

Retrieval Experience: A New Arena of Psychological Study

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In a famous chapter in the *Annual Review of Psychology* in 1970, Tulving and Madigan lamented the lack of progress made by students in the field of verbal learning and memory in understanding their subject matter. In fact, they began their chapter with the claim that “The domain of psychological research known today under the bifurcated title of verbal learning and memory has suffered through a long and dull history” (page 437). Much of their chapter was an attempt to address why this was the case, concluding with the thought that “the broad picture we have of human memory in 1970 does not differ from that in 1870” (page 477). They then went on to ask “What is the solution to the problem of lack of genuine progress in understanding memory?” While claiming not to know conclusively, they suggested that one promising direction might be for psychologists to examine some of the remarkable phenomena of the human memory system in its knowledge of its own capabilities. They initially endorsed the study of how people can monitor their own experiences, the type of study now known as metamemory and studied by feeling-of-knowing judgments, feeling-of-learning judgments, source judgments, and many others (see Nelson, 1992).

Since 1970, researchers interested in memory in all its various manifestations have heeded Tulving and Madigan’s call and probably gone well beyond what they might have imagined for the future of the field in 1970. Metamemory studies have boomed, but so have many other types of investigation. The field has been opened to all kinds of influences, from neuropsychological studies of brain-damaged patients (which were generally ignored by mainstream memory researchers in 1970), to the everyday memory movement, to issues in the clinic of repressed/recovered/induced memories, to modern

studies of neuroimaging, a technique undreamt of in 1970. And this list includes only a few more prominent new topics.

One of the other remarkable new trends in the psychological study of memory is reflected in the two chapters in this section: the issue of how people may retrieve information in different ways and with different states of awareness. The basic idea is that “responding” on a memory test may reflect different underlying states of awareness, with correspondingly different processes or systems effecting the response. The idea of studying retrieval experience is relatively recent, dating perhaps to Tulving’s (1985) introduction of the remember/know paradigm and his claim that remembering reflected an auto-noetic (self-knowing) type of awareness, whereas knowing reflected noetic (knowing) awareness. In addition, auto-noetic consciousness was attributed to output from an episodic memory system, whereas noetic consciousness was said to arise from retrieval from semantic memory. Remembering reflects mental time travel, the sense of reliving in some form events in one’s past. Knowing reflects the more general knowledge of one’s past. I know I traveled to several professional meetings in 1977, but I cannot remember any one of the trips.

The two chapters in this section reflect the development of the remember/know paradigm and raise many puzzles for students of human memory. Before discussing these puzzles, however, we might first do well to reflect on the remarkable success of the remember/know paradigm itself in elucidating retrieval experience. The distinction seems an elusive one when first described, perhaps more so to experimental psychologists than to their subjects. Some tough-minded experimentalists bridle at the use of such experiential measures. After all, in the good old days of verbal learning, a response was a

response. If subjects wrote down an item on a free recall or cued recall test, that meant they had recalled the item. Similarly, if subjects checked off an item or circled it on a recognition test, that meant the item was recognized. There was no need to ask further questions or pose further problems for the subject. The idea that one and the same response (recalling an item or recognizing it) could arise from different but equally valid types of processes, which would mean that the “same” response could mean different things, was never seriously considered. Of course, everyone knew about the problem of “guessing,” the idea being that some responses in recall and in recognition might arise because subjects did not really know the answer but just guessed. However, the idea that different kinds of retrieval experience might underlie responding (of the non-guessing variety) was not contemplated.

The closest technique in the empirical study of memory to capturing experience was asking subjects to rate the confidence of their memories. The relation of confidence to remembering and knowing is not straightforward, but it does seem clear (as described in both the chapters by Gardiner and Conway and by Rajaram in this section) that the remember/know technique does more than simply capture different levels of confidence of subjects, as Donaldson (1996) and others have claimed. Donaldson (1996) argued that the remember/know distinction may simply reflect two states of confidence, with more confident responses being called *remembered* and less confident old responses being called *known*. This idea seems wrong, because remember/know and sure/unsure responses can be dissociated. However, theorists may have the relation backwards. Rather than differing levels of confidence explaining remember/know responses, it may well be that the study of retrieval experience through the remember/know technique may

help explain why subjects feel more or less confident. *Remember* responses, with their strong feeling that the event is being re-experienced, might provide a strong basis for high confidence responses. *Know* responses may reflect high confidence or low confidence. As argued by Yonelinas (1994), only responding based on familiarity or fluency might be modelled by a signal detection process assuming systematic variations in some quantity (trace strength in the theory of signal detectability, fluency of processing in other models). Remember responses, which are almost always made with high confidence, cannot be so modelled.

