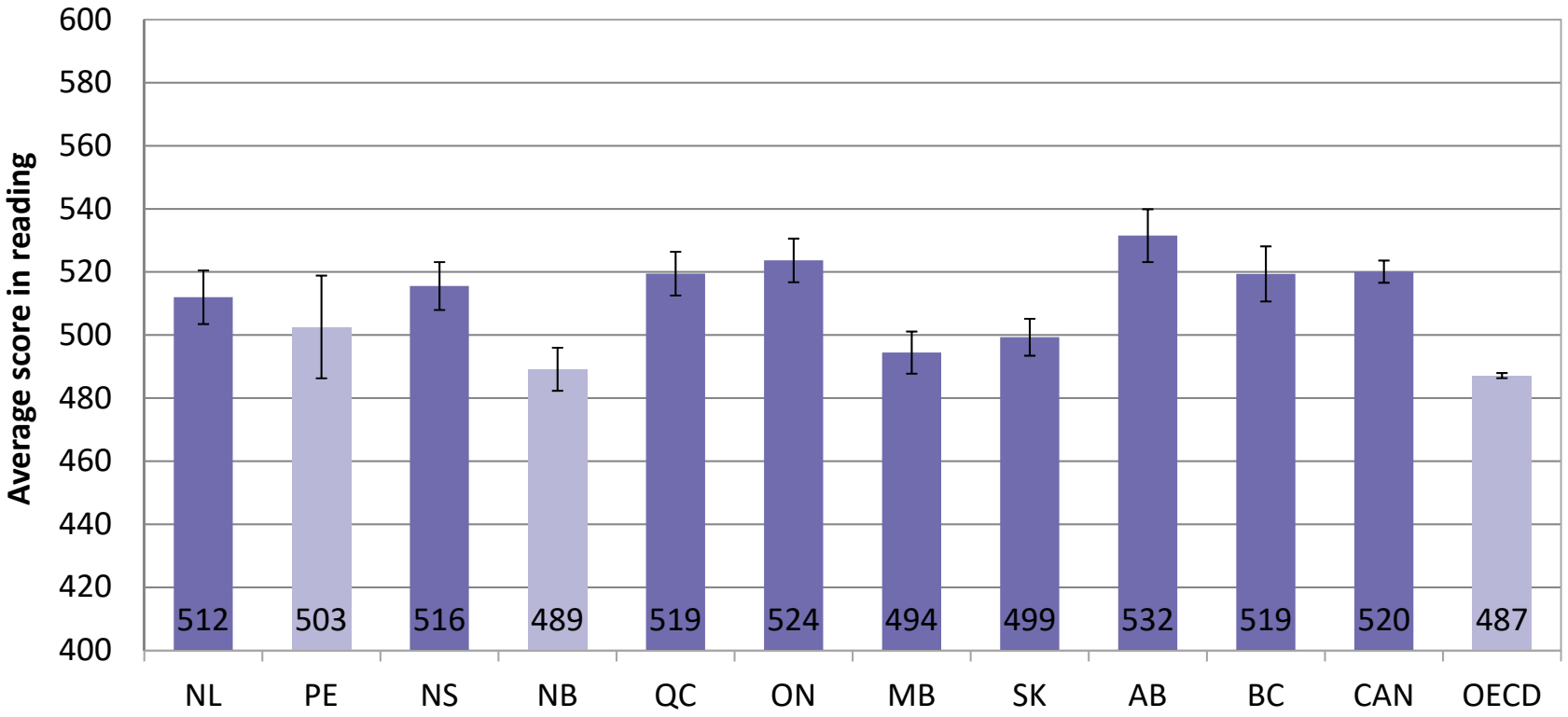
Country or province	Average score	95% confidence interval	Countries or provinces whose mean score is not significantly different from the comparison country or province	
B-S-J-Z (China)	555	550–561	Singapore	Above the OECD average
Singapore	549	546–553	B-S-J-Z (China)	
Alberta	532	523–540	Macao (China), Hong Kong (China), Ontario, Estonia	
Macao (China)	525	523–528	Alberta, Hong Kong (China), Ontario, Estonia, Finland, Quebec, British Columbia	
Hong Kong (China)	524	519–530	Alberta, Macao (China), Ontario, Estonia, Canada, Finland, Quebec, British Columbia, Ireland, Nova Scotia	
Ontario	524	517–531	Alberta, Macao (China), Hong Kong (China), Estonia, Canada, Finland, Quebec, British Columbia, Ireland, Nova Scotia	
Estonia	523	519–527	Alberta, Macao (China), Hong Kong (China), Ontario, Canada, Finland, Quebec, British Columbia, Ireland, Nova Scotia	
CANADA	520	517–524	Hong Kong (China), Ontario, Estonia, Finland, Quebec, British Columbia, Ireland, Nova Scotia, Korea, Newfoundland and Labrador	
Finland	520	516–525	Macao (China), Hong Kong (China), Ontario, Estonia, Canada, Quebec, British Columbia, Ireland, Nova Scotia, Korea, Newfoundland and Labrador	
Quebec	519	513–526	Macao (China), Hong Kong (China), Ontario, Estonia, Canada, Finland, British Columbia, Ireland, Nova Scotia, Korea, Newfoundland and Labrador, Poland, Prince Edward Island	
British Columbia	519	511–528	Macao (China), Hong Kong (China), Ontario, Estonia, Canada, Finland, Quebec, Ireland, Nova Scotia, Korea, Newfoundland and Labrador, Poland, Prince Edward Island	
Ireland	518	514–522	Hong Kong (China), Ontario, Estonia, Canada, Finland, Quebec, British Columbia, Nova Scotia, Korea, Newfoundland and Labrador, Poland, Prince Edward Island	
Nova Scotia	516	508–523	Hong Kong (China), Ontario, Estonia, Canada, Finland, Quebec, British Columbia, Ireland, Korea, Newfoundland and Labrador, Poland, United States, Prince Edward Island	
Korea	514	508–520	Canada, Finland, Quebec, British Columbia, Ireland, Nova Scotia, Newfoundland and Labrador, Poland, Sweden, United States, Prince Edward Island	
Newfoundland and Labrador	512	503–520	Canada, Finland, Quebec, British Columbia, Ireland, Nova Scotia, Korea, Poland, Sweden, New Zealand, United States, United Kingdom, Japan, Chinese Taipei, Prince Edward Island	
Poland	512	507–517	Quebec, British Columbia, Ireland, Nova Scotia, Korea, Newfoundland and Labrador, Sweden, New Zealand, United States, Prince Edward Island	

Above the Canadian average
At the Canadian average
Below the Canadian average

Above the OECD average
At the OECD average
Below the OECD average

PISA 2018 Reading results by achievement scores

Canada overall and eight provinces were above the OECD average for reading, and two provinces were at the OECD average.

