

# “Women can’t do Maths”

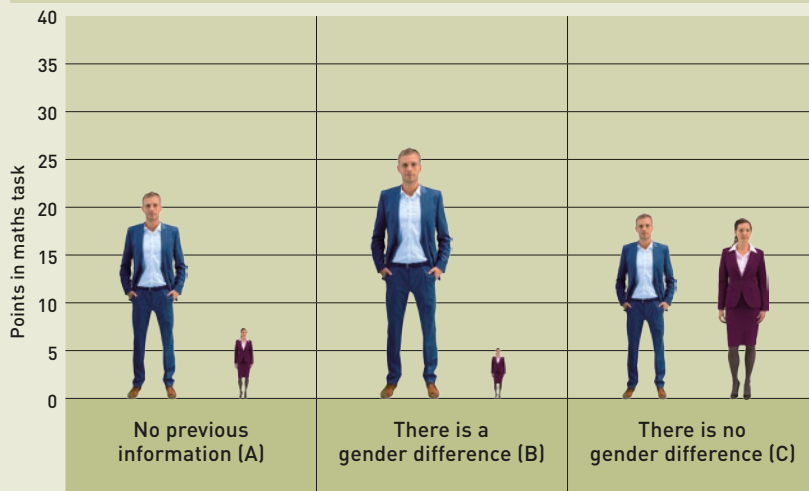
...and men are bad at languages

In fact, women are able to do maths...

A study with over 500.000 people from 69 countries shows that women perform equally well in mathematics as men – on average as well as in the distribution of abilities.<sup>1</sup> Differences between men and women are apparently culturally defined.<sup>2</sup>

...although their performance is still influenced by stereotypes.

Stereotypes influence performance in maths tasks<sup>3</sup>



- Due to the subconscious stereotype that women perform worse in mathematics, women actually deliver worse results than men for difficult tasks. (A)
- The effect becomes more pronounced if the stereotype is actively communicated. (B)
- If the participants are informed of no gender difference in performance prior to the test, the lesser performance of women vanishes. (C)

→ How does this conclusion apply to teachers?

[All results have a statistical significance of  $p < 0.05$ ]



1 Else-Quest, N.M., Hyde, J.S. & Linn, M.C. (2010). Cross-national patterns of gender differences in mathematics: A meta-analysis. *Psychological Bulletin*, 136(1), 103-127.  
 2 Nosek, B.A., Smyth, F.L., Sriram, N., Lindner, N.M., Devos, T. et al. (2009). National differences in gender-science stereotypes predict national sex differences in science and math achievement. *Proceedings of the National Academy of Sciences*, 106, 10593-10597.  
 3 Spencer, S.J., Steele, C.M. & Quinn, D.M. (1999). Stereotype threat and women’s math performance. *Journal of Experimental Social Psychology*, 35, 4-28.

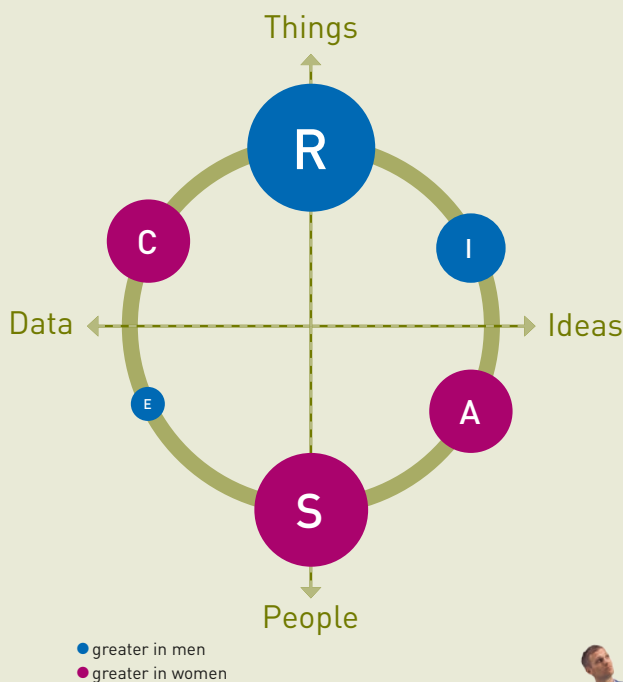
# “Women are not interested in technology”

...and men have no concern for social issues

...except if the issue is presented in an appealing context.