The remember/know procedure invokes the idea of “the same” response being effected by two different states of awareness that accompany retrieval arising from different sets of processes or systems, just as does two-process recognition theory (Jacoby, 1991; Mandler, 1980). But how to interpret remember/know data? Can they be equated with the two processes postulated in the two process recognition theories? After all, the remember/know technique has also been used for free and cued recall (Tulving, 1985). The relation between remember/know responses and two-process theory is discussed in the ensuing chapters.

I have heard complaints about the remember/know technique, although these are voiced more in person than in print. The remember/know procedure seems soft to most hard-headed experimentalists. After all, isn't the remember/know technique a return to introspectionism, with all its faults? The researcher trusts the subject to report on ineffable experience; unlike standard measures, there is no way to verify that the subject's report is right or wrong. Can these data prove valid and reliable measures of experiential states underlying behavior?

These qualms and questions may have been worth raising fifteen years ago, when Tulving (1985) first introduced the remember/know distinction and procedure, but in my opinion they can now be laid to rest, at least to those of us who have followed the literature on this topic. Despite the seeming impalpability of remember/know judgments, the distinction makes sense to subjects when they are carefully instructed. They use the technique with little problem. Further, a sizable body of evidence now attests to the usefulness of the distinction and the procedure. Systematic patterns of results from experiments using the remember/know procedure have been readily replicated across labs and the wee bit of inconsistency that sometimes arises may be due to slightly different sets of instructions being used. As is well summarized in the two chapters in this section and in other chapters by the same authors (Gardiner & Java, 1993; Rajaram & Roediger, 1997), the remember/know procedure has produced an interesting body of literature on retrieval experience. Further, the use of remember/know measures have produced sensible and orderly data when related to neural processing (e.g., Blaxton & Theodore, 1998; Duzel, Yonelinas, Mangun, Heinze & Tulving, 1997). The procedure captures a real, meaningful distinction both for subjects and for psychologists: two different means of accessing the personal past.

All this is not to say that there are not problems and perplexities galore in the study of retrieval experience via the remember/know technique. There are. Gardiner and Conway and Rajaram mention several puzzles in their chapters and the state of the field is one of exciting ferment. One interesting implication of the remember/know distinction within Tulving's (1985) memory systems theory, in which remembering is thought to reflect episodic memory and knowing semantic memory, is that there are no longer any

pure tests of episodic memory. It used to be said that there were “episodic memory tasks,” such as free recall, recognition, cued recall, paired associate learning, and so on. That idea can no longer be defended. Rather, episodic memory is now thought to be reflected only by *remember* responses that occur in one of these tasks. Know responses reflect retrieval from semantic memory, so one can have retrieval from semantic memory in “episodic memory tasks.” Perhaps so. However, Rajaram’s distinctiveness/fluency framework presented in this volume and elsewhere provides an alternative account of many of the remember/know phenomena. Rajaram’s account focuses on the processes by which *remember* and *know* responses arise, although it is compatible with Tulving’s (1985) ideas, too.

The remember/know procedure also provides a new purchase on some old problems. Take the case of false remembering, a phrase often used to refer to the production of intrusions in recall tests and false alarms on recognition tests. Such false responding is usually held to reflect the false remembering of these events. However, if we accept the idea that false responding, like true responding, can arise from different processes or systems and can reflect either remembering or knowing, then it is clear that the evidence on false memory needs to be reassessed. False responding (producing intrusions or false alarms) does not necessarily indicate false remembering. In fact, within the two process recognition theory (Mandler, 1980; Jacoby, 1991), the usual assumption is that false alarms arise from an integration or fluency process in which an item on a recognition test is processed easily (“jumps off the page”) and is judged to be old on this basis. Because such fluency is usually assumed to be reflected in *know* responses when the remember/know procedure is used, the fact that false alarms are

typically accompanied by *know* responses, not *remember* responses, seems consistent with this theory. However, if this is so, false alarms or intrusions do not necessarily implicate false remembering, in Tulving's (1985) sense.

Therefore, use of the remember/know distinction permits a different take on the concept of false memory. If this distinction is adopted, there can be more than one experiential basis for both true and false responding in either recall or recognition tests. Subjects could make an error and claim to *remember* the occurrence of the falsely recollected item. On the other hand, the subject might just *know* the event occurred, but not remember it. False remembering, then, would refer only to the case of errors that were also given *remember* judgments.