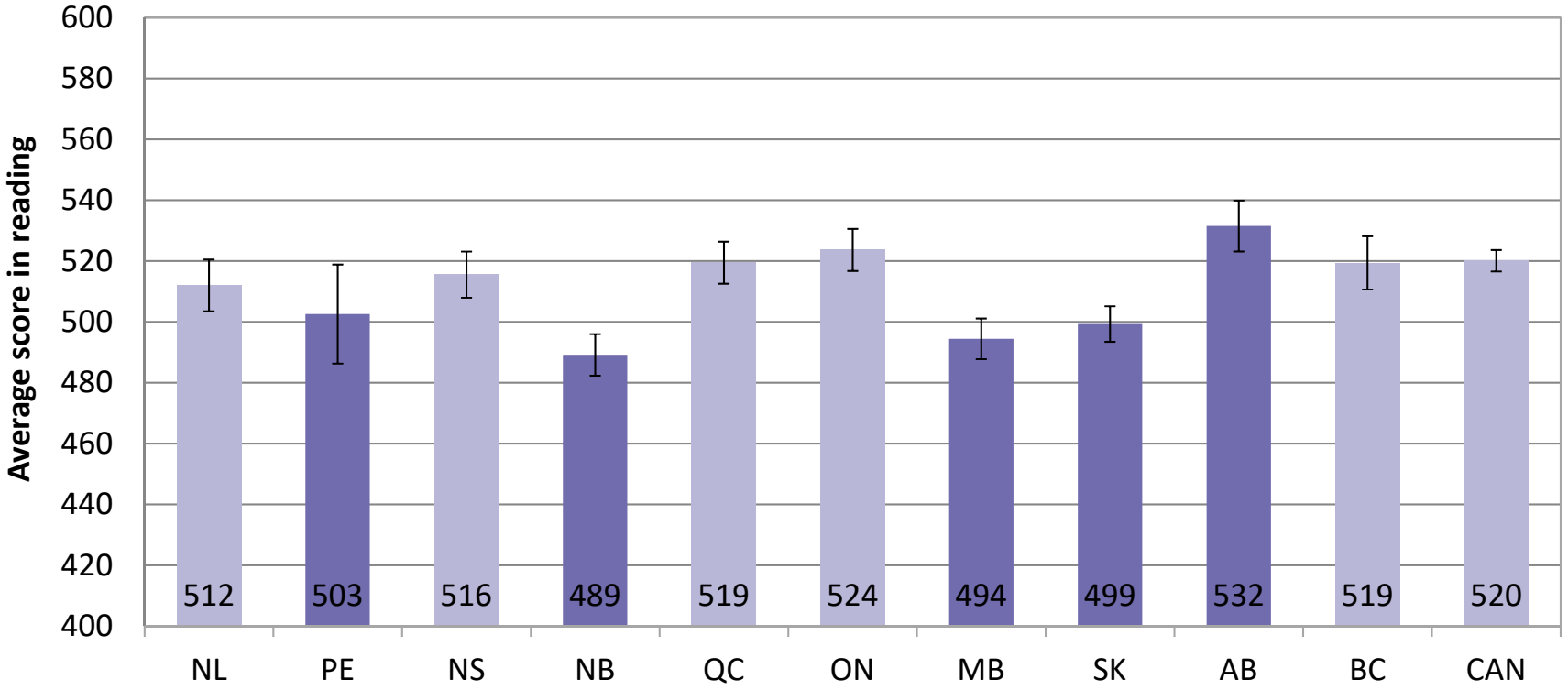


Note: Darker colour denotes a significant difference compared to OECD.

PISA 2018 Reading results by achievement scores

Compared to the results for Canada overall, students in …

- Alberta performed above the Canadian average
- 5 provinces performed as well as Canada
- 4 provinces performed below the Canadian average

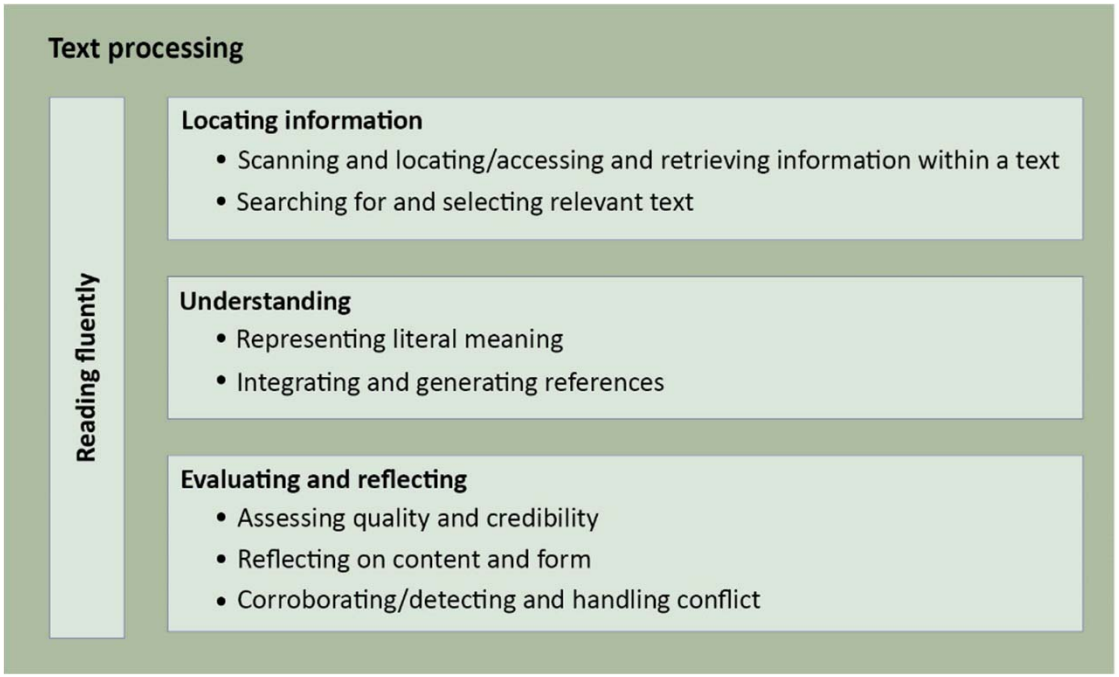


Note: Darker colour denotes a significant difference compared to Canada.

