Science Performance: The Nordic Countries from an International Perspective

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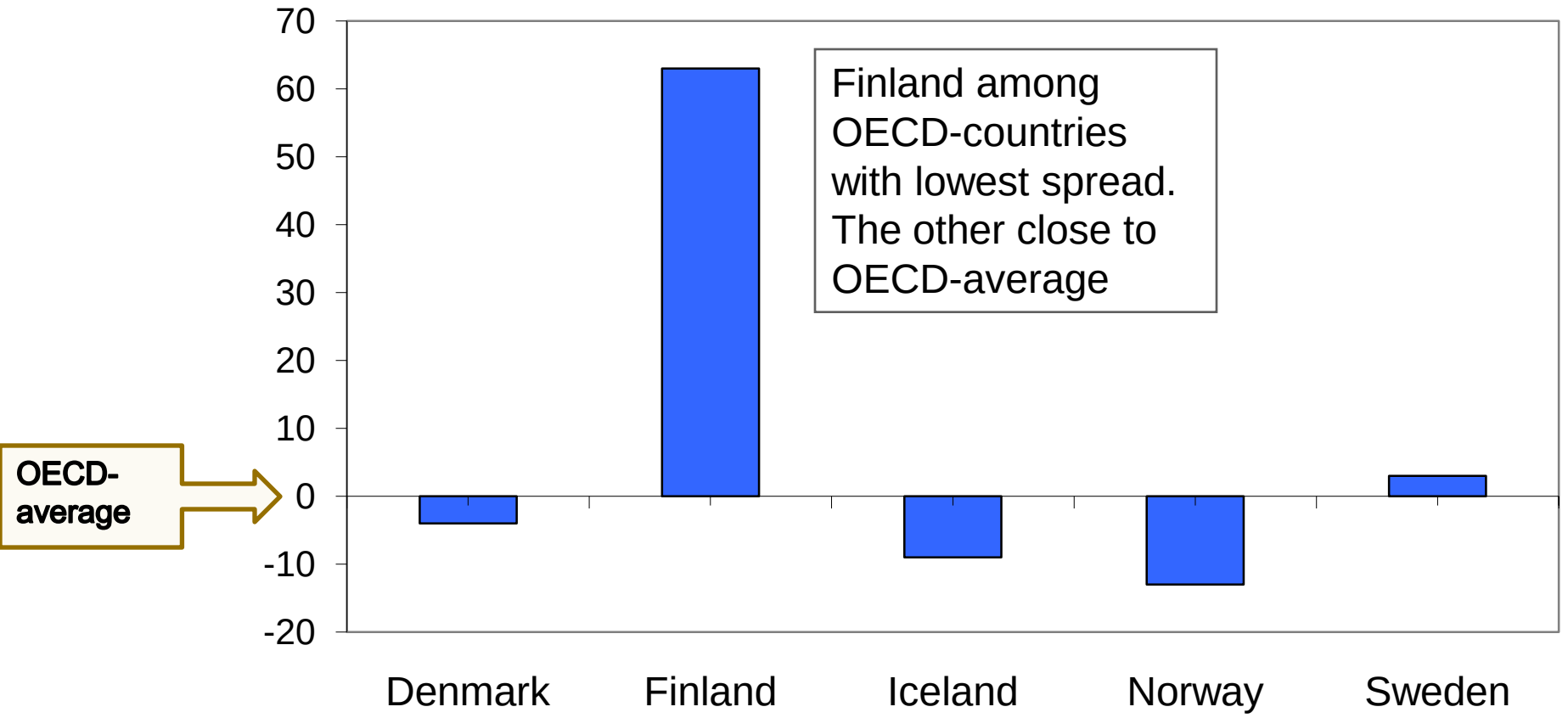
Scientific literacy in PISA

PISA 2006 framework:

- Both cognitive and affective aspects
- Science ”literacy” – application of science knowledge, not simple reproduction of knowledge

