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Metamemory prediction accuracy for simple prospective and retrospective memory tasks in 5-year-old children

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ABSTRACT

It is well documented that young children greatly overestimate their performance on tests of retrospective memory (RM), but the current investigation is the first to examine children's prediction accuracy for prospective memory (PM). Three studies were conducted, each testing a different group of 5-year-olds. In Study 1 ($N = 46$), participants were asked to predict their success in a simple event-based PM task (remembering to convey a message to a toy mole if they encountered a particular picture during a picture-naming activity). Before naming the pictures, children listened to either a reminder story or a neutral story. Results showed that children were highly accurate in their PM predictions (78% accuracy) and that the reminder story appeared to benefit PM only in children who predicted they would remember the PM response. In Study 2 ($N = 80$), children showed high PM prediction accuracy (69%) regardless of whether the cue was specific or general and despite typical overoptimism regarding their performance on a 10-item RM task using item-by-item prediction. Study 3 ($N = 35$) showed that children were prone to overestimate RM even when asked about their ability to recall a single item—the mole's unusual name. In light of these findings, we consider possible reasons for children's impressive PM prediction accuracy, including the potential involvement of future thinking in performance predictions and PM.

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Introduction

The concept of metamemory was introduced to the literature by Flavell (1971), who argued that memory development during childhood is attributable largely to the development of knowledge about how memory works and the strategic application of such knowledge during memory tasks (declarative and procedural metamemory, respectively). *Declarative metamemory* reflects the understanding of person, task, and strategy variables affecting memory (see reviews by Cavanaugh & Perlmutter, 1982; Weed, Ryan, & Day, 1990). In relation to memory for past information or retrospective memory (RM), one might know, for example, that remembering a long list of words is more difficult than remembering a short list of words (task variable), that adults typically outperform children on such tasks (person variable), and that rehearsing to-be-remembered items is better than simply looking at them (strategy variable). *Procedural metamemory,* on the other hand, reflects the ability to apply this declarative knowledge in the service of memory as well as to monitor, regulate, and predict one's memory performance (Flavell, Miller, & Miller, 2002; Schneider & Lockl, 2008). For example, a child might expect to recall the names of children from her current class but to forget the names of children from her kindergarten class attended few years ago.

A large body of research on metamemory development suggests that young children (4–6 years) have fairly limited understanding of person, task, and strategy variables affecting RM (Bjorklund, Dukes, & Brown, 2009; O'Sullivan, 1996; O'Sullivan, Howe, & Marche, 1996; Schneider & Pressley, 1997; Wellman, 1977). It has also been shown that the most striking developments in declarative metamemory take place between 4 and 8 years of age; by the time they reach third grade, most children have a reasonable grasp of factors influencing remembering (e.g., O'Sullivan et al., 1996). In addition, children with superior declarative metamemory perform better on RM tasks than children with inferior declarative metamemory (Flavell, 1971; Henry & Norman, 1996; Koriat, Goldsmith, & Pansky, 2000; O'Sullivan, 1996; Schneider, 1998; Schneider & Sodian, 1988; Short, Schatschneider, & Friebert, 1993).

Limited knowledge about memory-related variables in younger children might explain their highly inflated view of their RM memory capacity. Typically, this is assessed by the study–predict–recall paradigm in which children are exposed to the to-be-recalled material (e.g., words, pictures, toys) and asked to predict how many they will be able to recall from memory before actually recalling them. Although different amounts of study materials have been used (10, 15, and even 30 items), results invariably show that 4- to 6-year-olds grossly overestimate the number of recalled items (Dunlosky & Metcalfe, 2009; Lipko, Dunlosky, Lipowski, & Merriman, 2012; Shin, Bjorklund, & Beck, 2007; Yussen & Levy, 1975). For example, in a study by Lipko, Dunlosky, and Merriman (2009), 4- and 5-year-olds studied 10 pictures for 10 s, predicted how many they would recall, and then attempted to recall them. There were five consecutive trials with different sets of pictures. Results showed that children repeatedly overestimated their performance across all five trials even when they accurately assessed the small number of actually recalled items on a previous trial. These findings were replicated recently by Lipowski, Merriman, and Dunlosky (2013), who assessed children's predictions in a cued recall task on an item-by-item basis rather than asking children to make global predictions. As such, 4- and 5-year-olds were shown 12 animal toys one by one and heard what their names were. Children needed to recall the name of each toy and then were asked whether they thought they would be able to remember the name if they were questioned about it later. Predictions or judgments of learning (yes/no) were solicited either immediately or after a 2-min delay. Results showed that children significantly overestimated their recall in both the immediate and delayed judgment of learning tasks (Experiment 1; no practice condition in Experiment 3), with particularly strong optimism in the immediate condition, where 24 of 29 children predicted they would recall all 12 names.

Metamemory regarding prospective memory

In contrast to RM, the topic of metamemory has hardly been studied in relation to prospective memory (PM), which involves remembering to carry out intended actions in the future (e.g., keeping