PISA 2018 Reading subscales

As the primary focus of the PISA test, reading results were also reported at a more granular level by subscales. Process subscales represent the main cognitive processes required to solve the item. Source subscales involve the number of text sources in the item.

Reading fluency — the ability to determine whether a sentence makes sense — was not reported (e.g., The red car had a flat tire; Airplanes are made of dogs).



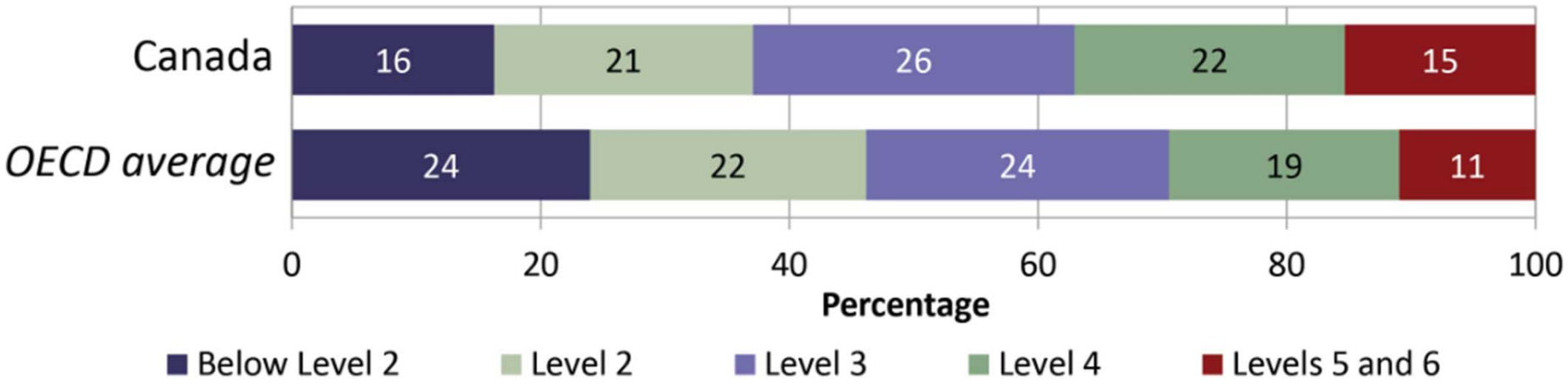
Text source

Text types, formats, and ranges

- *Single-source texts:* texts with a definite author or group of authors, publication date, or reference title or number
- *Multiple-source texts:* texts with different authors or groups of authors, publication dates, and/or reference titles or numbers

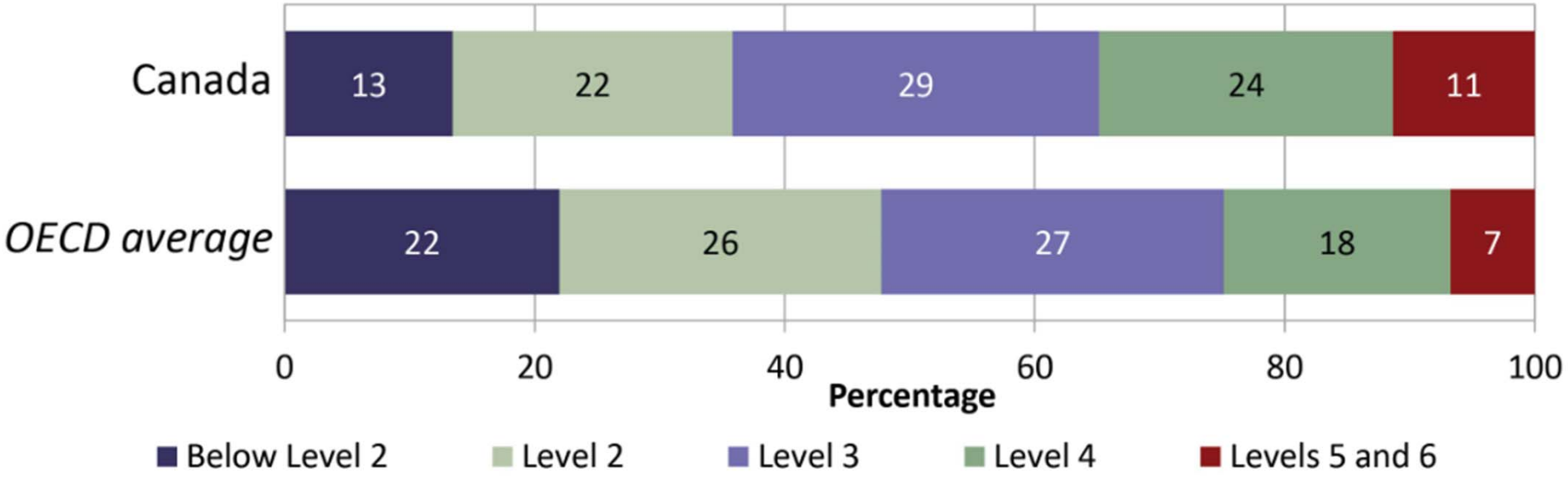
PISA 2018 Mathematics results by proficiency level

- 84 per cent of Canadian students performed at or above Level 2 in mathematics compared to 76 per cent in OECD countries
- 15 per cent of Canadian students were top performers (Levels 5 and 6)



PISA 2018 Science results by proficiency level

- 87 per cent of Canadian students performed at or above Level 2 in science compared to 78 per cent in OECD countries
- 11 per cent of Canadian students performed at Levels 5 and 6



Provincial achievement compared to overall Canadian results

In the provinces, the highest achievement was found in Quebec for mathematics and in Alberta for science.

