

## A preliminary small-scale non-randomised case match study into the effectiveness of targeted mathematical reasoning intervention

### Purpose of the research

There is often a debate over the effectiveness of interventions and their impact on progress. Usual classroom practice is to provide the lowest attaining pupils with intervention; we explored the impact of an intervention which specifically targeted problem solving and reasoning in Maths for the 'average' child who is not yet at national expectations at the end of year. Through this research, we measured the numerical reasoning progress made by children working in a specific intervention group who received this on top of normal classroom teaching.

### The research design

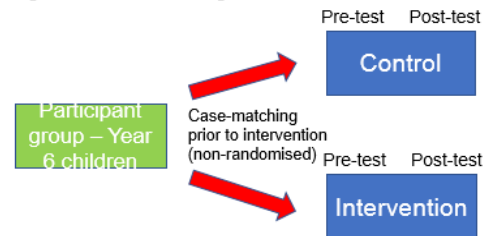
A non-randomised case-matched study with pre-test and post-test. The independent variable (the use of intervention for middle attaining children) was defined by creating the two conditions:

IV Level 1 (Control condition): Class based, teacher-led and activity-led problem solving and reasoning in Maths.

IV Level 2 (Experimental condition): Specific teacher-led targeted intervention for problem solving and reasoning in Maths as well as class based, teacher-led, child-led and activity-led problem solving and reasoning in Maths.

[Pre- and post-test matched pairs design (with two levels to the IV)]

Figure 1: Research design



### Methods

#### Participants, sample size and randomisation

Two Year 6 classes from the same school (two form entry) took part in the research. 21 case-matched pupils from within the classes were allocated to control or intervention based on attainment in the pre-test. 15 pupils in the year group were disregarded from this research as they received a different intervention as well as the control. Therefore, the analysis took place on 42 students.

#### Procedures

All children were taught by their own teacher and undertook tasks relevant to their year groups. Tasks were delivered by the class teacher to all pupils at the same time so that the experimental and control groups received the same input. Activities were delivered in line with normal classroom practice; children work in mixed attainment learning partners or independently. The intervention group received between 60 and 90 minutes of additional teacher-led reasoning and problem solving tasks. This was led by a different member of the senior leadership who has many years of teaching experience; the staff member is also a Maths specialist.

#### Materials (and apparatus)

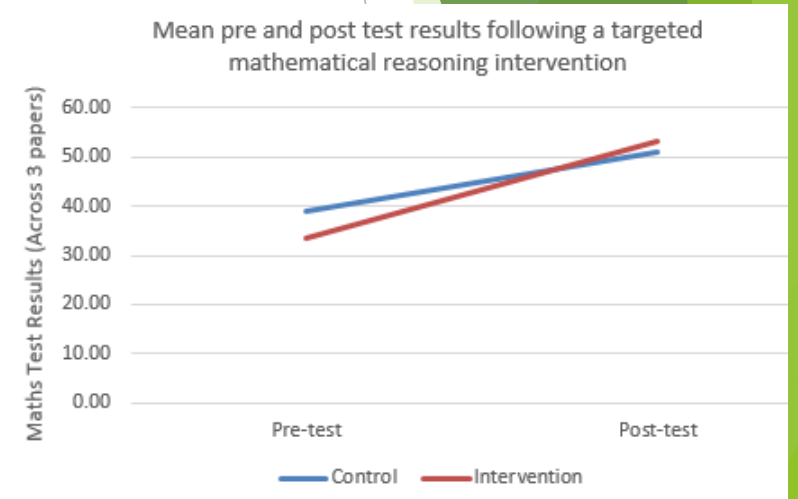
Pre- and post-tests were of a similar nature and we took into account the differences of the expectations of the new National Curriculum (2016). We ensured that the pre- and post- tests were both 2016 material and later. The pre-test was administered before any intervention began. A range of problem-solving and mathematical reasoning tasks from White Rose and Oxford Owl Mastery tasks were used during the research period.

### Results

Gain scores were first calculated from pre and post test scores (Figure 1).

A two-tailed paired samples t-test indicated that the intervention had a significant ( $p = 0.01$ ) positive effect ( $d_z = 0.665$ ) compared to the control.

Figure 2:



### Limitations

The trial was limited by the small sample size and therefore requires replication on a larger scale. Additionally, the effect of the discounted pupils was not known because their data was not included.

### Conclusions and recommendations for future research

The data suggests that targeted maths intervention does improve pupil progress with a moderately large effect. The intervention closed the gap between higher attaining pupils and children working towards national standards. It would be interesting to investigate the intervention over a longer period of time.