

Teachers' strike

Is everything great in our education system?



teachers' strike 22.01-30.01.2024



17 euros (1950 -> 1836 -> 1820 per month)



teacher career model



full-time work is 18-24 hours per week, regardless of subject and class size

<https://www.err.ee/1609237716/opetajate-streik-lopeb>

Math teachers

Do we have enough math teachers?

A collage of Estonian math teachers based on available data shows that

 92% of math teachers in Estonia are women,

most likely in the age group of 50-59,

with one in five over 60 years old,

2/3 of them work full-time and have a Master's degree or equivalent qualification.

<https://opleht.ee/2022/01/kollaaz-matemaatikaopetajast-ja-matemaatikast/>

Who wants to study to become a math teacher at the University of Tartu?



Bachelor's degree in mathematics, computer science or mathematical statistics



Bachelor's degree of any field with 60 ECT of mathematics or informatics related courses.



...



REPUBLIC OF ESTONIA
MINISTRY OF EDUCATION
AND RESEARCH

Valitsus kiitis heaks
ajakohastatud riiklikud
õppekavad

23.02.2023 | 10:41

<https://hm.ee/uudised/valitsus-kiitis-heaks-ajakohastatud-riiklikud-oppekavad>

Government approves updated national curricula

Vabariigi Valitsus kiitis täna heaks riiklike õppekavade muudatuste määruse, mille eesmärk on ajakohastada põhikooli ja gümnaasiumi riiklikud õppekavad. Aineõppes hakatakse õppima seda, mis on nii tänases maailmas kui ka õppija enda jaoks asjakohane ning aineõppes arendatakse süsteemselt üldpädevusi, näiteks õpi-, digi-, suhtlus-, kultuuri- ja väärtuspädevust.

Today, the Government of the Republic approved a decree on changes to the national curricula, which aims to update the national curricula of primary and secondary schools. Subjects will be taught in a way that is relevant to **today's world and to the learner**, and general **competences such as learning**, digital, communication, culture and values will be systematically developed.

Õpetajate Leht

Haridus- ja teadusminister kohtus riiklike õppekavade ajakohastamise töörühmade juhtidega

The renewal of the **math curriculum** kept in focus two important ideas in the development of mathematical thinking:

mathematical mindset and problem solving.

For example, in the general part of the curriculum, attention has been paid to creating a supportive classroom environment where it is allowed to be wrong and where **diversity of ideas and opinions** is recognised.

Silvia Pajus ja Kadri Saaremaa, matemaatika valdkonna töörühma esindajad:

„Matemaatika ainekava uuendamisel on fookuses kahte olulist ideed **matemaatilise** **arenguuskumuse ja probleemilahendusoskuse**. Näiteks on ainekava üldosas pööratud tähelepanu sellele, et klassiruumis oleks toetav keskkond, kus on lubatud eksida ning tunnustatakse ideede ja arvamuste paljususe eest.

Uuendusena on igasse kooliastmesse lisatud uus teemavaldkond „probleemide lahendamine“, mille õpitulemusi rakendab õpetaja teiste teemavaldkondade (näiteks arvutamine, geomeetria jt) õpetamisel. Lisaks on loodud ülevaatlik tabel kooliastme lõpuks taotletavate teadmiste, oskuste ja hoiakutega, et õpetajal tekiks ülevaade teadmiste arengust läbi kooliastmete.“

Vabariigi Valitsuse 6. jaanuari 2011. a määrus nr 1
„Põhikooli riiklik õppekava“
Lisa 5
(muudetud sõnastuses)

Ainevaldkond „Matemaatika“
1. Üldalused

1. General principles

9) learning environments, materials and tools based on information and communication technologies are used;

11) hands-on activities are planned in lessons to support better understanding of what is being taught;

1.5. Planning and organising learning

1.5. Õppe kavandamine ja korraldamine

Õppetegevus on õppijakeskne, toetab õpimotivatsiooni hoidmist ja õpilaste kujunemist aktiivseiks ja iseseisvaks õppijaiks ning loovaks ja kriitiliselt mõtlevaks ühiskonnaliikmeiks, kes suudavad teha valikuid ja võtta vastutust oma õppimise eest.

Põhikoolis õppetegevust kavandades ja korraldades teevad õpetajad koostööd, seejuures:

- 1) lähtutakse õppekava alusväärtustest, üldpädevustest, valdkonnapädevusest, kooliastme lõpuks taotletavatest teadmistest, oskustest ja hoiakutest ning õpitulemustest ja kooli õppekavas sätestatud õppesisust, kooliastmete õppe ja kasvatus rõhuasetustest ning lõimingust teiste õppeainete ja läbivate teemadega;
 - 2) arvestatakse didaktika nüüdisaegsete käsitluste ja ainevaldkonnas toimunud arenguga, võetakse arvesse kohaliku eripära ning muutusi ühiskonnas;
 - 3) taotletakse, et õpilase õpikoormus (sh kodutööde maht) on mõõdukas, jaotub õppeaasta ulatuses ühtlaselt ning jätab piisavalt aega puhkuseks ja huvitegevusteks;
 - 4) arvestatakse õpilaste eelteadmisi, huvisid, individuaalseid eripärasid ja võimeid, kasutatakse diferentseeritud ja sobivat pingutust nõudvaid ülesandeid, mille sisu ja raskusaste toetavad individualiseeritud ja õpilasele tähenduslikku käsitlust, reageeritakse õpi- ja eluraskustele, pakutakse õpiabi ja tuge õpivalikutes;
 - 5) võimaldatakse õpet nii individuaalselt kui ka koos teistega, kujundatakse õpiharjumusi ja -oskusi, suunatakse tegema valikuid;
 - 6) kaasatakse õpilasi õppetegevuste kavandamisse, võetakse aega eesmärkide ja taotletavate õpitulemuste saavutamise viiside ja hindamiskriteeriumide läbiarutamiseks ning refleksiooniks;
 - 7) rakendatakse uurivat õpet ja kasutatakse mitmekesiseid ja kombineeritud õppemeetodeid ning aktiivsust, loovust, koostööd ja tagasisidet soodustavaid õppetegevusi, laiendatakse õpilaste teadmisi, arendatakse oskusi ja kujundatakse hoiakuid;
 - 8) pööratakse tähelepanu õpitavast arusaamisele ning õpilaste loogilise ja loova mõtlemise arendamisele;
 - 9) rakendatakse ja kasutatakse info- ja kommunikatsioonitehnoloogiatel põhinevaid õpikeskkondi, õppematerjale ja -vahendeid;
 - 10) võimaldatakse siduda õpet koolivälise eluga, et kogu ainekäsitlus oleks võimalikult elulähedane, õpilasele eakohane ja tähenduslik;
 - 11) planeeritakse õppetöösse käelisi tegevusi, mis toetavad õpitava paremat mõistmist;
 - 12) tagatakse õppetöö tulemuslikkus õpitu kinnistamise ja kordamise abil.
- Lisaks on oluline eristada üksik- ja üldoskusi ning mõlemaid õpilastes arendada.

When will Estonia start conducting final exams as e-exams and are our teachers ready?



Estonian language exam this spring



No!

When will Estonia start conducting final exams as e-exams and are our teachers ready?



How are student solutions checked?



Who will prepare the exercise material and when will it be seen?



How is "leakage" of exam material prevented?



How will the exam be conducted?



Who is in charge of designing and implementing the exam information system?



Which countries have e-exams?



Estonia
participates
for the 1st
time



PISA 2000

PISA 2003

PISA 2006

PISA 2009

PISA 2012

PISA 2015

PISA 2018

PISA 2022

Reading

Mathematics

Science

Reading

Mathematics

Science

Reading

Mathematics

Changes in Estonia's performance over time

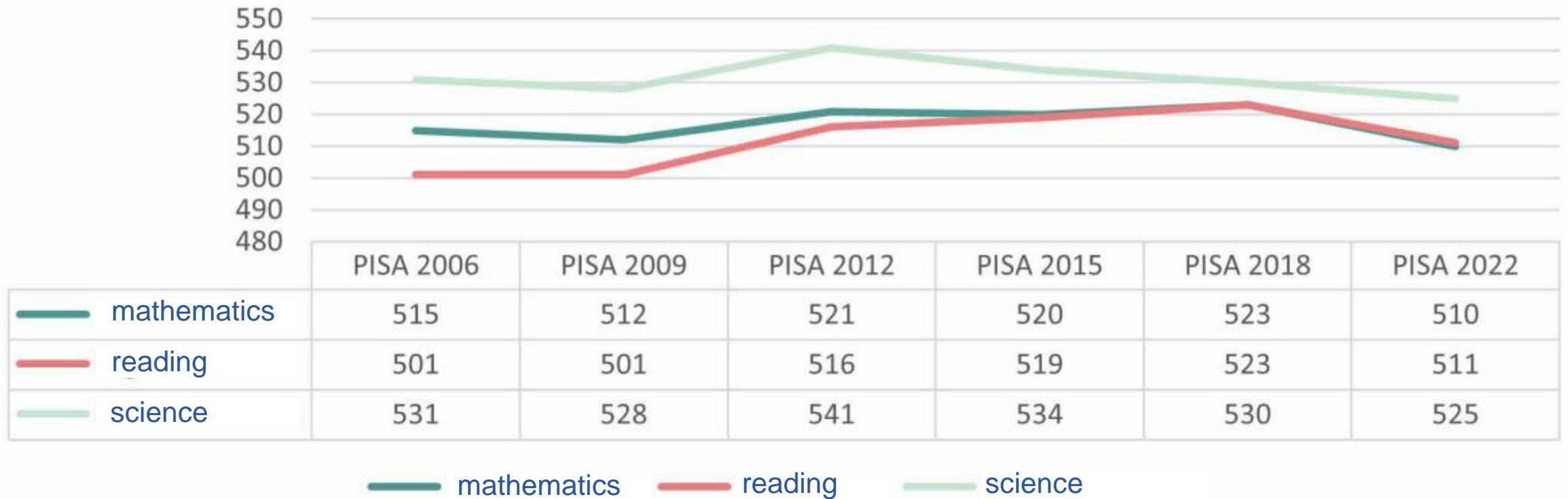


Figure 1. Average results in maths, reading and science in Estonia

Mathematics

We are ranked 6th-7th among all countries in the mathematics test, 3rd-4th among OECD countries. In the European ranking, we share 1st-2nd place with Switzerland.

In terms of our result compared to 2018, we are in the same place, although our average result is dropped by 13 points (equivalent to a third of the academic year).

Jrk	Tulemus	Matemaatika	Jrk	Tulemus	Lugemine	Jrk	Tulemus	Loodusteadused
1	575	Singapur	1	543	Singapur	1	561	Singapur
2	552	Macau (Hiina)	2	516	Iirimaa	2	547	Jaapan
3	547	Taipei (Hiina)	3	516	Jaapan	3	543	Macau (Hiina)
4	540	Hongkong (Hiina)	4	515	Korea	4	537	Taipei (Hiina)
5	536	Jaapan	5	515	Taipei (Hiina)	5	528	Korea
6	527	Korea	6	511	Eesti •	6	526	Eesti •
7	510	Eesti •	7	510	Macau (Hiina)	7	520	Hongkong (Hiina)
8	508	Šveits	8	507	Kanada	8	515	Kanada
9	497	Kanada	9	504	USA	9	511	Soome
10	493	Holland	10	501	Uus-Meremaa	10	507	Austraalia
11	492	Iirimaa	11	500	Hongkong (Hiina)	11	504	Uus-Meremaa
12	489	Belgia	12	498	Austraalia	12	504	Iirimaa
13	489	Taani	13	494	Suurbritannia	13	503	Šveits
14	489	Suurbritannia	14	490	Soome	14	500	Sloveenia
15	489	Poola	15	489	Taani	15	500	Suurbritannia
16	487	Austria	16	489	Poola	16	499	USA
17	487	Austraalia	17	489	Tšehhi	17	499	Poola
18	487	Tšehhi	18	487	Rootsi	18	498	Tšehhi
19	485	Sloveenia	19	483	Šveits	19	494	Läti
20	484	Soome	20	482	Itaalia	20	494	Taani
21	483	Läti	21	480	Austria	21	494	Rootsi
22	482	Rootsi	22	480	Saksamaa	22	492	Saksamaa
23	479	Uus-Meremaa	23	479	Belgia	23	491	Austria
24	475	Leedu	24	477	Portugal	24	491	Belgia
25	475	Saksamaa	25	477	Norra	25	488	Holland

