

Summary

Investigating the memory systems responsible for syntactic priming during language acquisition

Much research has accumulated supporting the view of multiple memory systems. A number of taxonomies have been forwarded that attempt to describe the functional and neurological correlates of each memory system. One model distinguishes between declarative and procedural memory (Squire & Zola, 1996). Functionally, declarative memory is involved in the explicit acquisition, retention and retrieval of information for personal events (in the case of episodic memory) or facts (in the case of semantic memory). The declarative memory system achieves this through linking different representations (Mayes, Montaldi, & Migo, 2007). Learning through this system is rapid, can occur following a single exposure, and is primarily supported by the medial temporal lobes (Squire, Stark, & Clark, 2004). The procedural memory system is involved in the acquisition and retrieval of habits, motor and cognitive skills (Packard & Knowlton, 2002). Unlike declarative memory, information learnt via this system does not require conscious awareness. Learning through this system is typically slower and achieved through repeated execution of a motor skill or exposure to a particular stimulus sequence. Evidence suggests that the procedural memory system is mediated by the basal ganglia and cerebellum (Gabrieli, 1998).

The development of these memory systems are of inherent interest to developmental psychologists, since their development will be correlated with the emergence of skills that the memory systems differentially support. The current developmental studies undertaken with infants and children suggest declarative and procedural memory systems develop according to different developmental timetables (Bauer, 2007; Schacter & Moscovitch, 1984). Generally, the procedural system has been argued to mature early, whereas the declarative system has been argued to undergo an elongated maturational process.

Although this is the general finding in the literature, there has been no longitudinal study to provide conclusive evidence for these observations. The current study therefore used a

longitudinal design to investigate the development of these two memory systems in children aged 4 – 7-years over a 12 month period.

A total of 40 children completed tests of procedural and declarative memory and tests of verbal and non-verbal intelligence twice over a one year period, and were compared to 27 children at Time 2 as a cross-sectional control. At Time 1 the children in the longitudinal sample had a mean age of approximately 5 ½ years. After correcting for measurement error, performance on the declarative memory task was found to improve at a larger rate in comparison to the procedural memory task. The findings of the study support the view of multiple memory systems which reach functional maturity at different points in development. Specifically, the study provides conclusive evidence for the argument that the procedural memory system reaches functional maturity early (in early primary school), whereas the declarative memory system continues to mature during this developmental period.

References

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