	Above the Canadian average	At the Canadian average	Below the Canadian average
Mathematics	Quebec	Ontario, Alberta, British Columbia	Newfoundland and Labrador, Prince Edward Island, Nova Scotia, New Brunswick, Manitoba, Saskatchewan
Science	Alberta	Newfoundland and Labrador, Prince Edward Island, Nova Scotia, Quebec, Ontario, British Columbia	New Brunswick, Manitoba, Saskatchewan

Changes in performance over time

Since PISA started in 2000, each of the three domains has been the major focus of the assessment at least twice. This allows comparisons in performance over shorter and longer periods of time.

Canadian results over time

	Reading	Mathematics	Science
Long-term comparison	2000–2018	2003–2018	2006–2018
	decline	decline	decline
Short-term comparison	2009–2018	2012–2018	2015–2018
	no change	no change	decline

Trends in OECD averages over time:

- the long-term pattern is the same as in Canada
- no change for the three domains in the short term

Canadian results by language of the school system – proficiency levels

For performance at or above the baseline level (Level 2) in mathematics, francophone students outperformed their anglophone peers in Canada overall; there were no significant differences between the language groups for reading and science.

At the higher performance levels, a greater percentage of anglophone than francophone students achieved Levels 5 and 6 in reading and science in Canada overall, while the opposite pattern was observed for mathematics.

	Level 2 and above		Levels 5 and 6	
	Anglophone	Francophone	Anglophone	Francophone
Reading	86	85	16*	12
Mathematics	83	87*	14	21*
Science	86	87	12*	10

**Significant difference between language groups in Canada*

Provincial results by language of the school system

At the Canadian level, higher achievement was found in reading in anglophone schools and in mathematics in francophone schools; no variation in performance was found between the two language groups in science.

	Anglophone schools performed significantly better than francophone schools	Francophone schools performed significantly better than anglophone schools	No significant differences between school systems
Reading	Nova Scotia, New Brunswick, Ontario, Manitoba, Alberta, British Columbia		Quebec
Mathematics		Quebec	Nova Scotia, New Brunswick, Ontario, Manitoba, Alberta, British Columbia
Science	Nova Scotia, Ontario, Alberta		New Brunswick, Quebec, Manitoba, British Columbia

Canadian results by gender – proficiency levels

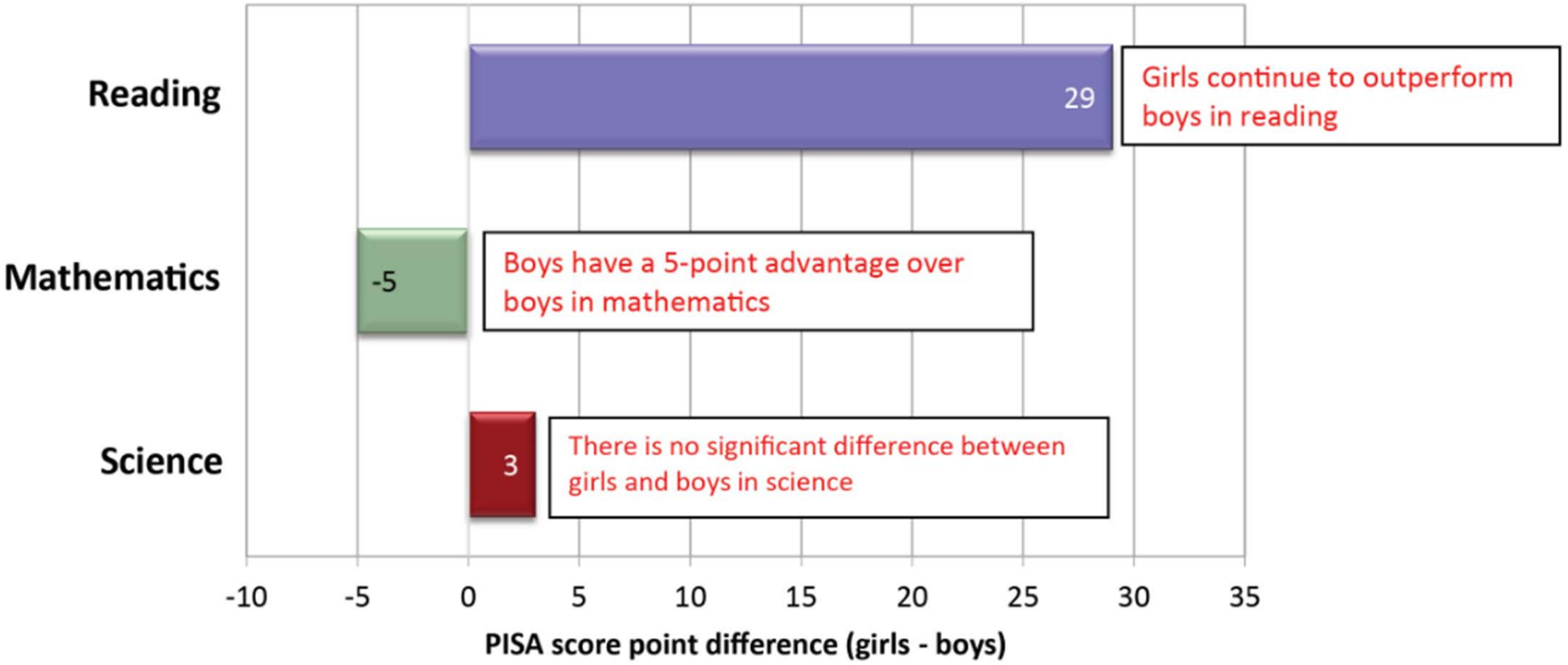
Girls continue to outperform boys in reading. This type of disparity is consistent across most countries/economies participating in PISA 2018 as well as across all Canadian provinces.

In mathematics in Canada overall, a higher percentage of boys achieved Levels 5 and 6. In science, a higher percentage of girls achieved at or above the baseline, while there was no gender gap at the higher levels of performance.

