The Isolation Effect (Hunt, 1995) is exhibited when memory is stronger for an item that appears distinctive in the context of a group of similar items. This effect relies on both distinctive and organizational processing (e.g., processing the difference between “watermelon” categorized as fruit in a list of other items categorized as “clothes”; Hunt & Lamb, 2001). Evidence of the isolation effect in preschoolers is equivocal (e.g., Howe, Courage, Vernescu, & Hunt, 2000), however, individual differences in cognitive flexibility may explain why only some children demonstrate the isolation effect.

Children who perform well on cognitive flexibility tasks demonstrate better organizational processing (Snyder & Munakata, 2010). Therefore, it is likely that more flexible thought will lead to automatic categorization of items in an isolation task and the recognition of a distinctive item.

The goal of the current study was to examine the relation between cognitive flexibility and expression of the isolation effect. We presented children with an isolation task and a common test of cognitive flexibility, the Dimensional Change Card Sort task (DCCS; Zelazo, Müller, Frye, & Marcovitch, 2003).

Method

Participants
Twenty-four 4-year-olds (M age = 4.40 years, SD = .27), 24 5-year-olds (M age = 5.32 years, SD = .24), and 24 6-year-olds (M age = 6.49 years, SD = .31) participated in the study.

Design and Procedure

Isolation Effect Task
Children were presented with two eight-item picture lists with the target in location 6.

In the Isolation List, the target item was categorically different compared to background items (Figure 1).

In the Control List, all items (including the target) were from the same category (Figure 2).

For each list, the experimenter presented the picture cards one at a time and asked children to name the picture. Additionally, children were asked to label the category of the item (e.g., is an elephant an animal or clothes?) to encourage organizational processing.

After presentation of the list, there was a 5-minute delay followed by a free recall period.

Dimensional Change Card Sort Task
Children were instructed to sort cards on one dimension (e.g., shape or color) and then switch sort by a conflicting rule (Figure 3).

After 6 trials, children were asked to disregard the first rule and sort by the opposite dimension.

Children were scored as passing the task if they sorted at least 5 out of the 6 trials correctly after the rule switch.

Results

A repeated measures logistic regression was conducted on children’s recall of the critical target item with target type (control vs. isolate) as within subjects variables and both age and DCCS performance (pass/fail) as a between subjects variable.

There was a marginal main effect of target type, Wald (1) = 3.4, p = .067, indicating that children were more likely to recall the isolate relative to the control target.

A significant DCCS performance by target type interaction, Wald (1) = 7.3, p = .007, indicated that children who passed the DCCS were more likely to recall the isolate target relative to the control target, whereas children who failed the DCCS did not demonstrate the isolation effect (see Figure 4).

Post hoc McNemar chi-squared tests indicated that children who passed the DCCS had better memory for the isolate target over the control target (p < .001), but children who failed the DCCS did not (p > .03).

Discussion

Children’s ability to consider information in multiple contexts is required for children to notice differences in the context of similarity (i.e., the isolation effect).

As such, children’s ability to categorize and notice distinctive stimuli is related to the ability to switch rules and manipulate contextual information.

Results from the current study suggest that developing cognitive flexibility may contribute to organizational and distinctive memory processing and the emergence of the isolation effect.

Organizational processing is typically spontaneous in adults but may be more effortful in children (Schwenck, Bjorklund & Schneider, 2009). This lack of spontaneous organization paired with general limitations in cognitive flexibility provides an explanation for why young preschoolers do not naturally demonstrate the isolation effect.

References