

Gender Inclusive Teaching

A lecture created by CERN's Diversity Office, in the framework of the CERN Teacher Programmes.

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Girls are less likely than boys to take up science subjects in high school, in western countries¹

At age 15, **60%** of the lowest achievers in mathematics, reading and science are boys, **40%** are girls.



IN 6 OUT OF 10 COUNTRIES BOYS CONTINUE TO PERFORM BETTER IN MATHEMATICS THAN THEIR FEMALE PEERS



GIRLS – EVEN HIGH ACHIEVERS - LACK CONFIDENCE IN MATHEMATICS



2 IN 3 GIRLS VS 1 IN 2 BOYS report often worrying that it will be difficult for them in mathematics classes



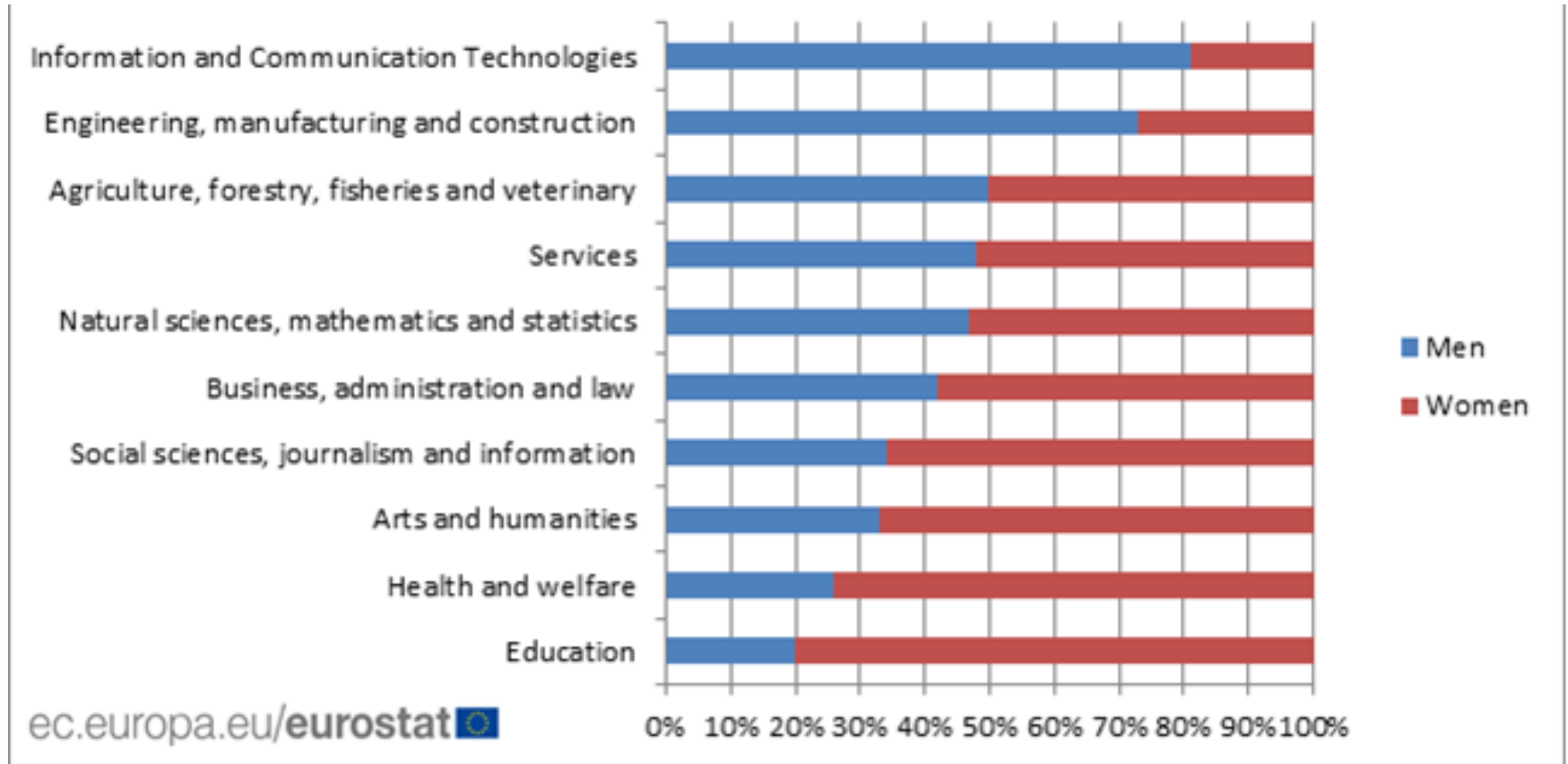
Four times the number of boys as girls consider a career in engineering and computing

