Remembrance of Things False

Scientists incite illusory memories and explore their implications

By BRUCE BOWER

More than 60 years ago, British psychologist Frederick Bartlett issued what amounted to a consumer alert regarding a common mental product—memory. Remembering events one has witnessed or experienced rests on a process of mental construction that tends to build in errors and outright fabrications, Bartlett asserted in *Remembering: A Study in Experimental and Social Psychology* (Cambridge, England: Cambridge University Press, 1932).

In his most famous experiment, Bartlett had college students read a North American Indian folk tale, "The War of the Ghosts," and then tested their recall of it on several occasions. Individuals mangled the story more with each succeeding attempt to remember it, notably by changing elements of the legend to match their own expectations, altering the form of the story to that of an English fairy tale, and sometimes even adding a moral to it.

People use frameworks of knowledge about the world based on prior experience to interpret and remember events, Bartlett theorized. This approach proves more efficient than cramming the brain with one memory after another, each stored in its entirety within a cavernous cerebral library, but it also creates the possibility of remembering things that never happened.

Largely neglected for several decades after its publication, Bartlett's book now attracts lots of attention in the world of memory research. Investigations of memory errors and illusions have mushroomed in the past several years. This trend takes its inspiration from both the long-standing study of perceptual and judgmental errors in psychology and the recent bitter debate over the reality of recovered memories of childhood sexual abuse (SN: 9/18/93, p. 184).

The conflict over lost and found memories of past traumas shows no sign of dissipating: Witness the final report of the American Psychological Association's working group on investigation of memories of childhood abuse, released in February. The group's six members—three clinicians who work with trauma victims and three psychologists who study the suggestibility of memory—agreed on a few general issues, such as the possibility that memories of abuse resurface after a period of forgetting and that psychotherapists or others can influence the construction of bogus memories.

The bulk of the 239-page report, however, consists of an impassioned debate between the clinicians and the scientists. The clinicians point to evidence that sexual abuse can result in memory disturbances which interrupt recall but do not introduce false memories. The researchers emphasize studies demonstrating the relative ease with which misleading information and imagined events enter memory.

Propelled by several highly publicized lawsuits against psychotherapists for allegedly conjuring up false memories of sexual abuse from their clients, a rising tide of studies examining what the researchers call implanted or illusory memory has deposited a thick layer of doubt atop any presumptions that recall of past events can be trusted.

"Memory's reputation has been tarnished lately," asserts Daniel L. Schacter, a Harvard University psychologist and author of *Searching for Memory* (New York: Basic Books, 1996). "Memory is by and large pretty accurate, but distortions can arise due to its constructive nature."

Memory distortions, as Bartlett found years ago, sometimes reflect elaborations on an actual event or piece of information. Many psychologists now devise laboratory techniques to induce what amounts to illusory memories. For instance, in an effect first reported in 1959, volunteers who listen to or read a list of related words later believe with great certainty that other words in the same category appeared on the list.

An updated version of this list-learning method yields about equal numbers of true and false memories, report Henry L. Roediger III and Kathleen B. McDermott, both of Washington University in St. Louis, in the July 1995 JOURNAL OF EXPERIMENTAL PSYCHOLOGY: LEARNING, MEMORY, AND COGNITION.

They gave college students 24 lists, each containing 15 words associated with a target word not on the list. A list associated with the target word "sleep," for instance, included "bed," "dream," "blanket," "doze," and "pillow."

When attempting to recall the words, students erroneously included the target word in half of the lists. When shown new lists—with the original target words, words from the original lists, and new words unrelated to the list categories—students reported having previously seen the target words even more often, about as frequently as the words they had actually studied.

Different patterns of brain activity characterize false and true memories produced in this way, according to a study in the August NEURON by Schacter, Roediger, McDermott, and their colleagues.

The scientists administered positron emission tomography (PET) scans to 12 volunteers as they listened to a series of words. Some of the words had been read aloud to them several minutes earlier, and some were new but similar in meaning to the words they had already heard.

Both accurately and falsely remembered words stimulated cell activity—shown on PET scans as increased blood flow—in a part of the brain that has been linked to memory of information and events. Only accurate memories, however, sparked a simultaneous burst of activity in a brain region implicated in the retention of information about sounds and speech.

In effect, only genuine memories triggered a sensory reaction in the brain.

On the other hand, only false memories elicited elevated activity in frontal brain areas involved in conscious attempts to remember information.

"This is only a first step in specifying brain processes involved in false memories," Schacter cautions. "These PET results don't generalize to memories about one's past, and this technique can't be used as a lie detector test."

Brain-scan investigations have only recently begun to unravel the cerebral network of brain areas that coordinates autobiographical memory (SN: 7/6/96, p. 5).

Some researchers argue that list-learning studies illuminate more about the power of categorical memory than about any fundamental flaws in information recall. Students expertly monitored the categories in which lists of related words fell and reasonably assumed that new words in those categories had also been on the lists, assert Jennifer J. Freyd of the University of Oregon in Eugene and David H. Gleaves of Texas A&M University in College Station.

Words bearing no relation to those in the lists did not invoke false memories, Freyd and Gleaves note in the May JOURNAL OF EXPERIMENTAL PSYCHOLOGY: LEARNING, MEMORY, AND COGNITION.

Roediger largely agrees with their assessment. "A reasonably good memory system makes these types of errors." The applicability of the results to recovered memories for childhood sexual abuse is uncertain, he adds.