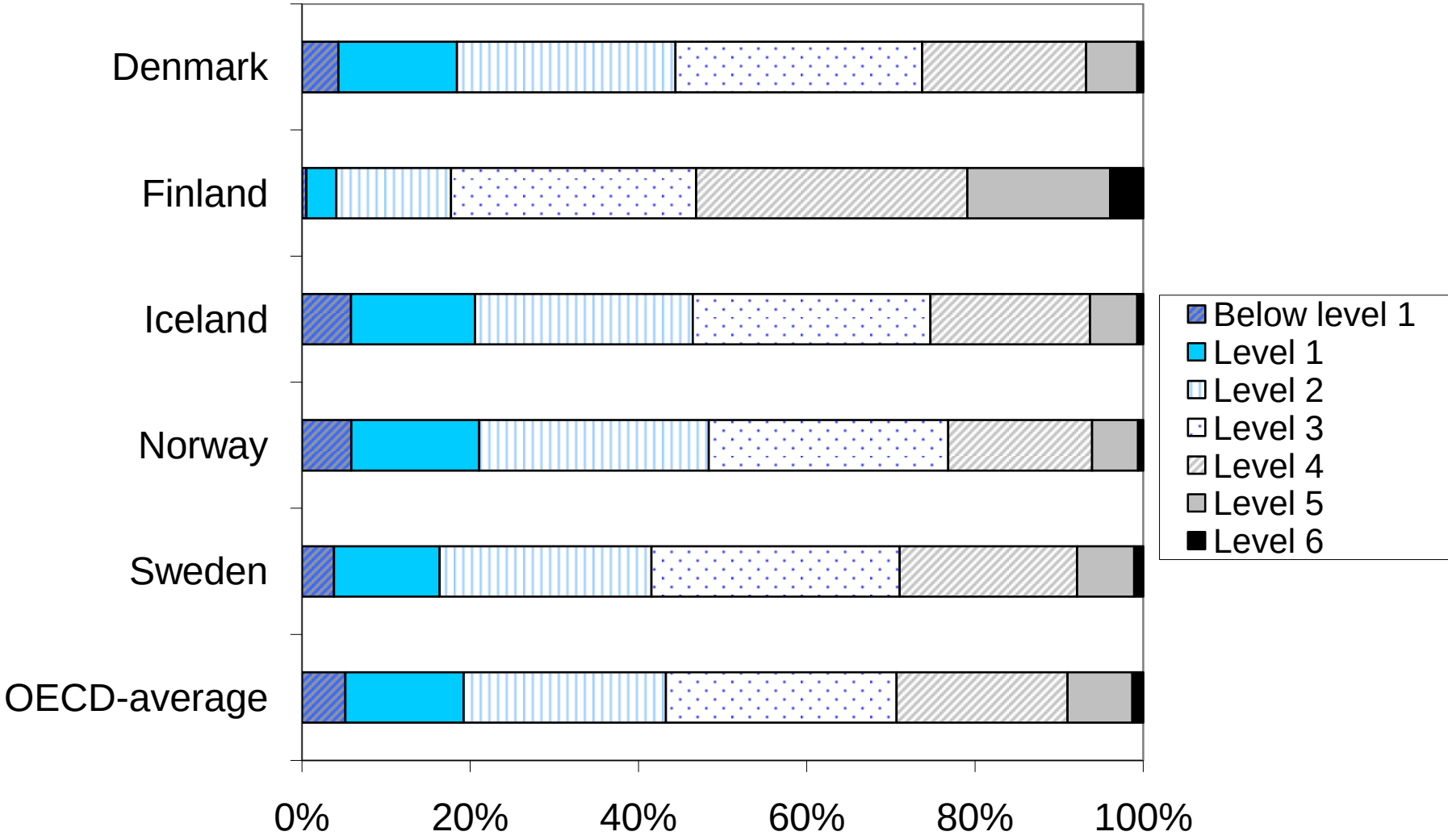
Science perfomance of the Nordic countries compared to the OECD-average