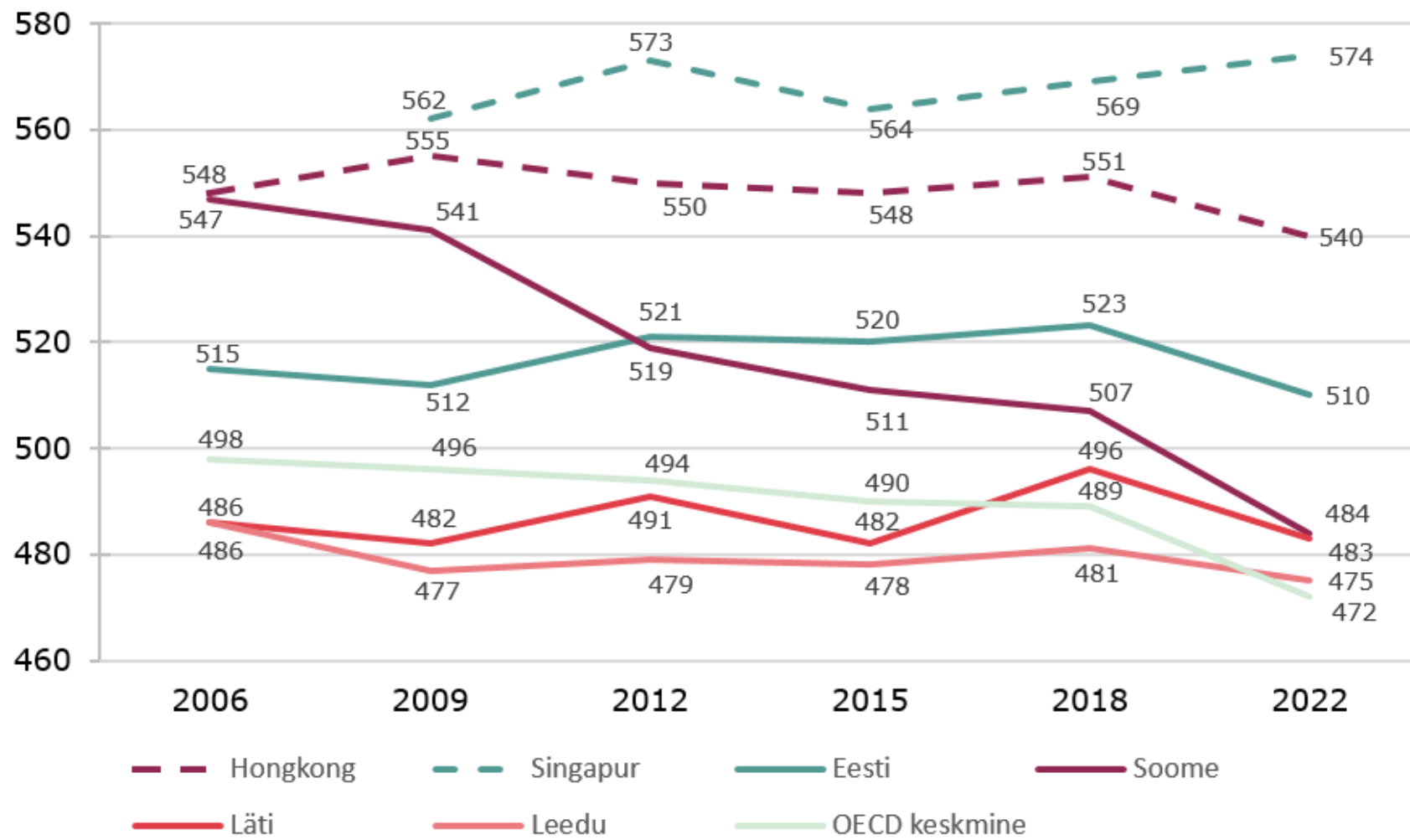


Figure 2. Dynamics of average performance by country in mathematics

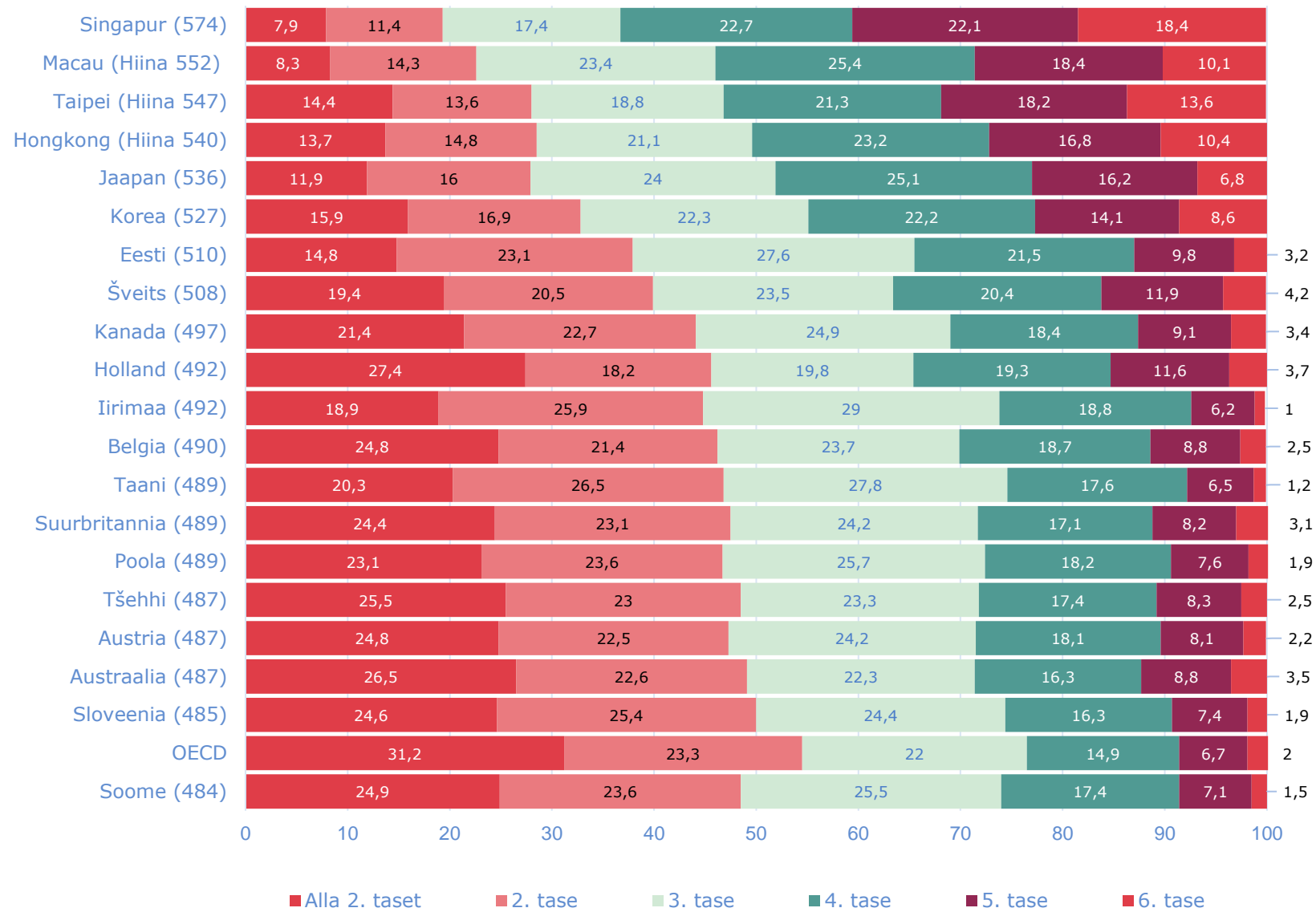


Figure 3. Percentage distribution of students in the 20 strongest countries by level of achievement in mathematics

Table 1. Mean scores in student performance on the mathematics content subscales

	x	Quantity	x	Space and shape	x	Change and relationships	x	Uncertainty and data
1.	579	Singapur	570	Singapur	574	Singapur	579	Singapur
2.	551	Macau (Hiina)	555	Macau (Hiina)	552	Macau (Hiina)	552	Macau (Hiina)
3.	546	Taibei (Hiina)	550	Taibei (Hiina)	549	Taibei (Hiina)	546	Taibei (Hiina)
4.	545	Hongkong (Hiina)	541	Jaapan	537	Hongkong (Hiina)	542	Hongkong (Hiina)
5.	535	Jaapan	541	Hongkong (Hiina)	533	Jaapan	540	Jaapan
6.	527	Korea	537	Korea	525	Korea	524	Korea
7.	515	Eesti	518	Šveits	508	Eesti	503	Eesti
8.	510	Šveits	514	Eesti	504	Šveits	502	Šveits
9.	496	Holland	496	Tšehhi	502	Kanada	500	Kanada
10.	494	Kanada	494	Taani	492	Iirimaa	499	Iirimaa
11.	494	Iirimaa	492	Kanada	489	Holland	499	Suurbritannia
12.	493	Poola	492	Sloveenia	488	Belgia	498	Taani
13.	491	Austria	490	Austria	487	Suurbritannia	496	Holland
14.	490	Tšehhi	489	Belgia	486	Austraalia	494	Austraalia
15.	488	Suurbritannia	488	Läti	484	Poola	493	Belgia
16.	488	Belgia	487	Poola	483	Läti	489	Poola
17.	486	Sloveenia	486	Holland	482	Taani	486	Uus-Meremaa
18.	486	Taani	485	Soome	482	Austria	485	Austria
19.	485	Läti	485	Austraalia	481	Soome	485	Soome
20.	485	Soome	483	Rootsi	480	Rootsi	483	Tšehhi
21.	483	Austraalia	477	Suurbritannia	480	Sloveenia	483	Sloveenia
22.	480	Rootsi	475	Saksamaa	479	Tšehhi	481	Rootsi
23.	479	Ungari	474	Iirimaa	477	Uus-Meremaa	479	Hispaania
24.	479	Leedu	474	Uus-Meremaa	474	Prantsusmaa	478	Läti
25.	478	Uus-Meremaa	472	Portugal	473	Leedu	478	Prantsusmaa
26.	476	Saksamaa	471	Leedu	473	Hispaania	478	Portugal
27.	472	OECD	471	Prantsusmaa	471	Portugal	476	USA
28.	471	Hispaania	471	Slovakkia	470	OECD	475	Saksamaa
29.	470	Prantsusmaa	471	OECD	470	Saksamaa	474	OECD
30.	469	Itaalia	471	Itaalia	468	Itaalia	474	Malta
31.	469	Slovakkia	469	Ungari	467	Ungari	473	Itaalia
32.	469	Norra	469	Norra	465	USA	472	Ungari
33.	466	Portugal	465	Island	465	Malta	471	Leedu

Table 2. Mean scores in student performance on the mathematics process subscales

Nr	x	Formulating	x	Employing	x	Interpreting	x	Reasoning
1.	575	Singapur	579	Singapur	578	Singapur	572	Singapur
2.	556	Macau (Hiina)	552	Macau (Hiina)	550	Macau (Hiina)	553	Macau (Hiina)
3.	550	Taibei (Hiina)	550	Taibei (Hiina)	548	Taibei (Hiina)	547	Taibei (Hiina)
4.	541	Hongkong (Hiina)	547	Hongkong (Hiina)	544	Jaapan	539	Hongkong (Hiina)
5.	536	Jaapan	536	Jaapan	540	Hongkong (Hiina)	534	Jaapan
6.	525	Korea	522	Korea	532	Korea	528	Korea
7.	507	Šveits	512	Eesti	511	Eesti	513	Šveits
8.	507	Eesti	508	Šveits	506	Šveits	509	Eesti
9.	493	Kanada	499	Holland	503	Kanada	499	Kanada
10.	492	Holland	495	Kanada	495	Holland	495	Taani
11.	488	Tšehhi	494	Iirimaa	495	Iirimaa	492	Austria
12.	487	Iirimaa	491	Poola	493	Belgia	491	Belgia
13.	486	Belgia	489	Suurbritannia	493	Austraalia	491	Rootsi
14.	486	Taani	488	Tšehhi	492	Suurbritannia	490	Holland
15.	485	Poola	488	Belgia	490	Poola	490	Suurbritannia
16.	484	Suurbritannia	488	Austria	489	Taani	490	Iirimaa
17.	484	Austraalia	487	Taani	488	Sloveenia	489	Poola
18.	484	Austria	485	Austraalia	487	Soome	486	Austraalia
19.	483	Läti	484	Läti	486	Uus-Meremaa	485	Soome
20.	482	Soome	483	Sloveenia	485	Läti	485	Tšehhi
21.	482	Sloveenia	481	Soome	484	Tšehhi	484	Sloveenia
22.	474	Uus-Meremaa	481	Rootsi	482	Austria	482	Uus-Meremaa
23.	474	Rootsi	477	Uus-Meremaa	482	Prantsusmaa	481	Läti
24.	470	Saksamaa	477	Ungari	480	Portugal	476	Norra
25.	470	Leedu	476	Saksamaa	478	Rootsi	476	Hispaania
26.	469	OECD	476	Leedu	478	Hispaania	475	Itaalia
27.	468	Ungari	472	OECD	476	Leedu	473	OECD
28.	467	Portugal	472	Prantsusmaa	475	Saksamaa	473	Saksamaa
29.	466	Hispaania	470	Itaalia	475	USA	472	Leedu
30.	465	Norra	470	Hispaania	475	Ungari	472	Prantsusmaa

