



# Attention to global gist processing eliminates age effects in false memories

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Received 19 March 2007; revised 8 August 2007

Available online 22 October 2007

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## Abstract

Counterintuitive age increases have been reported for the Deese–Roediger–McDermott (DRM) false memory illusion. The current theoretical explanation of this effect assumes that it is due to age increases in spontaneous interconnection of DRM list words' meanings. To test this explanation, 11-year-olds and young adults studied DRM lists under conditions that (a) encouraged them to form such meaning-based connections or (b) discouraged them from doing so. In line with the explanation, the usual developmental increase in false memory disappeared in the first condition but was preserved in the second condition. Also in line with the explanation, conjoint recognition analyses revealed that encouraging participants to form meaning connections increased their reliance on gist-based similarity judgments.

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*Keywords:* Memory development; Recognition memory; Source memory; Meaning; Gist

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## Introduction

The reintroduction of Deese (1959) list-learning paradigm by Roediger and McDermott (1995; see also Read, 1996) into the experimental literature provided researchers with a

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powerful laboratory-based method for using memory errors to understand cognitive processes. In the Deese–Roediger–McDermott (DRM) paradigm, participants study lists of words, such as *door*, *glass*, and *shade*, all of which are related to a critical nonpresented word, such as *window*. On later memory tests, participants falsely recognize and recall the presentation of nonpresented critical lures (e.g., *window*) at the same rate as they correctly recognize and recall actually presented list items (e.g., *shade*). Subsequently, researchers have used the DRM paradigm to better understand semantic memory in adults (e.g., Benjamin, 2001; Roediger & McDermott, 1995) and the development of semantic memory throughout childhood (e.g., Brainerd, Reyna, & Forrest, 2002; Holliday & Weekes, 2006) and into the later stages of life (e.g., Dehon & Bredart, 2004; Thomas & Sommers, 2005).

Interestingly, the extant data demonstrate that young children (5–9 years of age) are relatively immune to the high rates of false recall and recognition of critical lures committed by adults (e.g., Brainerd et al., 2002; Dewhurst & Robinson, 2004; Lampinen, Leding, Reed, & Odegard, 2006). In contrast, older children (11 years of age or older) falsely recognize and recall significantly more critical lures than do younger children (e.g., Brainerd, Forrest, Karibian, & Reyna, 2006). Age increases in the recognition form of the illusion are not artifacts of the high levels of response bias that younger children exhibit because those increases have been measured with bias-corrected statistics such as  $A'$  and  $d'$  (e.g., Lampinen et al., 2006; Weekes, Hamilton, Oakhill, & Holliday, in press). Age increases in the recall form of the illusion are not an artifact of young children simply exhibiting poorer recall generally because they are quite capable of recalling studied items. In fact, of all the words recalled, younger children recall a higher proportion of targets than do older children (e.g., Brainerd et al., 2002). Finally, the empirical testing of the invariance of the DRM memory illusion across childhood was not pursued by accident; rather, increases in the DRM illusion across childhood were predicted on theoretical grounds (Reyna & Brainerd, 1991, 1995; Reyna & Kiernan, 1994) before the confirming studies were conducted.

An account of semantic false memories in children and adults that predicts developmental differences of false recall and recognition rates in the DRM paradigm is provided by fuzzy-trace theory (Brainerd & Reyna, 1998; Reyna & Brainerd, 1995). According to fuzzy-trace theory, individuals encode verbatim and gist representations in parallel, and these representations vary in terms of their precision and content. For example, verbatim traces are composed of an item's surface features. On recognition memory tests, retrieval of verbatim traces tends to lead to the acceptance of targets through a process known as an identity judgment and the rejection of semantically related lures through a process known as recollection rejection. In contrast, gist traces represent the overall meaning of an event. Retrieval of gist traces can result in the correct acceptance of targets but can also result in the false recognition of semantically related lures. Acceptance of items based on gist typically occurs through a similarity judgment. Brainerd and colleagues (Brainerd, Reyna, Wright, & Mojardin, 2003; Brainerd, Wright, Reyna, & Mojardin, 2001) have also demonstrated gist to lead to subjectively compelling false memories via a process referred to as “phantom recollection” (illusory conscious recall of false detail).

In addition to the dissociation between verbatim and gist traces, Reyna and Kiernan (1994) drew a distinction between gist representations for single events and gist representations that integrate meaning across multiple events. Subsequently, Neuschatz, Lampinen, Preston, Hawkins, and Toglia (2002) extended this distinction to what they

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