Preschoolers' Early Utilization of Value-Based Selectivity: Considering Factors of Feedback and Age

Miriam Shamess, Heidi Martinez, & Diana Selmeczy Ph.D.

Department of Psychology, University of Colorado, Colorado Springs

Introduction

- Value-based selectivity is the **process by which important information is preferentially encoded at the expense of less important information** (Knowlton & Castel, 2021).
  - E.g. it is more beneficial for a child to remember their parent's phone number than their friend's cat's name.

- This skill develops throughout childhood and adolescence (Castel et al., 2011). However, previous research has not examined when this skill emerges and what factors support its development.

- **Feedback has been widely shown to support learning by scaffolding memory and information processing strategies** (Lipko-Speed et al., 2014; Pattie & Timperley, 2007).

- In the current study we will be examining whether feedback that highlights the relevance of value scaffolds the development of value-based remembering in preschool children.

Hypothesis

Children who receive feedback highlighting value for specific items will be more likely than those who only receive global feedback regarding value to utilize value-based remembering.

Older children will be better than younger children at value-based selectivity.

Participants

- Preschoolers (N = 67) between the ages of 3.5 – 5 years old were recruited from participating preschools in El Paso County Colorado.

- Participants were 56.7% female and 41.8% male, with a mean age of 4.49 (SD = 0.53).

Method

- Children completed three study/test cycles; each consist of an encoding and test phase.
  - **Encoding:** participants saw four animal/object pairs with an associated sticker value (1 or 5 smileys).
  - **Test:** 1 minute of free recall.

- Children were randomly assigned to a feedback condition; either global or item specific.
  - **Global:** children were told what pictures they correctly recalled, then rewarded with the total number of stickers earned.
  - **Item specific:** children were again told what pictures they correctly recalled, then shown how many stickers each recalled picture was worth when rewarded with their stickers.

- Children completed an NIH toolbox picture vocabulary and flanker task (NIH Toolbox Training Manual, 2012).