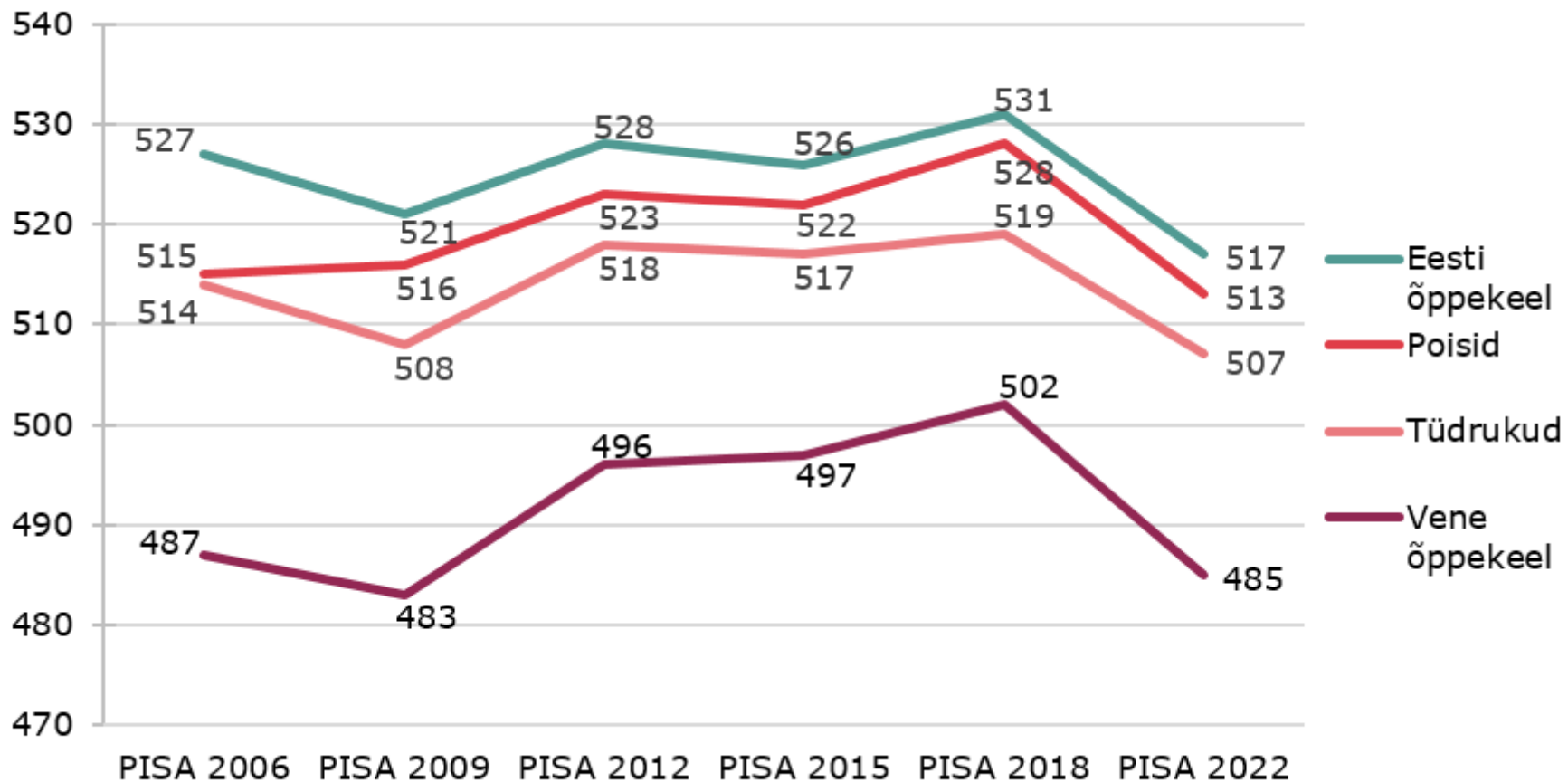
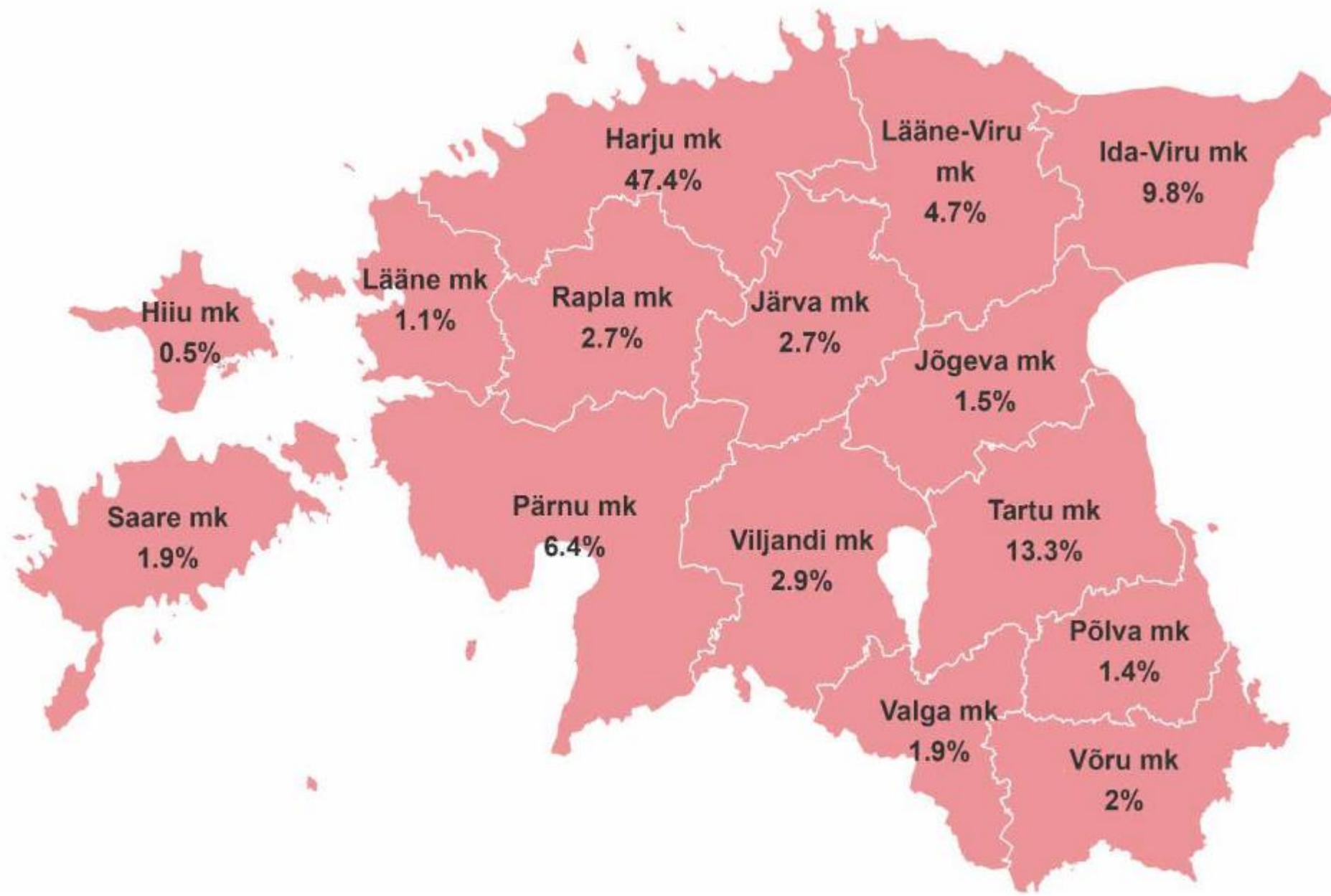


Figure 4. Dynamics of the average result by language of performance and gender



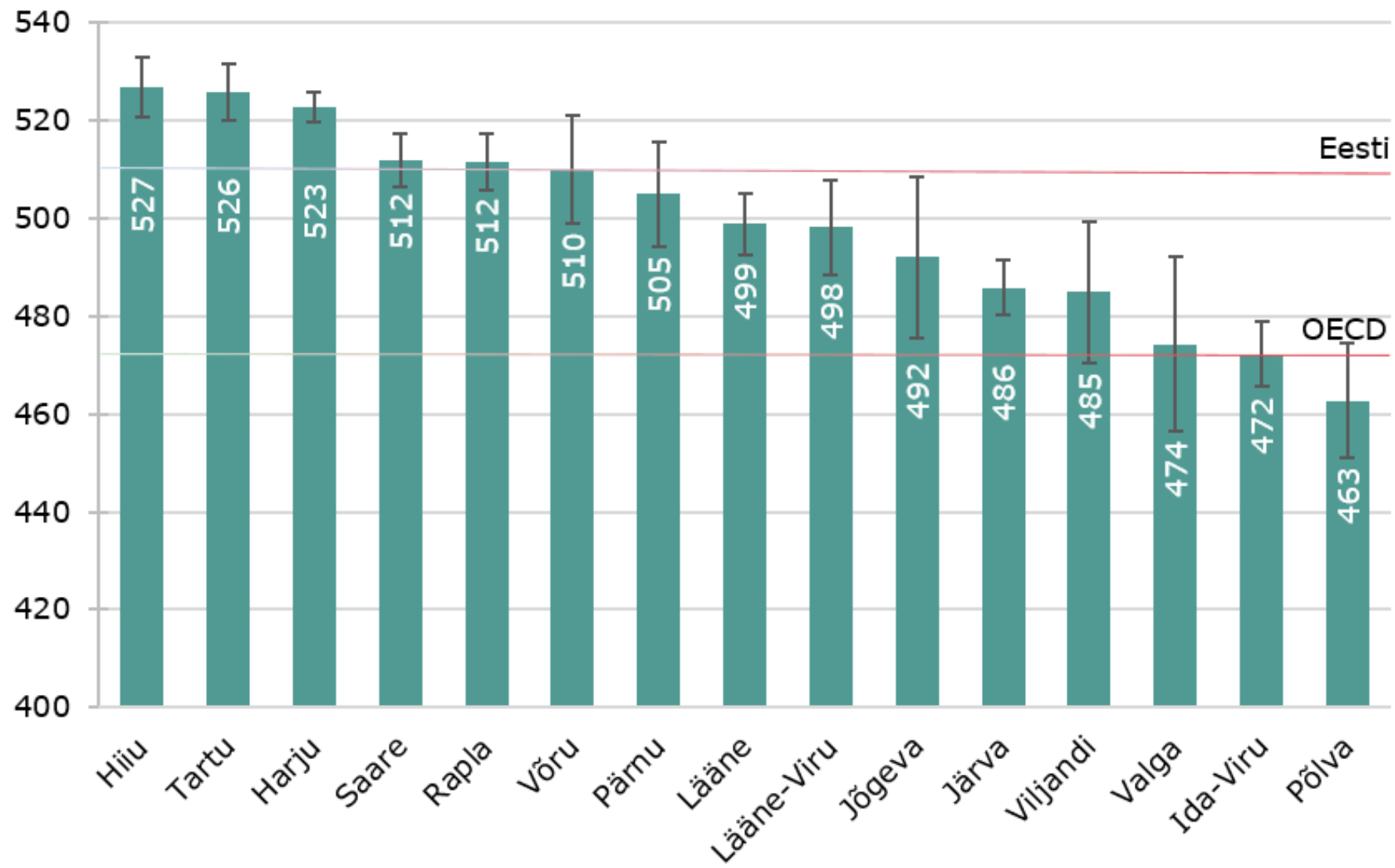


Figure 5. Average maths results by county
(\pm standarderror)

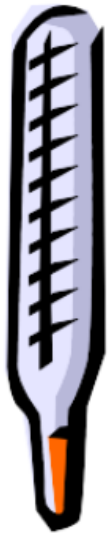


Pingutuse kraadiklaas

Kui palju Sa pingutasid?

Palun kujutle olukorda (koolis või kuskil mujal), mis on Sinule isiklikult äärmiselt tähtis ja kus Sa annad endast parima ja pingutad maksimaalselt, et võimalikult head tulemust saada.

Sellises olukorras märgiksid „pingutuse kraadiklaasil“ kõige kõrgema väärtuse, nagu allpool näidatud:



- 10
- 9
- 8
- 7
- 6
- 5
- 4
- 3
- 2
- 1

Kui palju Sa pingutasid seda testi täites, võrreldes äsja kujutletud olukorraga?

- 10
- 9
- 8
- 7
- 6
- 5
- 4
- 3
- 2
- 1

Kui palju Sa oleksid pingutanud siis, kui selles testis saadud tulemused läheksid arvesse Sinu koolihinnetes?

- 10
- 9
- 8
- 7
- 6
- 5
- 4
- 3
- 2
- 1

Jätkamiseks klõpsa noolt EDASI.

The majority of students in OECD countries (70.6%) reported that they made less effort in the PISA test than they would have had they done in an assessment task. In Estonia, 72.5% of test takers did so. The number of students who would try harder for a score has increased by 4.5% compared to 2018.

