#112

PISA in Focus

Can a growth mindset help disadvantaged students close the gap?

Programme for International Student Assessment

OECD
BETTER POLICIES FOR BETTER LIVES

Can a growth mindset help disadvantaged students close the gap?

- On average across OECD countries participating in PISA 2018, students with a growth mindset scored 31 points higher in reading, 27 points higher in science, and 23 points higher in mathematics than students with a fixed mindset after accounting for the socio-economic profile of students and schools.
- In all countries/economies that participated in PISA 2018 but one, students with a growth mindset had a significantly lower level of fear of failure than students with a fixed mindset. In almost half of the countries/economies, students with a growth mindset felt significantly more satisfied with their life.
- Growth mindset is associated with a larger score gain for girls (+3 points), and disadvantaged (+12 points) and immigrant students (+9 points) when compared to boys, and advantaged and non-immigrant students.

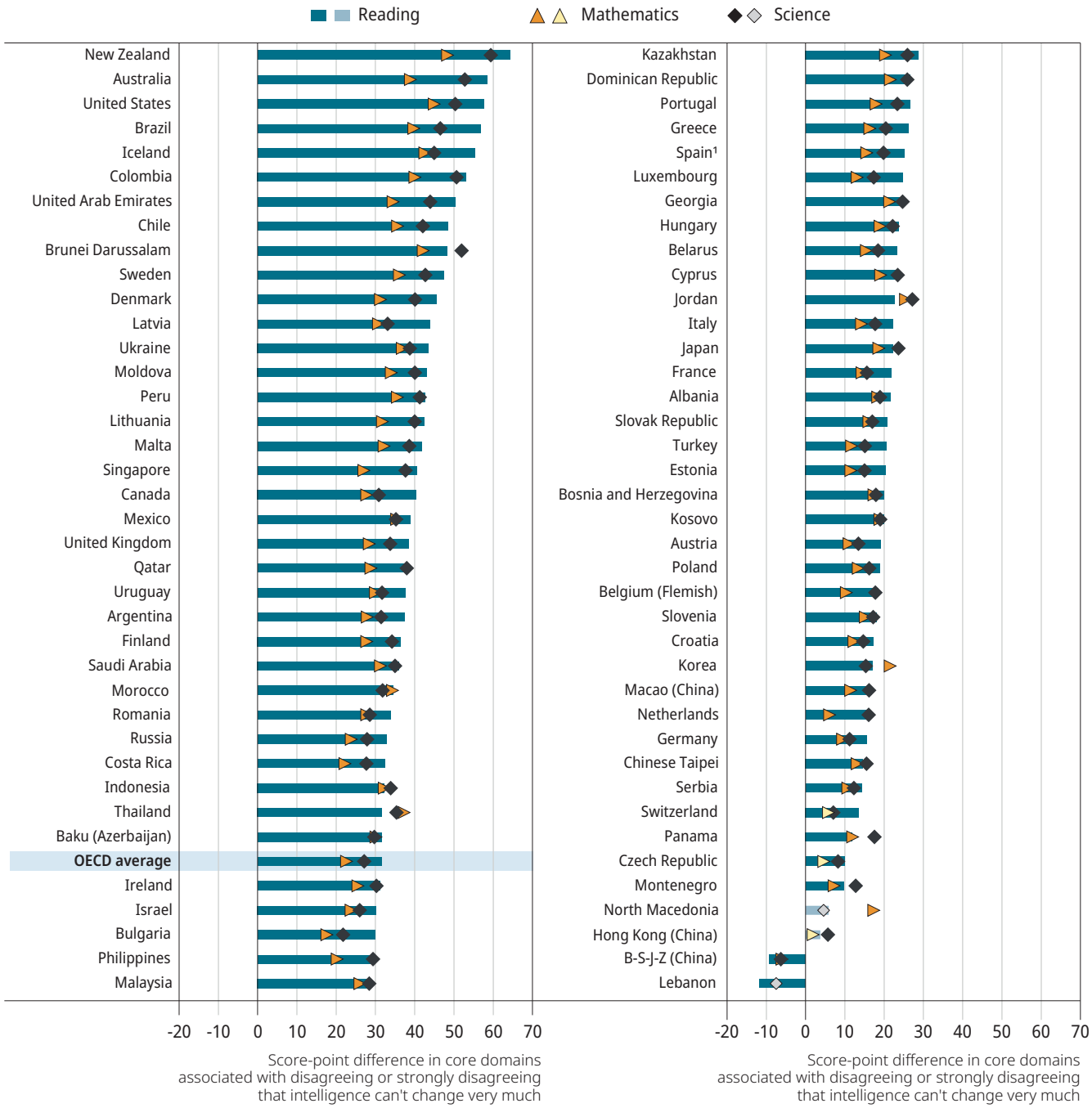
Why do certain students thrive when facing adversity while others languish? According to Carol Dweck (2006[1]), underlying beliefs about intelligence may affect learning motivation and students' performance. In the mindset theory, growth mindset is opposed to fixed mindset, and could explain why some people fulfil their potential and others do not. With the COVID pandemic dragging on, having a growth mindset may be even more critical. For students who are able to set their own learning goals, elaborate learning strategies, and master their progress, the disruptive experience of school closing may be enriching. For students who are used to being led in their learning and who have little taste for steering their learning on their own, the experience may be devastating. This PISA in Focus analyses how growth mindset is related to the performance and well-being of 15-year-old students, and its potential implications in terms of equity.