OECD PISA study on gender equality in education.²

Scientific fact:
“Perceptions and expectations influence the performance of students”³

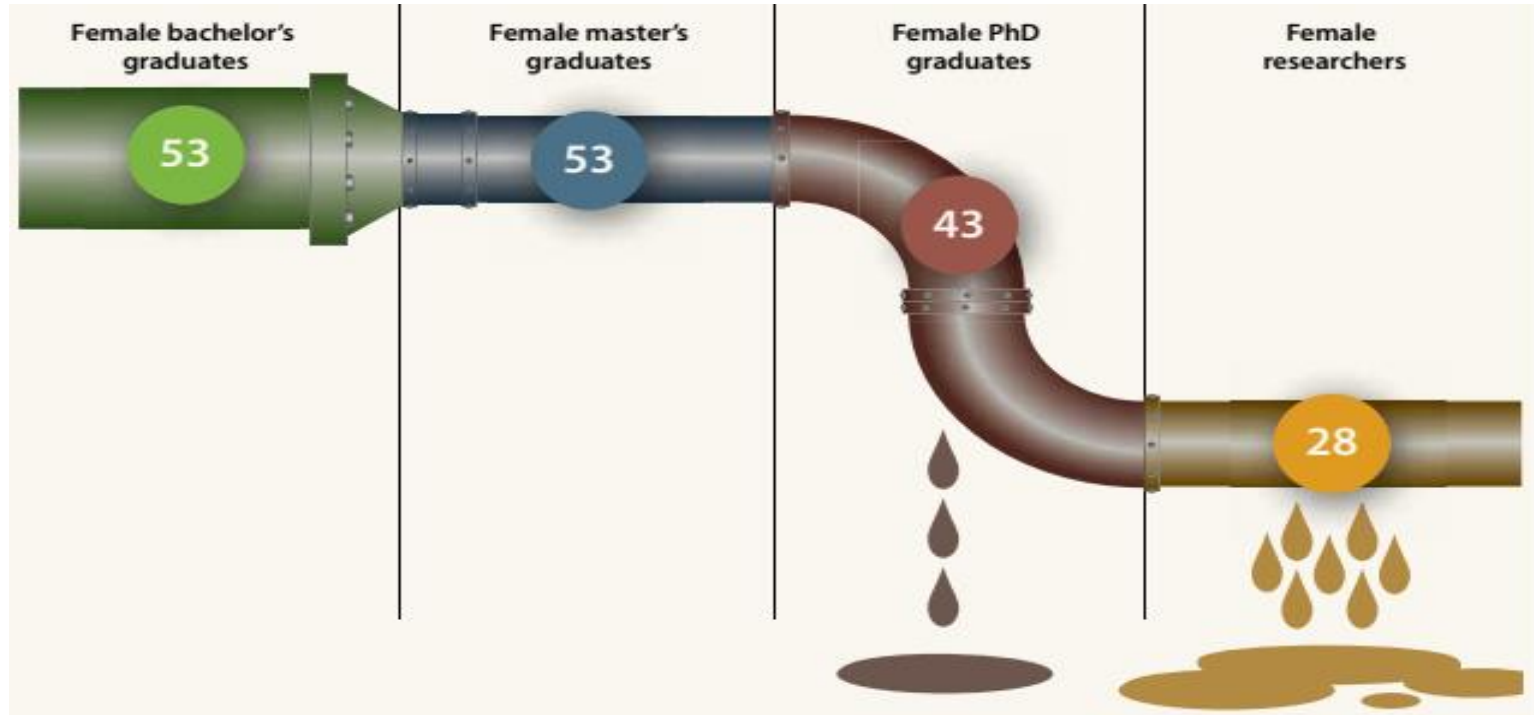
Distribution of EU graduates by field and sex⁴