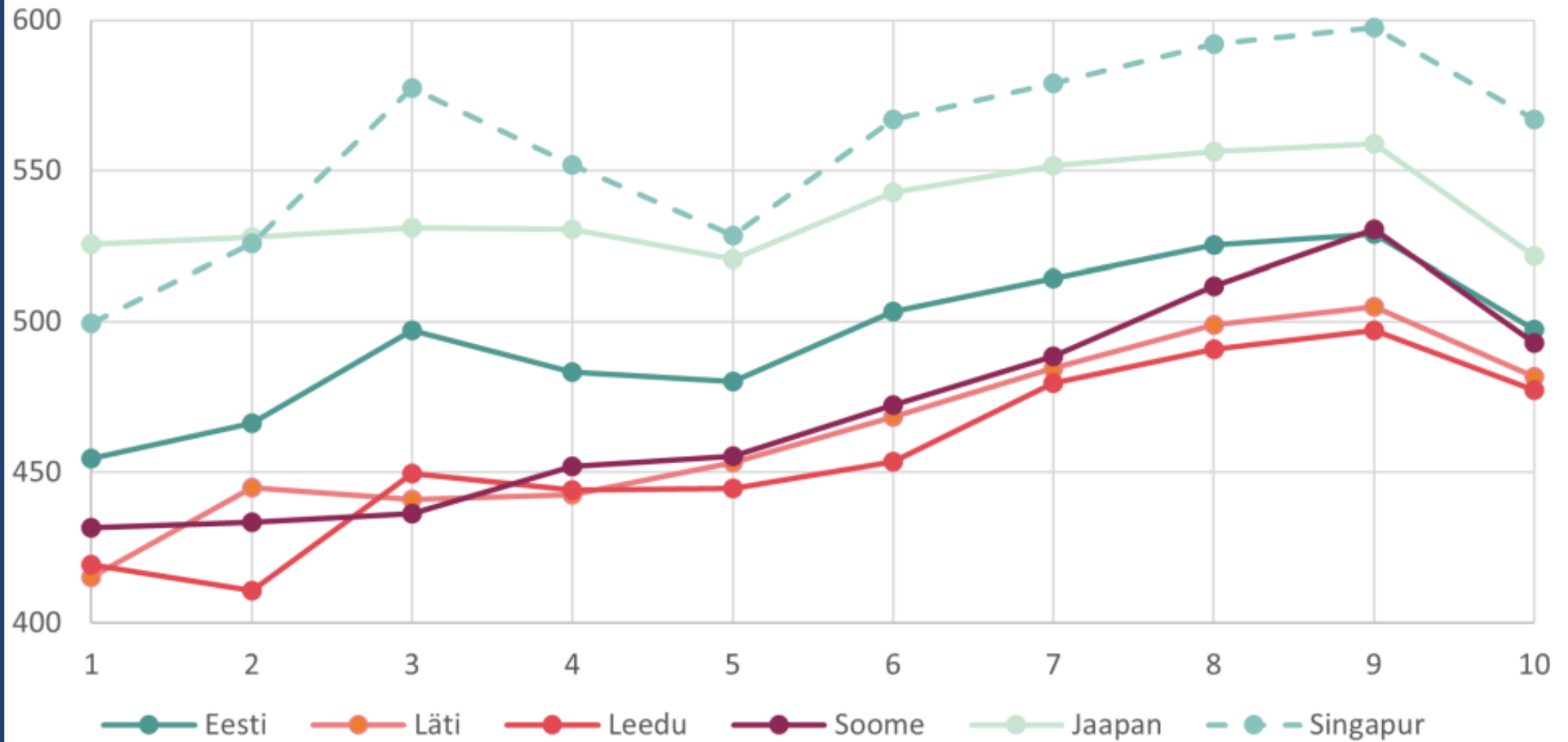
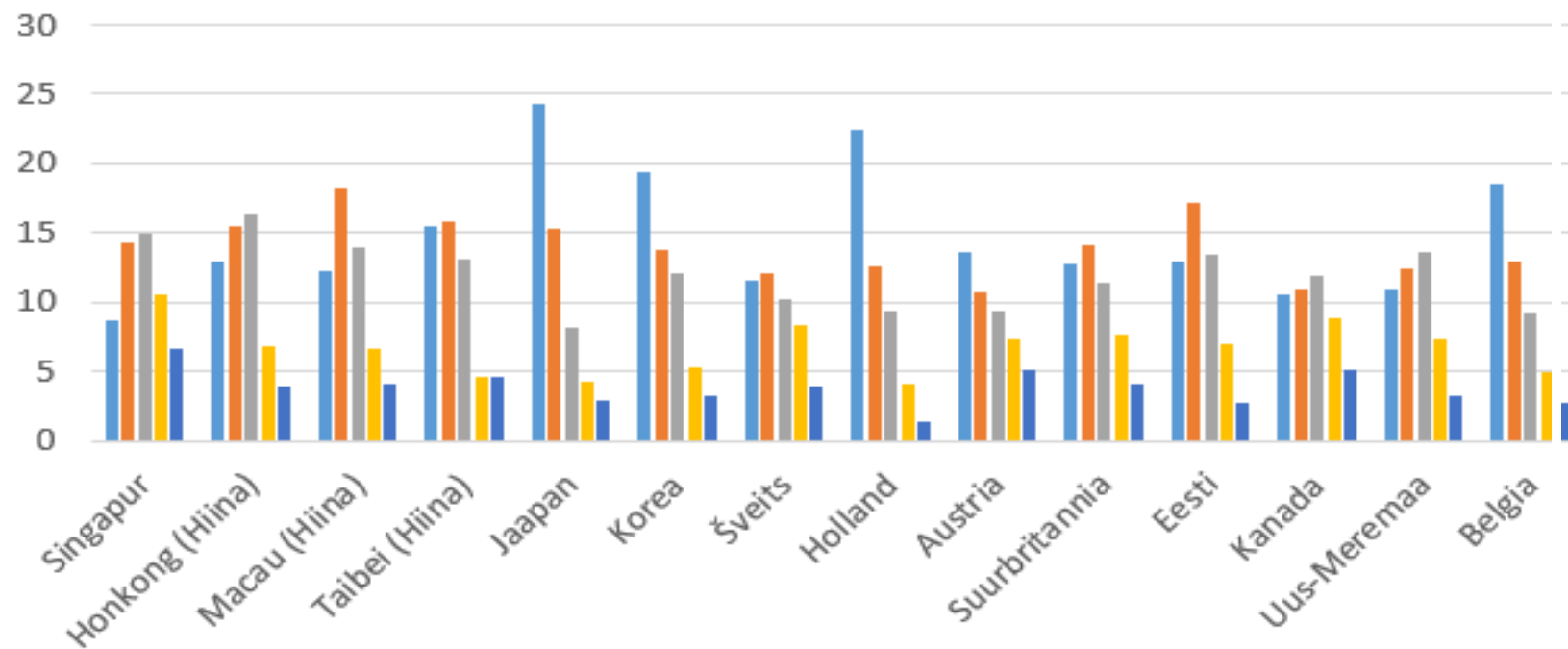
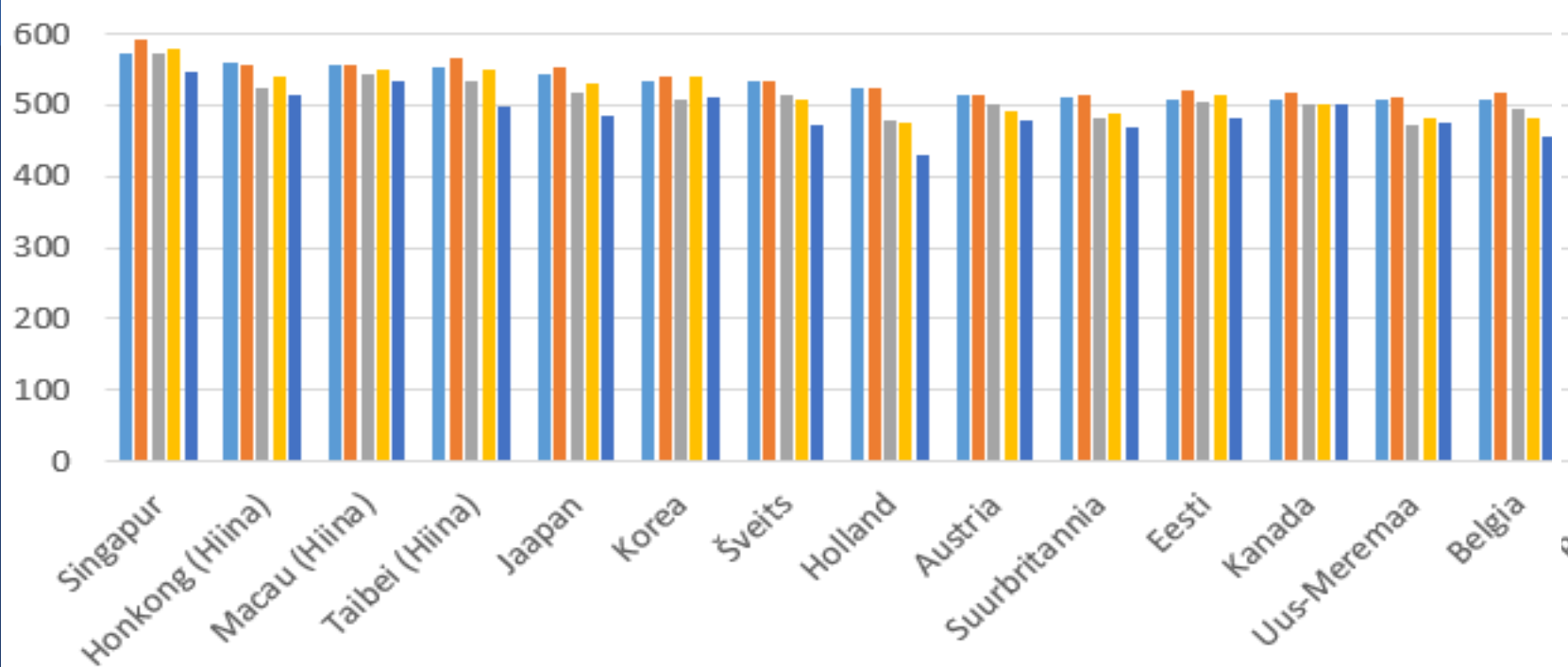


Figure 6.

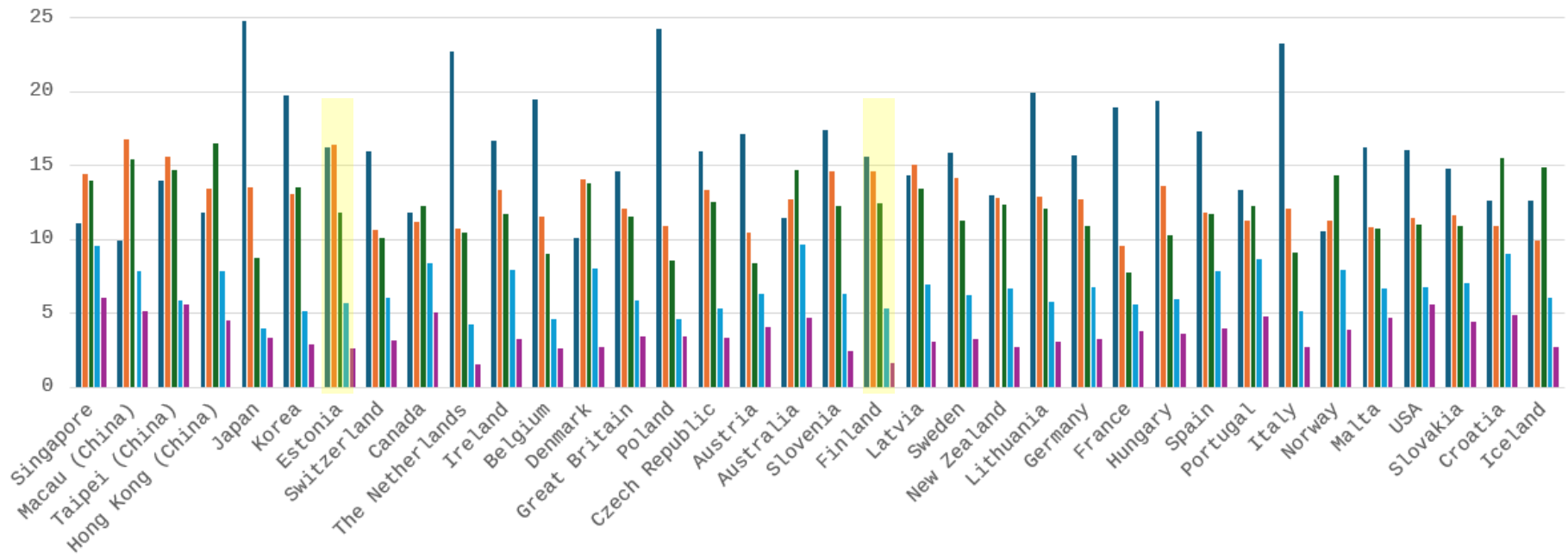
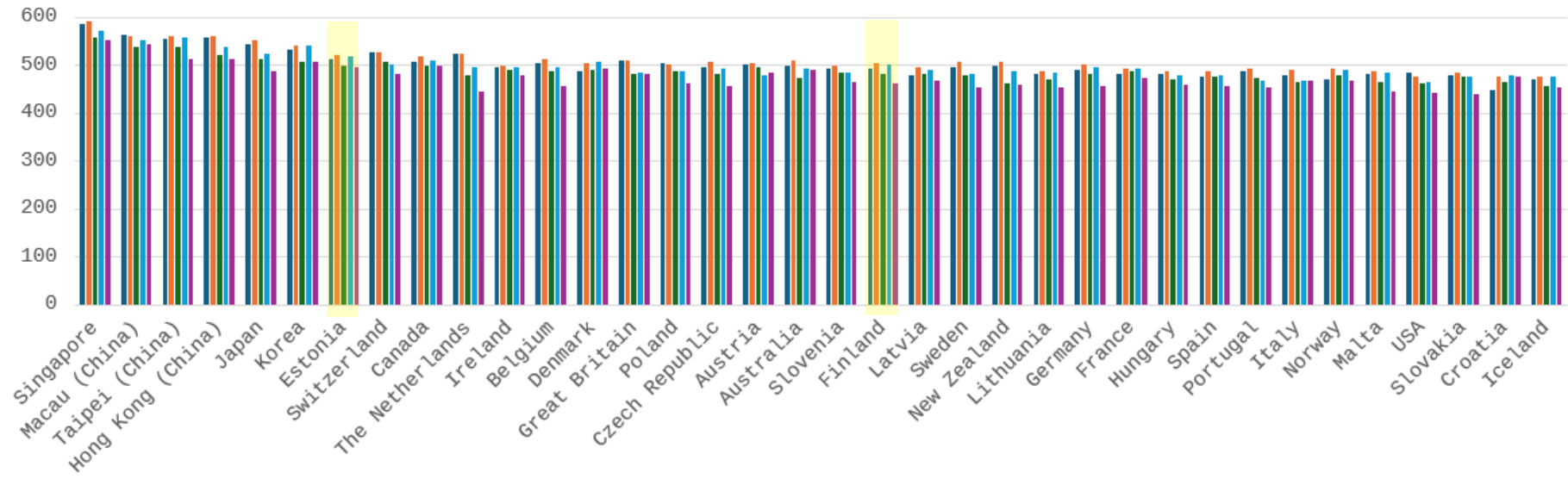
How much effort did students themselves report putting in to perform as well as possible on the PISA test

Figure 7. "The teacher showed us how mathematics can be useful in our everyday lives."