How does growth mindset relate to academic performance and well-being in PISA?

In its 2018 assessment, PISA measured in 77 countries' and economies' growth mindset[1] for the first time. According to the theory, students with a fixed mindset believe their talents are innate gifts, and tend to attach more importance to validating their ability and avoiding challenges because high levels of effort and setbacks are seen as signalling low ability. On the contrary, students with a growth mindset consider ability to be malleable, and will strive to develop it by setting challenging learning goals. They consider effort an inherent part of the learning process and setbacks to be fruitful experiences to assimilate. Therefore, students with a growth mindset may outperform their fixed mindset peers because they expend efforts to reach their full potential instead of remaining in their comfort zone. Students with a growth mindset may also experience heightened well-being since their positive conception of failure and challenges potentially decrease anxiety (Dweck and Yeager, 2019[2]).

Students who reported having a growth mindset scored higher in reading in PISA in 73 out of 77 countries and economies. The performance gap was the widest in New Zealand, Australia, and the United States where students with a growth mindset scored around 60 points higher in reading, 50 points higher in science, and 40 points higher in mathematics than their counterparts after accounting for the socio-economic profile of students and schools (Figure 1). In East Asian countries, growth mindset was not as highly associated with academic performance as in most OECD countries. In these countries, the dominant cultural ethos of working hard may attenuate the negative effects of a fixed mindset (OECD, 2021[3]). For instance, in Japan, Korea, Macao (China), and Chinese Taipei, the average performance gain in reading was only 18 points while it reached 31 points on average across OECD countries. In Hong Kong (China), growth mindset and reading performance were unrelated, and even negatively associated in B-S-J-Z (China).

Growth mindset and performance in reading, mathematics and science



1. In 2018, some regions in Spain conducted their high-stakes exams for tenth-grade students earlier in the year than in the past, which resulted in the testing period for these exams coinciding with the end of the PISA testing window. Because of this overlap, a number of students were negatively disposed towards the PISA test and did not try their best to demonstrate their proficiency. Although the data of only a minority of students show clear signs of lack of engagement (see PISA 2018 Results Volume I, Annex A9), the comparability of PISA 2018 data for Spain with those from earlier PISA assessments cannot be fully ensured.

Notes: Statistically significant values are shown in darker tones.

