

Memory: A New Synthesis

Daniel L. Schacter

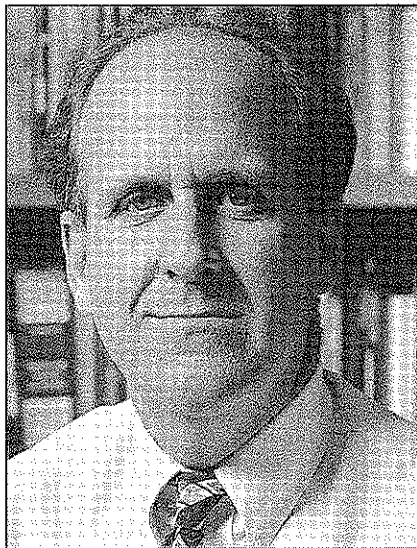
Searching for Memory: The Brain, the Mind, and the Past

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Review by

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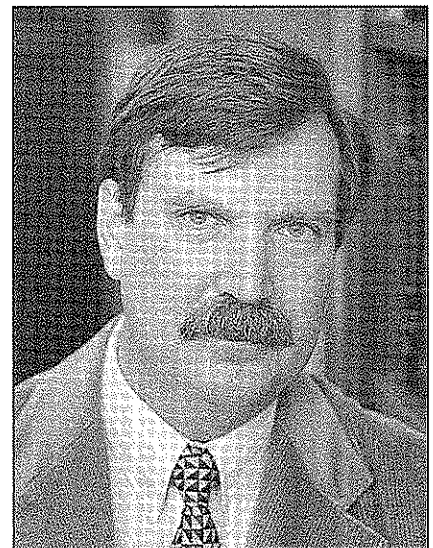
There was a time, about 100 years ago, when the study of memory might have been unified—when psychologists, neurologists, and philosophers, drawing on both laboratory data and clinical observation, might have worked together to understand how we acquire, represent, and recollect memories of the personal past. Think about Ribot and his law and Korsakoff and his syndrome. Think of Ebbinghaus and his nonsense syllables, of Calkins and her paired associates; of James's distinction between primary and secondary memory, and Bergson's contrast between conscious memory and unconscious

habit; of Muller's notion of consolidation, Janet's concept of dissociation, and Freud's theory of repression. Call it the stirrings of a "golden age" of memory, exemplified by James's analysis of Ansel Bourne's fugue state in the *Principles of Psychology*, and imagine what a model it would have been for keeping the rest of psychology unified as well.

Imagine and weep, for this golden age was not to be. Ebbinghaus proved that Kant and Wundt were wrong, and that "higher" mental processes such as memory could be studied scientifically, but neither he nor anybody else of the time applied the tools of laboratory research to the organic and functional disorders of memory observed in the clinic. By the same token, work on the pathology of memory focused on descriptive case studies, sometimes analyzed through theoretical lenses that had little foundation in empirical research. Then came the onslaught of behaviorism, with its distrust of mentalistic concepts like "memory," its narrow focus on the functional relations between stimulus inputs and response outputs, and its insistence that the mind and brain were black boxes that need not be opened by psychologists. Memory was absorbed into the study of learning, learning was construed as the forming of stimulus-response associations, animal learning was substituted for the human case, and the golden age that might have been quickly faded into, and then from, memory.

Beginning in the 1970s, however, a psychologist interested in memory could smell something fresh in the air. Memory

was coming back, and things were coming together. Stimulated by developments in computer science and artificial intelligence, psychologists had already slipped the bonds of verbal learning and had begun to theorize about the structure of the memory trace and the processes by which information is encoded in and retrieved from memory. Also, they once again turned to cases of brain damage and other forms of psychopathology for evidence, discovering in the process facts about memory that experiments on paired-associate learning by college sophomores had only hinted at dimly. We were going to get a second chance at a golden age of memory research.



John F. Kihlstrom

Photo courtesy of Yale University

Daniel Schacter was one of those psychologists smelling the air in the 1970s. In a chapter written with Endel Tulving (Schacter & Tulving, 1982), Schacter's graduate-school mentor, he looked back wistfully at what might have been and looked forward eagerly to the time when, quoting Ribot (1882, p. 10), the pathologies and anomalies of memory were no longer regarded as "amusing anecdotes" but rather as the means by which the structure and mechanisms of memory would be "laid bare." Now, some 15 years later, what Schacter and Tulving foresaw has come to pass: a new golden age of memory research has been thoroughly consolidated, and there is no going back. Schacter's book, which was selected as a *New York Times* Notable Book of the Year for 1996, and received the 1997 William James Book Award from the American Psychological Association, is the outward and visible sign of this consolidation.