- never or almost never
- less than half of the lessons
- about half of the lessons
- more than half of the lessons
- every or almost every lesson

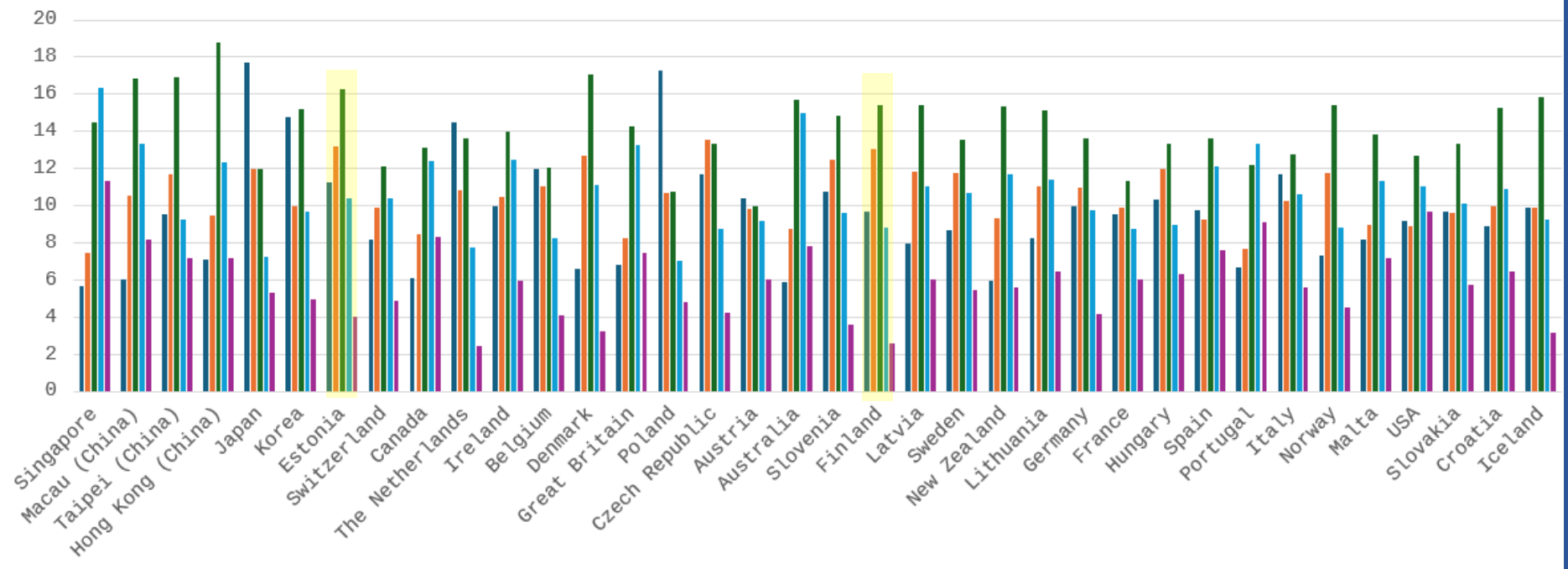
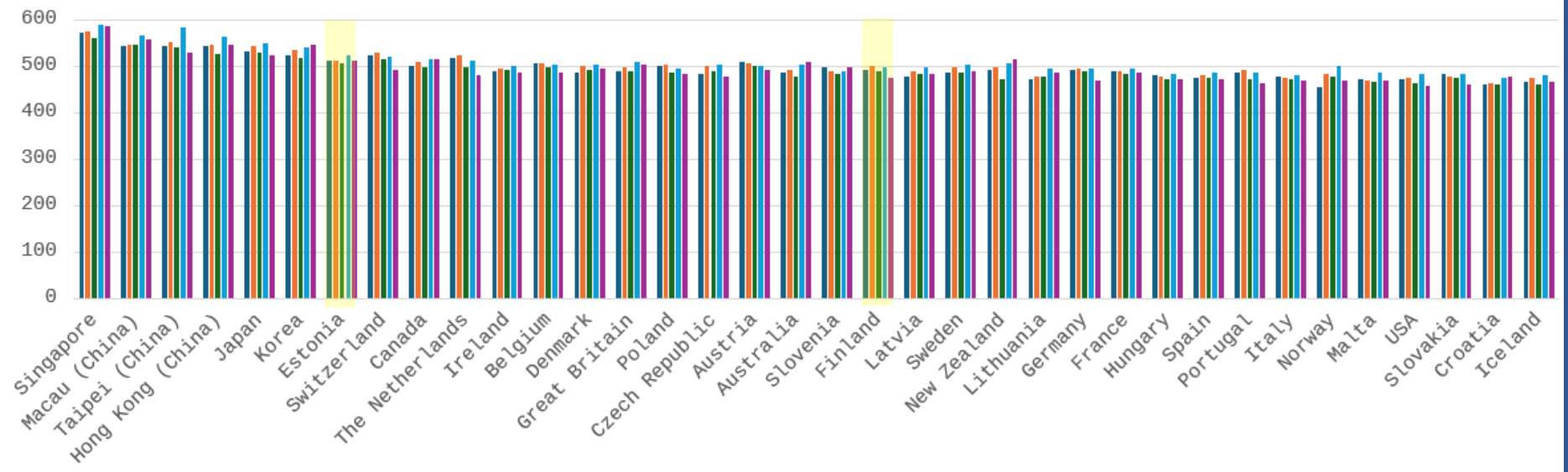


How often: The teacher asked us to think of problems from everyday life that could be solved with new mathematics knowledge



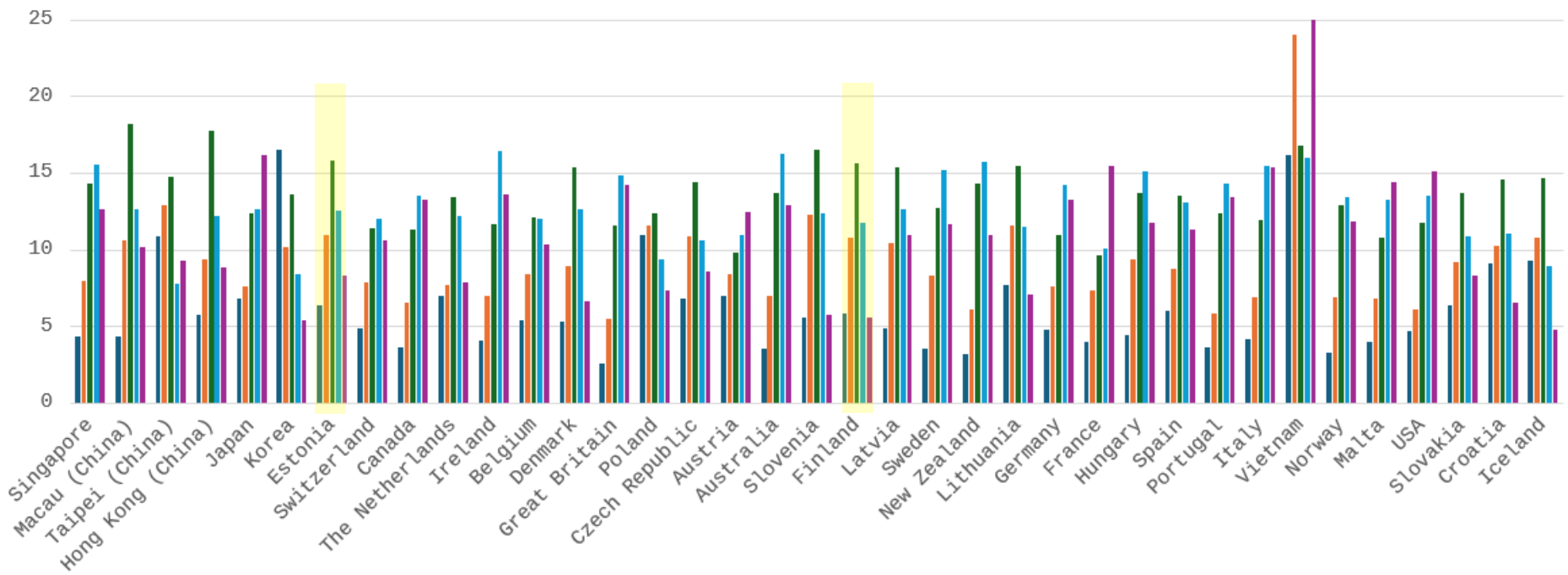
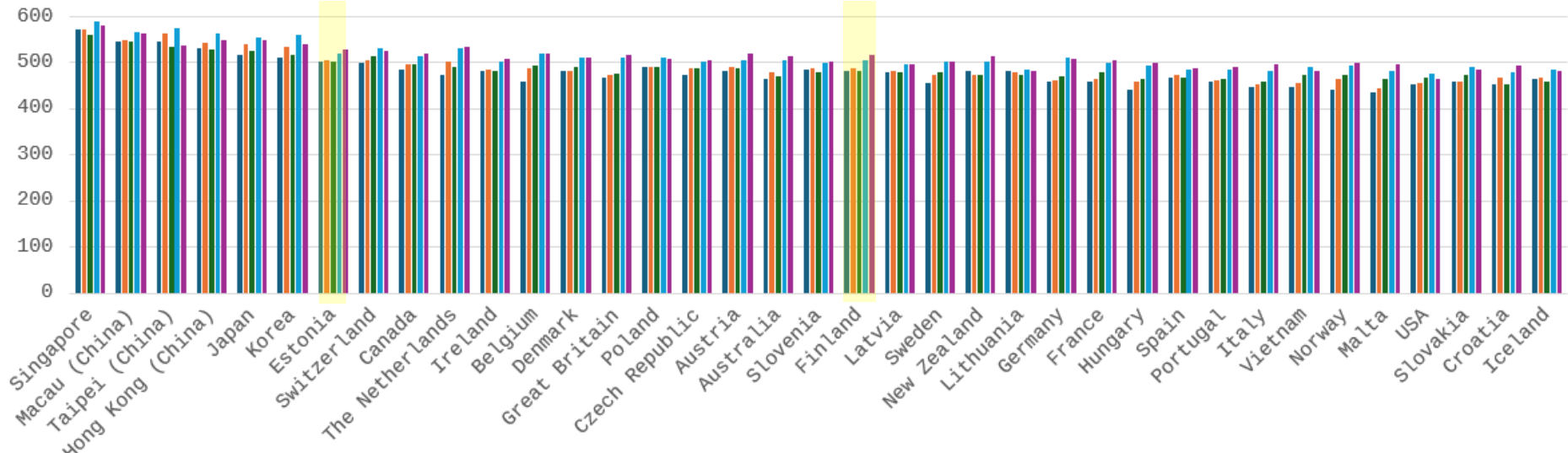
- Never or almost never
- Less than half of the lessons
- About half of the lessons
- More than half of the lessons
- Every lesson or almost every lesson

How often: The teacher taught us how to use mathematical logic when approaching new situations



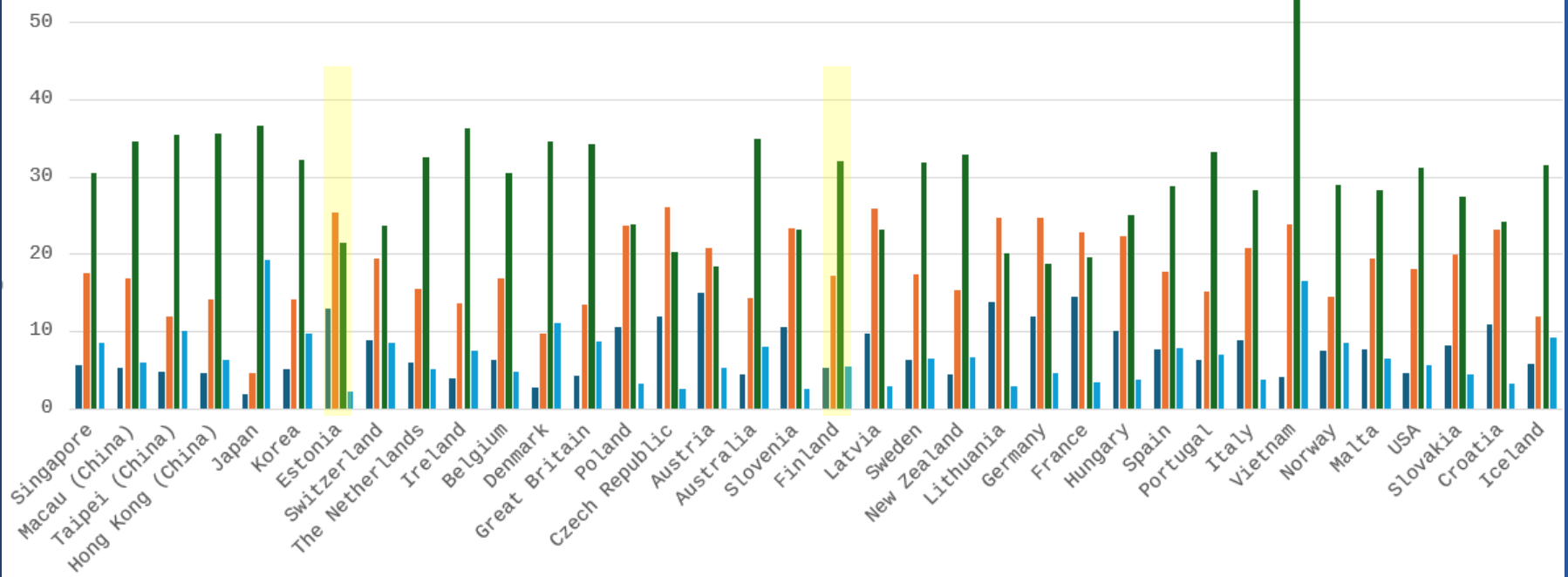
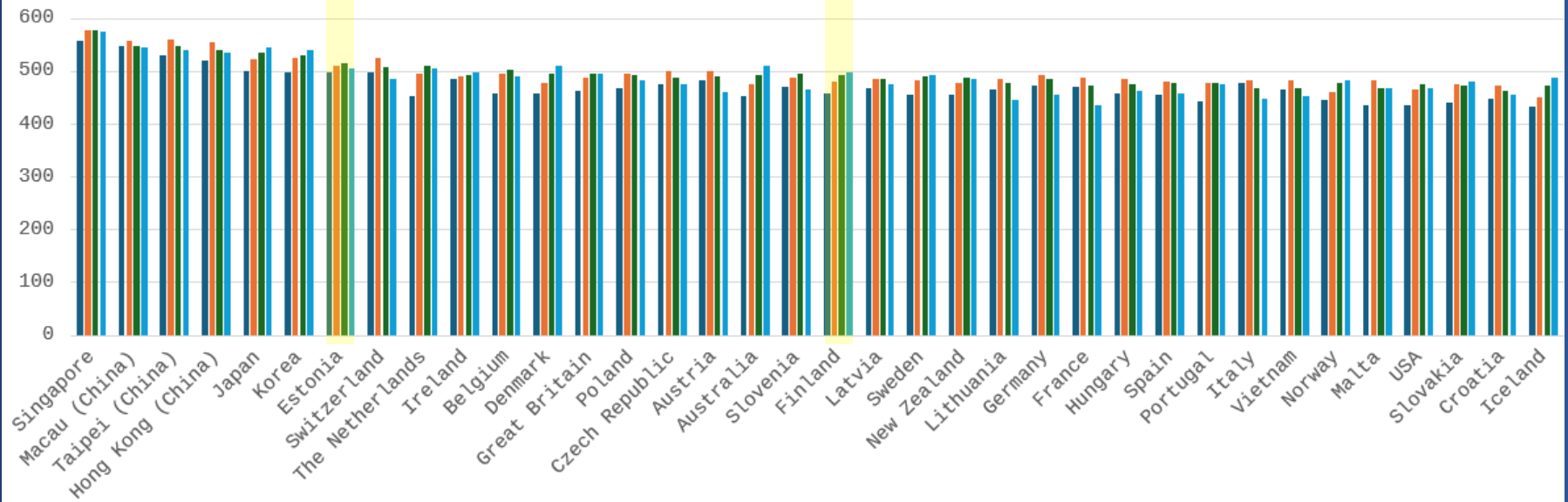
- Never or almost never
- Less than half of the lessons
- About half of the lessons
- More than half of the lessons
- Every lesson or almost every lesson

