The Master Mediator

Memory is Not a Video Recording

BY ROBERT A. CREO

Yesterday, all my troubles seemed so far away,
Now it looks as though they are here to stay,
Oh, I believe in yesterday …

The Beatles (1965)

* * *

When "Yesterday" was first released, I was in middle school and confident of the ability of my superior memory.

Much of my learning resulted from memorization. I could show off by reciting many things, such as the Gettysburg Address or the poem "If" by Rudyard Kipling. During French class, we listened to records for lessons, and I still remember the introduction which ended crediting "Harcourt Brace and World Incorporated." I can still recall where the *bibliothèque* is located.

I now realize I encoded these lessons into long-term memory.

In 1965, however, my confidence was somewhat shaken by an experiment done by our teacher. While she was standing in the front of the class teaching, a woman entered the classroom and went into her purse, took out her car keys, and may have, or may not have, shaken the keys, and then quietly left the room. One of the students interrupted Miss Doe—ironically, I can't remember the teacher's name—to inform her that while she was lecturing someone had come into the room and gone through her purse!

The author is a Pittsburgh attorney-neutral who is co-founder of the Master Mediator Institute, which conducts courses on negotiation behavior that focus on neuroscience and the study of decision making. He is author of "Alternative Dispute Resolution: Law, Procedure and Commentary for the Pennsylvania Practitioner" (George T. Bisel Co. 2006). He is a member of this newsletter's editorial board, and the CPR Institute's Panels of Distinguished Neutrals.

Miss Doe appeared somewhat surprised but was amazingly calm. She quizzed us about what had happened and what this blond, brunette, or red-head with the short-long hair had done.

The fact was that the eyewitnesses' accounts varied greatly. Most of us could not say what we had seen with certainty.

We were all inclined to adapt facts that had been confidently put forth by other students. There was much debate over the whether this interloper had shaken the keys at us! Miss Doe went into the hallway and brought her confederate into the room. Not surprisingly this woman was a different height, shape, age, and was wearing different clothes than during her key-grab.

The confederate refused to confirm or deny the key shaking, noting that sometimes in life uncertainty is healthy. Although I am sure I did not master all of the teaching points, this lesson I do remember—well, at least the essence of it.

MISINFORMATION EFFECT

My teacher's experiment from the 1960s was a forerunner to my future exposure of the concept of our limited abilities to observe and recall. A classic 1974 experiment by Prof. Elizabeth Loftus had subjects shown a video of a car accident, then immediately quizzed about it. The experiment found that there is a "misinformation effect" when the person conducting the interview uses certain phrases or wording of the question.

For example, by asking "Did you see the red car run the stop sign?" it is suggested to the observer that only one of the cars was red, and that it passed through an intersection with a stop sign shortly before the impact.

The audience response will vary, with some insisting that the blue car ran the stop sign, that the red car stopped fully, or some other variation of the story. Upon reviewing the video there is neither a red car nor a stop sign. See Loftus, E.F. & Palmer, J.C., "Reconstruction of Automobile Destruction: An Example of the Interaction between Language and Memory," 13 *J. Verbal Learning & Verbal Behavior* 585 (1974)(available at http://bit.ly/pY0K8L).

Robert A. Creo

At a National Academy of Arbitrators conference in the 1980s, Loftus showed hundreds of experienced arbitrators the same video she used in the 1974 experiment. Our highly talented and esteemed group did not fare much better than the subjects in her original experiments. Our stories were all over the place with no one able to correctly recount the accident details.

The arbitrators also were subject to the same framing influences where answers could be affected by the wording of the questions. Because the language used in the question itself has the ability to influence memory, this effect underpins many of rules of evidence, such as the basis for objection to leading questions on direct examination.

Prof. Loftus is one of the leading experts on memory. She is credited with developing the misinformation effect theory, which supports the concept that the memories of eyewitnesses are revised by being exposed to incorrect information, and that memory is not static or unchangeable. She has done pioneering research on repressed and false memories and has testified in numerous high-profile cases. See, e.g., Loftus, Elizabeth, et al., "Eyewitness Testimony: Civil & Criminal" (4th Ed., 2007);

(continued on next page)

The Master Mediator

(continued from previous page)
Loftus, E. F., & Loftus, G.R., "Mind at Play" (Basic Books, N.Y. 1983).

Recent research has expanded the concept of misinformation to the area of general, rather than personal, knowledge. An experiment tested the question of whether, once general knowledge is stored in memory, it is stable, or whether people will incorporate errors or misinformation they recently received.