- Men tend to be more interested in machines, technical solutions and abstract subjects, while women display an equal tendency of interest for people, problems within the social lives of people and artistic, aesthetic aspects of life.<sup>1</sup>
- Women prefer to work in a more interdisciplinary fashion than men.<sup>2</sup>
- Women tend to have a much broader range of interests than men.<sup>3</sup>
- If these interests are not addressed within academia or business, even talented women will avoid technology and science centred fields.<sup>3</sup>

- How does this knowledge apply to the planning of curricula and degree programmes?
- Do either mixed or homogeneous groups deliver more innovative solutions?

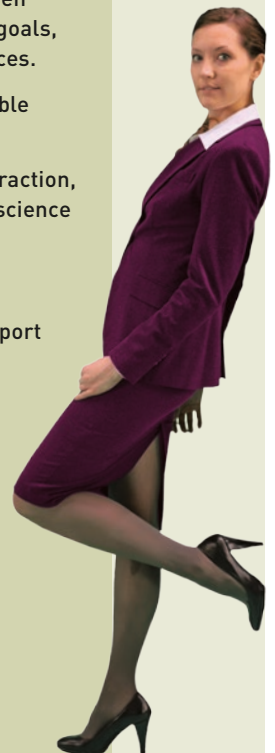


## Analysis of interest differences between men and women according to the RIASEC-Model<sup>1</sup>

The figure illustrates how strongly the average interests of women and men differ. Except for the enterprising goals, all areas show significant differences.

- R “realistic” = Working with tangible things, handiwork
- I “investigative” = research, abstraction, mathematics, medicine, social science
- A “artistic” = creative writing, illustration, presentation
- S “social” = social justice and support
- E “enterprising” = leadership, management
- C “conventional” = traditional, well-established, well-defined structures

<sup>1</sup> Su, R., Rounds, J. & Armstrong, P.I. (2009). Men and things, women and people: A meta-analysis of sex differences in interests. *Psychological Bulletin*, 135(6), 859-884.  
<sup>2</sup> Rhoten, D. & Pfirman, S. (2007). Women in interdisciplinary science: Exploring preferences and consequences. *Research Policy* 36, 56-75.  
<sup>3</sup> Wang M.T., Eccles J.S. & Kenny S. (2013). Not lack of ability but more choice: Individual and gender differences in choice of careers in science, technology, engineering, and mathematics. *Psychological Science*, 24(5), 770-775.



# “Women aren’t interested in technology”

...and men have no concern for social issues

...except if culture contradicts this statement

EU countries such as Iceland, Bulgaria and Poland have a female quota of 50% within STEM fields. With only 18%, Switzerland has a very low number of women occupied in science and engineering.<sup>1</sup>

## Why we need more women in these fields

Research groups with a balanced gender ratio deliver results more rapidly and more efficiently.<sup>2</sup>

Thanks to additional aspects and goals introduced by women, more innovation is possible.<sup>3</sup>

The ratio between risk-aversion/conservation and experimental enthusiasm is more balanced.<sup>4</sup>

Since women form 50% of the market, they are also important users of technology.

The lack of educated personnel in STEM fields is surmountable in Switzerland.<sup>5</sup>



<sup>1</sup> European Commission (2013). She Figures 2012: Gender in Research and Innovation. [http://ec.europa.eu/research/science-society/document\\_library/pdf\\_06/she-figures-2012\\_en.pdf](http://ec.europa.eu/research/science-society/document_library/pdf_06/she-figures-2012_en.pdf)

<sup>2</sup> European Commission (2006). Women in Science and Technology – The Business Perspective. [http://ec.europa.eu/research/science-society/pdf/wist\\_report\\_final\\_en.pdf](http://ec.europa.eu/research/science-society/pdf/wist_report_final_en.pdf)

<sup>3</sup> Su, R., Rounds, J. & Armstrong, P.I. (2009). Men and things, women and people: A meta-analysis of sex differences in interests. *Psychological Bulletin*, 135(6), 859-884.