	Level 2 and above		Levels 5 and 6	
	Girls	Boys	Girls	Boys
Reading	90*	82	18*	12
Mathematics	84	84	14	17*
Science	88*	85	11	12

**Significant difference between girls and boys*

Canadian results by gender – achievement scores



Provincial results by gender – achievement scores

The gender gap in reading in favour of girls persists across all provinces while there is gender equity in mathematics and science for all provinces, except for science in Alberta.

	Girls performed significantly better than boys	Boys performed significantly better than girls	No significant differences between girls and boys
Reading	All provinces		
Mathematics			All provinces
Science	Alberta		Newfoundland and Labrador, Prince Edward Island, Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan, British Columbia

Contextual analysis

As a high-performing country in PISA, there are many references to Canada in all three volumes of the international report.

For the first time, the PISA Canadian report has a chapter that reports contextual analysis focusing on reading, the primary domain of the assessment. That chapter provides information from the Canadian and international reports about some findings of interest.

Contextual findings – international report

Socioeconomic status (SES) and performance

- Canada had a relatively small performance gap between advantaged and disadvantaged students.
- The relationship between student performance and SES in Canada was significantly weaker than the OECD average.

Academic and socio-emotional resilience

- Disadvantaged students in Canada were more likely than advantaged students to feel like outsiders.
- In contrast to the OECD average, disadvantaged students in Canada were less likely to doubt their plans for the future when facing failure.

Social diversity and equity

- Canada had relatively low levels of social segregation and a more even distribution of advantaged and disadvantaged students in schools.

Contextual findings – international report

Preparing students for the future

- Disadvantaged students in Canada reported more frequently than their advantaged peers that they interned, shadowed workers, or visited job fairs.

Performance and resilience among immigrant students in Canada

- Immigrant students scored the same as or higher than their native-born peers.
- Immigrant students were more likely to expect to complete a tertiary degree.

Immigrant students' attitudes and dispositions in Canada

- Immigrant students were more likely to report difficulty and lower competence in reading.

Contextual findings – international report

Sense of belonging at school

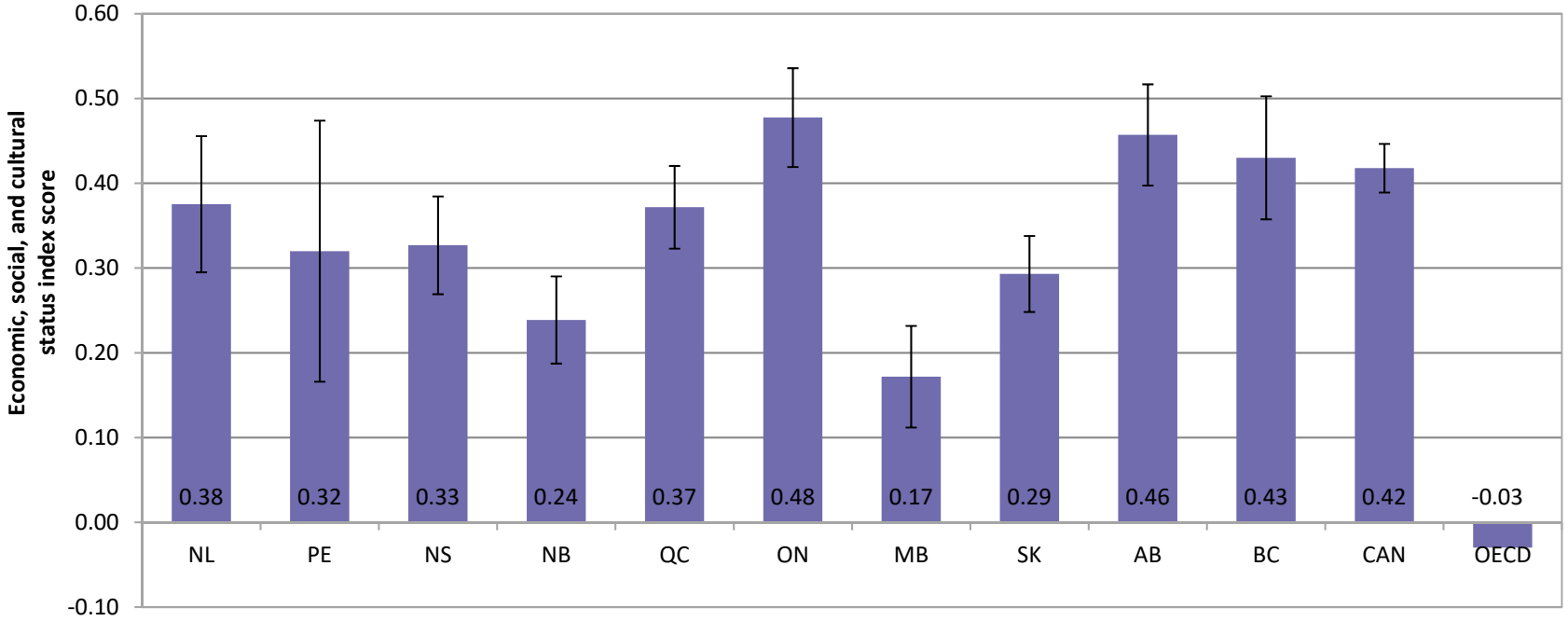
- Boys reported a greater sense of belonging at school than girls in 30 countries and economies, and this trend is particularly noticeable in Canada and three other countries (over one-fifth of a standard deviation).

Student self-efficacy and fear of failure

- In almost every education system, and consistent with results from previous studies, girls expressed greater fear of failure than did boys, and especially so in Canada and six other countries.

