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Drawing as an Encoding Strategy in Young Children

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1 Introduction

- Children’s working memory (WM) is limited compared to adults (Alloway, Gathercole, & Pickering, 2006). Lower memory loads and span levels are reported (Towse, Hitch, & Hutton, 1998).

- WM is crucial for storing and retaining material and is implicated in educational success (Gathercole et al., 2016); techniques to enhance WM could be educationally beneficial.

- A variety of strategies focusing on enhancing children’s memory at the encoding stage have been investigated: semantic encoding (Schleepeen & Jonkman, 2012), mnemonic encoding (Hashimoto, 1991) and relational encoding (Fletcher & Bray, 1997). However, these techniques can lead to cognitive overload in young children and are difficult to integrate into standard classroom lessons.

2 Method

- Twenty-eight participants aged between 5 and 8 years (M=6.97, SD = 0.16) recruited from a primary school.

- Consent was obtained from the school, the parents and assent from the children.

- Participants were randomly allocated to the draw or verbal rehearsal group.

- Children aged 5.0 to 6.6 were allocated to the younger age group and children 7.0 to 8.6 were allocated to the older age group.

3 Results

Table 1. Mean (SD) recall scores by encoding condition and age.

<table>
<thead>
<tr>
<th></th>
<th>Drawing</th>
<th>Verbal</th>
<th>Overall Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Younger Children</td>
<td>3.63 (.52)</td>
<td>3.00 (.63)</td>
<td>3.36 (.63)</td>
</tr>
<tr>
<td>Older Children</td>
<td>4.33 (1.03)</td>
<td>3.50 (.93)</td>
<td>3.86 (1.03)</td>
</tr>
<tr>
<td>Overall Mean</td>
<td>3.93 (.83)</td>
<td>3.29 (.83)</td>
<td>3.61 (.88)</td>
</tr>
</tbody>
</table>

- 2 x 2 between subjects ANOVA.

- Significant main effect for encoding condition, F(1,24) = 5.753, p < 0.05, n2 = 0.25, post hoc power = 0.634.

- Children in the drawing group recalled significantly more than children in the verbal rehearsal group.

- There was no main effect for the age condition F(1,24) = 3.95, p=ns, n2 = 0.141, post hoc power = 0.479.

- There was no significant interaction F(1,24) = 0.137, p=ns, n2 = 0.005, post hoc power = 0.063.

4 Discussion

- Memory recall was superior, regardless of age, when children were encouraged to draw during the rehearsal phase; supports first hypothesis.

- No significant age differences reported which was unexpected. Adds to the utility of drawing as it negates age differences evident in other memory research.

- Supports previous research (Engle & Nagle, 1979; Fletcher & Bray, 1997; Summers & Craik, 1994); deep encoding strategies do lead to improved memory recall compared to shallow encoding strategies such as verbal rehearsal.

- Drawing as an encoding technique for young children has not been extensively researched; results found support research conducted with adults and drawing as an encoding technique (Wammes et al., 2016).

- Theoretical explanations as to why drawing is an effective technique not fully explored.

- Dual-coding hypothesis (Mayer & Anderson, 1991), picture superiority effect (Palacio, Rogers, & Smythe, 1968) and greater reliance on visual rather than verbal cues (Conrad, 1971) have been considered but do not explain the enhanced performance of the drawing group; both groups had the target picture present during the rehearsal phase.

- Depth of processing (Wammes et al., 2016) and a constructivism approach (Piaget, 1964) more robust explanations. The action of drawing may lead to participants strengthening and consolidating memory at encoding (Papert, 1980). Interconnected memory cues make retrieval easier.

- Promising educational application; simplicity of drawing means it could be easily integrated into classrooms.