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Brief Report

Dual processes of false recognition in kindergarten children and elementary school pupils

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ABSTRACT

We investigated the contribution of monitoring processes to the emergence of false memories in children. Two age groups were compared, assuming lower monitoring ability at preschool age compared with older children. We also manipulated whether elementary school pupils responded in the memory test with or without time pressure. Furthermore, the frequency of list presentation was manipulated within participants. We found that presenting lists thrice compared with only once increased the number of false memories in kindergarten children and in elementary school pupils responding under time pressure but reduced false memories in elementary school pupils responding without time pressure. These findings indicate that kindergarten children still lack the ability to monitor the source of the activation of critical items of Deese–Roediger–McDermott lists.

Human memory is not always reliable. Besides insufficient encoding or forgetting, the occurrence of memories about events that actually have not occurred can distort remembering. Numerous studies have investigated the conditions under which such false memories occur.

One of the most prominent approaches to investigate false memories is the Deese–Roediger–Mc Dermott (DRM) paradigm (Deese, 1959; Roediger & McDermott, 1995). Participants first learn several lists of words that each comprise strong semantic associates with a specific word not presented (the critical item). The typical finding is that participants then frequently indicate that they remember critical items of the learned word lists in a subsequent test. These false memories occur in recall tests as

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well as in recognition (Payne, Ellie, Blackwell, & Neuschatz, 1996; for an overview, see Gallo, 2010). Using the DRM paradigm, many studies have found an increase of false memories from early childhood into adolescence (for overviews, see Brainerd, Reyna, & Ceci, 2008; Brainerd, Reyna, & Zember, 2011). The current study was aimed at examining the processes underlying the DRM illusion in kindergarten and elementary school-aged children.

The activation–monitoring account assumes that two antagonistic processes contribute to the emergence of false memories in the DRM paradigm (Gallo & Roediger, 2002). Activation refers to how strongly a critical item is activated during encoding of the items of a list. Monitoring refers to distinguishing the source of activation at retrieval, that is, whether this activation results from the actual presentation of a word (external source) or from its associations with presented words (internal source).

The impact of the activation process is reflected by the dependence of false memories on the backward association strength of a list. Backward association strength is indicated by the probability that list items elicit the critical item when participants are asked to generate associations with the list items (Roediger, Watson, McDermott, & Gallo, 2001). Further evidence for the contribution of associative activation consists in the influence of list length on false memories. The more list items that are presented, the higher the probability that the critical item is falsely remembered (Robinson & Roediger, 1997). The number of list items also has been shown to predict the activation level of the critical item assessed by a lexical decision task (Hancock, Hicks, Marsh, & Ritschel, 2003). As an alternative to the associative–activation process, the fuzzy-trace theory by Brainerd and Reyna (1998) assumes that participants extract the gist of a DRM list at encoding. Whereas gist traces represent the meaning or theme of the stimuli, verbatim traces represent surface details. The gist representation then activates the critical item. In addition, verbatim processing of list items can occur and is assumed to serve as a protection from false memories because it is item specific and does not activate the critical item (Brainerd & Reyna, 1998, 2005).

Evidence for the contribution of monitoring processes to false memories comes, for example, from studies manipulating time pressure at retrieval. To decide whether a word has actually been presented or was only activated internally by its associations with other items involves controlled processing and, therefore, is time-consuming. The less time available, the less monitoring can contribute to memory performance. Correspondingly, the rate of false memories increases under time pressure; that is, short response windows in a memory test are associated with a relatively higher number of falsely remembered critical items compared with longer response windows (Heit, Brockdorff, & Lamberts, 2004; see also Carneiro et al., 2012). The contribution of monitoring to false memories also is suggested by investigations with older participants. It has been suggested that monitoring ability deteriorates in older people (Cohen & Faulkner, 1989). This loss might be linked to general decrements in inhibitory control of cognitive interference (Dempster, 1992). Increases of false memories in older people (Schacter, Koutstaal, & Norman, 1997), therefore, can result from deficient monitoring.

Benjamin (2001) investigated this assumption by manipulating time pressure and presentation frequency of DRM lists in combination with a comparison of a university student sample with a sample of older adults. Repeated list presentation was assumed to increase associative activation as well as monitoring because it improves item-specific processing of the studied items. This source-relevant information then can be used as a criterion besides mere familiarity for endorsing an item at test. Thus, the monitoring benefit could decrease the rate of false memories after repeated list presentation as compared with a single list presentation. However, for participants unable to efficiently use monitoring processes, repeated list presentation was assumed to only increase associative activation entailing more false memories. In a first experiment, the effect of presentation frequency of DRM list items on false memories by younger and older participants was examined. Presenting DRM lists thrice was associated with fewer false memories for younger participants but with more false memories for older participants as compared with presenting lists only once. A second experiment examined only young participants while manipulating presentation frequency and time pressure. Whereas presenting lists thrice again reduced false memories without time pressure, presenting lists thrice increased false memories under time pressure.