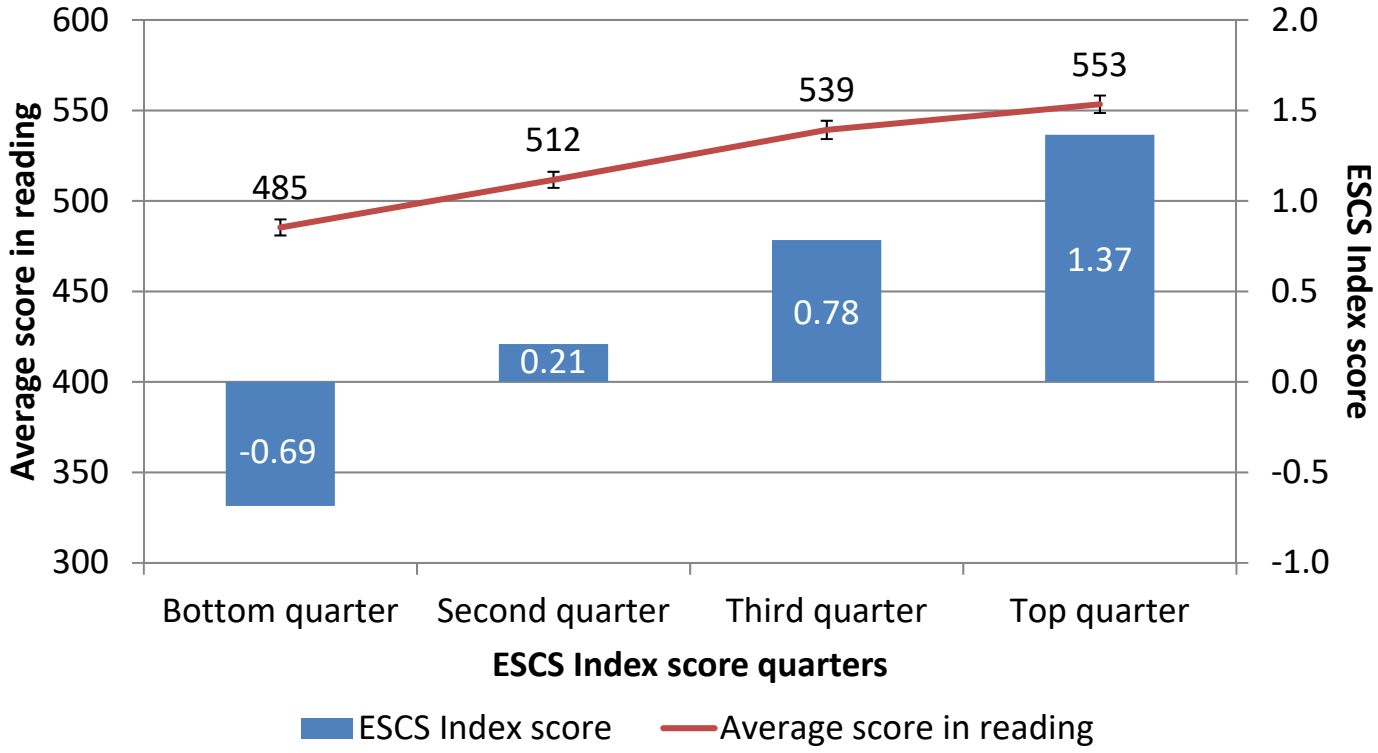
Contextual findings – Canadian report

Canada placed among the top countries and economies in terms of the index of economic, social, and cultural status (ESCS). The OECD average is -0.03 on this index.



Contextual findings – Canadian report

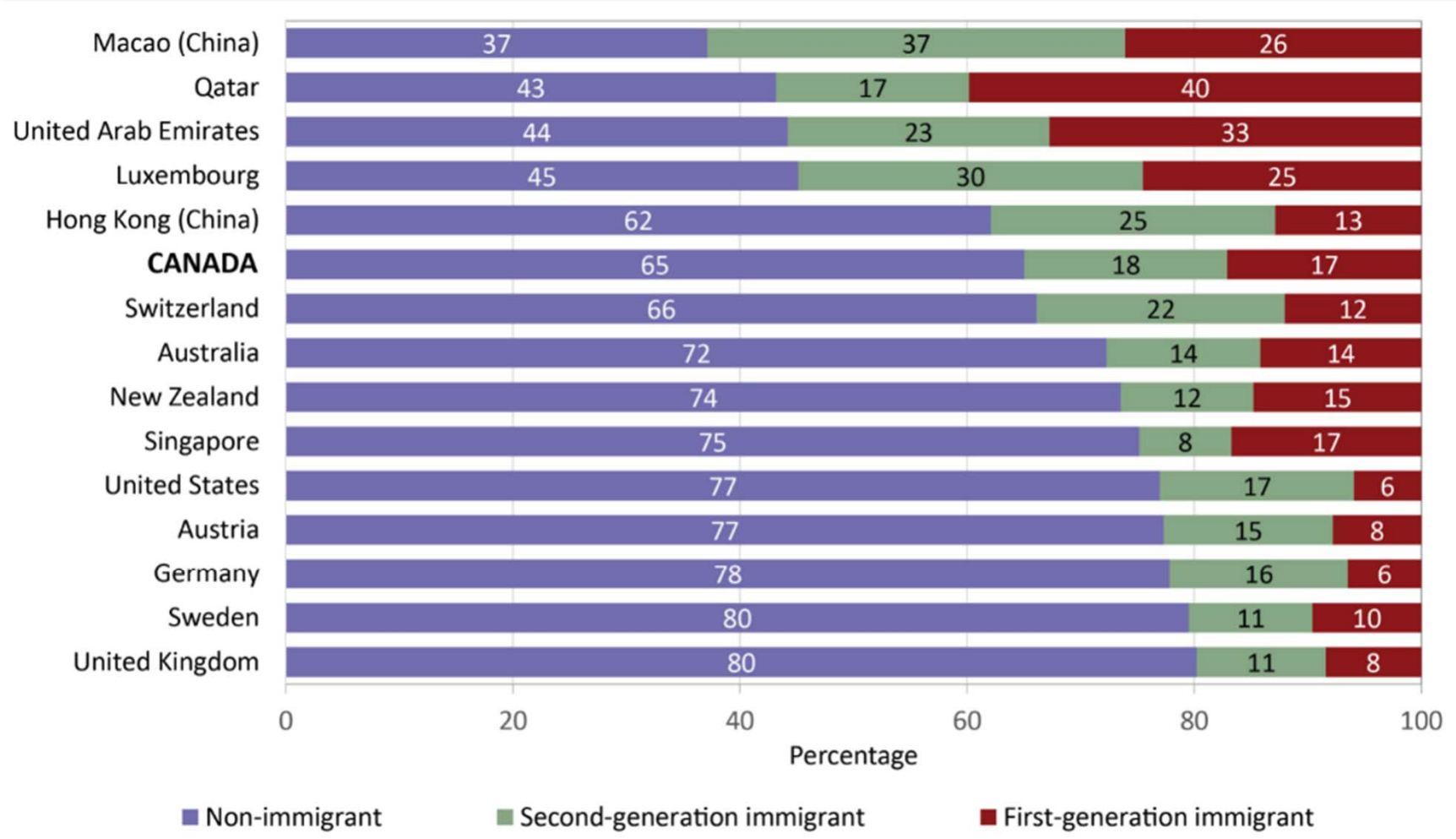
Socioeconomically advantaged students outperformed disadvantaged students in reading in PISA 2018 across all countries, economies, and provinces.