Other facets of a proficient memory system may also spawn some distortions. A study directed by Ralph Hertwig of the Max Planck Institute for Psychological Research in Munich and accepted for publication in PSYCHOLOGICAL REVIEW suggests that a memory error known as hindsight bias occurs as a by-product of expertly learning and remembering pertinent information.

In hindsight bias, recall of one's original confidence in the truth of an assertion is swayed by finding out that the assertion was indeed true (inflating recalled confidence of its veracity) or was in fact false (deflating recalled confidence). For example, if one initially rates a business associate as competent and later hears that he or she has been promoted to head of regional sales, one may remember having originally thought of the associate as a rising star.

In laboratory experiments on this effect, volunteers read an assertion—such as, "prohibition was called 'the noble experiment'"—on three separate occasions. First they rate their confidence in its truth or falsity, then they receive feedback about whether or not it's true, and finally they recall their original confidence rating.

Hertwig's analysis of data from a variety of hindsight bias studies indicates that, given limited knowledge about an assertion, repeated exposures to it boost confidence in its truth (in the absence of any feedback to the contrary). This repetition effect results from the human penchant for tallying the frequency with which relevant events have occurred in order to reach real-world decisions, he maintains (SN: 7/13/96, p. 24).

The repetition effect accounts for the curious finding that assertions deemed true in experimental feedback sessions produce much more hindsight bias than those labeled false, Hertwig holds. If feedback ratifies the truth of a statement about which one is uncertain, memory of initial confidence is inflated in the same direction by both the feedback and the repetition of the information, he contends. If feedback disputes a statement, prior confidence in its veracity looks weaker in retrospect, but this distortion does not gain added force from the simple repetition of the statement.

"The hindsight effect may be an unavoidable consequence of constructing memories about confidence in past knowledge based on what's been learned since then," Hertwig holds.

Repeated exposure to information that totally rewrites the past may foster memory blunders of a potentially more dangerous sort than hindsight bias, other scientists assert. Thinking over and over about childhood events that never happened proves a relatively easy way to create false memories, at least in some individuals, they argue.

Such findings raise concerns about the accuracy of recovered memories of childhood sexual abuse achieved in psychotherapy by "reliving" suspected traumas through hypnosis, guided imagery, or other prompts.

In one experiment, directed by psychologist Maryanne Garry of Victoria University of Wellington, New Zealand, 46 college students noted whether they had experienced any of 40 childhood events (such as breaking a window with a hand or getting rescued from the water by a lifeguard). Two weeks later, half of them were instructed to imagine themselves as children experiencing several of these events, including some which had never happened to them.

Only volunteers who performed the imaginative exercise reported substantial rises in confidence that both actual and illusory incidents had occurred.

The ease with which vividly pictured figments of the imagination come to mind may promote their acceptance as real, Garry's group suggests in the June PSYCHONOMIC BULLETIN AND REVIEW. People may also lose track of the source of memories that have been imaginatively reworked again and again, the researchers suggest.

In a similar study, conducted by Ira E. Hyman Jr. and Joel Pentland, both psychologists at Western Washington University in Bellingham, 32 college students were prompted on two consecutive days to imagine having spilled a bowl of punch at a wedding as a child. The next day, eight of these students reported false memories of the event. The false memories typically incorporated the bowl of punch incident into a broader account based on accurate personal knowledge, Hyman and Pentland report in the April JOURNAL OF MEMORY AND LANGUAGE.

Several prior studies conducted by Hyman and others have found that about one volunteer in five develops illusory memories of childhood events suggested by friends, relatives, or experimenters. Falsely recalled incidents have included getting lost in a mall and being hospitalized overnight for a high fever.

Hyman and his coworkers theorize that some people prove more likely than others to embrace false memories, perhaps because of a skill at concocting mental images, a keen retention of both real and suggested events, or a willingness to revise self-knowledge based on others' suggestions.

Memory implantation studies exploit categorical knowledge in much the same way as Roediger and McDermott do in their studies of word lists, contends Kathy Pezdek of the Claremont (Calif.) Graduate School. It is fairly easy to create false memories of familiar events, such as knocking over a bowl as a child, but not of unfamiliar events, which for most people includes childhood sexual abuse, she argues.

In a study presented at the Psychonomic Society's 1996 annual meeting, Pezdek found that 3 of 20 college students were able to persuade a sibling or close relative that he or she had gotten lost in a mall as a child, when in fact the incident had never occurred. In contrast, none of 20 students managed to plant false memories in a sibling or relative of having received a painful enema from his or her mother as a child.

Hyman cautions, however, that scientists know little about the amount or kind of personal knowledge needed to create some presumably false memories, such as those of alien abductions.

On a broader level, the mental blueprints for memory construction lie largely out of reach. Investigators have yet to sketch out the rules of thumb and inferential procedures necessary for assembling personal recollections.

Even Bartlett's influential findings remain somewhat enigmatic, Roediger asserts, because no one has replicated the British investigator's original "The War of the Ghosts" results. Roediger and Mark A. Wheeler of the Rotman Research Institute in North York, Ontario, conducted one of the few studies to attempt this feat. Instead of succumbing to memory distortion, volunteers actually improved their recall of "The War of the Ghosts" and another story when given a second memory test shortly after the first, the scientists reported in the June 1992 PSYCHOLOGICAL SCIENCE.

"We can tell a lot about a memory system by looking at the errors it makes, but we also need to emphasize its adaptive nature," says Roediger. □