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True (but not false) memories are subject to retrieval-induced forgetting in children

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ABSTRACT

Veridical and false memories of children aged 6 to 15 years were studied in two experiments with the retrieval-induced forgetting paradigm. Using the Deese–Roediger–McDermott (DRM) false memory word lists, children's reports of true, but not false, memories showed evidence of retrieval-induced forgetting. These differences were observed across delays as long as 2 days following word list presentation. The lack of observation of retrieval-induced forgetting in children's false memories provides evidence that a key assumption in the theory of retrieval-induced forgetting, cue independence, might not consistently apply. These experiments underscore the need for both practical and theoretically motivated study of true and false memories.

Introduction

The long-standing debate regarding the nature of false memories in children has substantial practical and theoretical implications (see Brainerd, Reyna, & Ceci, 2008). The sometimes marked differentiations between veridical and false memory representations are increasingly being explored across a variety of retrieval paradigms that both inform us about how such memories are represented and can test the assumptions of associated theories (e.g., Howe, 2005). In the current experiments, we explored children's true and false memories using a particular partial retrieval paradigm—the retrieval-induced forgetting paradigm.

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Retrieval-induced forgetting

Cuing with part of the to-be-remembered material can be an effective method of facilitating recall. Indeed, partial retrieval cues are suggested regularly in investigative interviewing techniques with both adults and children as a way to assist with recollection of important event details (e.g., cued recall questions; Lamb, Orbach, Hershkowitz, Esplin, & Horowitz, 2007). However, there is a well-developed area of research that has demonstrated that partial retrieval can increase the difficulty in accessing associated memories not initially targeted for retrieval. This retrieval-induced forgetting (RIF) phenomenon is proposed to be a result of targeted memories inhibiting semantically related memories that compete for retrieval. These suppressed non-retrieved memories are subsequently more difficult to access (Anderson, Bjork, & Bjork, 1994).

Forgetting associated with partial retrieval is especially concerning in a forensic context. Suppose that during a police interview of a witness only a limited number of specific questions are asked. The theory of RIF predicts that this partial retrieval may suppress future recall of other strongly associated details. The negative effects of partial retrieval have been observed beyond basic laboratory tasks (i.e., word lists), in children's autobiographical memory (Phenix & Price, 2012), and in eyewitness memory for salient events (e.g., MacLeod, 2002; Migueles & Garcia-Bajos, 2007; Shaw, Bjork, & Handel, 1995).

Researchers who have studied partial retrieval phenomena such as RIF have often done so with the use of word lists. For instance, during the initial *study phase* of the RIF paradigm, participants study a list of CATEGORY–exemplar pairs (e.g., FRUIT–apple, FRUIT–banana, DRINKS–rum). Later during the *partial retrieval practice phase,* they practice retrieving half of the exemplars using word stems (e.g., retrieve and say aloud "apple" when presented with A P _ _ _) from half of the categories. During the final *test phase,* participants attempt to recall all exemplars from all categories shown during the original study phase. Retrieval-induced forgetting is found when the unpracticed exemplars (e.g., banana) from practiced categories (e.g., FRUIT) are recalled less often than the baseline condition of non-retrieved exemplars (e.g., rum) from unpracticed categories (e.g., DRINKS). This difference in performance between non-retrieved exemplars from practiced and non-practiced categories is the RIF effect and is theorized to result from the practiced exemplars (e.g., apple) inhibiting related non-retrieved exemplars (e.g., banana) relative to a baseline (e.g., rum).

The RIF phenomenon is remarkably robust, although it is subject to several boundary conditions. For instance, when items are conceptually integrated, or strong interconnections between items are formed, RIF is attenuated (Goodmon & Anderson, 2011). Another factor that may attenuate RIF is the duration of delay between the practice and test phases. RIF does not appear consistently across long delays, with some researchers finding it to be a very short-lived phenomenon (Chan, 2009; MacLeod & Macrae, 2001; Saunders & MacLeod, 2002) and others finding RIF after as long as 24 h or a week (Garcia-Bajos, Migueles, & Anderson, 2009; Migueles & Garcia-Bajos, 2007; Storm, Bjork, Bjork, & Nestojko, 2006). It is likely that the nature of the to-be-remembered details affect the durability of any memory phenomena.

The RIF literature focuses mainly on adults' memory. However, the work with children may be particularly interesting because RIF is theorized by many (e.g., Anderson et al., 1994; but see, e.g., Jonker, Seli, & MacLeod, 2013) to be a result of inhibition stemming from competition between items. The development of inhibitory control during childhood has implications for children's performance on many memory tasks because controlling initial temptations to provide a particular response (e.g., one that is socially appropriate or well-practiced) may mean that children will instead be more likely to rely on memory to make accurate decisions. Because of children's developing inhibitory control, researchers have posited that even when RIF is observed, the mechanisms underlying RIF may differ across different developmental spans (e.g., Aslan & Bäuml, 2010).

False memories and the DRM paradigm

To examine whether reports of true and false memories differ in children as a function of partial retrieval practice, we decided to use the well-established Deese–Roediger–McDermott (DRM) paradigm known for generating false memories (Deese, 1959; Roediger & McDermott, 1995). This paradigm involves the presentation of several lists of strongly related words for study and, during a