

ENCODING SPECIFICITY AND RETRIEVAL PROCESSES IN EPISODIC MEMORY¹

ENDEL TULVING² AND DONALD M. THOMSON
Yale University and University of Toronto, Toronto, Canada
Monash University, Clayton, Victoria, Australia

Recent changes in pretheoretical orientation toward problems of human memory have brought with them a concern with retrieval processes, and a number of early versions of theories of retrieval have been constructed. This paper describes and evaluates explanations offered by these theories to account for the effect of extralist cuing, facilitation of recall of list items by non-list items. Experiments designed to test the currently most popular theory of retrieval, the generation-recognition theory, yielded results incompatible not only with generation-recognition models, but most other theories as well: under certain conditions subjects consistently failed to recognize many recallable list words. Several tentative explanations of this phenomenon of recognition failure were subsumed under the encoding specificity principle according to which the memory trace of an event and hence the properties of effective retrieval cue are determined by the specific encoding operations performed by the system on the input stimuli.

The current transition from traditional associationism to information processing and organizational points of view about human memory manifests itself in many ways. One of the clearest signs of change has to do with the experimental and theoretical separation between storage and retrieval processes. In an important early paper, Melton (1963), for instance, pointed out that "the principal issues in theory of memory . . . are about either the storage or the retrieval of traces [p. 4]." Only 10 years before Melton made the statement, it would have puzzled most students of verbal learning. At that time memory was still a matter of acquisition, retention, transfer, and interference of associations between stimuli and responses. While everyone was aware of the logical distinction between acquisition and retention on the one hand and retention and recall on the other hand, these distinctions shaped

neither experiment nor theory. At the level of conceptual analysis, the mechanism of recall was included in the concept of association; at the level of experimental operations, recall was observable behavior whose measurable aspects simply served to provide evidence about strength of associations. Moreover, the act of recall was empirically neutral in that it did not affect the state of the system; it was theoretically uninteresting because it could not be studied independently of acquisition.

The last 10 or 15 years have changed the ideational framework for studying memory. Today the orienting attitudes clearly include the notion that both recall and recognition are more or less complex retrieval operations or processes that can be studied and analyzed in some sense separately of storage operations or processes. Retrieval operations complete the act of remembering that begins with encoding of information about an event into the memory store. Thus, remembering is regarded as a joint product of information stored in the past and information present in the immediate cognitive environment of the rememberer. It is also becoming increasingly clear that remembering does not involve a mere activation of the learned association or arousal of the stored trace by a stimulus. Some sort of a more complex in-

¹This research was supported by the National Science Foundation Grant 24171X.

The paper was written during the first author's residence as a Fellow at the Center for Advanced Study in the Behavioral Sciences in Stanford, California.

²Requests for reprints should be sent to Endel Tulving, either at Department of Psychology, Yale University, New Haven, Connecticut 06510 or at the Department of Psychology, University of Toronto, Toronto M5S 1A1, Canada.