How often: The teacher asked us to explain our reasoning when solving a mathematics problem



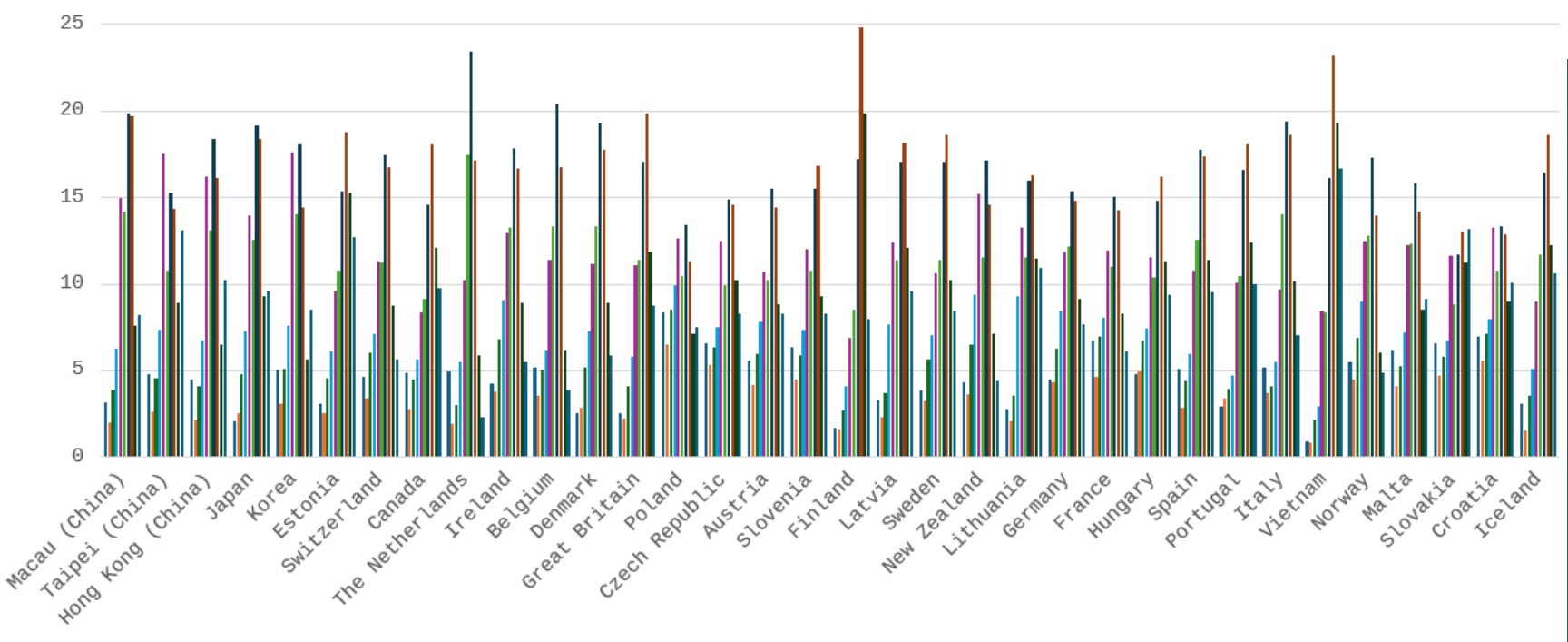
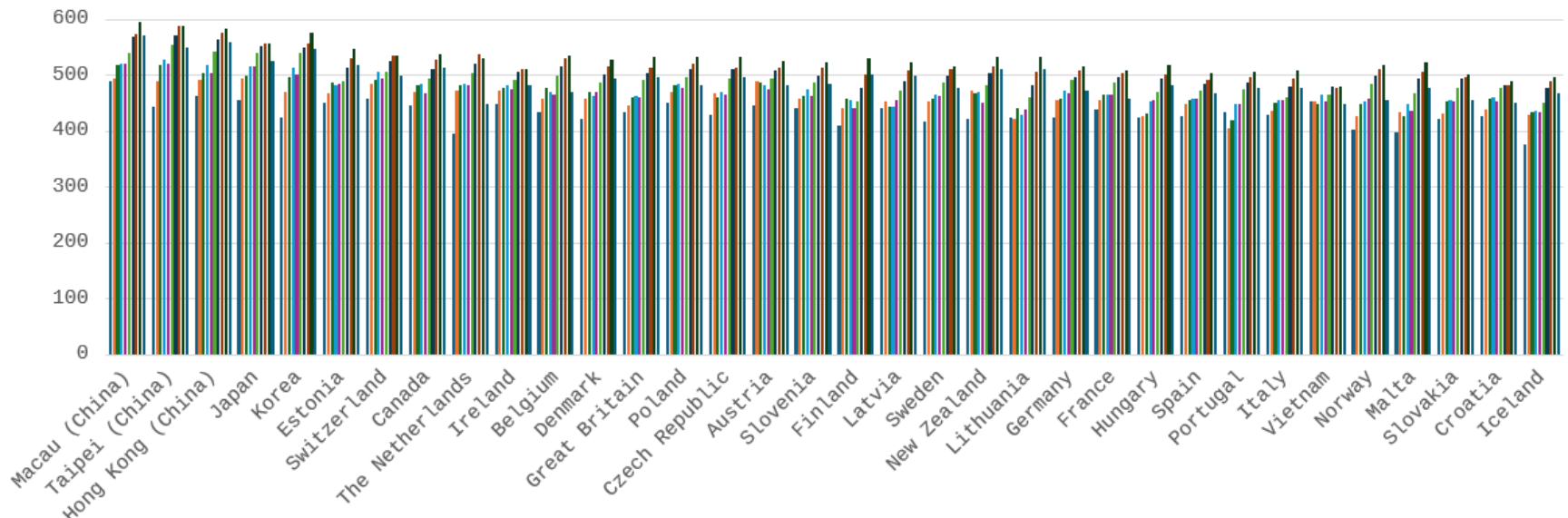
- Never or almost never
- Less than half of the lessons
- About half of the lessons
- More than half of the lessons
- Every lesson or almost every lesson

If I walked into my classes upset, my teachers would be concerned about me

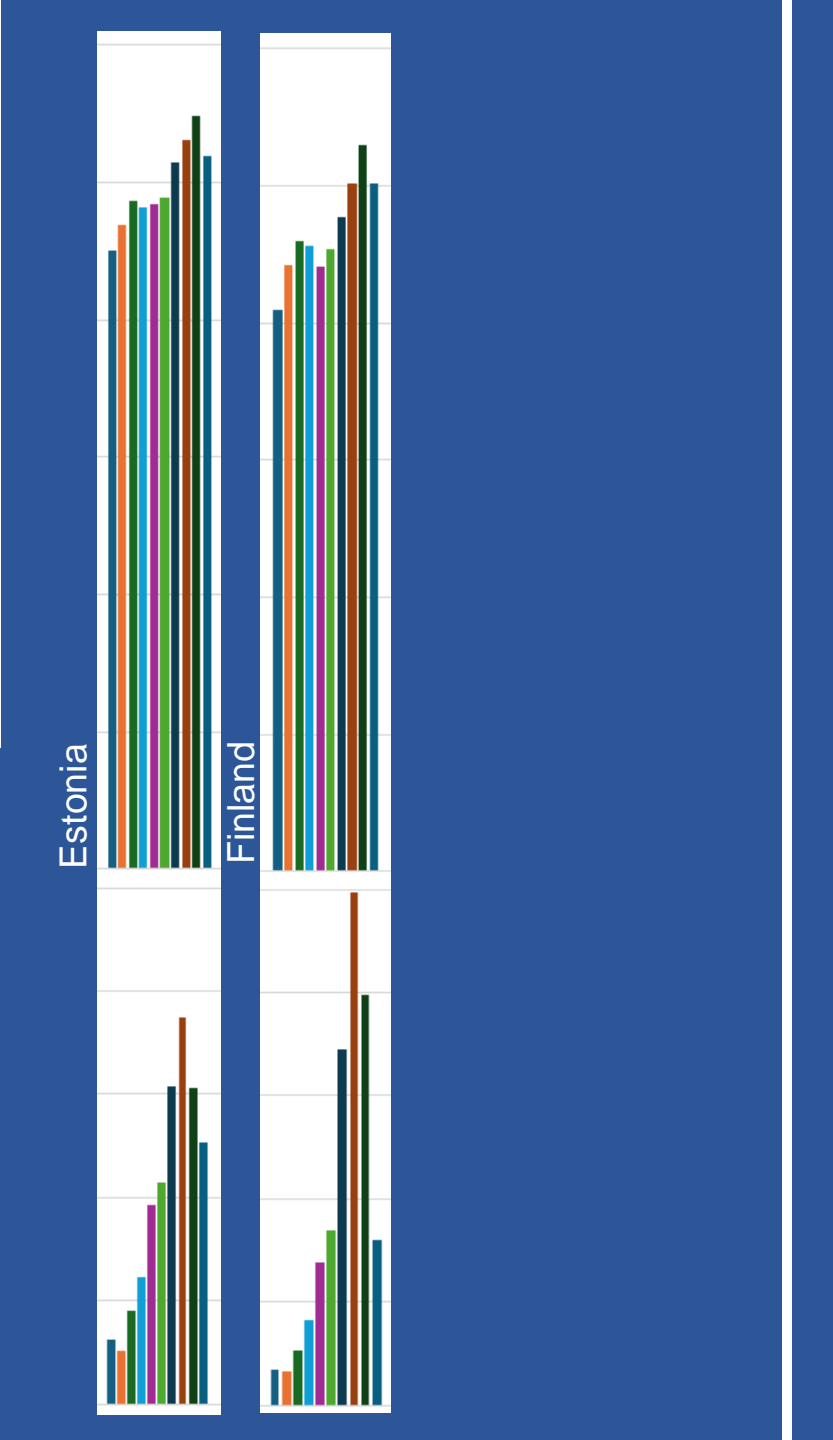


Strongly disagree Disagree Agree Strongly agree

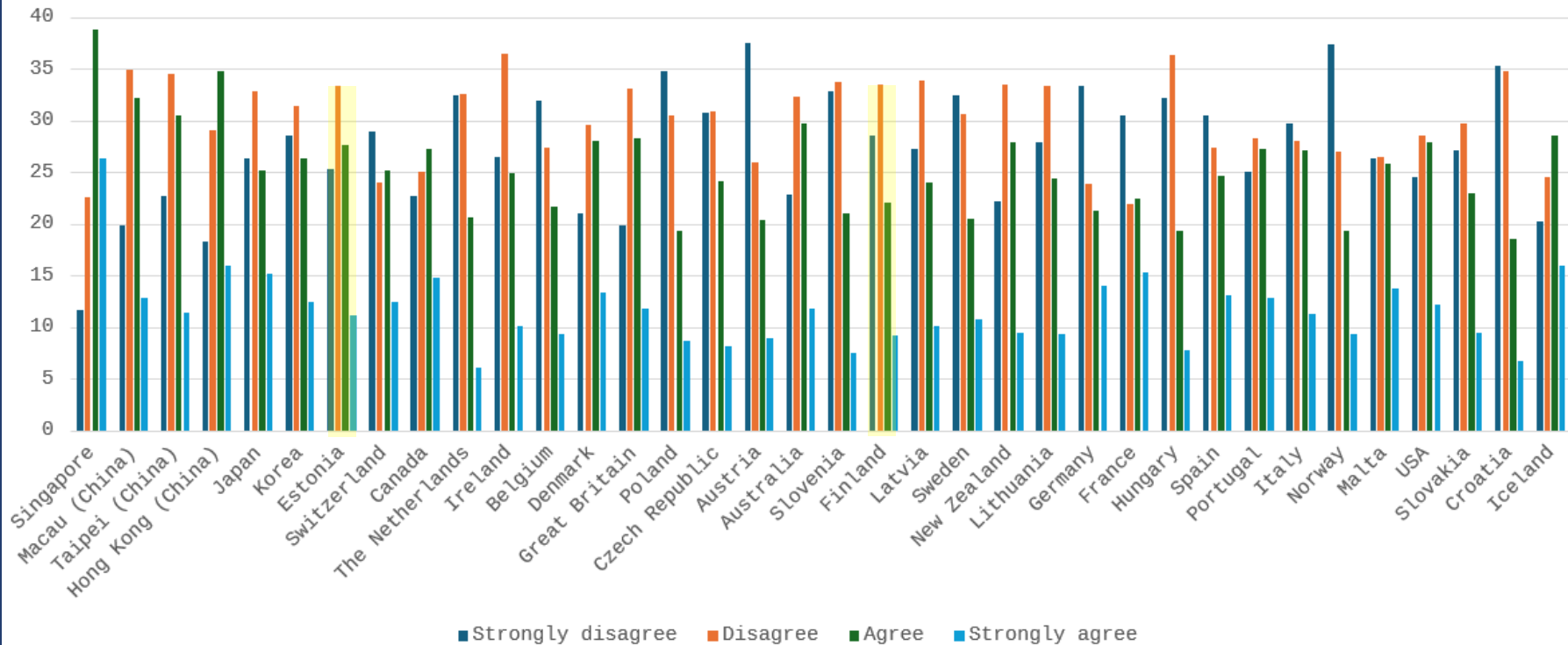
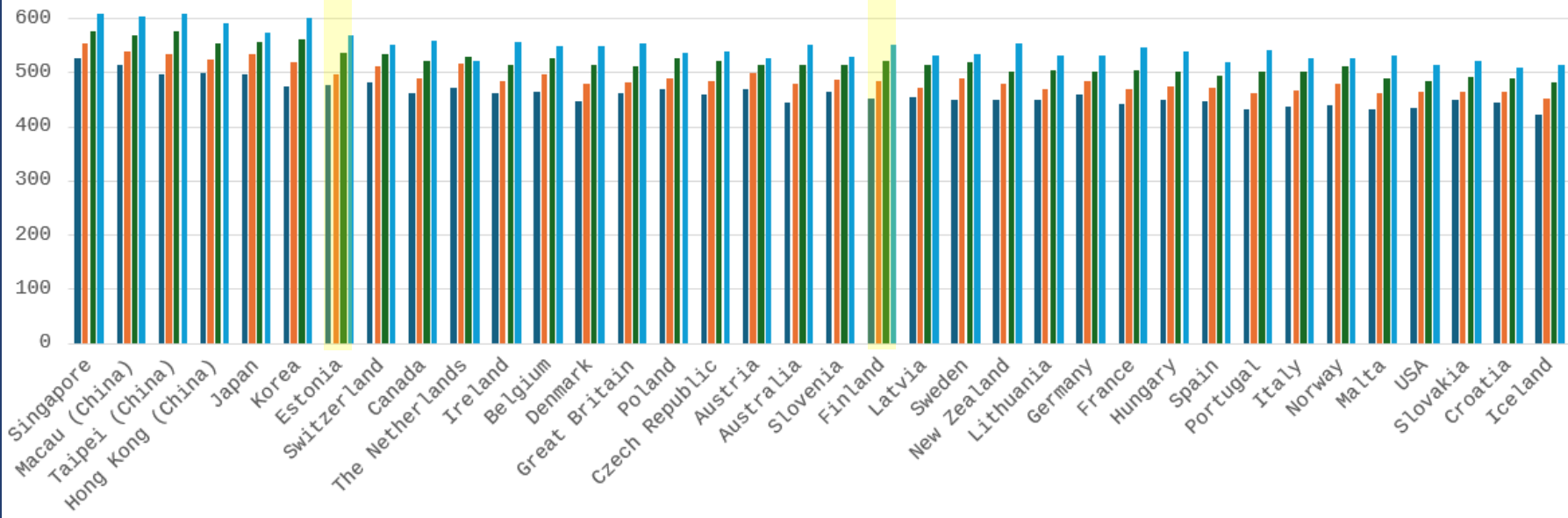
On 1-10 scale, rate quality of mathematics instruction this school year? Quality of mathematics instruction?