- For analyses:
  - Selectivity was calculated using *high value items / correctly recalled items*. 0.5 indicates equal recall of high and low value items, > 0.5 indicates selectivity toward high value items.
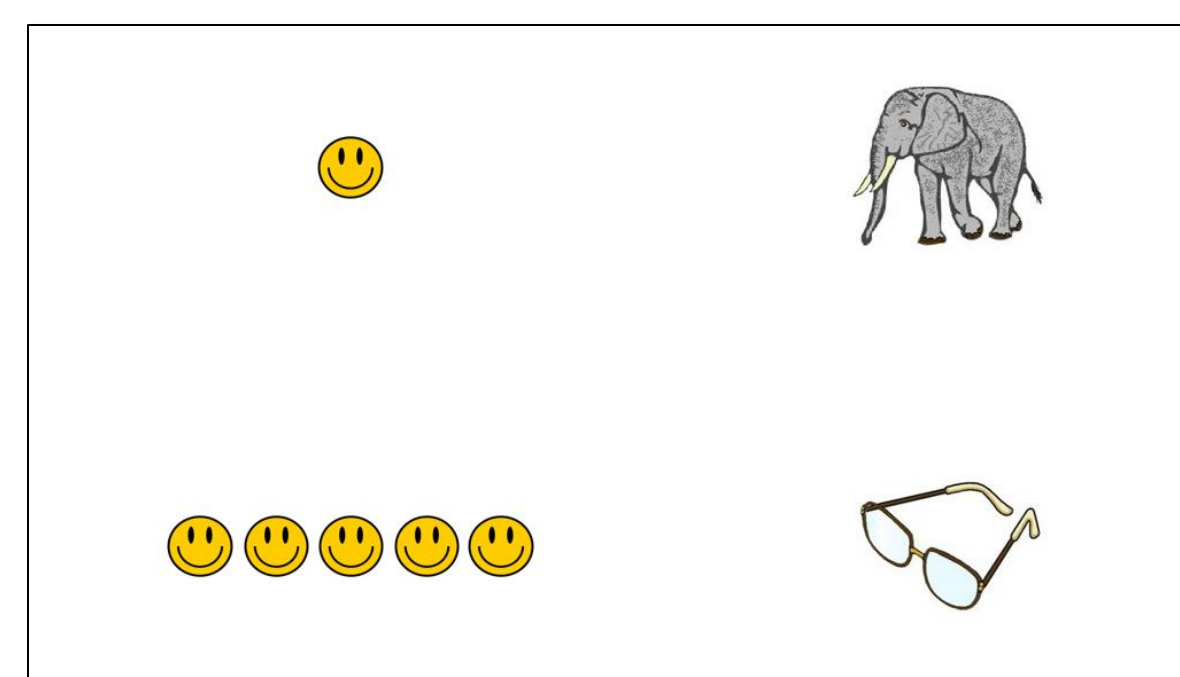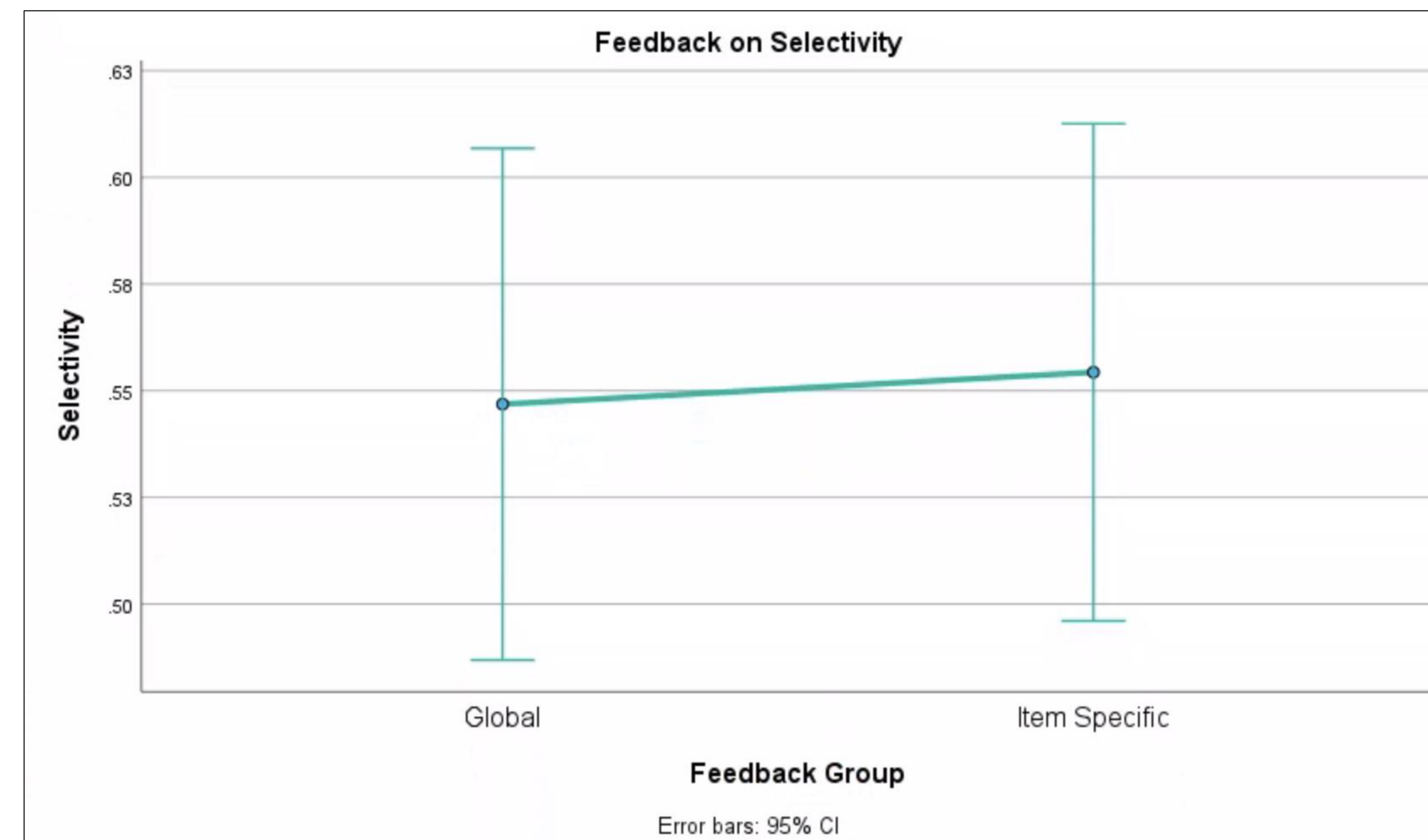
Results

