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Variability among word lists in eliciting memory illusions: evidence for associative activation and monitoring

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Abstract

Associative lists created by the same means are remarkably different in their propensity to elicit false memories in the DRM (Deese, 1959; Roediger & McDermott, 1995) paradigm. We confirmed this variability in Experiment 1 by constructing lists in the typical fashion but with words that were weakly associated to their critical words. Low levels of false recall occurred. In Experiment 2 these results were replicated at three presentation rates (.5, 1, and 3 s per word). Also, slower presentation rates yielded lower false recall for both strong and weak lists. Experiment 3 showed that false recognition rates also varied across lists, as did subjective ratings accompanying false recognition. We interpret these findings as supporting an activation/monitoring framework. Lists vary in a principled way in their tendency to activate the critical item, and slowing the presentation rate permits greater accrual of item-specific information that makes monitoring of retrieval more accurate.

Keywords: False recall; False recognition; Presentation care; Associative strength; Subjective judgments

Roediger and McDermott (1995), adapting procedures used by Deese (1959), introduced a paradigm that is now widely used to study one type of false memories. Subjects heard either 12 or 15-item lists and were asked to recall each list immediately after it was presented. With minor exceptions, the lists were all composed of the highest associates of one word in the Russell and Jenkins (1954) word association norms. For example, the items for one list (*bed*, *rest*, *awake*, etc.) were associated to the word *sleep*. In immediate free recall tests, with instructions not to guess, these critical nonstudied words were recalled with a high probability (.40 with 12-item lists and .55 with 15-item lists) and these rates rivaled the probability of recall of items from the middle serial positions of the list. False recall—recall of events that did not actually occur—was as great or even greater than recall of some events that did occur. The same general outcome occurred on recognition tests that were given after many lists had been presented, with false alarm rates to critical items equaling the hit rates for the list items. False recognition of unrelated lures was quite low, so subjects were not simply responding positively to all test items.

The levels of false recall and false recognition reported by Roediger and McDermott (1995)

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seemed surprising, even to them, because the experiments incorporated features that are usually believed to discourage false memories. Subjects were presented word lists (thought to encourage a reproductive, rather than reconstructive mode of recollection; Bartlett, 1932). Their recall tests immediately followed each list and included instructions against guessing, yielding conditions that should have minimized false recall. In addition, unlike other false memory paradigms, there was no attempt to explicitly insert misleading or false information (e.g., Loftus & Palmer, 1974). Nonetheless, the levels of false memories (as indexed by both objective and subjective measures) were among the strongest ever reported in the literature. Subjects reported that the false memories for critical items were quite compelling when tested either with a confidence judgment procedure or with Tulving's (1985) "remember"/"know" procedure.

Perhaps because the results were so striking, many researchers attempted relatively direct replications of Roediger and McDermott's (1995) experiments (e.g, Payne, Elie, Blackwell, & Neuschatz, 1996; Schacter, Verfaellie, & Pradere, 1996, among many others) seeking to confirm (or not) their findings. The basic results are easily replicable, and in some sense, the findings from the DRM (Deese–Roediger–McDermott) procedure seem to be considered commonplace now, seven years after the original report. The prevailing wisdom seems to be that "Of course people recall, recognize and recollect the critical word that is related to all the words on the list. How could it be otherwise?" The interpretation of the results reported by Roediger and McDermott (1995) have been questioned on occasion (e.g., Miller & Wolford, 1999; but see Roediger & McDermott, 1999; Wickens & Hirshman, 2000; and Wixted & Stretch, 2000 for counterarguments), but everyone reports strong effects of false recall and false recognition under the conditions that Roediger and McDermott (1995) used.

Researchers now use the DRM paradigm to ask all sorts of interesting questions about the arousal of these types of false memories, generally using the 24 lists Roediger and McDermott (1995) used or the expanded set of 36 lists published in a norming study by Stadler, Roediger, and McDermott (1999). In fact, because these lists produce such robust false remembering, they have fuelled a cottage industry aimed at reducing the effect. Several manipulations have been identified that can reduce false remembering relative to true remembering (but rarely is the effect eliminated). Such manipulations include fully debriefing subjects about the illusion, and warning them to avoid false memories (e.g., Anastasi, Rhodes, & Burns, 2000; Gallo, Roberts, & Seamon, 1997; Gallo, Roediger, & McDermott, 2001b; McDermott & Roediger, 1998; Neuschatz, Payne, Lampinen, & Toglia, 2001; see also Libby & Neisser, 2001); presenting the list items in a distinctive format such as pictures, anagrams, or visual relative to auditory presentation (e.g., Gallo, McDermott, Percer, & Roediger, 2001a; Hicks & Marsh, 1999; Israel & Schacter, 1997; Smith & Hunt, 1998); or giving subjects repeated exposures to the study materials (e.g., Benjamin, 2001; McDermott, 1996; Seamon et al., 2002). Many of these investigations have been focused on the ability of the rememberer to control their memory accuracy via heuristics or monitoring strategies. For instance, the reductions in false remembering due to presenting lists in distinctive formats have been attributed to enhanced source monitoring (Hicks & Marsh, 1999) or other retrieval-based heuristics that subjects can use (Israel & Schacter, 1997; Schacter, Israel, & Racine, 1999). Similarly, warnings are most effective when given before study (relative to after study but before test), when subjects can strategically determine the critical item to some lists and consciously avoid misattributing these thoughts to actual presentation (Gallo et al., 2001b). By emphasizing cognitive control as a means to reduce memory errors, these findings complement those from several other paradigms that demonstrate that recollection-based control processes can keep familiarity-based errors in check (e.g., Brainerd, Reyna, & Mojardin, 1999; Jacoby, 1991; McElree, Dolan, & Jacoby, 1999; Rotello, Macmillan, & Van Tassel, 2000; Yonelinas, 1997).

Such approaches are theoretically important, and are useful for developing practical means by which false remembering can by minimized. However, by emphasizing individual or cognitive control over false memories they run the risk of overlooking the potentially powerful influence of stimulus control (see Watkins, 1991, for a discussion). In the context of the DRM procedure, this approach belies appreciation of a factor that has been relatively neglected, viz., that of variability of the potency of lists in producing false recollection. Roediger and McDermott (1995) did not use all of the 36 lists that Deese (1959) used in his experiments in their own studies, for the good reason that many of Deese's lists did not produce