It should be understood, however, that this book is not an encyclopedia of memory theory and research. It offers nothing like Crowder's (1976) magisterial summary of the verbal learning tradition in memory (i.e., the stimulus-response view running from Ebbinghaus to Postman and Underwood), and of the early years of the cognitive revolution (short- vs. long-term memory, stage analysis, organization theory, and levels of processing). Rather, the book is organized around Schacter's own enthusiasms: experimental studies of amnesia, the distinction between explicit and implicit memory; memory systems; and memory distortions. That is fair enough—especially because these enthusiasms cover a lot of what is interesting in the contemporary psychology of memory, and the author's own work has been so central to the establishment of the new golden age. The book is further personalized by reproducing selections from Schacter's collection of paintings and other artwork illustrating the experience, structure, and function of memory, as well as his commentaries on them.

A major theme running through the book is what Schacter calls "memory's fragile power": our enormous ability to recollect the past, which serves us so well so often, is compromised by a certain level of unreliability, so that we also experience failures and distortions of memory and sometimes have recollections that are outright false. Earlier metaphors for memory, such as the library and the computer, were fundamentally misleading: Remembering is not like looking up a book in a catalog, finding it on the shelf, taking it down, and reading it. Rather, remembering is more

like writing a book from fragmentary notes. When an event occurs, the "notes" we encode in memory are greatly influenced by our preexisting knowledge, as well as our goals and passions of the moment. And so, when we later remember the event, that is our interpretation of the notes and the reconstructions we make around them. Of course, this point was made forcefully by Bartlett (1932) in his attack on Ebbinghaus and the associationistic tradition in memory. But Bartlett's research was relatively weak. Schacter buttresses the point with an impressive array of experimental and neuroscientific data.

Schacter begins his book with an account of the subjective experience of remembering. Searching for memory in the mind, Schacter discusses the distinction between field and observer memories, between memory for factual details and memory for the source of that knowledge, and between remembering an event and knowing that it occurred. It is difficult, he argues, to disentangle our autobiographical memory for our personal pasts with other knowledge and beliefs that we have about ourselves and the world around us. This fact, in turn, is the source of many of the distortions that can creep into memory, confusing what we know with what we think we know and what we ourselves remember with what others have told us. Memory's fragile power stems, in part, from the fact that what we remember so well might not have happened at all.

Schacter's emphasis on phenomenology reminds us that although computers may have memories, recollection is an act of human consciousness. But sometimes the phenomenology is not carried far enough. In line with much recent experimental work, Schacter treats knowing the past as a kind of wastebasket category, including any instance of recognition in which the person does not in some sense reexperience the remembered event. But such a broad definition may obscure phenomenal distinctions that are theoretically important. I can remember an event from my past, and I can know that something happened to me (the way I know that Bill Clinton is president of the United States). But I can also feel intuitively that something happened (as when someone's face or name rings a bell), and I can believe that something happened, on the basis of other things that I know and remember. These different forms of recollective experience may be based on quite different cognitive and neural processes.

The phenomenological analyses set the stage for a discussion of the way memories are encoded and retrieved. Schacter em-

phasizes that memory is not something that happens automatically, but rather is a by-product of perceptual activity. The amount of attention we pay to events as they occur, and the way we connect those events with our preexisting fund of background knowledge, is critical to the way we will remember them later. Schacter also discusses the role of environmental cues in retrieving memories. But although an earlier psychology of memory might have examined encoding and retrieval processes separately, Schacter emphasizes their interactive nature. Retrieval is not just something that happens automatically if the person is presented with rich enough cues. Rather, the way these cues themselves are perceived and interpreted and their relationship to the way the memories are encoded originally, is critical to whether they will help the person to bring a past event to mind and how that event will be remembered.

True to the spirit of the new golden age, Schacter's book relies heavily on neuroscientific evidence—including both behavioral studies of brain-damaged humans and animals and brain-imaging studies of intact subjects. It is now clear that the medial temporal lobe and hippocampus play a critical role in encoding new memories. People with lesions in these areas seem unable to consciously remember anything new. Damage to the frontal lobes prevents people from strategically controlling and monitoring their memory performance, so that some amnesic patients are not aware that there is anything wrong with their memories and others confabulate recklessly. The amygdala plays an important role in emotional memory. Lesions in this area impair the acquisition of fear responses. Searching for memory in the brain, we find the coordinated activity of a number of specialized modules. In one of Schacter's brain-imaging studies, for example, the frontal lobe lights up when people try to remember, but the hippocampus lights up when the effort is successful. Each structure makes its own contribution to every act of remembering to what is remembered and to the qualities of the memory.

But memory is not just about recollective experience. We sometimes have memories without any recollective experience at all. Schacter has been a leader in the study of implicit memories, where past events have effects on subsequent experience, thought, and action in the absence of explicit or conscious recollection. Implicit memory also reflects memory's fragile power—the power of the past to influence the present outside of our conscious

awareness and voluntary control. Implicit memory has both theoretical and practical significance. Practically, it makes it possible for amnesic patients to learn new skills. Even though they are not consciously aware that they have acquired this knowledge, if the environment is structured appropriately, they can put the new learning to adaptive use. On a theoretical level, analysis of the differences between explicit and implicit memory led Schacter and others to hypothesize the existence of new, heretofore, unappreciated memory systems in the brain.