Fig. 1: Selectivity did not significantly differ between item-specific feedback (M = .55, SD = .15) and global feedback (M = .54, SD = .17), $t(65)$ = 0.33, p = .88.
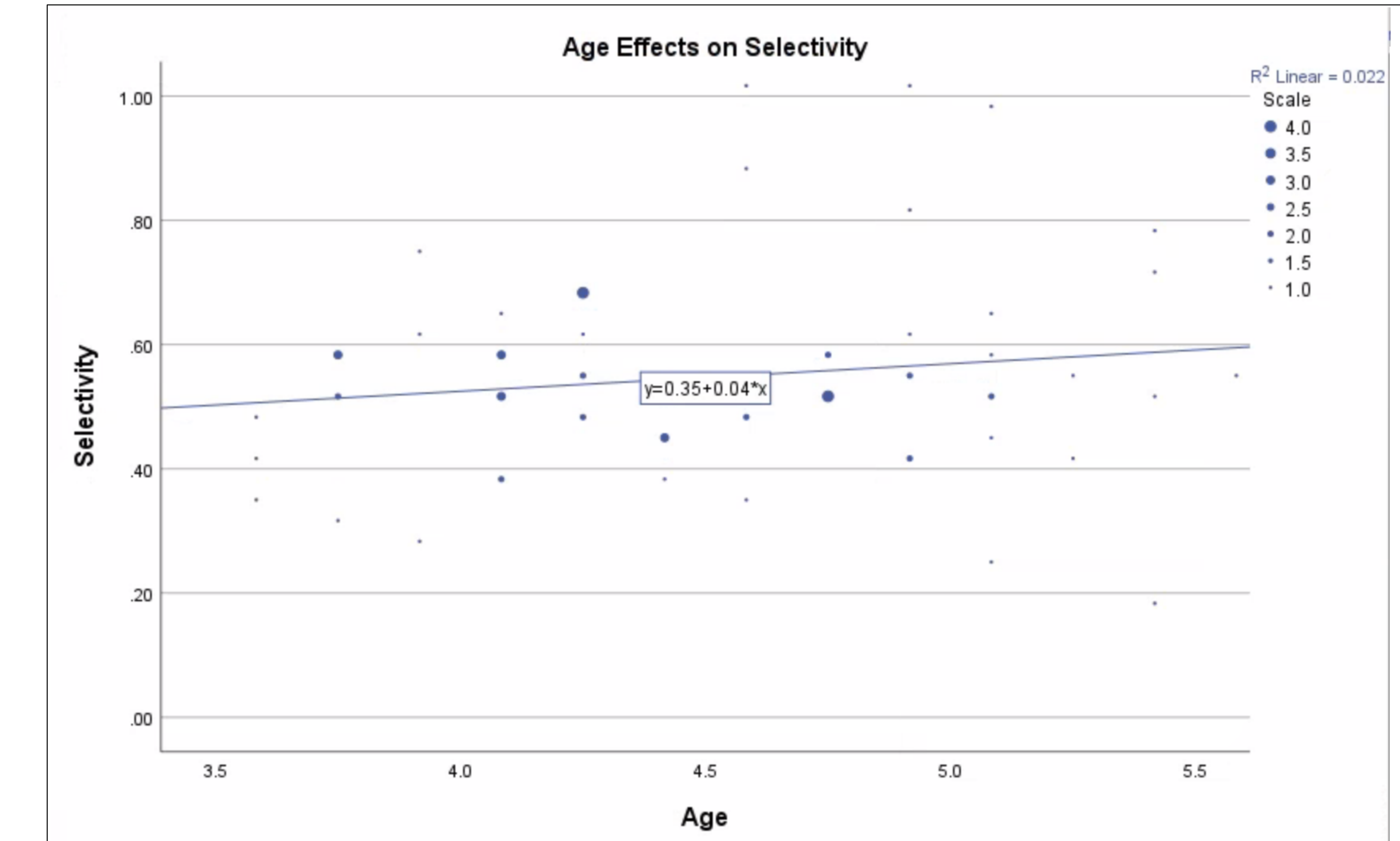