■ Worst mathematics instruction possible1 ■ 2 ■ 3 ■ 4 ■ 5 ■ 6 ■ 7 ■ 8 ■ 9 ■ Best mathematics instruction possible10

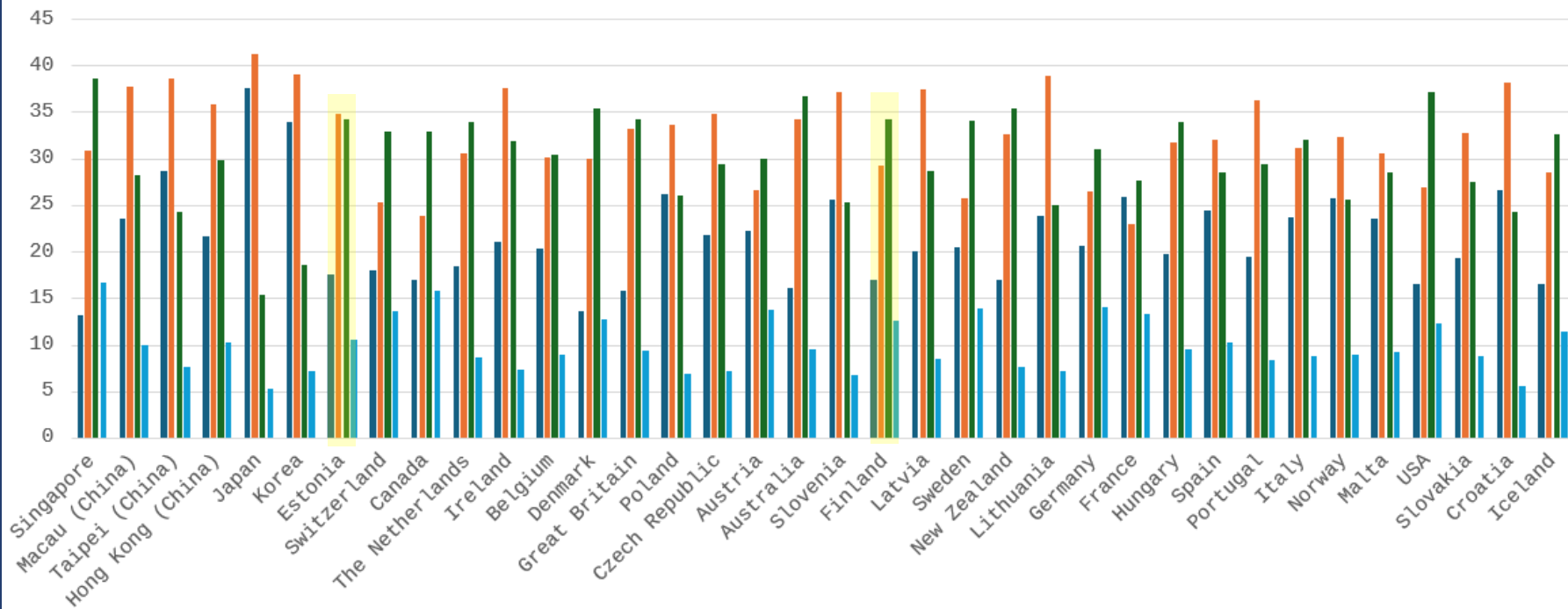
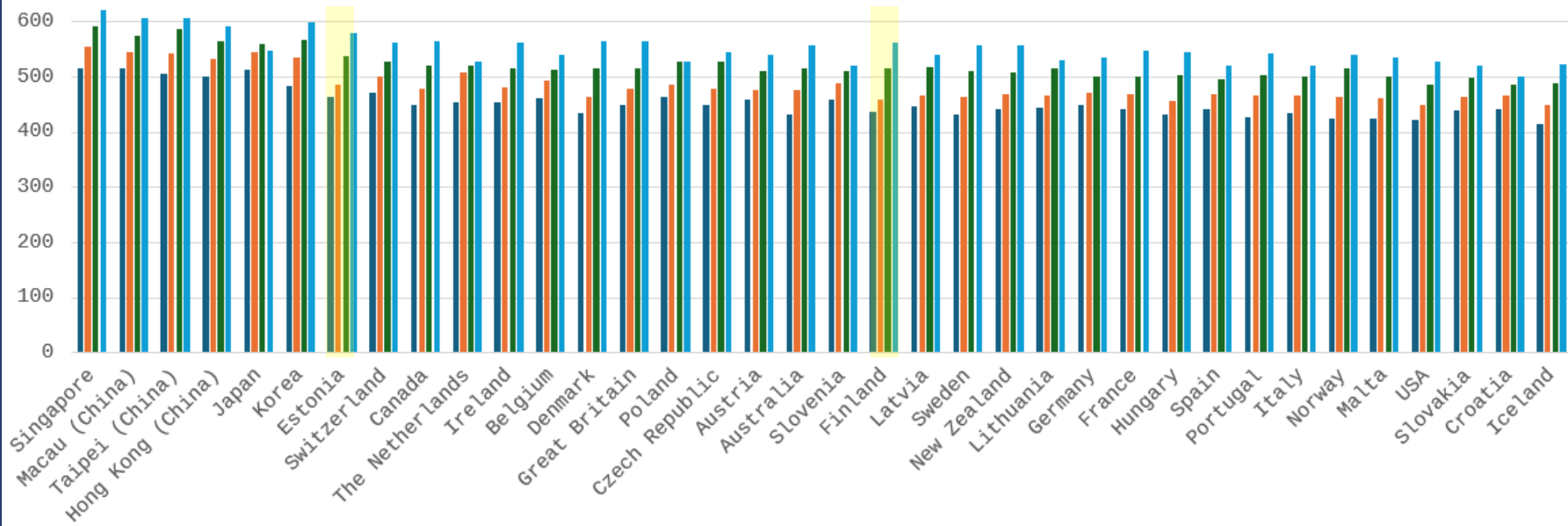


Mathematics is one of my favourite subjects



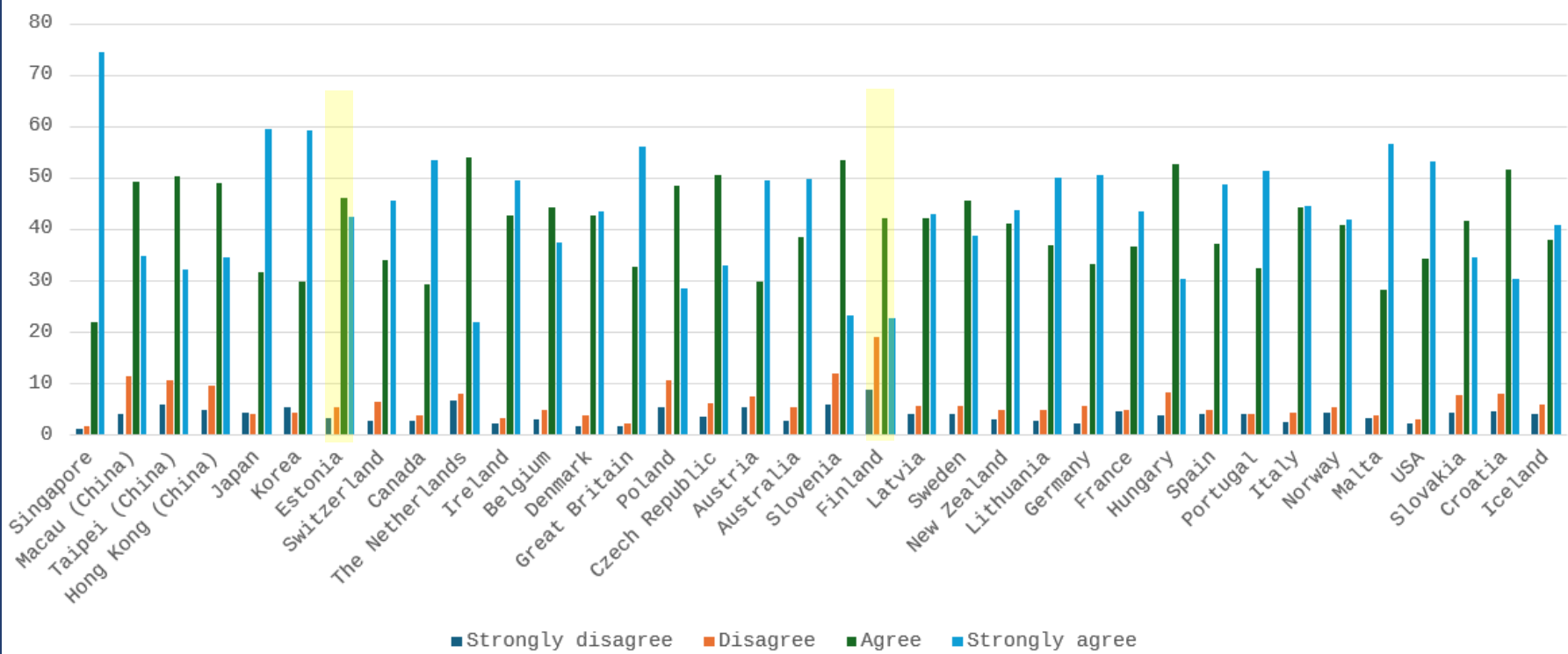
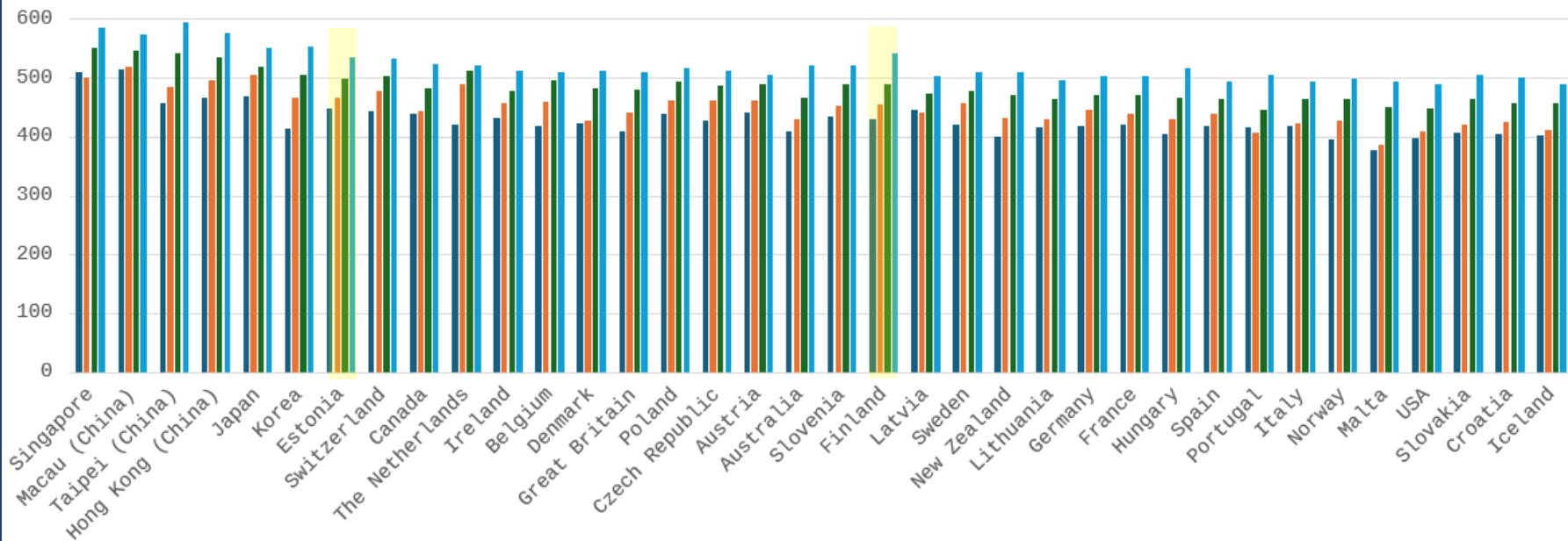
■ Strongly disagree
 ■ Disagree
 ■ Agree
 ■ Strongly agree