Subjects answered common knowledge questions, such as who invented the light bulb and which ocean is the largest, and then for two weeks read stories that contained errors contradicting what they already knew to be correct.

Subjects reproduced errors from the stories despite having recently answered them correctly on the initial test. The finding was that prior knowledge offered no protection against errors entering the knowledge base, and that the misinformation effect was equivalent for both previously known and unknown facts.

Even a single recent exposure to a factual error increases its accessibility above that of a strongly held prior response. One theory is that the recent error does not replace the correct fact but that the memory retrieves the more recent information encoded shortly before the retesting. Both facts, although inconsistent, coexist in memory but the recent exposure, especially if it is manipulated by slowing its presentation and emphasizing the error, increases the likelihood that it will fluently come to mind when prompted by the test question.

Over time, however, the false fact is likely to fade, and the correct information will be reproduced on a later general knowledge test. The general conclusion is that "people's knowledge about the world is malleable and errors can easily enter the knowledge base, regardless of what is already stored in memory." See Fazio, L.; Barber, S.; Rajaram, S.; Ornstein P. & Marsh, E., "Creating Illusions of Knowledge: Learning Errors that Contradict Prior Knowledge,"141 *J. Experimental Psychology: General* 142 (May 21, 2012)(available at http://bit.ly/14zCx8r).

MAPPING BRAIN ACTIVITY

In February 2013, President Obama announced the Brain Activity Map project, a decade long, multi-million dollar research initiative with the goal of building a comprehensive map of the brain's activity. It is an attempt to create a road map of stable and predictable neural pathways that can represent the various brain functions.

Research by Elizabeth C. Warburton and Gareth R.I. Barker, of the University of Bristol in Bristol, U.K., indicates that when we try to recall a specific item, such as a familiar face, multiple brain regions have to work together, and not independently. The medial prefrontal cortex is associated with higher brain functions and works together with the medial temporal lobe (MTL). The hippocampus and the perirhinal cortex are part of the MTL. [Definitions of scientific terms discussed here and to be expanded upon next month are collected in the box at the end of the article.]

A 2011 study found that neither "object" memories (the "what") nor temporal order recognition (the "when") could be formed if communication was disrupted between the hippocampus and either the medial prefrontal cortex or the perirhinal cortex. R.I. Barker, G.R.I, & Warburton, E.C., "When Is the Hippocampus Involved in Recognition Memory?" 31(29) *Journal of Neuroscience* 10721 (July 20, 2011)(available at http://bit.ly/10iLv9u).

The hippocampus is thought to play a role in spatial navigation, memory and learning. Recent research supports the theory that hippocampus acts as intermediate storage. During rest phases, especially while sleeping, information that was received is consolidated by the hippocampus and passed on to other areas of the brain for long-term storage.

Hippocampal processes are linked to rhythms called "oscillations" that are similar to the brain waves detected by electroencephalographs. Studies have indicated that suppression or intensifying brain oscillations can impair or improve learning. The science is consistent with the notion that disturbance of hippocampal rhythms correlates to pathological conditions like epilepsy, schizophrenia and Alzheimer's disease.

The hippocampus is involved in what is often called "declarative or conscious" memory, which involves a person declaring "I remember" being there or describing an action or scene involving the intent to retrieve the information.

The perirhinal cortex is at the core of forming unconscious conceptional memories. This is when memories surface unexpectedly in response to some overt or covert cue seemingly unrelated to the current context or activity. The "what, when, and where" of episodal memory is integrated by these two brain structures, with the hippocampus generating an incremental timing signal between key events to indicate the passage of time, and the perirhinal cortex integrating the information into the order of the events.

FACIAL RECOGNITION

Facial recognition is complex. It is based upon a process where our eyes take in two-dimensional images of a face, comparable to a series of snapshots of a camera, and processes it in a way that stores a three-dimensional mental representation of the face.

Fuhgettaboutit!

This month's column subject: ADR memory.

The specifics: How your brain is wired.

The lesson: Focus on the details, because differing perceptions about the same thing may be why you are at the bargaining table.

'When we try to recall a specific item, such as a familiar face, multiple brain regions have to work together, and not independently.'

These are unconscious automatic processes that enable people to recognize faces despite changes in the context such as lighting and viewing angles. Research demonstrates that for facial recognition people look first at a smaller portion of another face—specifically to the eyes, then secondarily to the mouths.

