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False memories lack perceptual detail: Evidence from implicit word-stem completion and perceptual identification tests ☆

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Abstract

We used implicit measures of memory to ascertain whether false memories for critical nonpresented items in the DRM paradigm (Deese, 1959; Roediger & McDermott, 1995) contain structural and perceptual detail. In Experiment 1, we manipulated presentation modality in a visual word-stem-completion task. Critical item priming was significant and unaffected by modality. In contrast, priming of critical items was absent in a perceptual identification test when only DRM list items were studied (Experiment 2A), whereas priming was found when critical items were studied (Experiment 2B). Standard modality effects were present for list items in each experiment and for critical items in Experiment 2B. We conclude that: (a) false memories do not inherently contain structural and perceptual information and (b) past reports of critical item priming relied on implicit tests more prone to conceptual activation.

Keywords: False memory; Priming; Implicit memory; Word-stem completion; Perceptual identification; Modality effects

The Deese–Roediger–McDermott (DRM) paradigm has been used extensively to investigate the creation and retrieval of false memories (Deese, 1959; Roediger & McDermott, 1995). In the standard procedure, people learn lists of items (e.g., table, desk, swivel, etc.) associatively related to a critical, nonpresented theme word (e.g., chair; henceforth referred to as the critical item). These encoding conditions produce reliable, and very often, high levels of false memory for the critical item (e.g., Hicks & Marsh, 2001; Payne, Elie, Blackwell, & Neuschatz, 1996; Read, 1996; Roediger & McDermott, 1995). One reason for the great amount of interest in this paradigm is that people often report false memories with high confidence and/or vividness (e.g., Norman & Schacter, 1997; Roediger & McDermott, 1995). People are also willing to make attributions concerning the source or context in which the critical item was ostensibly encountered (e.g., Hicks & Hancock, 2002; Hicks & Marsh, 1999, 2001; Lampinen, Neuschatz, & Payne, 1999; Marsh & Hicks, 2000; Payne et al., 1996).

The work on false recognition and source attributions suggests that people may be retrieving vivid

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perceptual details associated with critical items (see Hicks & Hancock, 2002; for one possible explanation). As compared to true memories, however, false memories do not contain perceptual attributes to the same extent. For example, Norman and Schacter (1997) reported that perceptual characteristics, such as how words sounded, were more available for studied items as compared to critical items (see also Mather, Henkel, & Johnson, 1997; for comparable data). One conclusion drawn from these reports is that retrieval of specific perceptual attributes does not accompany false memory retrieval, or at least that such attributes are not as vivid or plentiful in false memories as compared to true memories. Rather, false memories appear to be associated primarily with conceptual detail, such as associations formed during encoding.

However, a line of investigation into the indirect retrieval of false memories suggests that perceptual detail is associated with the activation of critical items in the DRM paradigm. A handful of studies have shown priming for nonstudied critical items on perceptual implicit memory tests, such as word-stem completion (McDermott, 1997; McKone & Murphy, 2000; Smith, Gerkens, Pierce, & Choi, 2002), word-fragment completion (McDermott, 1997), and anagram solution (Lövdén & Johansson, 2003). Two other studies have also shown priming of critical items in a lexical decision task (Hancock, Hicks, Marsh, & Ritschel, 2003; Whittlesea, 2002), although in two others using lexical decision critical items showed no evidence of priming (McKone, 2004; Zeelenberg & Pecher, 2002). Nor was priming found in a word naming task (Whittlesea, 2002). Notwithstanding these latter null results, the collective findings are remarkable in that they demonstrate visual perceptual priming for concepts not visually perceived. Demonstrations of perceptual critical item priming are significant because they challenge the view that critical items are primarily the result of conceptual activation in a semantic network (e.g., Roediger, Balota, & Watson, 2001).

To reconcile this paradox, McKone and Murphy (2000) proposed that perceptual critical item priming in the absence of perceptual encoding is caused by modality-specific conceptual activation. Specifically, they suggested that studying DRM lists promotes implicit associative responses (IARs) of critical items (e.g., Underwood, 1965) and that these IARs also involve the activation of surface form consistent with the source of activation, such as list words' modality of presentation. In other words, the IAR is akin to a visual or auditory image. Although the initial activation is conceptual (i.e., associative) in nature, that activation takes some modality-specific form. McKone and Murphy used the *IAR/imagery* hypothesis to explain why visual word-stem completion produced significant critical item priming when study lists were presented visually, whereas visual word-stem completion did not show significant critical item priming when study lists were presented aurally in a separate experiment. In other words, they not only found a modality effect for critical items, but when study was auditory but testing was visual, the level of priming (about .06) was not statistically significant. Lövdén and Johansson (2003) argued that studying DRM list items promotes a covert verbal recoding of the critical item to explain why they found priming in an anagram solution task. We consider their recoding hypothesis to be similar in spirit to McKone and Murphy's, and therefore we classify it as a variant of the IAR/imagery hypothesis.

One obvious concern about the aforementioned priming demonstrations is that the implicit tests used may be prone to explicit contamination (e.g., Bowers & Schacter, 1990; Schacter, Bowers, & Booker, 1989). In other words, people may consciously use recently studied information to perform implicit memory tests. Two of the studies showing critical item priming have employed procedures to either reduce or assess the impact of explicit memory (McKone & Murphy, 2000; Smith et al., 2002). The current study addresses the issue of explicit contamination in a number of ways. First, the implicit memory tests include predominantly words not seen in any previous phase of the experiment. Second, participants in each experiment completed a post-experiment questionnaire assessing retrieval strategies for the implicit task, and all priming analyses were evaluated both with and without those participants who report attempting to remember words from an earlier phase of the experiment. Third, the first experiment includes two conditions in which participants encode the study lists incidentally; thus, participants in these conditions hear no mention of a memory test either at encoding or retrieval. Fourth, as discussed later in more detail, the perceptual identification task we used in the remaining experiments is less prone to explicit contamination by its very nature.

The primary goal of this study is to thoroughly test the IAR/imagery account of perceptual critical item priming. Following McKone and Murphy (2000), we manipulated presentation modality as one way to test this hypothesis. The modality specificity of presented item priming in perceptual implicit memory tests is a standard finding, demonstrating that the perceptual processes used to encode these stimuli play a large role in their subsequent priming (e.g., Jacoby & Dallas, 1981). According to the IAR/imagery hypothesis, critical item priming is based on a similar perceptual encoding (i.e., imagining perceptual details instead of directly perceiving them). Thus, this hypothesis predicts that critical item priming should show the same effects of modality as presented item priming.

We also explore the IAR/imagery hypothesis by evaluating critical item priming on two different types of perceptual implicit memory tests. In Experiment 1, we used