The Development of Preschoolers Value-Based Remembering: An Examination of Encoding Behavior and Eye-movements

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INTRODUCTION

- Children encounter a plethora of information on a daily basis and must learn to selectively attend to information that is most valuable.
- The ability to encode information that is explicitly deemed as more valuable has been shown in children as young as 5 years old (Castel et al., 2011).
- However, the approximate age of when this skill begins to develop and the encoding strategies that support its development are currently unknown.
- The purpose of this study was to determine at which age children begin to selectively attend to information that is deemed more valuable.
- We predicted that older children would selectively attend to valuable information more so than younger children.

DESIGN

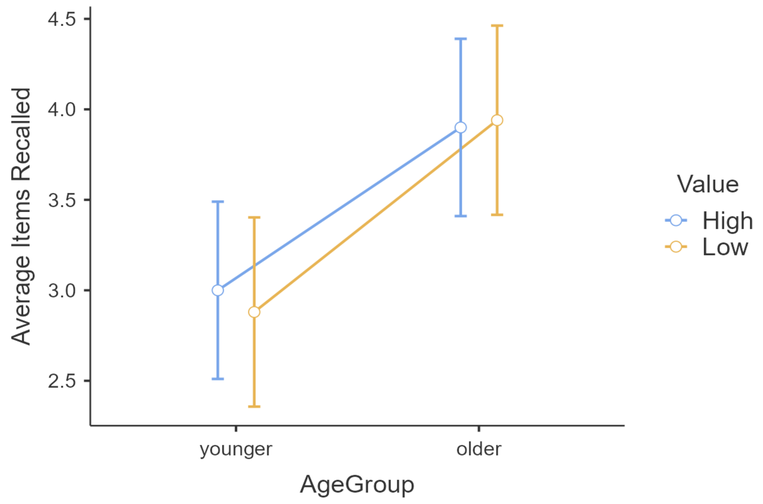
- Participants were 100 children, ages 3.5 to 5 years (M_{age}= 4.5, 56 females). We median split children into younger (< 4.5 years) and older age groups (≥ 4.5 years).
- Sessions occurred in person at preschools and daycares in El Paso County
- A non-invasive eye tracker (Tobii T60) was used to track children's eye movements

Procedure:

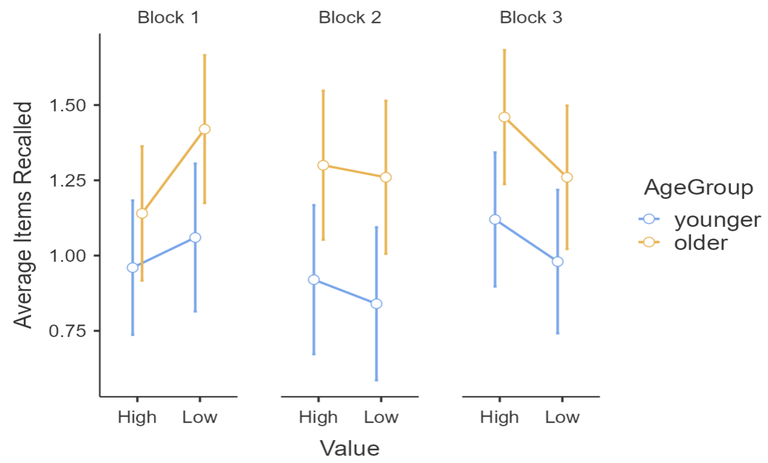
- Encoding: Participants were presented with 8 images varying in value (five stickers or one sticker). Participants were told they would be awarded with the associated sticker value if they later correctly remembered the image.
- Test: Participants completed a free recall test and were awarded with the associated sticker value for correct items.
- Participants completed 3 encoding / test blocks

Example Encoding Screen with Eye-Tracking Heat Map

RESULTS



Analysis of items recalled revealed a significant difference between the younger and older age groups (F(1, 98) = 10.5, p = 0.002, η^2p = 0.097). Specifically, the older age group scored significantly higher than the younger age group. No other interactions exist.

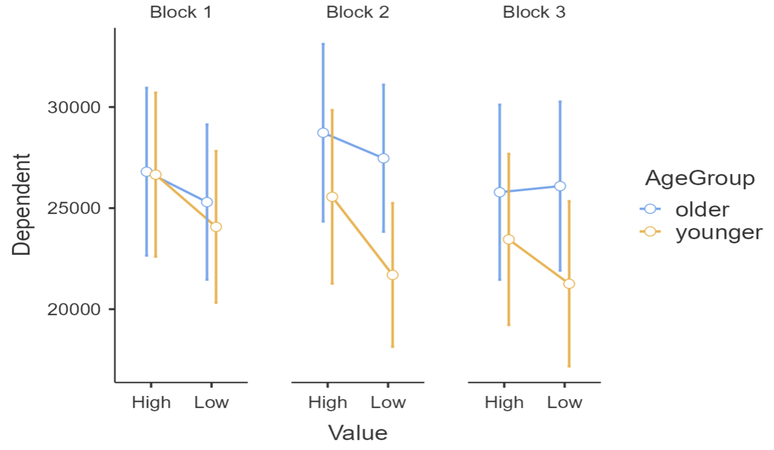


The interaction effect between Block and Value was statistically significant, F(2, 196) = 3.75, p = 0.03, η^2p = 0.04.

A paired samples t-test revealed a significant difference between the number of High Value items and Low Value items recalled in test block three, t(99) = 1.94, p = 0.028, but not other test blocks ps>.05.

Overall, these results suggest children were able to engage in value-based remembering after practice with the task.

RESULTS



There was a significant main effect of AOI (Area of Interest), such that children attended more to high compared to low value images F(1, 86) = 4.137, p = 0.045, η^2p = 0.046. No other main effects of interactions emerged, ps >.05.

These results suggest children's attention during encoding was sensitive to value throughout the task.

DISCUSSION

- Preschool aged children were able to selectively remember high-value compared to low value items but that this skill only developed after practice with the task.
- Critically, eye-tracking demonstrated that children attended more to high value items than low value items even during their first study/test block.
- Overall, these results suggest that children begin to selectively attend to more valuable information as early as 3.5-years-old based on their looking behaviors. However, they require practice before they are able to translate these selective attention patterns during encoding into successful behavioral recall of high value items.
- Future research will further examine children's eye-movements to determine whether patterns of looking behaviors (e.g., transitions between items) are associated with value-based remembering.

Castel, A. D., Humphreys, K. L., Lee, S. S., Galván, A., Balota, D. A., & McCabe, D. P. (2011). The development of memory efficiency and value-directed remembering across the life span: a cross-sectional study of memory and selectivity. *Developmental psychology*, 47(6), 1553–1564. https://doi.org/10.1037/a0025623