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That's a good one! Belief in efficacy of mnemonic strategies contributes to age-related increase in associative memory

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ABSTRACT

The development of associative memory during childhood may be influenced by metacognitive factors. Here, one aspect of metamemory function––belief in strategy efficacy—was tested for a role in the effective use of encoding strategies. A sample of 61 children and adults (8–25 years of age) completed an associative recognition memory test and were assessed on belief in the efficacy of encoding strategies. Independent of age, belief ratings identified two factors: "deep" and "shallow" encoding strategies. Although the strategy factor structure was stable across age, adolescents and adults were more likely to prefer using a deep encoding strategy, whereas children were equally likely to prefer a shallow strategy. Belief ratings of deep encoding strategies increased with age and, critically, accounted for better associative recognition.

Introduction

Episodic memory refers to the awareness of earlier events that occurred in a certain place at a certain time and is crucial for everyday life. Episodic memory requires processes that allow the binding, or association, of disparate pieces of information over time and space (Tulving, 1972). This

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fundamental associative component of episodic memory is typically conceptualized as the linking of two pieces of information, content and contextual information, together into a memory representation (Shing, Werkle-Bergner, Li, & Lindenberger, 2008; Tulving, 1972). The current understanding of episodic memory function is largely predicated on the study of adults, whereas less is known about episodic memory during childhood and adolescence (Ofen, 2012). It is accepted that episodic memory develops throughout infancy and childhood (Bauer, 2005; Nelson, 1993; Perner & Ruffman, 1995; Tulving, 1983; Wheeler, Stuss, & Tulving, 1997). It is not clear, however, at what age children acquire a mature, functioning episodic memory system, and it appears that the episodic memory system continues to develop through middle childhood and adolescence (Brown, 1975; Ofen, 2012). Indeed, associative memory in children is more prone to false recognition errors than memory for single items (Shing, Werkle-Bergner, Li, & Lindenberger, 2009; Shing et al., 2008), suggesting prolonged maturation of associative memory recognition.

Metamemory—the knowledge about memory (Schneider, 1999; Schneider & Pressley, 1997)—is known to influence the encoding, maintenance, and retrieval of memories (Hertzog & Dunlosky, 2004; Schneider, 1999; Schneider & Pressley, 1997). Belief in memory efficacy (Bandura, 1997), together with the use of encoding or retrieval strategies (Bjorklund & Douglas, 1997; Hertzog & Dunlosky, 2004), metacognitive monitoring (Dunlosky & Connor, 1997; Hertzog, Kidder, Powell-Moman, & Dunlosky, 2002), and belief in control of memory outcomes (Lachman & Andreoletti, 2006), has been shown to influence memory outcomes individually or through a synergistic effect (Hertzog & Dunlosky, 2004).

The extent to which protracted development of episodic, or associative, memory between middle childhood and adulthood is supported by development of metamemory is not well understood. Some have speculated that development of metamemory functions partially explains the early development of memory systems (Bjorklund & Douglas, 1997; DeMarie-Dreblow & Miller, 1988; Flavell, 1970). Little is known, however, about the interactions of metamemory and episodic memory during middle childhood and adulthood. Because associative memory functions follow a protracted trajectory of development that extends through adolescence, there is substantial interest in capturing the factors that modify memory functioning during this period of development (Ofen, 2012). This study was designed to examine possible interactions between the development of metamemory and the development of associative memory during this developmental period.

In this study, we targeted two aspects of metamemory: belief in the efficacy of mnemonic strategies and use of mnemonic strategies. Our goal was to characterize developmental effects in those aspects of metamemory and assess their influence of memory functioning. Belief in efficacy of mnemonic strategies is known to modify recognition memory in older adults (Bender & Raz, 2012); however, the influence of age-related differences in the belief in the efficacy of mnemonic strategy in child development has never been tested before. Moreover, age-related differences in the belief in the efficacy of mnemonic strategies may be linked to strategy use across development and, thus, may add to the established findings that demonstrate beneficial effects of mnemonic strategy use during childhood (Bjorklund & Douglas, 1997).

Children rapidly grow in their ability to use mnemonic strategies during the elementary school years (Best, Miller, & Jones, 2009; Shing & Lindenberger, 2011; Schneider & Pressley, 1997). Prior to elementary school, children commonly do not display simple organizational and rehearsal strategies that are known to be effective (Reese, 1962). Furthermore, a young child might not benefit from explicit strategy instruction (Flavell, 1970), although there may be memory gain seen in a classroom setting (Grammer, Coffman, & Ornstein, 2013) or under specific training conditions (Bjorklund, Miller, Coyle, & Slawinski, 1997). Only by middle to late childhood do children begin to spontaneously demonstrate elaborative mnemonic strategies, but they might not necessarily benefit from the strategy as adolescents or young adults would (Bjorklund et al., 1997; DeMarie-Dreblow & Miller, 1988; Sander, Werkle-Bergner, Gerjets, Shing, & Lindenberger, 2012).

Children might not benefit from strategies because of a lack of spontaneous strategy use (i.e., production deficiency; Flavell, 1970) or due to an inability to benefit from a strategy regardless of explicit instruction (i.e., utilization deficiency; DeMarie-Dreblow & Miller, 1988). Utilization deficiency is more prevalent in younger children than in older children (Bjorklund et al., 1997) and is often contrasted against memory deficits in older adults. Unique to later-life decline, older adults