Mathematics is easy for me



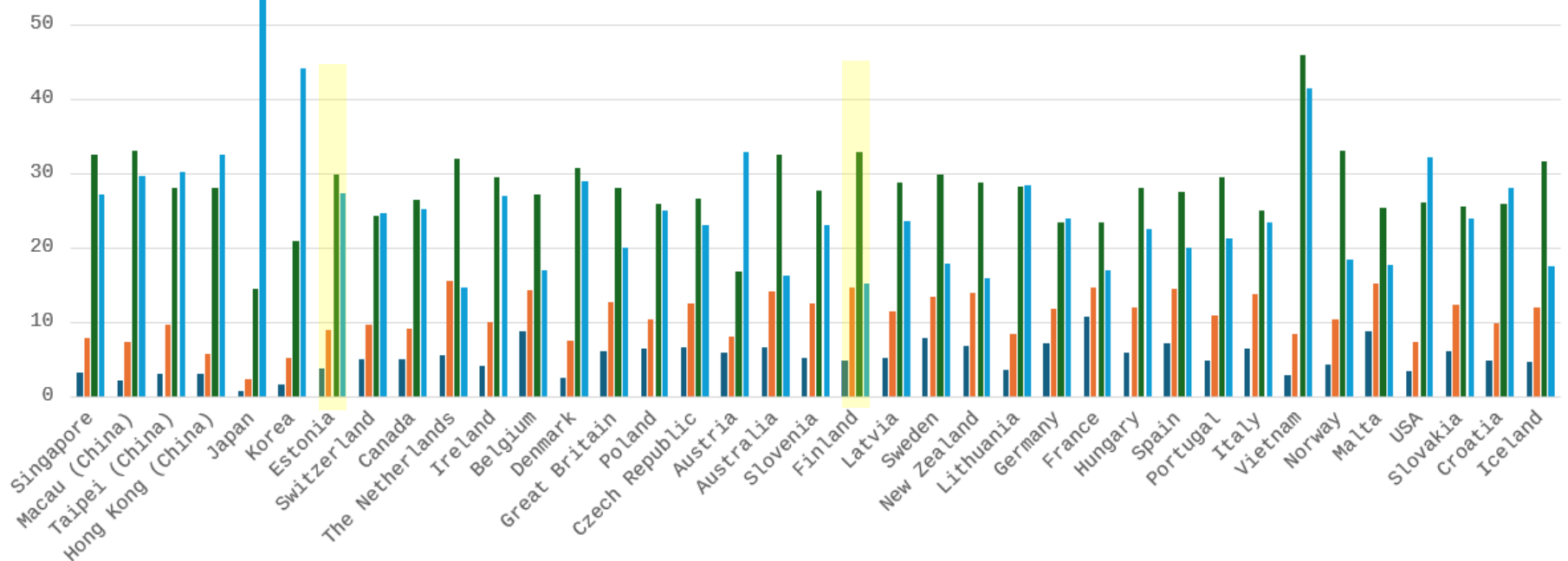
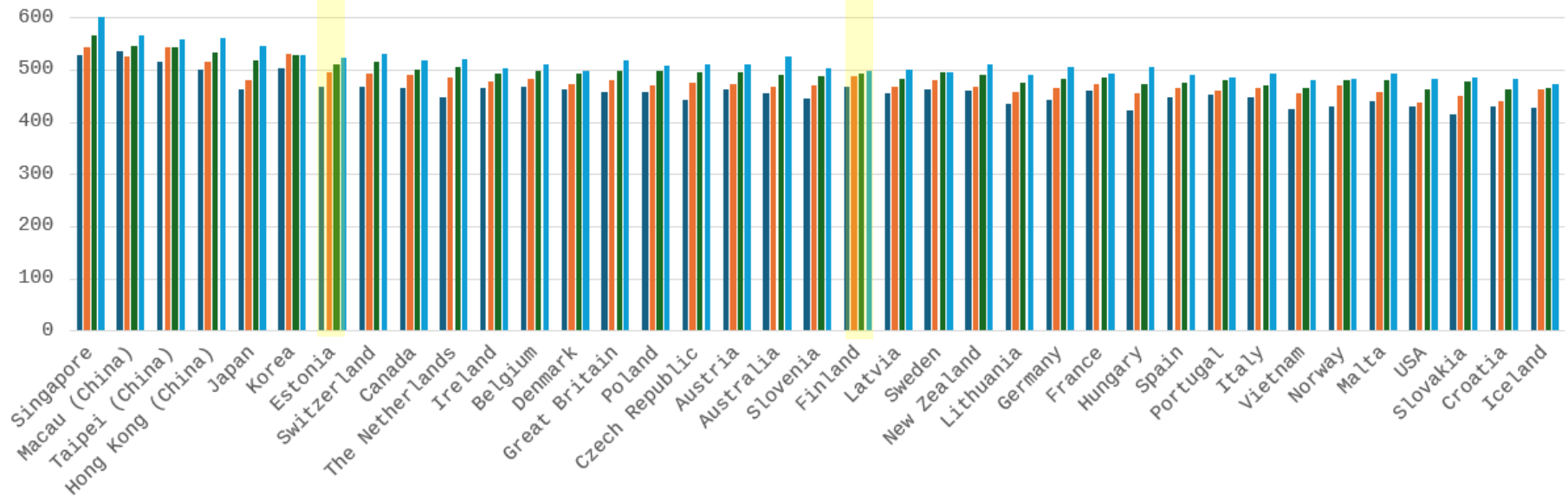
■ Strongly disagree ■ Disagree ■ Agree ■ Strongly agree

I want to do well in my mathematics class



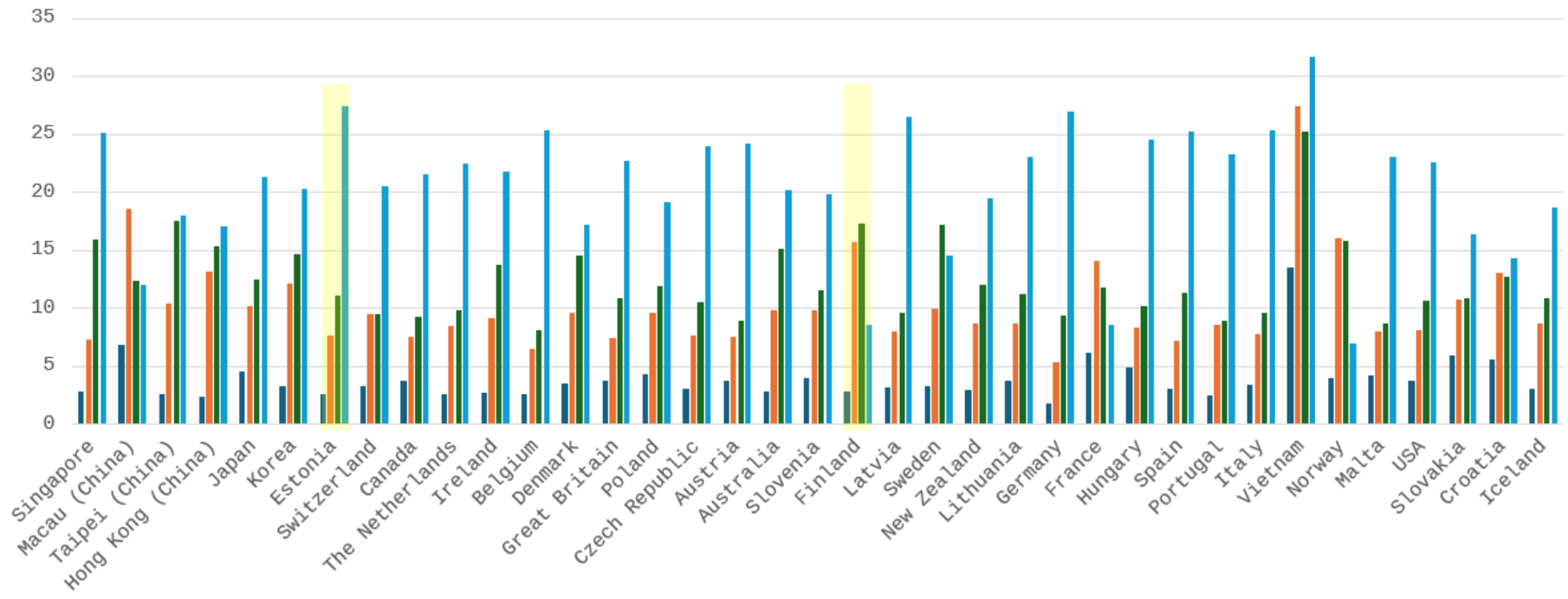
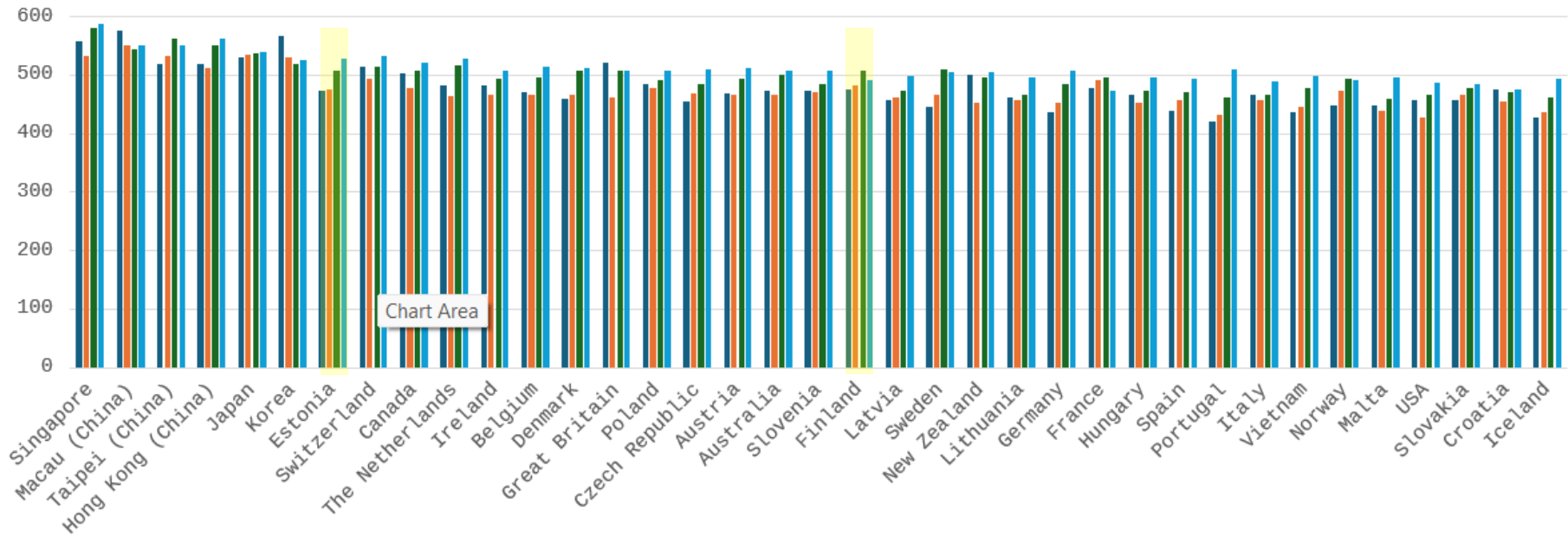
Strongly disagree Disagree Agree Strongly agree

How often: The teacher has to wait a long time for students to quiet down



■ Every lesson ■ Most lessons ■ Some lessons ■ Never or almost never

How often at school: coding/programming computers



■ Frequently ■ Sometimes ■ Rarely ■ Never

Table 5. Number of classes missed for no reason in the last two weeks and PISA result. Days absent and being late for school in the last two rows in Estonia

	No missed classes		1-2 missed classes		3-4 missed classes		5 or more	
	Score	%	Score	%	Score	%	Score	%
Eesti	521	68	495	23	474	5	449	3
Läti	493	66	474	23	458	5	453	4
Leedu	486	67	462	24	448	4	426	3
Soome	495	80	460	14	445	2	426	2
Jaapan	538	97	485	2	477	0	499	0
Singapur	579	92	541	6	519	1	488	1
Eestis popipäevad	519	80	486	15	465	3	444	2
Eestis hilinemine	523	54	505	30	493	9	461	7

Estonian 15-year-old students are generally somewhat more satisfied with their lives than students on average in OECD countries. Approximately 16% of our students responded that they are not satisfied with their lives (in 2018, this was 14%).

Comparing indicators related to the well-being of Estonian 15-year-old girls and boys, it emerged that girls generally feel worse in school than boys: their sense of security and sense of belonging to school are lower, and they are generally less satisfied with their lives. Only bullying, based on their responses, was less frequent among girls.

Less than the average in other countries, only 8% of Estonian students responded that during the COVID-19 pandemic closures, they felt interest every day in school in how they feel (OECD average 13%).

Comparing the results of the PISA 2012 and PISA 2022 mathematics surveys, it can be argued that students' perseverance has decreased over the span of 10 years. Currently, less than a third of students (28%) agree with the statement that they will continue with a task until it's completed, whereas more than half of students exhibited such determination a decade ago.

Among Estonian students, 28% feel helpless when solving mathematics tasks, and 27% get nervous. Ten years ago, the percentage of students feeling helpless was lower (24%).

Mathematics results were negatively affected by students' frequent tardiness (46% of students have been late at least once within two weeks) and unjustified absences, either missing individual lessons (32%) or entire days (20%). Results are also adversely affected by prolonged commotion at the beginning of class, as well as distracting digital tools, among other factors.

Approximately half (47%) of Estonian students would rate the quality of their mathematics teacher with at least 8 points on a 10-point scale. However, one-tenth of students, presumably facing issues with their mathematics teacher, would rate them with no more than 3 points.

According to the PISA test, explaining and memorizing rules and formulas benefit students' knowledge. On the other hand, continuous discussion about the practical usefulness of mathematics may rather be detrimental.

The average performance of students aiming for higher education exceeded the country's average significantly.

Based on the test results, as much as 55% of students plan to continue their education to higher education level. Furthermore, one in every five aims for a doctoral degree. Is the state and universities prepared for this?

Parents are well-educated. Family support is greater when common time is found to stay informed about school activities, for example, during dinner.

Kiitos!