The former theory was that it was a holistic approach, and that the brain processes the eyes, nose, and mouth simultaneously. But recent experiments have found that recognizing an individual feature was as effective as viewing the whole face. See Gold, Jason M., Mundy, P.J. & Tjan, B. S., "The Perception of a Face is No More than the Sum of Its Parts," *Psychological Science* (March 5, 2012)(available at http://1.usa.gov/13Ktcyp).

* * *

Next month, the Master Mediator delves deeper in the mechanics and recesses of brain processes. Our exploration includes how advocates and mediators might use recent advances in the science of memory to improve their presentations, documents and outcomes.

(For bulk reprints of this article, please call (201) 748-8789.)

Glossary

Here are some short definitions of key terms and concepts surrounding memory that are explored here, from a variety of online sources.

BRAIN AREAS

Amygdala is two almond-shaped tissues of neurons on either side of the thalamus at the lower end of the hippocampus; works with hippocampus and memory stimulation; involved in signaling stimuli such as fear, reward and other social and emotional functions.

Hippocampus derives its name from the Latin for seahorse which bears a similar shape; it is part of the limbic system with one on each side of the brain; it is located in the medial temporal lode on the edge of the cerebral cortex; it is involved in spatial navigation and the greater the volume of tissue seems to correlate with greater spatial and navigation acumen; it learns and consolidates—but does not store—new information from short-term to long-term memory; if it is damaged, there is no transfer of short term to long term and results in short attention span; it may be involved for up to three months in changing neural connections after learning;

Limbic System (paleomammalian brain) comes from Latin "limbus" for border and composed of the structures (hippocampus, anterior thalamic nuclei, septum, fornix cingulated cortex, olfactory cortex, mammillary body and amygdala) that line the edge of the cerebral cortex; thought to be involved in emotional behavior, motivation, long-term memory and olfaction.

Prefrontal Cortex is in anterior part of the brain's frontal lobes located in front of the motor and premotor areas; the situs of executive functioning of decision making, cognitive and social behavior, such as determining good and bad, prioritizing, prediction, defining goals and impulse control.

Medial Temporal Lode (MTL) is a region of the cerebral cortex located beneath the lateral fissure and is involved with emotion, retaining visual memories and comprehending language, and deriving meaning.

Perirhinal Cortex plays important role in visual recognition of complex objects and also in the formation of unconscious conceptional memories which arise in response to some overt or covert cue or trigger.

Thalamus comes from the Greek for "inner chamber," and is a symmetrical structure located between the cerebral cortex and midbrain involved in relaying sensory and motor signals, consciousness, alertness and sleep.

PROCESSES

Encoding or Acquisition: receiving, processing and combining information.

Retention or Storage: recording and retaining encoded information.

Retrieval or Recall: accessing the stored information in response to a cue or activity.

Declarative or Conscious Memory: active intent to recall, "I remember" descriptions.

Episodic or autobiographical memory: events and experiences in a person's life; remembering own past.

Explicit Memory: conscious and intentional recall of past experiences and information.

Implicit Memory: previous learning or experiences guide task without conscious awareness of the prior experiences; leads to illusion-of-truth effect where subjects are likely to rate as true those statements they have already heard previously. Operates via a different mental process than explicit memory.

Long-Term Memory: potentially unlimited duration with large storage capacity; encodes semantically by meaning. Episodic memory—what, when, and where—is part of long term.

Procedural Memory: performance of particular types of actions to guide processes usually below the level of conscious memory; automatically retrieved, such as motor skills (tying shoes) or cognitive activity (reading). Created by repetition, and is long term and implicit.

Semantic Memory: consists of all explicit memory that is not autobiographical; knowledge of historical events; recognize people. Some research that episodic memory dependent on right hemisphere and semantic memory on left side.

Sensory or Perceptual Memory: Holds sensory stimuli (sound, vision, smell, tactile and kinetic) for less than seconds; not prolonged by repetition or rehearsal. Iconic memory is visual and based upon brief storage of an image that has been seen for a short time. Echoic memory is sound.

Short-Term Memory: recall for a few seconds to a minute without rehearsal. Probably primary storage process is acoustical and to lesser extent visual.

Working Memory: holds plural pieces of transitory information for the manipulation and execution of verbal and nonverbal tasks, such as reasoning and comprehension; part of goal-directed actions; linked with learning and attention; declines with age. Not the same as short-term memory.

I hope this helps so you do not have to remember too much!

—Robert A. Creo