



RISK OF LOSING STEM MOTIVATION FOR GIRLS BUT NOT BOYS?

ELEMENTARY SCHOOL STUDENTS' GENDERED MOTIVATION PROFILES, ACHIEVEMENT, AND STEM ASPIRATION

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INTRODUCTION

Supporting efforts to narrow the gender gap, we analyzed the relationship between:

students' **gender**, **motivational beliefs** in different subjects, their school **achievement** and **STEM aspiration** at the end of elementary school.

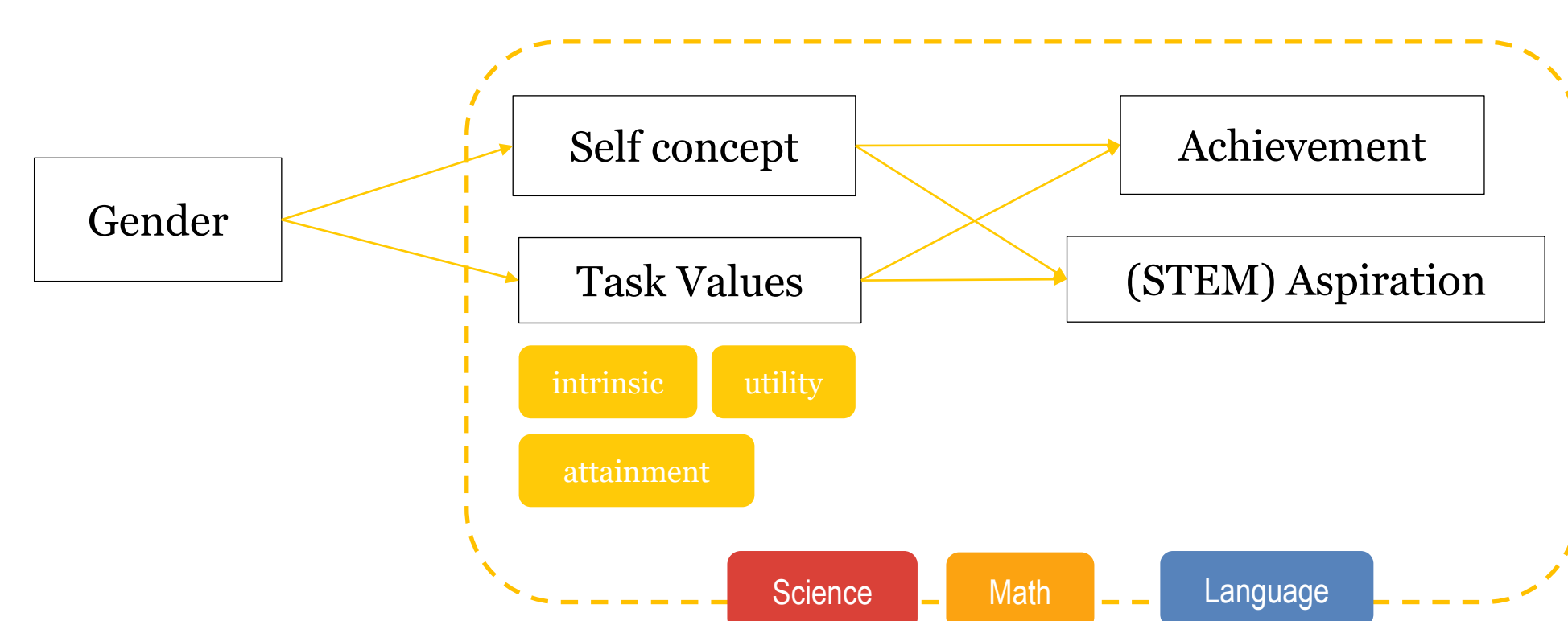


Figure 1. Our study framework based on Expectancy Value Theory/EVT (Eccles and Wigfield, 2020) and Dimensional Comparison Theory (Moller & Marsh, 2013)

We set forth to answer:

- **RQ1:** what kind of **motivation pattern** and **transition** can we identify in elementary school students in grade 5 and 6? Are there **gender differences** in these pattern and transition?
- **RQ2:** how do these motivational beliefs influence their achievement and STEM aspiration?

