Drawing as an Encoding Strategy in Young Children

Lauren Taylor and Anna Macklin

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 (Schleepen & 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.

Drawing as an Encoding Technique

- Drawing can be an effective encoding technique for adults (Wammes, Meade, & Fernandes, 2016).
- Drawing during recall has been found to increase the amount of information children report (Patterson & Hayne, 2011); however, drawing as an encoding technique has received limited attention.
- Expected that drawing may act as a simple but deep encoding strategy which evokes verbal and nonverbal cues (Craik & Tulving, 1975).

Aims

The study investigated whether drawing could be an effective encoding strategy for children aged between 5 and 8 years.
It was predicted that:

1. There would be a significant difference between the two encoding conditions; children in the drawing condition would recall more than children in the verbal rehearsal condition.
2. There would be a significant difference between the two age groups; regardless of condition older children would recall more than younger children.

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.

Figure 1: Six target pictures to be encoded and recalled

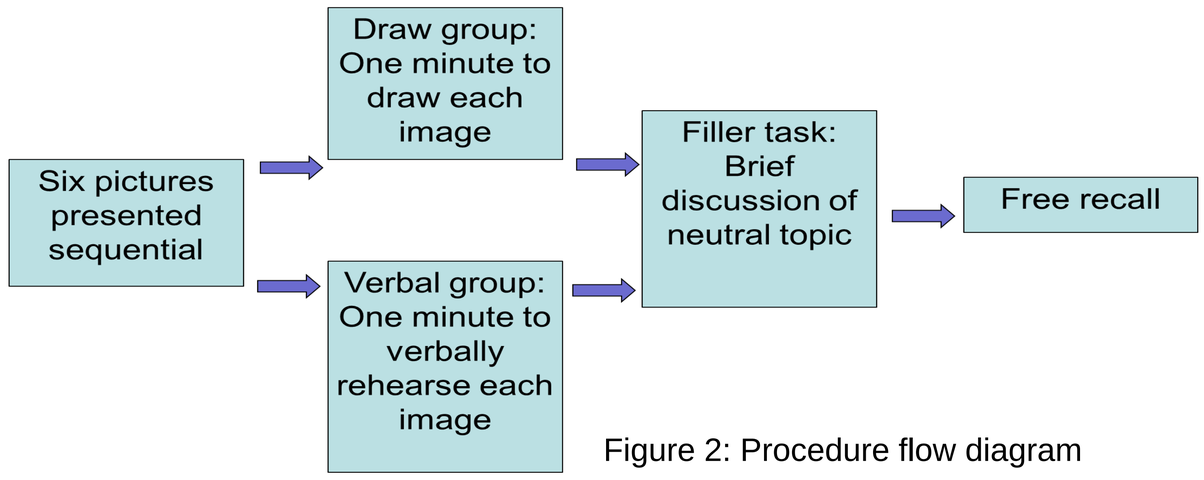

Figure 2: Procedure flow diagram

3 Results

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

	Drawing	**Verbal**	**Overall Mean**
Younger Children	3.63 (.52)	3.00 (.63)	3.36 (.63)
Older Children	4.33 (1.03)	3.50 (.93)	3.86 (1.03)
Overall Mean	3.93 (.83)	3.29 (.83)	3.61 (.88)

- 2 x 2 between subjects ANOVA.
- Significant main effect for encoding condition, $F(1,24) = 5.753$, $p < 0.05$, $n2 = 5.75$, 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 $F(1,24) = 0.117$, 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 (Paivio, 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 easer.
- Promising educational application; simplicity of drawing means it could be easily integrated into classrooms.