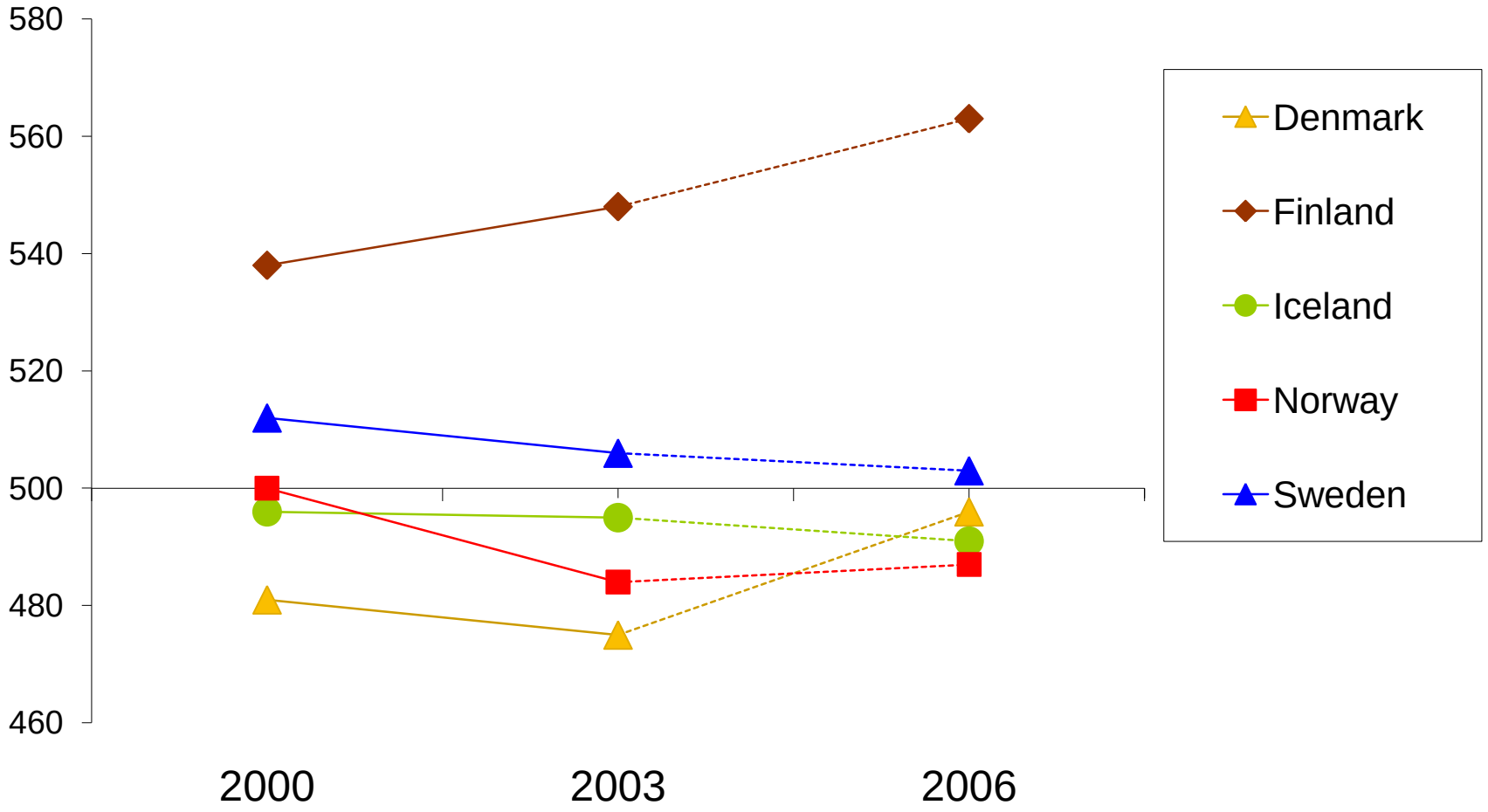
Proficiency levels in science

- Student scores in science are grouped into six proficiency levels
  - level 6 representing the highest score.
- Describe what kind of science competences students typically demonstrate at different points
  - Can’t be applied to individual students, but it makes sense to describe proficiencies of *typical* students at certain levels

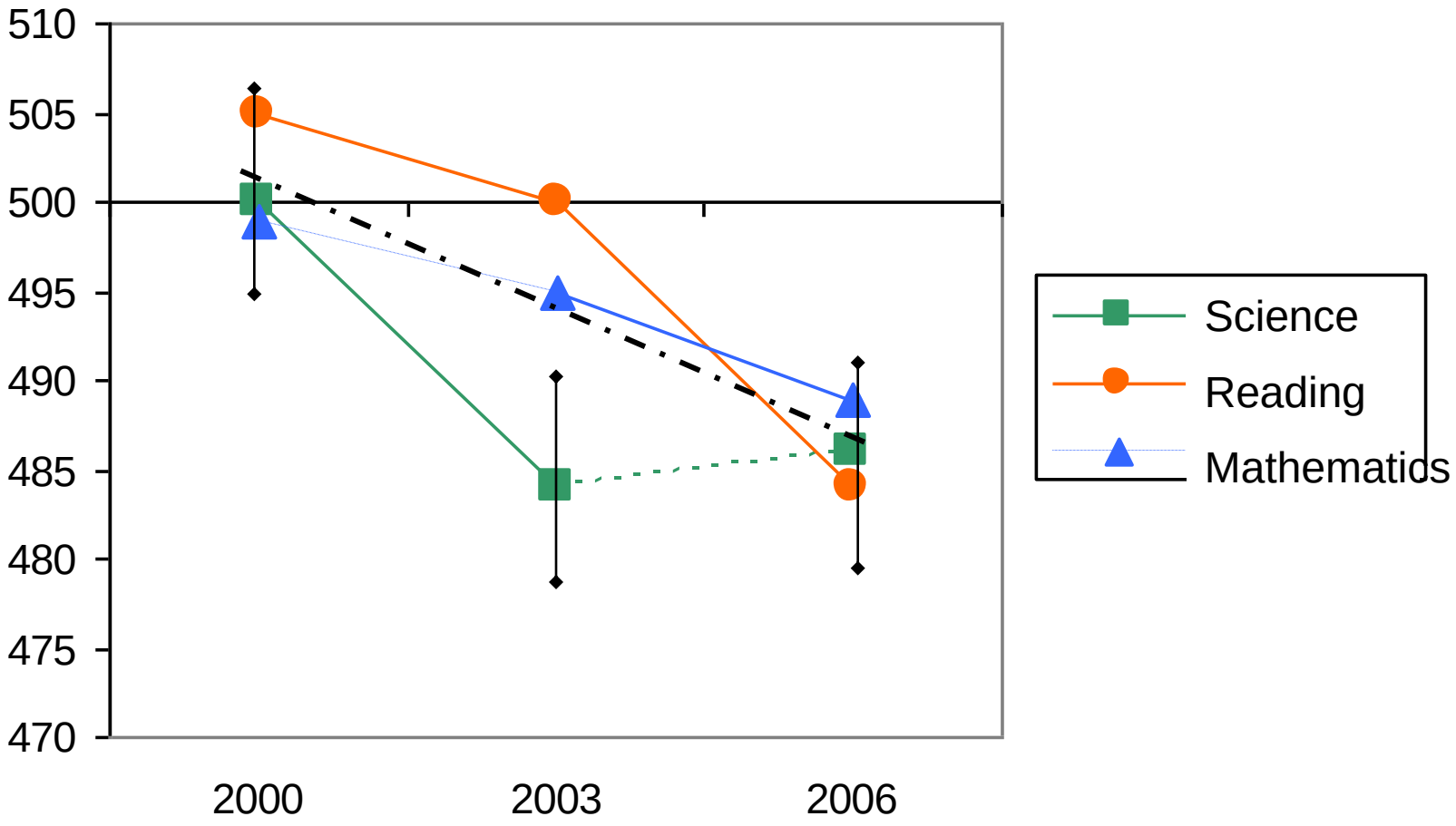
Percent of students at each proficiency level