METHODS

Data: Students at the end of elementary school (Grade 5 and 6, $N = 360$, 55% girls, Mean at grade 5 = 11.14 years old).

Variables:

- Measures of **Task value** and **Self-concept** based on EVT in Science, Math, Finnish
- Students' dream job, coded as STEM aspiration
- Students' grades in Science, Math, Finnish

With *Latent Profile and Transition Analysis*, we derived:

- motivational belief **profiles** and profile **transition probabilities** within the two years
- Regression with **achievement** and **STEM aspiration** with the influence of gender

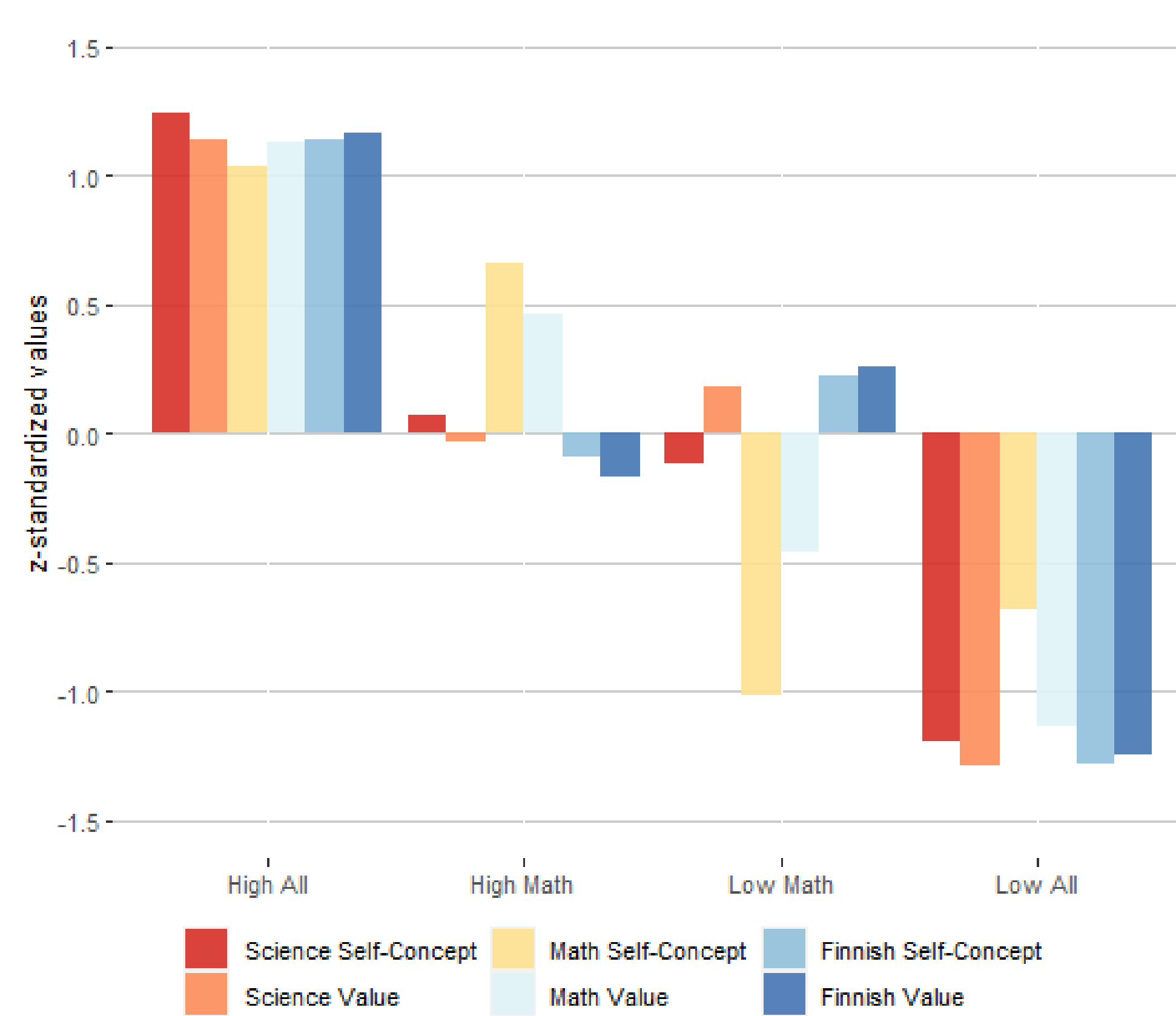


Figure 2. Four motivational profiles in grade 6 for Science, Math and Finnish

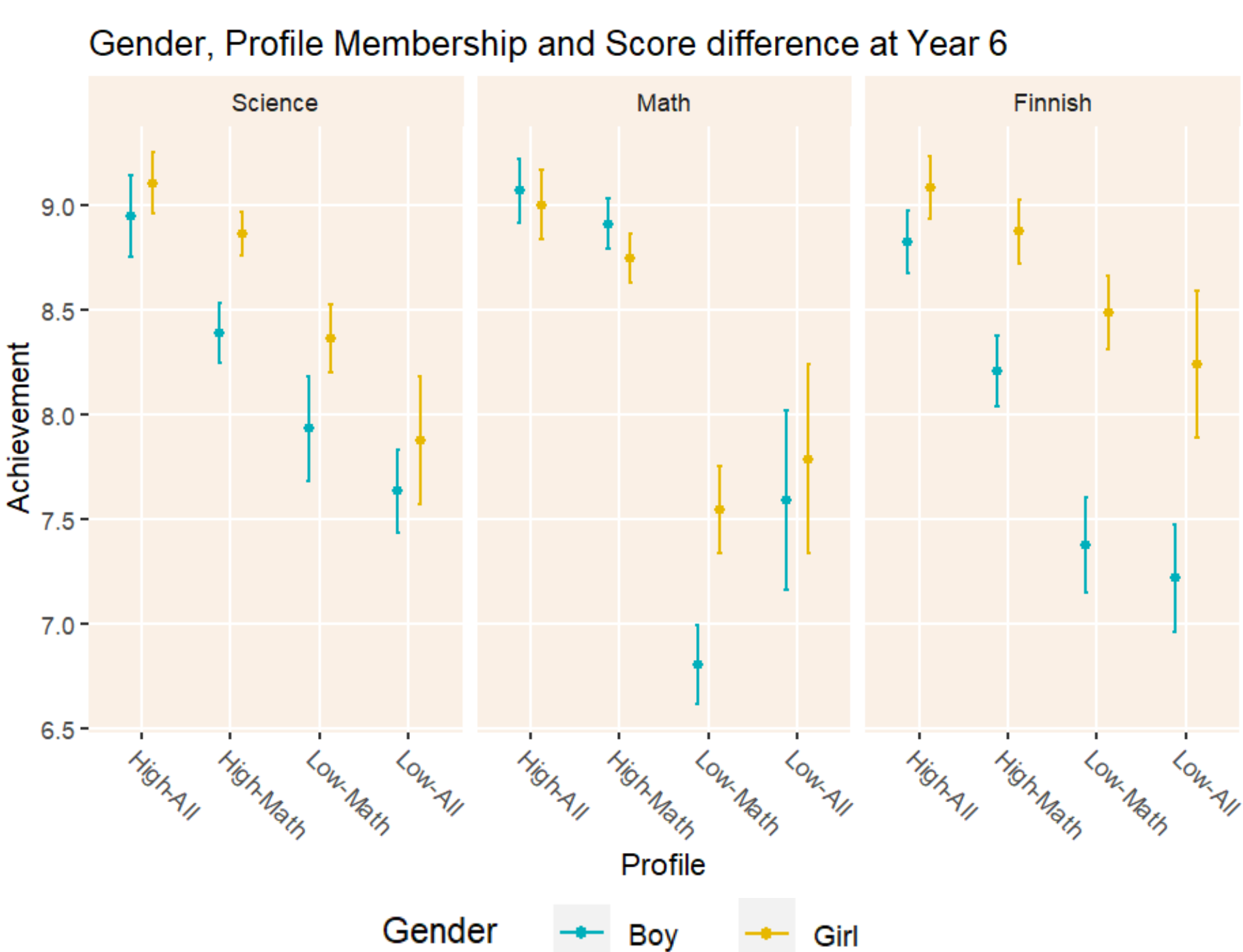


Figure 3. Achievement difference of boys and girls within the four motivational profiles

Table 1. Transition Odds of Girls and Boys

6th grade profiles				
(Girls)				
5th grade	High all	High math	Low math	Low all
High all	0.746	0.090	0.130	0.033
High math	0.000	0.999	0.000	0.001
Low math	0.026	0.001	0.753	0.220
Low all	0.140	0.047	0.271	0.542
(Boys)				
High all	0.709	0.268	0.024	0.000
High math	0.003	0.790	0.002	0.205