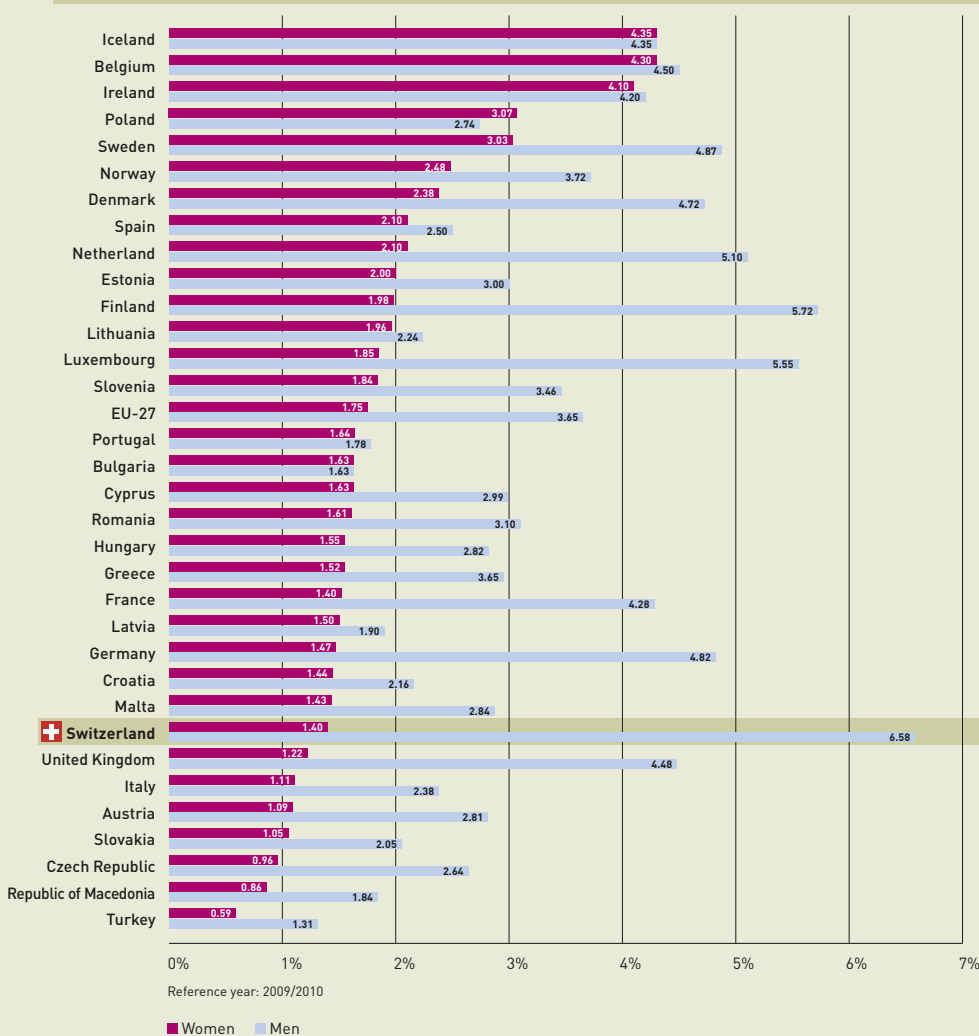
<sup>4</sup> Gratton, L., Kelan, E., Voigt, A., Walker, L. & Wolfram, H.J. (2007). Innovative potential: Men and women in teams. The Lehman Brothers Centre for Women in Business. [http://www.london.edu/assets/documents/facultyandresearch/Innovative\\_Potential\\_NOV\\_2007.pdf](http://www.london.edu/assets/documents/facultyandresearch/Innovative_Potential_NOV_2007.pdf)

<sup>5</sup> Schweizerische Eidgenossenschaft (2010) Mangel an MINT-Fachkräften in der Schweiz: Ausmass und Ursachen des Fachkräftemangels in MINT. Bericht des Bundesrates. [http://edudoc.ch/record/39339/files/Bericht\\_Fachkraeftemangel\\_de.pdf](http://edudoc.ch/record/39339/files/Bericht_Fachkraeftemangel_de.pdf)

## Whether women start a career in science or engineering strongly depends on the culture

The ratio of gender distribution within STEM fields varies greatly from country to country.<sup>1</sup>

Proportion of scientists and engineers in the total labour force, by sex



<sup>1</sup> European Commission (2013), She Figures 2012: Gender in Research and Innovation. [http://ec.europa.eu/research/science-society/document\\_library/pdf\\_06/she-figures-2012\\_en.pdf](http://ec.europa.eu/research/science-society/document_library/pdf_06/she-figures-2012_en.pdf)