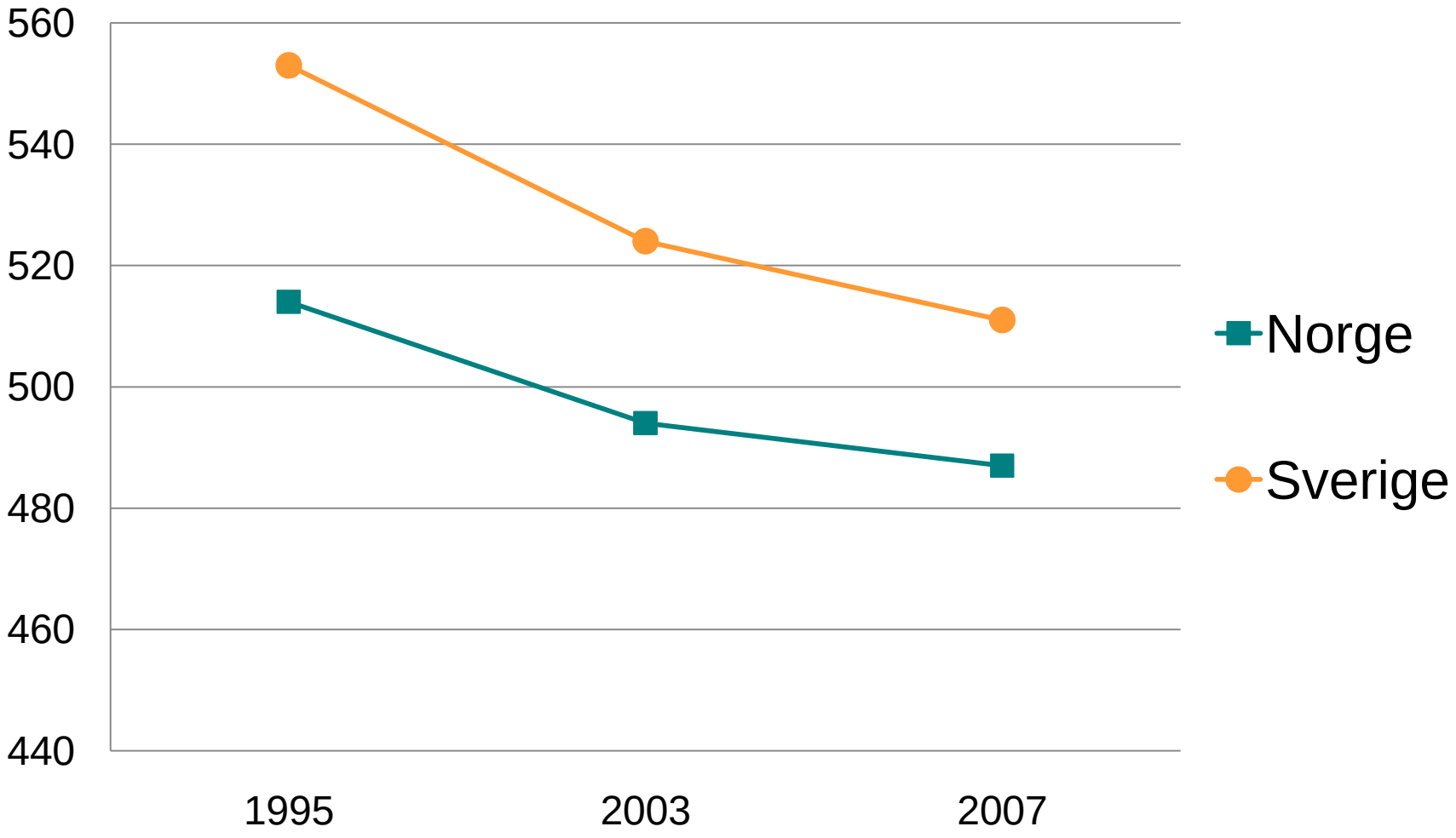
Trends in science in PISA 2000 - 2006



Trends in Norway PISA 2000 - 2006



Science
Trends in TIMSS



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Three scientific competences

1. **Identifying science issues**
2. **Explaining phenomena scientifically**
3. **Using scientific evidence**