Low math	0.000	0.380	0.620	0.000
Low all	0.159	0.041	0.103	0.696

Table 2. Outcome difference between profile

Profile	High All	High Math	Low Math	Low All	Significant difference
Science	9.016 [8.819; 9.214]	8.653 [8.496; 8.811]	8.265 [8.035; 8.495]	7.784 [7.474; 8.094]	P1 > P2 > P3 > P4
Math	9.039 [8.854; 9.225]	8.828 [8.697; 8.960]	7.378 [7.062; 7.693]	7.613 [7.120; 8.106]	(P1 = P2) > (P3 = P4)
Finnish	8.929 [8.752; 9.105]	8.571 [8.373; 8.769]	8.309 [8.052; 8.567]	7.673 [7.253; 8.092]	P1 > (P2 = P3) > P4
STEM Aspiration	0.406 [0.288; 0.523]	0.379 [0.271; 0.487]	0.254 [0.123; 0.384]	0.083 [0.029; 0.136]	P1 = P2 = P3 > P4

RESULTS

We found **four motivational profiles** (Figure 2):

- more **girls** are characterized by **low math motivation**;
- more **boys** transitioned to **high math motivation** (Table 1)

In relation to achievement & aspiration:

- **Higher math motivation** associated with **higher math achievement** and vice versa (Table 2);
- Within-profile **higher achievement** of **girls** in Science and Finnish (Figure 3);
- **Low overall motivation** is associated with **lower STEM aspiration**; math specific motivation is *not related* to STEM aspiration

CONCLUSION

At the end of elementary school, we found evidence of:
- a significant amount of girls have shown low motivation in math, more likely to stay in low math and have lower math achievement – **potential vicious cycle**

-association between domain-specific motivation with achievement, but not as clearly associated with STEM aspiration

IMPLICATIONS

-Specific attention needed to girls with low math motivation, as they mostly will only continue declining in math motivation and achievement

- there is not yet strong coupling between STEM specific motivation and STEM aspiration -- potential point of intervention to improve their STEM aspiration

REFERENCES

Eccles, J.S., and Wigfield, A. (2020). From expectancy-value theory to situated expectancy-value theory: A developmental, social cognitive, and sociocultural perspective on motivation. *Contemporary Educational Psychology* 61. doi: 10.1016/j.cedpsych.2020.101859.
Moller, J., & Marsh, H. W. (2013). Dimensional comparison theory. *Psychol Rev*, 120(3), 544-560. <https://doi.org/10.1037/a0032459>

Scan for pdf version of the poster, further details of the study, and contact details

