Improving Working Memory

This project tested two interventions: the Improving Working Memory intervention (WM) and an adapted version, named the Working Memory Plus intervention (WM+). Both aimed to improve the numeracy skills of Year 3 pupils (aged 7-8) who were behind the class average in numeracy by improving their working memory: the ability to remember and manipulate information over short time-frames. Exercises included asking pupils to repeat the things they needed to remember and assigning them to one of their fingers. The WM+ intervention also included some arithmetic content alongside the working memory elements. Both interventions were delivered by teaching assistants, who received one day of training and a handbook with detailed delivery instructions, in ten one-hour sessions over one term.

EEF Summary

The Improving Working Memory (WM) and Working Memory Plus intervention (WM+) both build on evidence from cognitive science which suggests that numeracy difficulties may be related to poor working memory capacity. The WM intervention combined training for pupils in strategies to improving working memory and time for them to practise these. The WM+ intervention covered the same material, but with less time spent on training and practising working memory strategies and more time instead on arithmetic.

The independent evaluation provides evidence that both the WM and WM+ interventions had positive impacts on maths outcomes, with children in the intervention schools making the equivalent of 3 additional months’ progress in maths. These results have a high security rating. Pupils eligible for Free School Meals (FSM) in the schools implementing the WM intervention made a small amount of additional progress in maths compared to those in the control group of schools; no impact was found for FSM-eligible pupils in the WM+ schools. These results have a lower security due to the smaller numbers of pupils.

The programme does take up a significant amount of teaching assistants’ time and took them away from supporting classes. In some cases, schools needed to provide cover for the teaching assistant, which put additional demands on their resources. This is consistent with the evidence on the best use of Teaching Assistants, which shows larger impacts when they are used to deliver structured intervention than when deployed as general classroom support.

The EEF is exploring the possibility of testing the WM intervention at a larger scale.
## Research Results

### Outcome/Group

<table>
<thead>
<tr>
<th>Outcome/Group</th>
<th>Impact - the size of the difference between Improving Working Memory pupils and other pupils</th>
<th>Security - how confident are we in this result?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maths (Working Memory)</td>
<td>3 Months' Progress</td>
<td>N/A</td>
</tr>
<tr>
<td>Maths (Working Memory +)</td>
<td>3 Months' Progress</td>
<td>N/A</td>
</tr>
<tr>
<td>Maths (FSM - Working Memory)</td>
<td>-1 Months' Progress</td>
<td>N/A</td>
</tr>
<tr>
<td>Maths (FSM - Working Memory +)</td>
<td>0 Months' Progress</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### Were the schools in the trial similar to my school?

- There were 127 schools in the trial, located across England, with small clusters in Oxford, Sheffield and Leeds.
- 108 of the 127 schools were Good or Outstanding schools.
- 39% and 30% of the pupils in the WM arm and WM+ arm respectively were eligible for FSM.

### Could I implement this in my school?

- The programme is currently not available to buy.
- Schools considering doing something similar should think about the staff requirements and how to best cover teaching assistant time that they will be out of lessons.

### How much will it cost?

The average cost was £23 per pupil per year when averaged over 3 years for the WM intervention, and £24 for the WM+ intervention.

- **Cost per pupil**: £23
- **No. of Teachers/TAs**: Variable
- **Training time per staff member**: 1 Day

<table>
<thead>
<tr>
<th>Schools</th>
<th>Pupils</th>
<th>Key Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>127</td>
<td>1475</td>
<td>Key Stage 2</td>
</tr>
</tbody>
</table>
Evaluation Conclusions

1. Children in both the WM and WM+ schools made the equivalent of 3 additional months' progress in maths, on average, compared to children in the business as usual control schools. These results have high security ratings.

2. Pupils eligible for Free School Meals (FSM) in the WM schools made a small amount of additional progress in maths compared to those in the control schools and no impact was found for FSM children in the WM+ schools. These results are of lower security than the overall findings because of the smaller number of pupils.

3. The evaluation found positive impacts on working memory, and attention and behaviour in class for pupils receiving the interventions compared to children in comparison schools.

4. The intervention was found to be time intensive, predominantly due to the need for TAs to leave class to deliver sessions, which increased pressure on teachers during lessons and in some cases required schools to source TA cover.