Note: Top quarter of index represents socioeconomically advantaged students while the bottom quarter represents disadvantaged students in Canada.

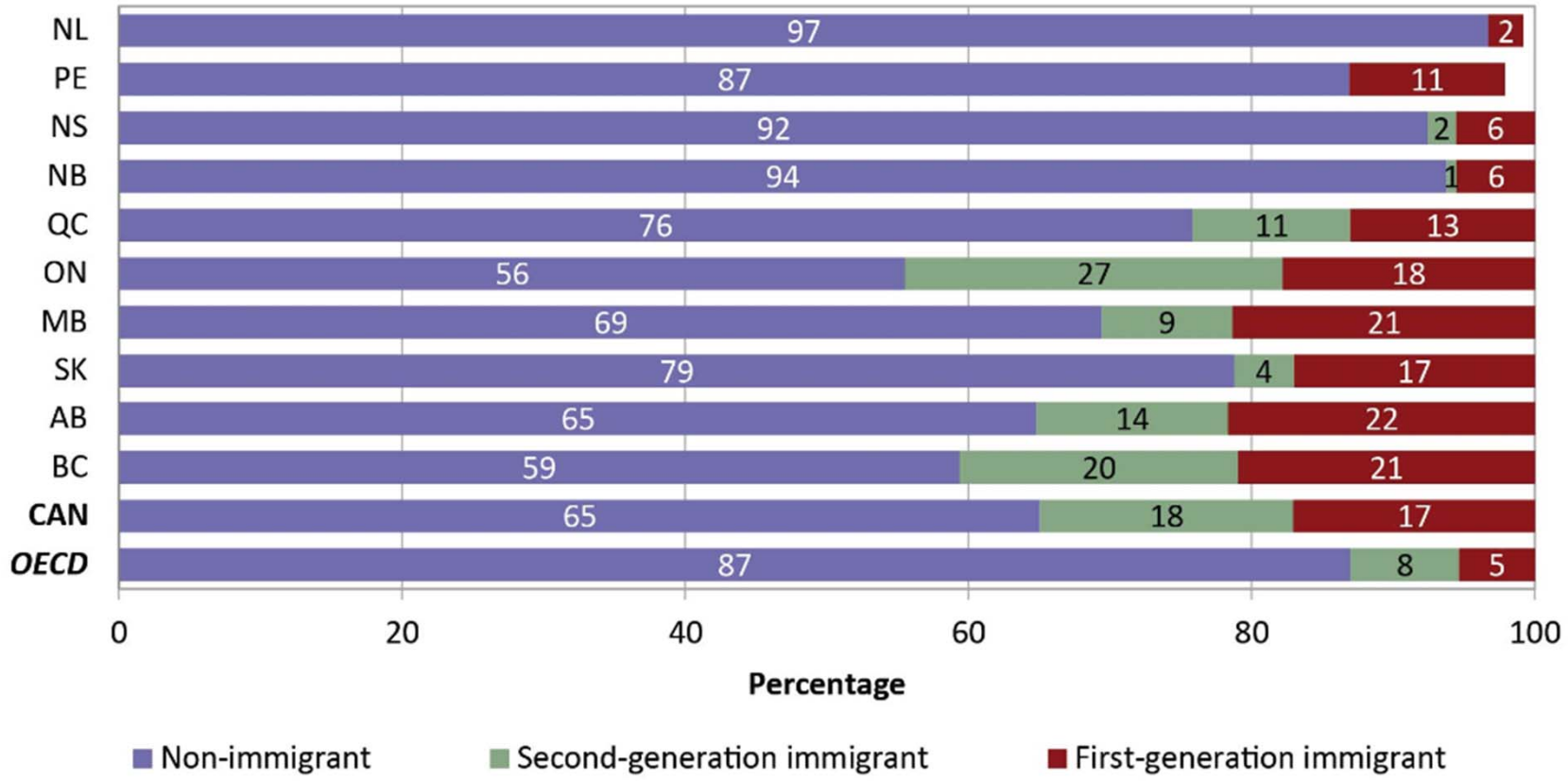
Contextual findings – Canadian report

Of all OECD countries, only Luxembourg has a higher percentage of immigrant students compared to Canada.



Contextual findings – Canadian report

In Canada, the highest proportion of immigrant students are found in Ontario and British Columbia.

