I can’t do maths, yet! The impact of process praise on maths mindset and effort

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Introduction

Carol Dweck’s ‘theories of intelligence’ proposes that different core beliefs about intelligence can set up different patterns of response to challenge and setbacks.

Fixed mindset

Previous research has shown that even when pupils on both ends of the continuum show equal intellectual ability, their theories of intelligence shape their response to academic challenge (Aronson, Fried and Good, 2002).

Growth mindset

Furthermore, a person’s theory of intelligence appears to be unrelated to the value they place on a particular skill set e.g. mathematics. Rattan et al (2012) analysed undergraduates’ sense of belonging, enjoyment and usefulness of maths and revealed maths was equally valued by participants with different theories of maths intelligence.

Impact of praise

According to Haimovitz and Corpus (2011) teachers who use praise which focuses on traits and abilities reinforce intelligence as fixed and unchanging (entity theory). This in turn leads to decreased motivation, engagement and focus. The effects of praise on pupil’s effort and attainment is therefore larger in subjects where pupils regularly experience difficulties and failures such as maths.

Research questions

RQ1: Do pupils in Year 4, 5, and 6 who are exposed to daily process praise show a higher growth mindset in maths when compared with a waitlist control?

RQ2: Do pupils in Year 4, 5, and 6 who are exposed to daily process praise achieve a higher effort grade in maths when compared with a waitlist control?

RQ3: For pupils in Year 4, 5 and 6 is there a positive relationship between theories of intelligence, as measured by maths mindset scale, and the value placed on maths, as measured by belonging and usefulness scales?

Methods

Design

Participants

522 pupils from year 4, 5, 6 across three primary schools in the Local Authority. 280 pupils in the experimental Group and 242 in the control group. There were no significant differences between the groups except for EAL.

Random allocation was at school level.

Pre and post measures

Maths mindset

The fidelity check involved the researcher agreeing with the teacher to come into the maths lesson and complete the process praise count at the same time as the teacher. Further fidelity checks involved the researcher receiving daily praise count data through the Google form for each participating teacher.

Results

For research questions 1 an 2 a mixed analysis of variance (ANOVA) was conducted to assess the impact of the process praise intervention on Mindset and Effort. The between subjects variable was group (experimental and control) and the within subject variable was time (pre and post intervention).

For research question 3 the relationship between mindset and value of maths was investigated using Pearson product-moment correlation coefficient.

Discussion

• Pupils who were exposed to the process praise intervention saw (on average) an increase in effort over time, whereas pupils in the control group saw a small decrease in effort over the same time period.

• Pupils in the experimental group were (on average) also more likely to attribute a higher percentage of a fictitious pupil’s score to hard work following the intervention than the control group.

• The difference in means for the mindset statements between the experimental and control group were not significant, suggesting the intervention did not impact on the maths mindset of pupils.

• Younger pupils’ implicit theories of maths intelligence are not related to their beliefs about the value of maths (as measured by usefulness and belonging), consistent with previous research findings on older pupils.

Take home message

• Using process praise statements in maths can lead to pupils making more effort in maths.

• Reinforcing the value of numerical literacy is unlikely to improve pupils effort in maths.

• Increasing the use of process praise by teachers is not necessarily enough to alter the maths mindsets of pupils, suggesting further changes to the structure and organisation of learning are required e.g. directly teaching children about neuroplasticity.

References


Rattan, A., Good, C., & Dweck, C. S. (2012). “It’s ok — Not everyone can be good at math”: