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The production of spontaneous false memories across childhood

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ABSTRACT

We found evidence that the usual developmental trends in children's spontaneous false memories were eliminated using novel stimuli containing obvious themes. That is, children created more false memories than adults when scenes needed to be remembered. In Experiment 1, 7- and 8-year-olds had higher false memory rates than adults when using visual scenes. Experiment 2 showed that gist cuing could not account for this effect. In Experiment 3, children and adults received visual scenes and story contexts in which these scenes were embedded. For both types of stimuli, we found that children had the highest false memory rates. Our results indicate that the underlying theme of these scenes is easily identified, resulting in our developmental false memory trend.

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Introduction

Given the central importance of memory to our everyday lives, it is not surprising that there has been considerable debate among scientists and philosophers concerning the precise mechanisms by which memory operates and how it often results in erroneous or false memories. In the false memory literature, one can broadly distinguish between two types of false memories. Numerous studies have focused on the formation of *suggestion-induced* false memories. These memory aberrations are the consequence of suggestive manipulations (e.g., Otgaar, Sauerland, & Petrila, 2013).

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The current article focuses squarely on the issue of the development of *spontaneous* false memories. These are the types of false memories that arise *without* any external suggestive pressure and are the sole result of endogenous mechanisms such as spreading activation (Brainerd, Reyna, & Ceci, 2008). We present a novel set of three experiments examining specific conditions that modify (attenuate or reverse) the usual developmental trends in spontaneous false memories. To foreshadow our findings, we show that developmental patterns in spontaneous false memories can be manipulated depending on whether certain theoretical conditions are met.

Spontaneous false memories: The classic paradigm

Spontaneous false memories are often induced using the Deese/Roediger–McDermott (DRM) paradigm (Deese, 1959; Roediger & McDermott, 1995). In this paradigm, word lists consisting of related words (e.g., *weep, sorrow, wet*) are presented to participants. These words are associatively related to a nonpresented critical theme word called the critical lure (e.g., *cry*). Recall and recognition tests show that participants often falsely recollect the critical lure at rates comparable to true memory rates (Roediger & McDermott, 1995). The interest in the DRM paradigm stems partially from the fact that the DRM illusion is a robust memory phenomenon and that, at least for adults, it is difficult to inhibit because of its automatic nature (Howe, 2005; Howe, Wimmer, Gagnon, & Plumpton, 2009).

To be more specific, many memory researchers make use of the DRM paradigm because it provides a robust tool to assess the cognitive mechanisms behind false memories (Brainerd et al., 2008). The DRM paradigm also attracts much scientific attention because studies show that the DRM illusion is related to false autobiographical memories, implying that this task could be used to make inferences about autobiographical memory (Gallo, 2010; but see also Otgaar & Candel, 2011). Furthermore, developmental studies using the DRM paradigm show an age-related increase in the production of false memories, with children being less susceptible to DRM false memories than adults (Brainerd & Reyna, 2012; Brainerd et al., 2008; Howe et al., 2009). This developmental reversal in spontaneous false memories has been obtained in a growing number of studies on children's false memory development (e.g., Brainerd & Reyna, 2007; Howe, 2007; Otgaar & Smeets, 2010).

Two main theoretical accounts offer an explanation for the formation and development of spontaneous false memories. Fuzzy trace theory (FTT; Brainerd et al., 2008) was the first framework to predict the increase in spontaneous false memories with age. For FTT, experiences are stored in parallel in two opponent traces: a verbatim trace and a gist trace. Verbatim traces encode the surface and item-specific details of an experience, whereas gist traces capture the underlying meaning of an experience. False memories occur because when verbatim traces are not available, people rely on the gist of an experience. Items retrieved that are consistent with the gist of an experience (e.g., word list) can be falsely remembered given the absence of contradictory (e.g., verbatim) information. In addition, FTT suggests that because children are less likely to extract the gist of an experience than adults, children should be less susceptible to false memories. Indeed, memory studies have reliably shown that children are less able to link meaning to information and are less likely to extract the relationship between different parts of information within an experience than adults (see Bjorklund, 1987, 2005; Esposito, 1975).

Associative activation theory (AAT; Howe et al., 2009) provides an alternative approach to the development of different types of false memories, one that also anticipates age differences in knowledge base and automatic processing. AAT, which is partially based on activation monitoring theory (AMT; Roediger, Watson, McDermott, & Gallo, 2001), postulates that the most important factor underlying false memory production is the nature of the person's knowledge base and the type of automatic activation of information that it affords. AAT, like AMT, derives from the core notion of spreading activation in memory. Here, processing of one word or concept leads to a spread of activation to corresponding and related nodes and concepts in our knowledge base (mental lexicon) (Anderson, 1983; Collins & Loftus, 1975; Landauer & Dumais, 1997). That is, one concept activates other related concepts in memory where some of these activations involve concepts that were not presented. These nonpresented concepts have been erroneously activated because of their close link (association) with presented concepts in the knowledge base. These associative relations can vary immensely, ranging

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