Three scientific competences

1. **Identifying science issues**

   Recognising issues that is possible to investigate scientifically

   Identifying keywords to search for scientific information

   Recognising the key features of a scientific investigation

2. Explaining phenomena scientifically

Applying knowledge of science in a given situation

Describing or interpreting phenomena scientifically and predicting changes

Identifying appropriate descriptions, explanations, and predictions

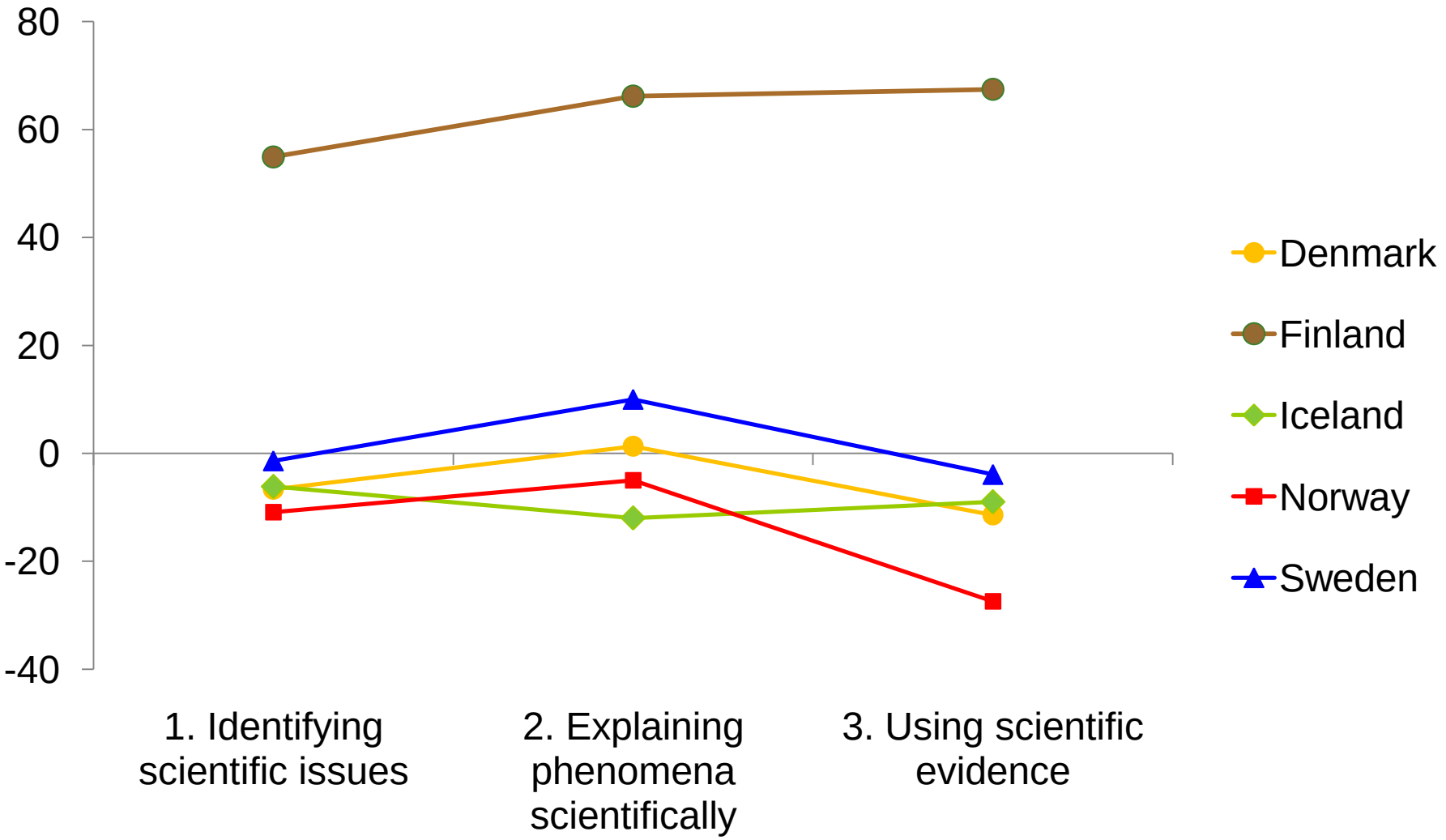
3. Using scientific evidence

Interpreting scientific evidence and making and communicating conclusions

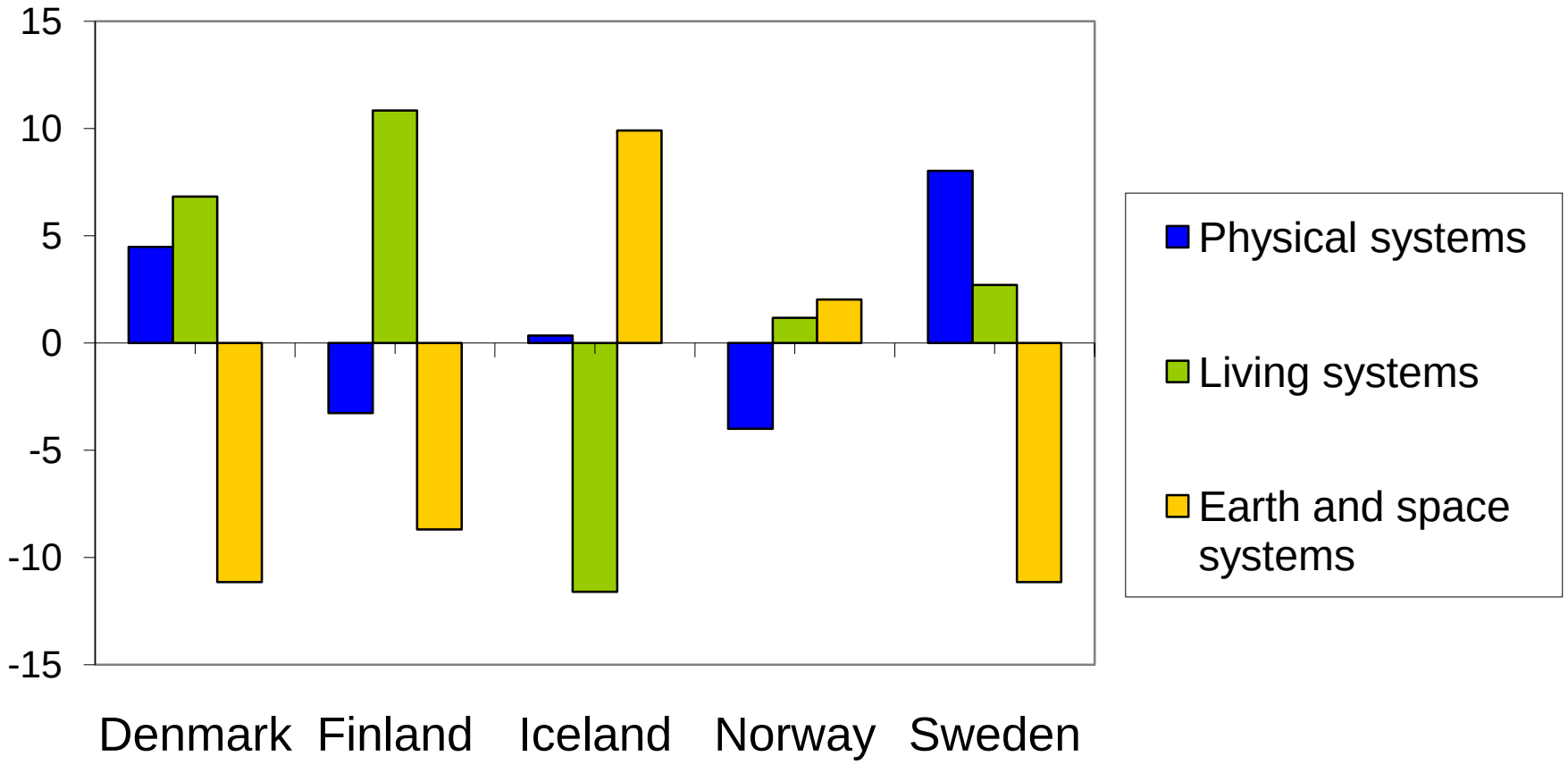
Identifying the assumptions, evidence and reasoning behind the conclusions

Reflecting on the societal implications of science and technological developments