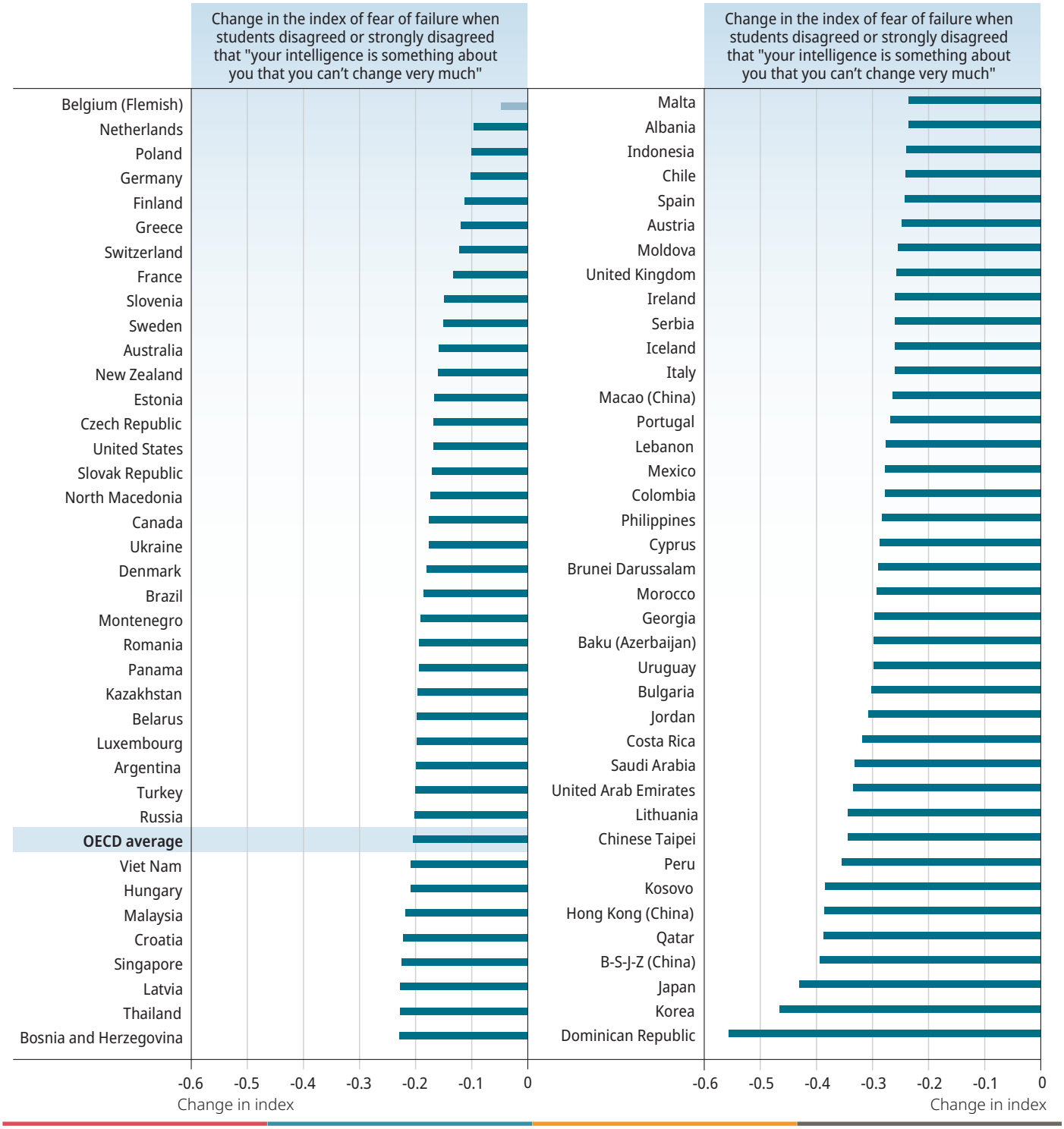
All linear regression models account for students' and schools' socio-economic profile. The socio-economic profile is measured by the PISA index of economic, social and cultural status (ESCS).

Countries and economies are ranked in descending order of the score-point difference in reading associated with disagreeing or strongly disagreeing that intelligence can't change very much.