Fig. 2: The relationship between age (M = 4.49, SD = 0.53) and selectivity (M = 0.55, SD = 0.16) was found to not be significant $r(N = 67)$ = .15, p = .23. While not significant, older children did tend to be more selective than younger children.
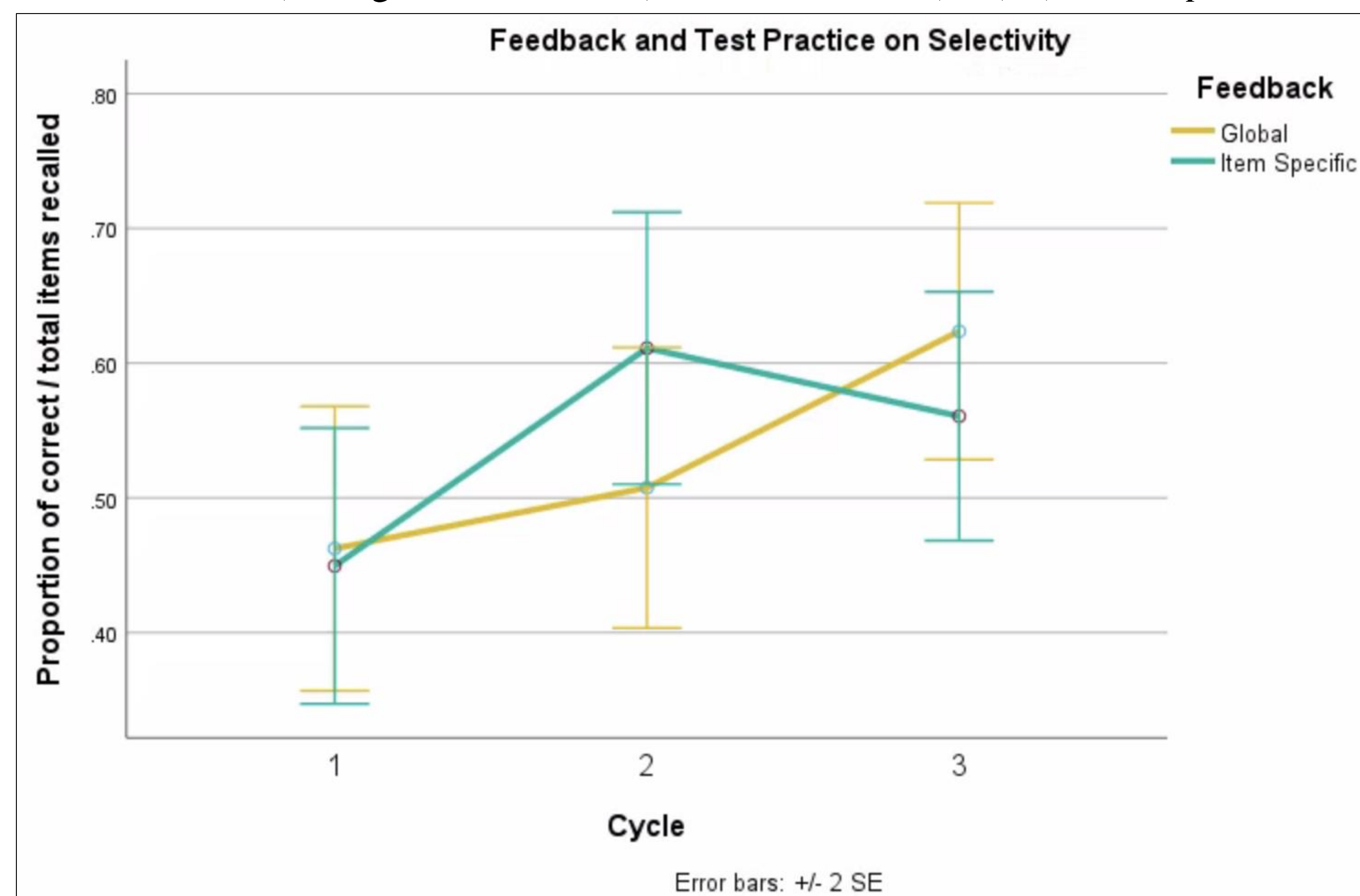

Fig. 3: The interaction between test practice and feedback was not significant, $F(2, 67)$ = 1.72, p = .18. Although the interaction was not significant, numerically the item-specific feedback group improved selectivity more quickly than the global group across study/test cycles.

Selectivity

Children significantly recalled more high value items (M = 4.15, SD = 1.67) than low value items (M = 3.48, SD = 1.58, p = .02).

Discussion

- Preschoolers were selective, expanding the range of acquisition for this skill far earlier than previously identified. In addition, children significantly improved with test practice. While the factors of age and feedback did not show significant effects, the trends may indicate early contributions to the development of value-based selectivity.
  - The interaction between feedback and test practice, while not significant, indicates that item specific feedback initially improved selectivity more so than global feedback before exhibiting decline, perhaps due to mental fatigue from the more complex feedback method.

- The current study was limited by its smaller than estimated sample size and close age group which may have limited variance between groups.
  - The task was conducted within a preschool environment which may have been distracting to some participants, decreasing overall recollection.
  - This study exclusively examines children in conventional preschool programs. These results may differ for children in alternative programs (e.g. Homeschool).

- Future research would benefit from widening the age range and educational background of participant pool.
  - In addition, future research could compare selectivity with feedback (both types) and without. While there is no significant difference between feedback groups, overall, does feedback impact selectivity?

- We hope these findings can set the stage for future expansion of these, and other underlying factors. By promoting this skill in early childhood, children can more accurately and efficiently engage in appropriate learning strategies.

References

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.

Hattie, J., & Timperley, H. (2007). The Power of Feedback. *Review of Educational Research, 77*(1), 81–112.

Knowlton, B. J., & Castel, A. D. (2022). Memory and reward-based learning: A value-directed remembering perspective. *Annual Review of Psychology, 73,* 25–52.

Lipko-Speed, A., Dunlosky, J., & Rawson, K. A. (2014). Does testing with feedback help grade-school children learn key concepts in science? *Journal of Applied Research in Memory and Cognition, 3*(3), 171–176.

NIH Toolbox Training Manual – English version September, 2012. (n.d.).