Of special interest to Schacter is a set of perceptual representation systems, whose task is to encode and retain information about the perceptual structure of events—not their meaning or implications, but just what they look or sound like. At the same time, however, Schacter is more careful than many others to recognize that implicit memory should not be identified with perceptual processes or representations. The reason is that there are other forms of implicit memory, such as semantic priming effects, which cannot be mediated by purely perceptual representations or processes. These semantic priming effects require a deeper, more conceptual encoding. And there are still other forms revealed in skilled performance on behavioral and cognitive tasks. Perhaps, as Schacter suggests, such effects are mediated by additional memory systems supporting semantic and procedural memory. On the other hand, it may be that all expressions of implicit memory have something in common, making it unnecessary to postulate an increasing proliferation of memory systems to accommodate research results.

If there is one thing missing in the new golden age of memory, it is a role for computer simulation models of memory. Computer simulations represent psychological theorizing at its most formal and rigorous, but Schacter mentions this approach only in passing, pointing out that certain neural network models show how preexisting knowledge can produce memory distortions. A truly complete theory of memory needs to be able to accommodate pathological as well as normal memory functioning, and writing an operating computer simulation with this feature would be a real advance—something that was not even a gleam in Ribot's eye. Moreover, such models may contribute to the debate over the multiple memory systems favored by Schacter and many other cognitive neu-

roscentists. What would be the implications, for example, if models like ACT, MINERVA, or SAM, which assume only a single associative memory system, can simulate the dissociations between explicit and implicit memory observed in patients and normals? In any event, it is now clear that the data of amnesia are not just the stuff of "amusing anecdotes," and that a simulation model that cannot produce at least some explicit-implicit dissociations must lose credit as a comprehensive theory of memory functioning.

Psychologists search for memory in the mind and the brain, but the people they study use memory to represent and understand the past. But memory's power is fragile, and a person's memories of the past may or may not be valid representations of what actually happened. Here, Schacter enters the "memory wars" (see also Crews, 1995) over the effects of childhood sexual abuse and other traumata on memory. Schacter reminds us that memories of abuse, no less than other memories, are reconstructions and should not be taken at face value in the absence of independent corroboration. But rather than embracing a rhetorical dichotomy between true and false memories of abuse, Schacter recommends that we attempt to determine "how and in what ways memory corresponds to reality" (p. 277). An incest memory may be false, for example, yet still reveal something important about the patient's relationship with his or her family. Moreover, Schacter appropriately cautions that some therapeutic techniques used in the attempt to recover ostensibly repressed or dissociated traumatic memories, such as hypnosis and guided imagery, are highly suggestive and may inject further distortion into a person's recollection. The "reality" a memory corresponds to may be the therapist's, not the patient's. In particular, Schacter warns that demonstrations of implicit memory cannot be taken as license to infer past abuse on the basis of present symptoms. The symptom may be an implicit representation of prior trauma, or it may have other origins entirely. The only way we can know for sure is by comparing the memory with an independent, objective record of the past.

Schacter's book includes a number of moving case studies of patients who suffer one or another form of memory dysfunction. In contrast to many other neuroscientists, he treats the functional disorders of memory—psychogenic amnesia, fugue, and the interpersonality amnesia observed in multiple personality disorder—as seri-

ously as he does those of clearly organic origin. Controlled, quantitative research on amnesic patients is what Ribot hoped to foster 100 years ago, and it is a hallmark of the new golden age represented by this book. But although most other cognitive neuropsychologists seem content simply to report the results of experimental tests, Schacter is equally concerned with the impact of memory loss on the personal lives of the patients. So, for example, when Schacter discovers that Frederick, a patient in the early stages of Alzheimer's disease, shares his passion for golf, Schacter takes him out for a couple of rounds on familiar and unfamiliar courses and contrives informal tests of memory along the way. The result is that we get a better view of the role that memory plays in the everyday lives of these individuals. Schacter reminds us, as Bartlett tried to as well, that memory is a topic for personality and social psychologists as well as for cognitive psychologists.

I once had a colleague who, during a discussion of departmental staffing issues, informed me that "Memory is everything, therefore it is nothing." The alternative view, in the words of the writer Saul Bellow quoted by Schacter, is that "Memory is life." Reading this book one is forced to the view that Bellow was closer to the mark. Explicitly or implicitly, our past exists in our present, and our awareness of the past helps us both to make sense of who we are and to shape our futures. Searching for memory is searching for self.

As the spirit of the golden age extends beyond memory to perception, language, thinking, consciousness, emotion, development, and even personality and social interaction, as indeed is already happening, Schacter's book will serve as a model for how the new breed of psychologists should represent their work both to their colleagues and to the public at large.

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