Source: OECD, PISA 2018 Database

Students who reported having a growth mindset displayed a lower index of fear of failure[2] in 76 out of 77 countries and economies. This robust relationship holds after accounting for the socio-economic profile of students and schools, and corroborates the growth mindset theory, namely that students with a growth mindset are less afraid of setbacks. The difference in fear of failure is especially sharp in East Asian countries participating in PISA, and less pronounced for the three countries – New Zealand, Australia, and the United States – with the widest performance gap between growth and fixed mindset students (Figure 2).

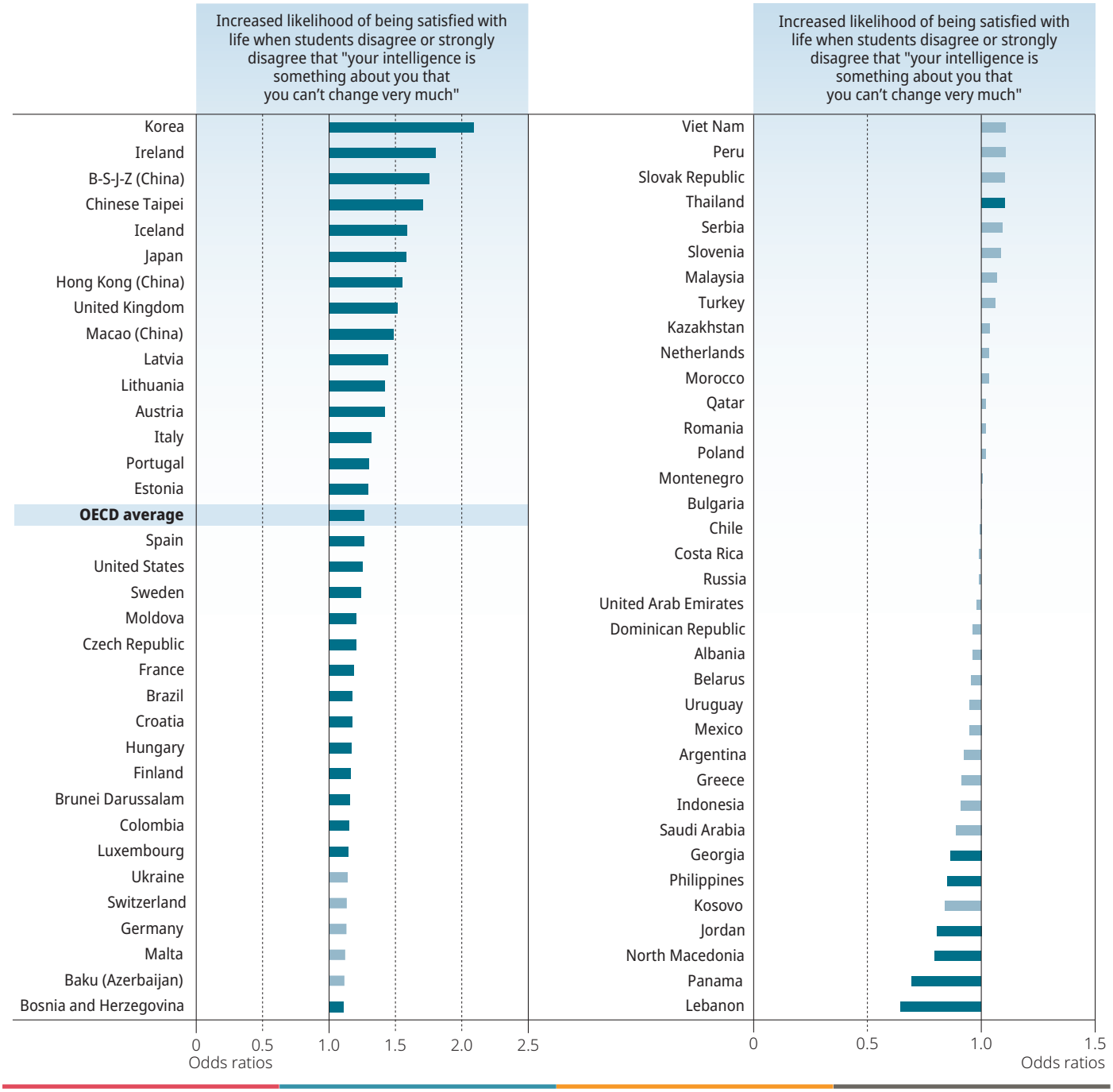
Growth mindset and fear of failure



Notes: Statistically significant values are shown in darker tones.
All linear regression models account for students' and schools' socio-economic profiles. The socio-economic profile is measured by the PISA index of economic, social and cultural status (ESCS).
Countries and economies are ranked in descending order of the change in the index of fear of failure associated with disagreeing or strongly disagreeing that intelligence can't change very much.
Source: OECD, PISA 2018 Database

Students who reported having a growth mindset felt more satisfied[3] with their life in 30 out of 70 countries and economies. In 18 additional countries, the change in life satisfaction associated with growth mindset was positive but not significant (Figure 3). On average across OECD countries, a student with a growth mindset is more likely to consider his/her life satisfactory by 27 percentage points. In East Asian countries, this association reaches 49 percentage points, at least. For instance, in Korea, students with a growth mindset are more than twice as likely to feel satisfied with their life. In these countries, having a growth mindset is highly correlated with a lower fear of failure and higher evaluation of life satisfaction. These results suggest that growth mindset may also provide some psychological protection from life's challenges.