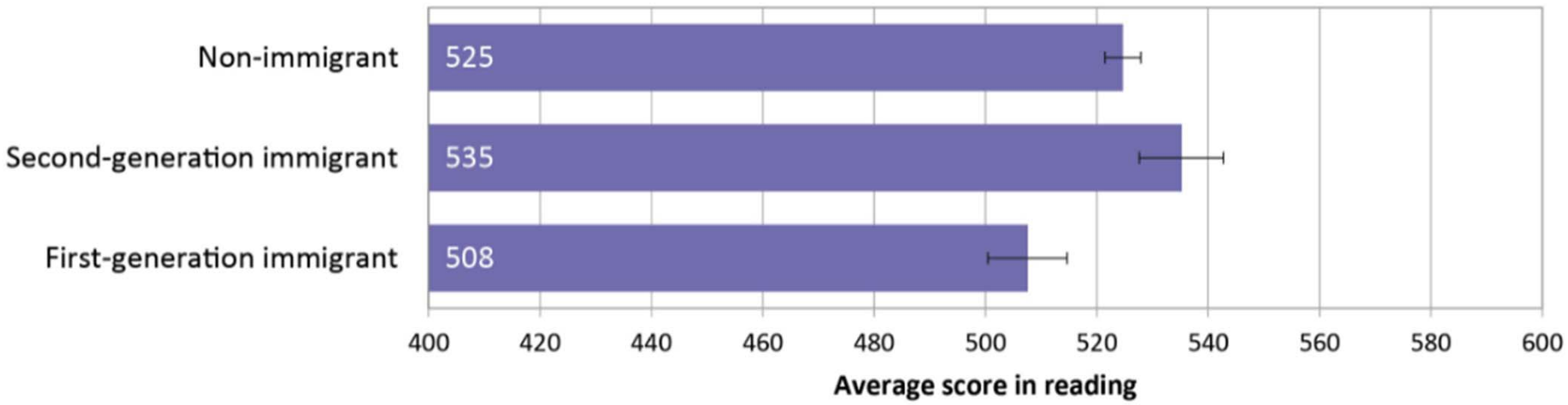


Contextual findings – Canadian report

In the majority of countries/economies participating in PISA, non-immigrant students outperformed their immigrant peers.

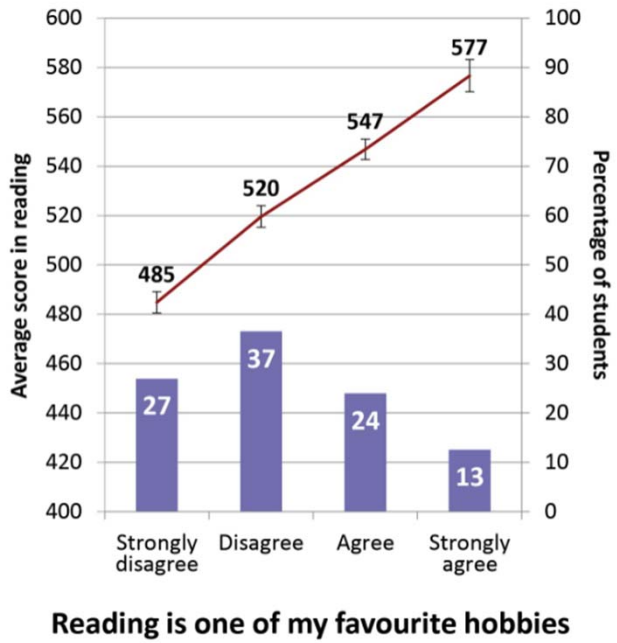
At the Canadian level:

- immigrant students performed as well as non-immigrant students in reading
- second-generation immigrant students performed better than non-immigrant students
- first-generation immigrant students were outperformed by their non-immigrant and second-generation immigrant peers

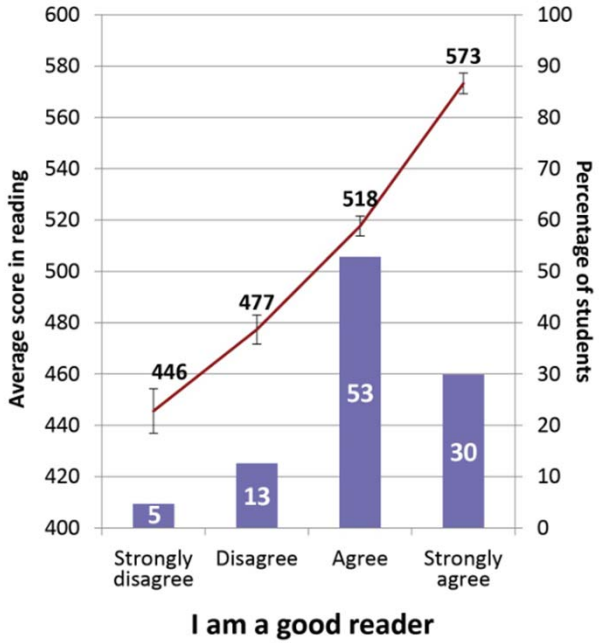


Contextual findings – Canadian report

Reading attitudes – students who enjoy reading and who are more confident about their reading abilities were more likely to have higher reading scores.



Reading is one of my favourite hobbies



I am a good reader

Reading strategies – students who found discussing content with other people and summarizing the text in their own words as very useful strategies achieved significantly higher scores than those who did not find these strategies as useful.

PISA 2018 – Conclusions

Compared to Canada, among the 79 countries and economies that participated in PISA 2018:

- 3 performed better in reading;
- 9 performed better in mathematics; and
- 5 performed better in science.

Overall in Canada, over 80 per cent of students are achieving at or above the baseline level of proficiency in all three domains, and over 10 per cent are considered top performers in PISA.

	Reading (%)	Mathematics (%)	Science (%)
Level 2 proficiency or above	86	84	87
PISA top performers (Levels 5 and 6)	15	15	11

PISA 2018 – Conclusions

- There was no difference in reading performance between the anglophone and francophone school systems in Quebec.
- In Canada overall and in six provinces — Nova Scotia, New Brunswick, Ontario, Manitoba, Alberta, and British Columbia — students in the majority-language system outscored those in the minority-language one in reading.
- In mathematics, students in francophone schools outperformed their peers in anglophone schools in Canada overall and in Quebec; in the remaining provinces, there was no statistically significant difference between the two language groups.
- No variation in performance was found between the two language groups in science in Canada overall or in any province.

PISA 2018 – Conclusions

- Girls performed better in reading than boys in PISA 2018. In Canada, 82 per cent of boys attained Level 2 or higher, compared with 90 per cent of girls. This type of disparity is consistent across most countries participating in PISA 2018, as well as across all Canadian provinces.

- In Canada overall, boys outperformed girls in mathematics, while there was no significant variation in science performance by gender. In OECD countries, there was a small gap between the sexes for both mathematics and science.

PISA 2018 – For more information

The PISA 2018 results provide a rich source of comparative data that can be used to examine educational systems in Canada.

Future research will by available in *Assessment Matters!*, a series of research briefs published quarterly on the CMEC website.

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