Scientific competences

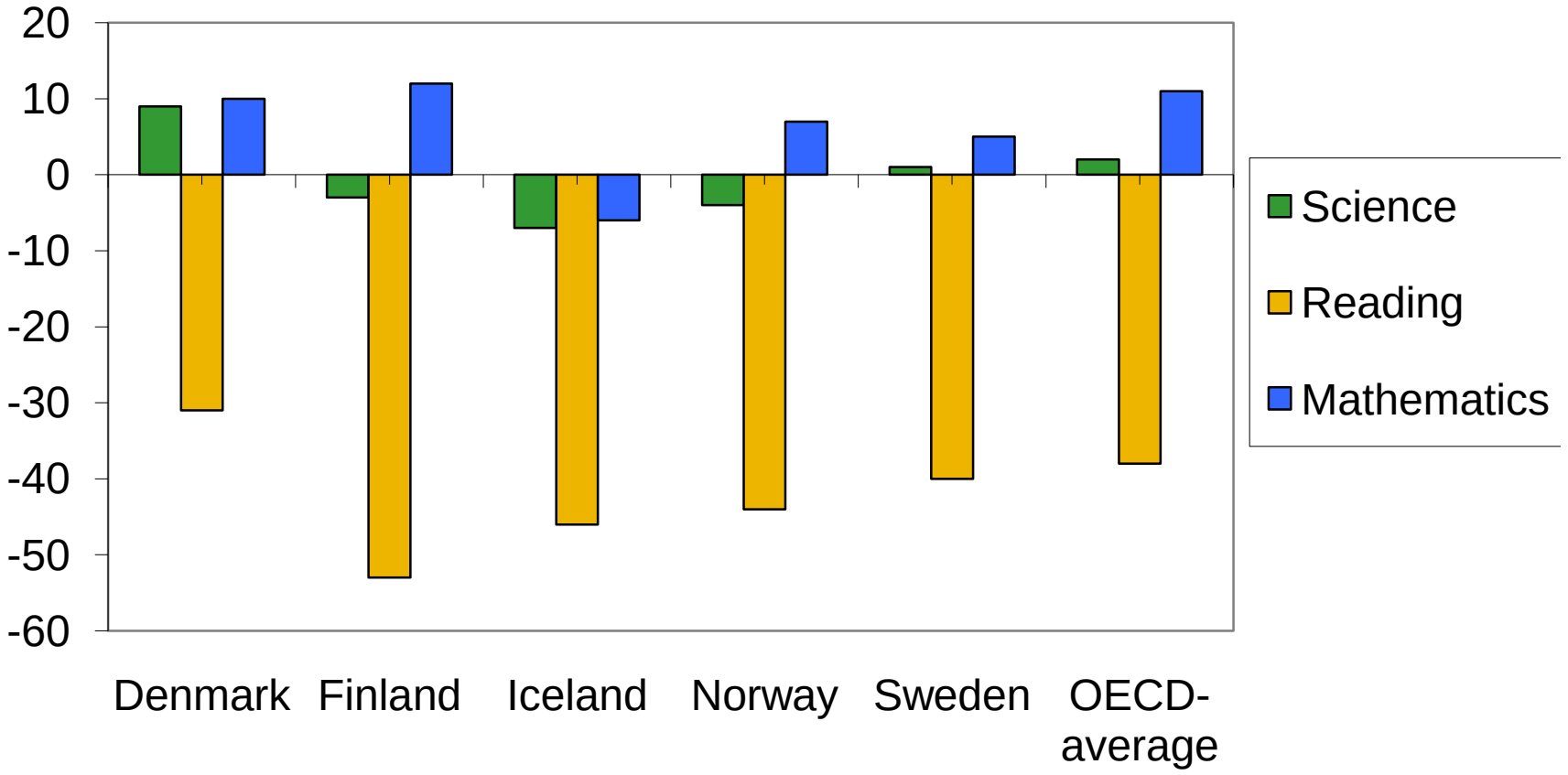


Performance in the three areas

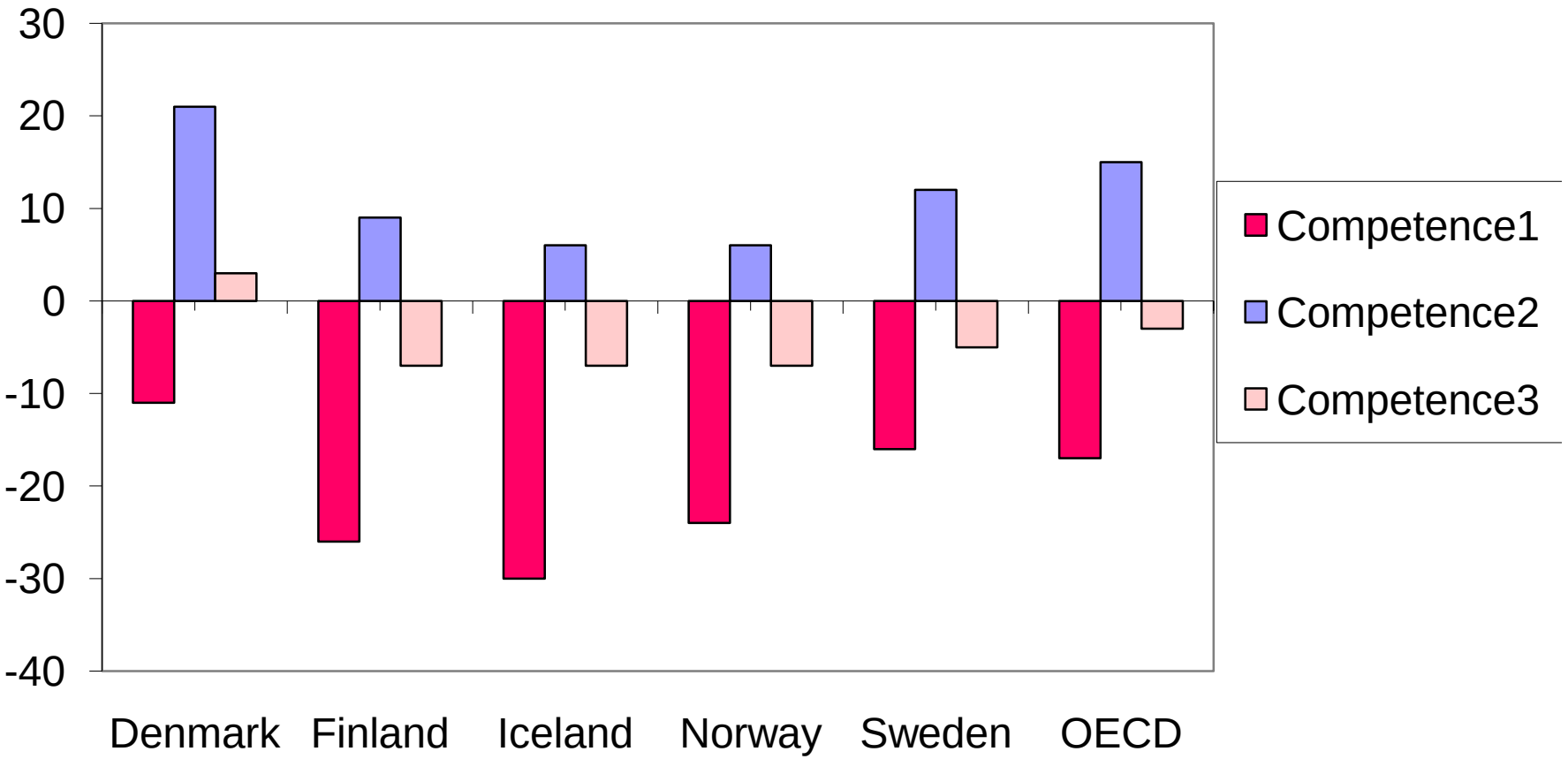


Gender differences in score points

Positive values in favour of boys

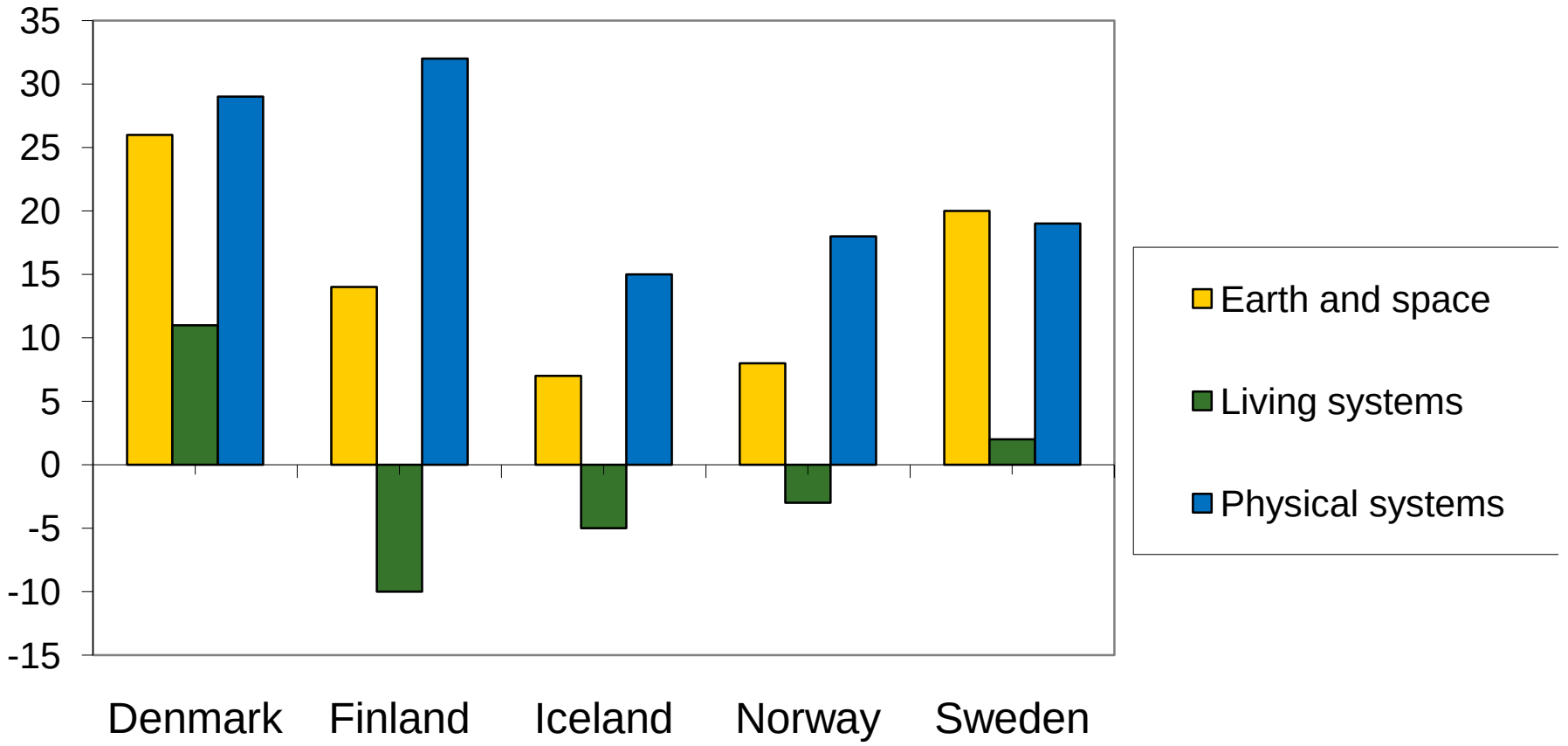


Gender differences for each competence in science (Positive values in favour of boys)



Gender differences in each area

Positive values in favour of boys



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How different are we?

To what extent are there similarities between the five Nordic countries concerning students' responses on individual items?