Growth mindset and life satisfaction



Notes: Statistically significant values are shown in darker tones.
All linear regression models account for students' and schools' socio-economic profile. The socio-economic profile is measured by the PISA index of economic, social and cultural status (ESCS).
Countries and economies are ranked in descending order of the change in the likelihood of being satisfied with life when students disagree or strongly disagree that "your intelligence is something about you that you can't change very much"
Source: OECD, PISA 2018 Database, Table B.11 in this report.

Who benefits the most from having a growth mindset?

The analysis of PISA data sheds light on a positive relationship between growth mindset and academic performance. But, is this relationship constant or does it vary across specific subgroups? In other words, is having a growth mindset associated with the same performance gain for different groups of students?

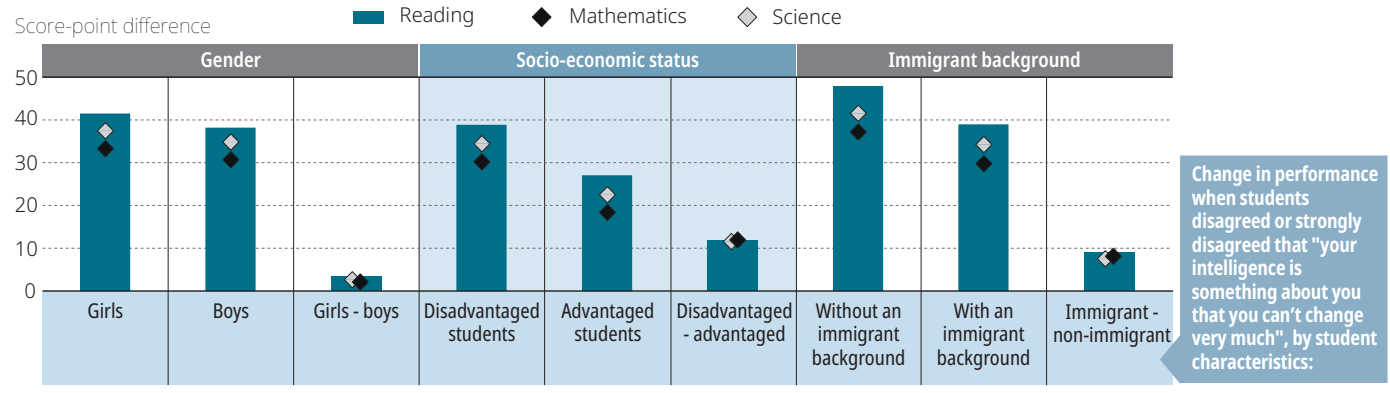
Growth mindset in PISA is associated with a larger score gain for girls, and disadvantaged and immigrant students when compared to boys, and advantaged and non-immigrant students. The performance gap in reading between students displaying or not displaying a growth mindset was wider on average for girls (a 42-score-point difference) than for boys (a 39-score-point difference). This average gap of 3 points across OECD countries is statistically significant. Similarly, the average growth mindset-related performance gap reached 12 points in reading between disadvantaged and advantaged students, and 9 points in reading between immigrant and non-immigrant students (Figure 4).