2015



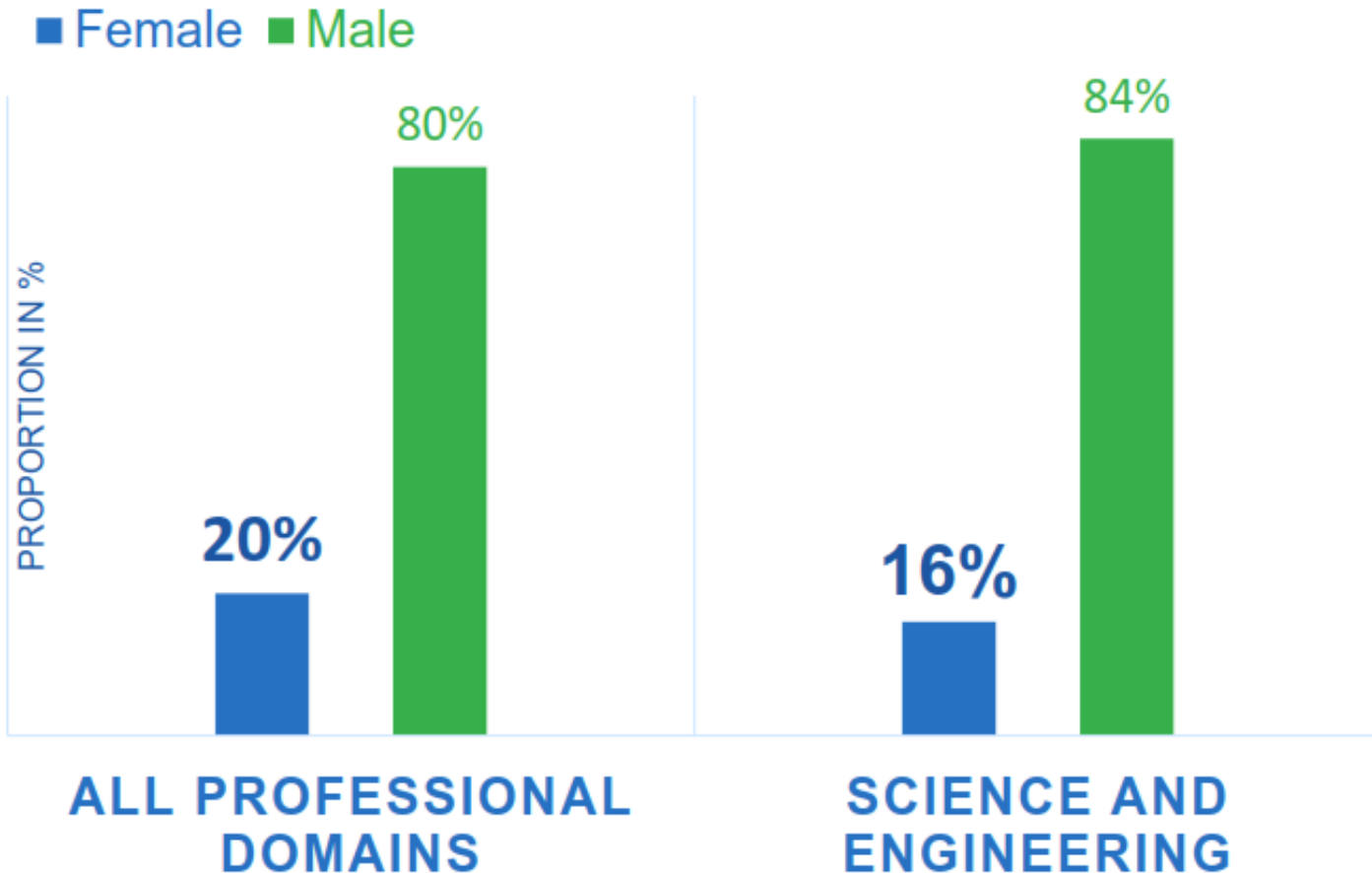
The leaky pipeline

share of women in higher education and research (%)₅



Gender distribution in various professions

At CERN – 2016₆



How does a scientist look like ?

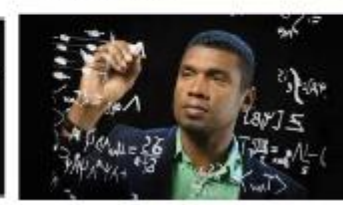
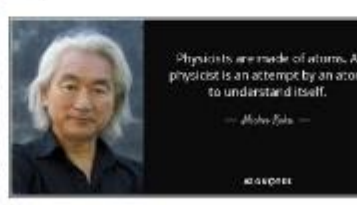
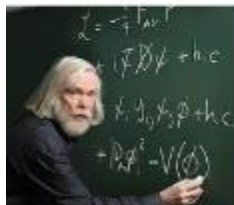
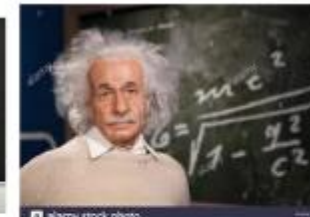
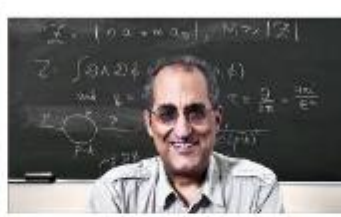
Stereotypes in science

C. Vidal, 2005:

“A human being is firstly a product of his / her own social & cultural history.”