How much better or worse do the students perform on a particular item compared to what is expected from the overall achievement of the country and overall difficulty of the item?

Cognitive similarities

Correlations between countries' residual p-values of items

	Denmark	Finland	Iceland	Norway
Finland	0,14			
Iceland	0,27	0,05		
Norway	0,57	0,20	0,31	
Sweden	0,50	0,24	0,24	0,56

Country	Corr.	Country	Corr.	Country	Corr.
Norway	0.77	New Zealand	0.05	Chinese Taipei	-0.15
Sweden	0.75	Lithuania	0.03	Azerbaijan	-0.16
Denmark	0.73	Italy	0.03	Uruguay	-0.18
Iceland	0.58	Estonia	0.02	Tunisia	-0.18
Finland	0.52	Belgium	0.02	Argentina	-0.19
Austria	0.41	Latvia	0.02	Greece	-0.20
Germany	0.38	United States	0.02	Serbia	-0.21
Switzerland	0.38	Macao-China	0.00	Israel	-0.22
Luxembourg	0.33	Portugal	0.00	Russia Fed.	-0.24
Liechtenstein	0.33	Croatia	-0.02	Qatar	-0.25
Czech Rep.	0.29	Slovenia	-0.03	Mexico	-0.26
Poland	0.17	Slovak Rep.	-0.03	Brazil	-0.27
Hungary	0.15	Hong Kong	-0.03	Colombia	-0.27
United Kingdom	0.15	Japan	-0.04	Bulgaria	-0.27
Australia	0.13	Chile	-0.06	Jordan	-0.29
Netherlands	0.10	Korea	-0.07	Indonesia	-0.30
Ireland	0.09	France	-0.10	Montenegro	-0.32
Canada	0.08	Turkey	-0.10	Kyrgyzstan	-0.32
Spain	0.05	Thailand	-0.14	Romania	-0.40

Thanks

for your attention!

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