These results are in line with the literature stating that teaching growth mindset in schools may buffer the negative effects of biased perceptions, curbed aspirations, and economic deprivation on students' academic achievement. The interaction between growth mindset and gender has been advanced to explain outcome differences in science, technology, engineering, and mathematics (STEM) fields. It has been proposed that females are more vulnerable to the detrimental effects of a fixed mindset in mathematical ability (Dweck, 2007[4]; Good, Rattan and Dweck, 2012[5]). Growth mindset may help curb self-defeating thoughts and correct biased perceptions about math abilities that impede performance for many female students (Degol et al., 2018[6]). In addition, it has been found that mindset could be a stronger predictor of academic success than available resources for low-income students (Claro, Paunesku and Dweck, 2016[7]). Growth mindset intervention was also most beneficial to students at risk of dropping out (Paunesku et al., 2015[8]).

Accordingly, growth mindset interventions could improve equity in acedemic performance. The fact that growth mindset has larger pay-offs for vulnerable students who are at the greatest risk of poor performance (Burnette et al., 2013[9]; Dweck and Yeager, 2019[2]; Yeager and Dweck, 2020[10]) opens an avenue for designing policies and interventions promoting equity and bridging the performance gap between different groups of students. These policies can be even more effective when vulnerable subgroups such as lower performers, socio-economically disadvantaged students, and female students in STEM fields are targeted.

Association between growth mindset and performance, by student characteristics

OECD average



Notes: All values are statistically significant.
All linear regression models account for students' and schools' socio-economic profile. The socio-economic profile is measured by the PISA index of economic, social and cultural status (ESCS).
Source: OECD, PISA 2018 Database, Tables B.4, B.5 and B.6 in this report.

The bottom line

On average in PISA, students who reported having a growth mindset scored higher in reading, mathematics, and science, displayed lower levels of fear of failure, and are more likely to consider their life satisfactory. In addition, PISA data reveal that growth mindset is associated with a larger score gain for girls, and disadvantaged and immigrant students when compared to boys, and advantaged and non-immigrant students. These results are in line with the literature stating that teaching growth mindset in schools may buffer the negative effects of biased perceptions, curbed aspirations, and economic deprivation on students' academic achievement. These larger potential pay-offs for vulnerable students who are at the greatest risk of poor performance opens an avenue for designing policies and interventions promoting equity and bridging the performance gap between different groups of students.

Notes

1. PISA 2018 asked students whether they agreed ("strongly disagree", "disagree", "agree", or "strongly agree") with the following statement: "Your intelligence is something about you that you can't change very much". Disagreeing with the statement is considered a precursor of a growth mindset, as it is more likely that someone who thinks intelligence can change will challenge him/herself to improve it.
2. The index of fear of failure in PISA summarises students' responses to the following questions: "When I am failing, I worry about what others think of me", "When I am failing, I am afraid that I might not have enough talent", and "When I am failing, this makes me doubt my plans for the future".
3. One of the measures of subjective well-being in PISA consists of the life evaluation scale where students are asked to rate their life satisfaction on a scale from 0 (not at all satisfied) to 10 (completely satisfied). A student is considered as "satisfied" if he/she evaluated his life satisfaction between 7 and 10.

For more information

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