Although in standard recognition memory paradigms false alarms are often judged to be events that are *known*, not *remembered*, Roediger and McDermott (1995) reported a dramatic exception. After studying lists of related words, all of which were associates to a common word that is not presented, subjects falsely recognized the associate at very high rates. In addition, for about 75% of the false alarms to the associates of the list items, subjects reported that they *remembered* its occurrence when assessed by the remember/know procedure, even though the associate had never been presented. This outcome represents true false remembering, not just false responding (which is what is usually assessed in false memory paradigms). In addition, the level of *remember* responses for the false alarms in the Roediger and McDermott (1995) study was about the same as the level for actually studied items. Roediger, Jacoby and McDermott (1996) also reported reasonably high levels of false remembering of misleading information in the Loftus (1991) misinformation paradigm.



In an ensuing chapter, Rajaram grapples with the issue of how data such as those produced by Roediger and McDermott (1995) might be interpreted within her fluency/distinctiveness theory. Remember responses are attributed to distinctive processing within her framework, but how can an event that was never even presented become distinctive? (We leave the answer to readers of her chapter). Here we raise a different point: do the Roediger-McDermott (1995) data (now replicated several times) have dire implications for the remember/know procedure itself? Do these data call into question what *remembering* means in the technique? Do they invalidate the paradigm's assumptions? After all, how can people claim to experience the remembering of an event that never actually occurred? In my opinion, the remembering of events that never happened, although a fascinating phenomenon in its own right, does not call the remember/know paradigm into question. People can have the illusion of remembering events just as they can have the illusion of perceiving events (as in the phenomena of subjective contours or apparent motion). Perceptual illusions and memory illusions may turn out to have much in common, at a broad level of analysis (Roediger, 1996). Both implicate constructive processes in cognition.

The study of retrieval experience is relatively young. Human memory has been studied for 115 years and retrieval experience has been studied for only the last 15 years. The chapters by Gardiner and by Rajaram serves as interesting milestones in what will doubtless prove to be a long, fascinating journey.

## References

- Blaxton, T.A. & Theodore, W.H. (1998). The role of the temporal lobes in recognizing visuospatial materials: Remembering versus knowing. Brain and Cognition, 35, 5-25.
- Donaldson, W. (1996). The role of decision processes in remembering and knowing. Memory & Cognition, 24, 523-533.
- Duzel, E., Yonelinas, A.P., Mangun, G.R., Heinze, H.J. & Tulving, E. (1997). Event-related brain potential correlates of two states of conscious awareness in memory. Proceedings of the National Academy of Sciences, 94, 5973-5978.
- Gardiner, J.M., Java, R.I. (1993). Recognizing and remembering. In A. Collins, S. Gathercole, M. Conway & P. Morris (Eds.). Theories of memory, (pp. 163-188). Hillsdale: Erlbaum.
- Jacoby, L.L. (1991). A process-dissociation framework: Separating automatic from intentional uses of memory. Journal of Memory and Language, 30, 513-541.
- Loftus, E.F. (1991). Made in memory: Distortions in recollection after misleading information. In D. L. Medin (Ed.), The Psychology of Learning and Motivation, 27, 187- 215. New York: Academic Press.
- Mandler, G. (1980). Recognizing: The judgment of previous occurrence. Psychological Review, 87, 252-271.
- Nelson, T. O., Ed. (1992). Metacognition: Core readings. Boston: Allyn & Bacon.
- Rajaram, S., & Roediger, H.L. III (1997). Remembering and knowing as states of consciousness during recollection. In J.D. Cohen & J.W. Schooler (Eds.),

Scientific approaches to the question of consciousness, (pp. 213-240). Hillsdale: Erlbaum.

Roediger, H.L. (1996). Memory illusions. Journal of Memory and Language, 35, 76-100.

Roediger, H.L., & McDermott, K.B. (1995). Creating false memories: Remembering words not presented in lists. Journal of Experimental Psychology: Learning, Memory, and Cognition, 21, 803-814.

Roediger, H.L., Jacoby, D. & McDermott, K.B. (1996). Misinformation effects in recall: Creating false memories through repeated retrieval. Journal of Memory and Language, 35, 300-318.

Tulving, E. (1985). Memory and consciousness. Canadian Psychologist, 26, 1-12.

Tulving, E., Madigan, S.A. (1970). Memory and Verbal Learning. Annual Review of Psychology, 21, 437-484.

Yonelinas, A. P. (1994). Receiver-operating characteristics in recognition memory: Evidence for a dual process model. Journal of Experimental Psychology: Learning, Memory and Cognition, 20, 1341-1354.