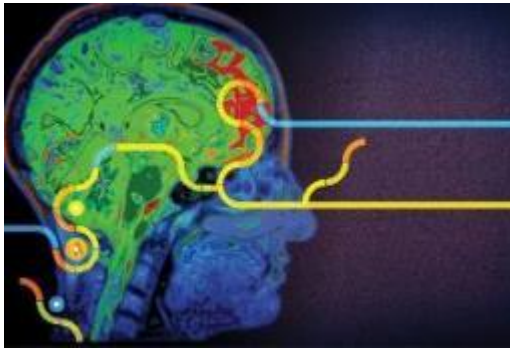
Looking up the word “physicist” on the web...



Unconscious Bias

How do stereotypes and prejudice form?

Our brain: thinking fast and slow: System 1 and 2⁸



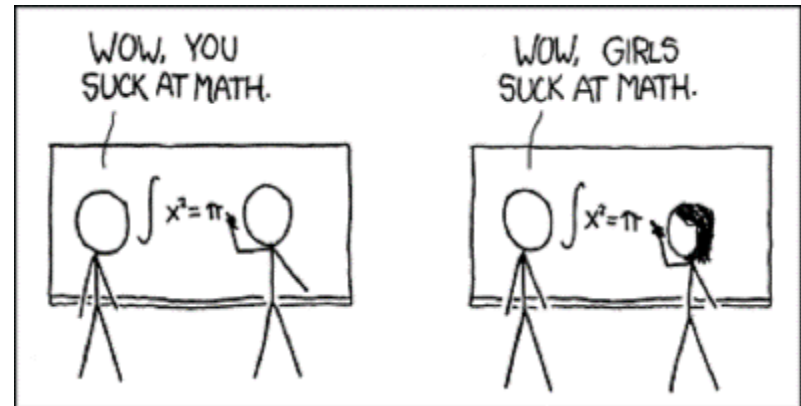
System 1

- Is fast and efficient
- Jumps quickly to conclusions
- Risks of making mistakes

System 2

- Is slow, systematic and conscious
- Understands complexity
- Rationalises feelings of system 1

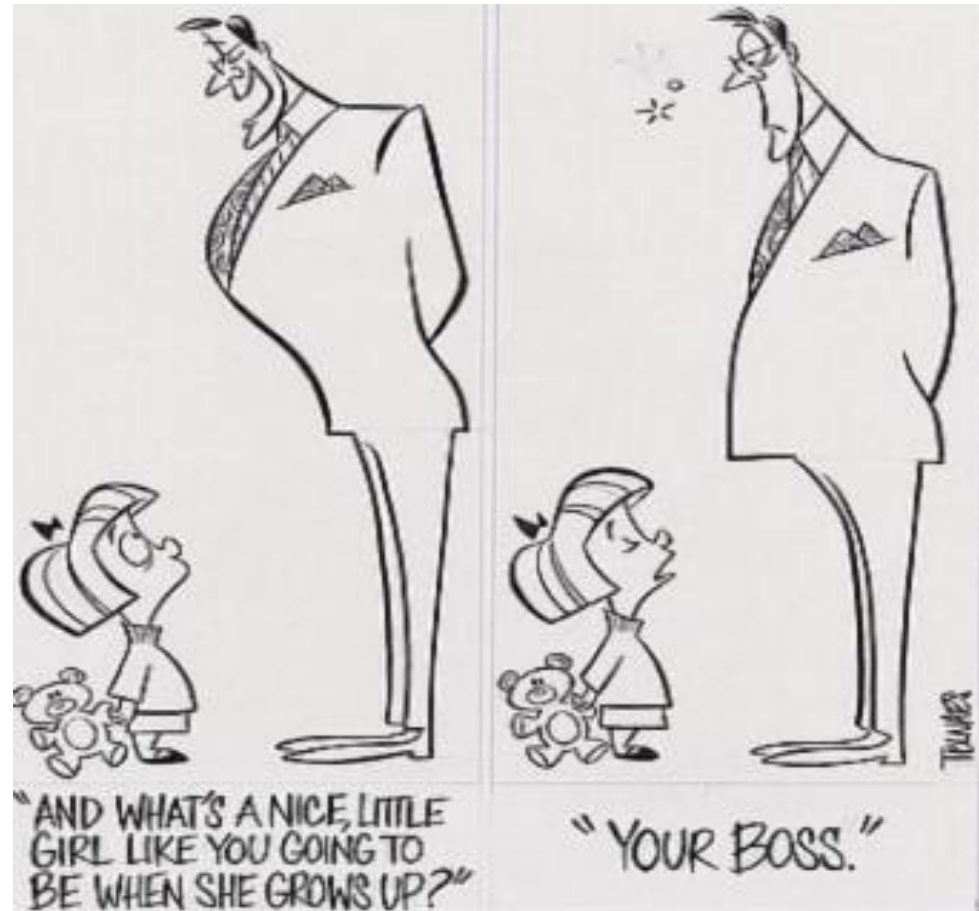
System 1 thinking involves **associating new information with existing patterns**, or thoughts, rather than creating new patterns for each new experiences⁸.



