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Distinctive information and false recognition: The contribution of encoding and retrieval factors

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Abstract

Four experiments evaluated the role of encoding-based and retrieval-based factors in the production of false recognition. The association of unusual fonts with study items, the match between study and test font, and the duration of retrieval time allotted to subjects to make recognition memory decisions were varied in order to examine the role encoding and retrieval play. The combined results of these experiments suggest that both encoding and retrieval are important for understanding false recognition. Additionally, the results of these studies suggest that visual features encountered at encoding can become associated with representations of unstudied items. This association, in turn, can lead to inflated levels of false recognition when unstudied items are tested in a visual format experienced at encoding or when participants utilize monitoring processes to search memory for evidence of perceptual information encountered during encoding.

Keywords: False memory; Recognition; Distinctiveness; Encoding; Retrieval

Introduction

Recent interest in memory errors can be traced to a report by Roediger and McDermott (1995). Roediger and McDermott, reviving a paradigm originated by Deese (1959), demonstrated that when given a list of study items that are semantically related to a single, unstudied word (referred to as the *lure item*), participants will both falsely recall and recognize the unstudied lure item. Further, participants claimed to be able to consciously recollect the lure item's presentation on the study list, as indexed by *remember* responses (Roediger & McDermott, 1995; Tulving, 1985). The overall high levels of false recognition and recall, as well as the fact that participants often claim to consciously recollect lure items on recognition memory tests has been taken as evidence that these errors reflect fundamental memory processes.

Despite the hypothesis that errors in this paradigm (referred to as the DRM paradigm below) derive from basic memory processes, one particularly striking feature of performance in the DRM paradigm is how strongly lure false alarms persist in the face of manipulations intended to reduce memory errors. For example, increasing presentation duration for study items does not seem to diminish levels of false recognition (Gallo & Roediger, 2002), and may even increase levels of false recognition (Arndt & Hirshman, 1998). Similarly, repeating study items diminishes, but does not eliminate, false recognition of lure items (Benjamin, 2001; Seamon

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et al., 2002). Finally, even providing participants with explicit warnings about the nature of the paradigm, giving them an example of a study list, and instructing them to monitor for and attempt to reject lure items on a recognition memory test does little to reduce lure false alarms when given after study (Gallo, Roediger, & McDermott, 2001) and does not fully eliminate lure errors when given prior to study (Gallo et al., 2001). Thus, it is of particular interest to examine variables that substantially reduce lure false alarms. Doing so will both enhance our understanding of the genesis of false recognition and the kinds of information people are able to utilize to reduce false recognition. The exploration of one such manipulation, presentation of study items in unusual-looking fonts (Arndt & Reder, 2003), will be the central focus of the research reported in this paper.

A second stimulus for the present research derives from contemporary theoretical perspectives that suggest false memory is the joint product of encoding-based and retrieval-based factors (e.g., Brainerd, Reyna, Wright, & Mojardin, 2003; Roediger, Watson, McDermott, & Gallo, 2001). While multiple two-factor explanations for the generation of false memory exist, the one most germane to the present set of studies is activation-monitoring theory (Roediger et al., 2001). Thus, this theory and its propositions are outlined in detail, along with its characterization of the properties of encoding-based processes and retrieval-based processes that produce false memory.

Roediger et al. (2001) suggest that false memory is caused by two factors, activation and monitoring. While activation processes are not solely operative at encoding and monitoring processes are not solely operative at retrieval, the focus of the studies reported here explore activation processes that are the product of encoding-based influences and monitoring processes that occur at retrieval. Thus, the discussion of activation processes is limited to the encoding factors that are assumed to influence lure activation and the discussion of monitoring processes is limited to their role at retrieval.

In activation-monitoring theory, increased lure item activation is assumed to increase false memory. Roediger et al. suggest that the extent to which study conditions produce item-specific and relational processing (Hunt & Einstein, 1981) determines how strongly a lure item's representation will become activated. Relational processing will tend to increase activation levels of lure items' representations by drawing participants' encoding resources to the commonalities among study items. In contrast, item-specific processing draws participants' encoding resources and attention to elements of study items that distinguish them from one another, which may allow participants to better distinguish studied items from unstudied, but related, items at retrieval. Thus, the extent to which encoding conditions emphasize relational processing over item-specific processing should lead to enhanced levels of lure item activation, and subsequently, increased levels of false memory.

The characterization of monitoring processes in activation-monitoring theory borrows notions from the source-monitoring framework (Johnson, Hashtroudi, & Lindsay, 1993). Monitoring processes are assumed to be enhanced by the encoding of information that is particular to a study episode, which in turn allows subjects to distinguish studied items from unstudied items at retrieval. Thus, monitoring processes will tend to be enhanced by the encoding of presentation characteristics of study items (e.g., item-specific information such as visual presentation features and auditory features), mental operations that were engaged during study, or any other factor that is uniquely associated with the experience of encoding study items (Johnson et al., 1993). At retrieval, monitoring processes then provide participants with improved ability to reject unstudied items because items that were not encountered during an episode are unlikely to be associated with the details of a study episode.

While activation-monitoring theory borrows most heavily on the source monitoring framework to characterize how retrieval-based processes can be used to reduce false memory, it is important to note that other theoretical accounts of monitoring processes exist, each of which may also provide an account of monitoring-based reductions in false memory. In the false memory literature, the two most prominent explanations of monitoring processes are the *distinctiveness heuristic* (e.g., Dodson & Schacter, 2001, 2002a, 2002b; Gallo, Weiss, & Schacter, 2004; Hege & Dodson, 2004; Schacter, Cendan, Dodson, & Clifford, 2001; Schacter, Israel, & Racine, 1999) and *recall-to-reject* processing (e.g., Brainerd et al., 2003; Gallo, 2004; Rotello, Macmillan, & Van Tassel, 2000).

The distinctiveness heuristic hypothesis suggests that certain encoding experiences are strongly indicative of the source of a memory (e.g., encoding of pictorial information; Gallo et al., 2004; Schacter et al., 1999, 2001). These salient memories of study items in turn lead people to expect that they will be able to retrieve distinctive information at test. In the absence of being able to retrieve distinctive information about a test item, participants will reject that item. Given that unstudied items such as lures in the DRM paradigm were never encountered at study and therefore should not have distinctive information associated with their representations, the distinctiveness heuristic allows subjects to effectively distinguish between studied items and related lure items. The distinctiveness heuristic, while suggesting very similar processes to that outlined in the source monitoring framework, proposes one essential difference in how monitoring processes operate. The use of a distinctiveness heuristic has been suggested to operate on a global, rather than a local basis (Dodson & Schacter, 2001;