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When False Recognition Meets Metacognition: The Distinctiveness Heuristic

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We investigated the contribution of a distinctiveness heuristic to rejecting false memories. Individuals studied words, pictures, or both types of items and then completed a recognition test on which the studied items appeared once, whereas the new words appeared twice. Participants who had studied pictures were less likely to falsely recognize repeated new words than were participants who had studied words. We argue that studying pictures provides a basis for using a distinctiveness heuristic during the recognition test; participants infer from the absence of memory for expected picture information that a test item is "new." These experiments also investigated the influence of two variables—diagnosticity and metacognitive control—on the use of the distinctiveness heuristic. We examined the role of diagnostic information in eliciting the heuristic by varying the proportion of studied items that appeared as pictures. Compared to a word encoding condition, participants successfully rejected repeated new words after studying 50, 25, and 33% of the items as pictures in Experiments 1, 2, and 3, respectively. Thus, the distinctive information need not be completely diagnostic (i.e., perfectly predictive of an item's oldness) for participants to use the heuristic. We also show that the distinctiveness heuristic is under metacognitive control such that it can be turned on or off depending on participants' expectations about its usefulness for reducing memory errors. © 2002 Elsevier Science (USA)

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Although memory is often durable and accurate, it is also subject to various types of forgetting and distortion (Schacter, 1999, 2001). During the past several years, increasing experimental and theoretical attention has focused on misattribution errors that occur when some form of memory is present but is attributed to an incorrect time, place, or source (for reviews, see Johnson, Hashtroudi, & Lindsay, 1993; Roediger, 1996; Schacter, Norman, & Koutstaal, 1998). Demonstrations of errors and distortions in remembering raise a question with important theoretical and practical implications: How can memory misattributions be reduced or avoided? Several studies have shown that a number of encoding and retrieval manipulations can produce reliable reductions in memory errors such as false recall and false recognition (e.g., Gallo, Roberts, & Seamon, 1997; Hicks & Marsh, 1999; Kensinger & Schacter, 1999; Koutstaal, Schacter, Galluccio, & Stofer, 1999; Mather, Henkel, & Johnson, 1997; McDermott, 1996; McDermott & Roediger, 1998; Schacter, Verfaellie, Anes, & Racine, 1998).

We recently suggested one mechanism for reducing misattribution errors that we call the *distinctiveness heuristic* (Dodson & Schacter, 2001; Schacter, Cendan, Dodson, & Clifford, in press; Schacter, Israel, & Racine, 1999), a mode of responding in which people expect to remember vivid details of an experience and make recognition decisions based on this metacognitive expectation. When a novel event or item lacks the expected distinctive information, people can use this absence of critical evidence to reject the item.

We provided evidence for the operation of the distinctiveness heuristic in three sets of experiments using a procedure originally developed by Deese (1959) and later refined and extended by Roediger and McDermott (1995). In the Deese/Roediger-McDermott (DRM) paradigm, participants hear lists of words (e.g., *candy*, *sour*, *sugar*) that all are semantic associates of a non-

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presented theme or lure word (e.g., *sweet*). When later given an old–new recognition test that contains studied words (e.g., *sour*), new unrelated words (e.g., *point*), and new related lure words (e.g., *sweet*), participants frequently and confidently claim that they previously studied the related lures. This robust false recognition effect has been documented and explored in various laboratories (e.g., Gallo et al., 1997; Mather et al., 1997; Norman & Schacter, 1997; Payne, Elie, Blackwell, & Neuschatz, 1996; Schacter, Verfaellie, & Pradere, 1996; Smith & Hunt, 1998).

Schacter et al. (1999; see also Israel & Schacter, 1997) modified the DRM procedure by presenting each word in an associated list auditorily along with a picture of the item. Compared to a condition in which participants studied only words (in both visual and auditory modalities), false recognition of related lures was reduced dramatically following pictorial encoding. Schacter et al. (1999) argued that the reduction in false recognition was attributable to participants' metacognitive expectation that they should be able to remember the distinctive pictorial information. Thus, the *absence* of memory for this distinctive information provides evidence that the test item is new (cf. Rotello, 1999; Strack & Bless, 1994). By contrast, participants who studied words would not expect detailed recollections of studied items and, hence, would not base recognition decisions on the presence or absence of memory for such distinctive information.

Dodson and Schacter (2001) reported a similar reduction in false recognition of related lures after participants said aloud target words on study lists compared to when they heard the target items (participants also saw the studied words in both conditions). Dodson and Schacter noted that earlier studies provide evidence that people expect to remember information that they have generated themselves (Conway & Gathercole, 1987; Foley, Johnson, & Raye, 1983; Hashtroudi, Johnson, & Chrosniak, 1989; Johnson, Raye, Foley, & Foley, 1981; Kelley, Jacoby, & Hollingshead, 1989). They suggested that in the DRM procedure, participants who said words at study employed a distinctiveness heuristic during the recognition test; they demanded access to the distinctive "say" information in order to judge an item as "old." Because related lure words were never said, the distinctiveness heuristic helped participants to avoid falsely recognizing them.

Although our previous studies provide evidence consistent with the operation of a distinctiveness heuristic, they leave open a fundamental question: What are the necessary conditions for eliciting or "turning on" the distinctiveness heuristic? Schacter et al. (1999) reported reduced false recognition after pictorial encoding compared to word encoding in a between-subjects design. However, they observed no evidence of reduced false recognition for picture lists compared to word lists in a within-subjects design where some associate lists were studied as pictures and others were studied as words. Dodson and Schacter (2001) reported an identical pattern—reduced false recognition for said lists compared to heard lists in a between-subjects design but not in a within-subjects design.

As noted by Schacter et al. (1999) and Dodson and Schacter (2001), in a between-subjects design, distinctive information is perfectly predictive or *diagnostic* of prior study. If participants remember having seen a picture or having said a word aloud, then they can be certain that the item appeared on the study list. Conversely, the absence of the expected distinctive information provides diagnostic evidence that the item did not appear in the list. In a within-subjects design, by contrast, distinctive information is no longer diagnostic of prior study. Because participants studied some lists as pictures and others as words (Schacter et al., 1999) or said aloud some lists and heard others (Dodson & Schacter, 2001), not remembering distinctive information about a test item does not necessarily mean that the item is novel; it might mean only that the item was from one of the lists presented as words. Thus, the contrasting patterns of false recognition in between- and within-subjects designs can be taken as support for the idea that participants rely on the distinctiveness heuristic only when distinctive information is diagnostic of prior study and abandon the heuristic when distinctive information is not diagnostic of prior study.

However, there is a confounding feature of the DRM procedure that creates two different