Unconscious Bias

How do stereotypes and prejudice form?

→ Be aware of unconscious bias!



Creating an enabling environment



Picture taken from <https://www.getsmartoregon.org/about-smart/equity/>

***Equitable = not treating everyone the same,
But creating an environment which allows everyone to give of their best...***

How can we do better?

Re-thinking teaching methods

***To build an inclusive classroom,
engaging female students, learn more:***

- <http://InclusivePhysics.org>
(project under development)
- Institute of Physics resources, on the matter:
http://www.iop.org/education/teacher/support/girls_physics/resources/page_63821.html
- A leaflet with advice for teachers, on the topic
<http://diversity.web.cern.ch/2016/08/gender-inclusive-teaching-2016-high-school-teacher-programme>



Visit InclusivePhysics.org

Contribute in one of CERN's four core missions: "training the scientists of tomorrow"

Take part in events, locally and globally

Numerous initiatives are held locally and globally; to spark the interest of female students in science. A few examples below:

- Girls in ICT Day:
<https://www.itu.int/en/ITU-D/Digital-Inclusion/Women-and-Girls/Girls-in-ICT-Portal>
- International Day of Women and Girls in Science:
<http://www.un.org/en/events/women-and-girls-in-science-day/>
- Expanding your Horizons:
<http://eyhn.org>



Expanding Your Horizons:
an organization providing
STEM experiences to female students
to spark their interest.

Find out what's happening in your country / region !

Thank you!

Questions ?



References

1. **UK study by the Institute of Physics; Girls in the Physics Classroom:**
https://www.iop.org/education/teacher/support/girls_physics/review/file_41599.pdf
2. **OECD PISA study on gender equality in education; The ABC of Gender Equality:**
<https://www.oecd.org/pisa/keyfindings/ENG-PISA-infographic-gender.pdf>
3. **Self-Concept Predicts Academic Achievement Across Levels of the Achievement Distribution; Domain Specificity for Math and Reading:**
https://www.researchgate.net/publication/319904560_Self-Concept_Predicts_Academic_Achievement_Across_Levels_of_the_Achievement_Distribution_Domain_Specificity_for_Math_and_Reading
4. **Bransford et al. How People Learn: Brain, Mind, Experience, and School: Expanded Edition, ed.:** <https://www.nap.edu/catalog/9853/how-people-learn-brain-mind-experience-and-school-expanded-edition>
5. **Science Graduates are younger and better employed Eurostat:**
<http://ec.europa.eu/eurostat/documents/3433488/5443449/KS-NS-06-018-EN.PDF>
6. **UNESCO Science Report, 2015; the UNESCO report provides data on 189 countries and profiles of 140 of them:** <https://unesdoc.unesco.org/images/0023/002354/235406e.pdf>
7. **2016 CERN Personnel Statistics:** <http://cds.cern.ch/record/2265782>
8. **C. Vidal, Wikipedia:** https://fr.wikipedia.org/wiki/Catherine_Vidal
9. **“Thinking Fast and Slow”, Daniel Kahneman**
10. **Study published by the Institute of Physics; An investigation into the impact of question structure on the performance of first year physics undergraduate students at the University of Cambridge:** <http://iopscience.iop.org/article/10.1088/0143-0807/36/4/045014>

