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Introduction

Although language and memory are most often investigated separately, the two constructs seem to be linked in important ways. Several studies have demonstrated that memory is related to verbal ability. For example, Rose, Feldman, Wallace, & Cohen (1991) found that recognition memory in infancy predicted language development in 2½-, 3-, and 4-year-olds. Ullman (2001) has suggested that lexical memory depends largely on the declarative memory system. Others (Martin & Saffran, 1997) have even hypothesized that language processing and short term memory are actually supported by the same capacity. There is additional evidence from brain imaging studies linking the two constructs. However, there are few studies that have examined the link between language and memory as they develop in young children. Examining the relationship between these two constructs as they emerge could provide important information about the underlying cognitive processes that support them.

It was hypothesized that 3-year-olds with better short-term recognition memory would also score higher on a measure of receptive language.

Participants



Three-year-old children who were part of the fourth wave of data collection in a longitudinal study of individual differences in cognitive development* participated in this study. The original sample consisted of 108 healthy full-term 5-month-old infants and 32 have been seen to date at the age 3 assessment. EEG and ECG measures were also taken, but those data will not be discussed here.

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Language

The PPVT-III (Peabody Picture Vocabulary Test-III; Dunn & Dunn, 1997) was administered to assess each child's verbal comprehension and receptive vocabulary. Raw scores ranged from 31 to 65; $M = 49.04$; $SD = 9.50$.



Short-Term Memory



Short-term memory was assessed using a variation of the Corsi-Milner test of recognition memory (Corsi, 1972; Diamond et al, 1997). During this task, the children were shown a series of cards (40 trials), each depicting a simple monochromatic line drawing of an everyday object. All images were presented for approximately 5 seconds. This task required the child to distinguish an

image that had been shown from an image that had not been shown. After trials 4, 8, 12, 16, and 20, a question card depicting two images (one of which was previously presented) was shown. The child was asked, "Which of these two pictures have you already seen?" During each of the practice trials, the child was shown a picture card immediately followed by a question card depicting two images. For results to be considered valid, the child was required to demonstrate that he or she understood the meaning of the words *already seen* by correctly identifying which card was "already seen" in at least two of three practice trials. The experimenter explained any errors to the child and praised and explained any correct responses during practice trials only. No feedback was given during the administration of the test. One point was given for each correct answer. Scores ranged from 0 to 5; $M = 4.3$; $SD = 1.26$.

Results

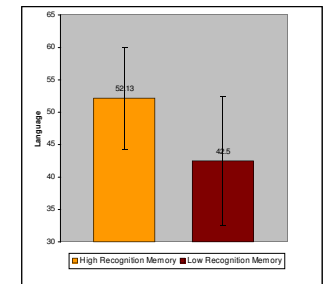
Valid data were obtained on both tasks for 23 children. Five children were excluded because they were unable to perform the Corsi-Milner task, and 4 children were excluded because they did not cooperate during one or both of the tasks.

Correlational Analysis

Scores on the Corsi-Milner test of recognition memory were positively correlated with scores on the Peabody Picture Vocabulary Test; $r(21) = .62$, $p = .002$. As predicted, children who scored higher on the memory measure also scored higher on the receptive language measure.

Comparison of Means

The sample was divided into two groups based on performance on the Corsi-Milner recognition memory test. Children who scored less than 5 on the recognition memory measure ($M = 42.50$, $SD = 9.94$) performed significantly worse on the Peabody Picture Vocabulary Test than those with a perfect score on the memory task ($M = 52.13$, $SD = 7.85$); $t(21) = 2.56$, $p = .02$; indicating that children with better memory also have higher language ability.



Discussion

These results provide support for the idea that the emergence of language is linked to the development of memory. Children with a better memory tend to have a more extensive vocabulary. This is consistent with the idea that the development of language relies heavily on memory capacity. However, the nature of this research does not necessarily indicate a causal relationship. The link is probably bidirectional. Language may enhance memory because labels can serve as retrieval cues, as suggested by Hayne (2004).