

The Persistence of Memory Is a Lie

By Jeffery Greb

Salvador Dali's *The Persistence of Memory* (1931) is perhaps his most famous painting (it's the one with the melting clocks), but that's not my subject here. I've used it in my title to emphasize how highly subjective and distorted our actual memories are, like the clocks in the painting. Simply put: our memories are not to be trusted. Our memories are frightfully flawed and frequently skewed to present ourselves in the best light, even as we attempt complete objectivity.

While some people have better memories than others, no one is entirely immune to the vagaries of our brains, which insist on modifying the objective into the subjective to meet the individual needs of our egos.¹ Because we trust our own memories, we also tend to trust those of others despite study after study demonstrating memory's inaccuracy. For example, police, judges, and juries still weigh eyewitness testimony as irrefutable; however, police statistics show that 20-25% of the time witnesses select a person in a line-up or photo array that police know is not a perpetrator while 75% of people freed through DNA evidence by the Innocence Project are convicted due to mistaken eyewitness testimony.² People tend to view memory like computer memory whereby files are stored in a uncorrupted state until needed and retrieved. As Dean Burnett points out, "... 'the brain is like a computer' is something you should say to many modern neuroscientists, if you enjoy watching people twitch due to barely suppressed frustration. This is because it is a very simplistic and misleading comparison..."³ It seems our brains purposefully distort reality when we use our memory. Before delving into the nature of these distortions, though, let's take a brief look at how memories are created.

Memory can be separated into two broad types: short- and long-term. Short-term memory (better called "working memory") can be very short. It focuses on what you're actually experiencing in the moment and is thus easily lost as you shift your attention. It is also very limited. In the 1950s, George Miller's experiments indicated that working memory is limited to

¹ Even the curious and well-documented case of Solomon Schereshevsky, a man who remembered everything exactly and objectively, shows how insidious our brains can be. While Schereshevsky couldn't forget a face, he remembered each permutation of a face as unique. Consequently, if you were happy when you met him, then met him later when you were sad, he could not recognize you as the same person because your face was different. See A. R. Luria (L. Solotaroff, trans.) (1968), *The Mind of a Mnemonist: A Little Book about a Vast Memory*.

² Leonard Mlodinow (2012), *Subliminal: How Your Unconscious Mind Rules Your Behavior*.

³ Dean Burnett (2016), *Idiot Brain: What Your Head Is Really Up To*.

seven items.⁴ This is one reason why telephone numbers are seven digits.⁵ In fact, working memory is limited to about four items, but humans naturally chunk items reducing their number. Burnett gives the example of the list of words "... 'smells,' 'mom,' 'cheese,' 'like,' and 'your'" is five items and difficult to remember; "[h]owever, if you were asked to remember the phrase 'Your mom smells like cheese,' that would be one item, and a possible fight with the experimenter." Using chunking, we were actually memorizing telephone numbers in two chunks (eg 555-1234 is memorized as 555 *and* 1234 – conveniently pre-chunked for us by the hyphen). Adding the area code didn't mean adding three more digits; it added one more chunk.

If we attend to something long enough in our working memory, it can become part of our long-term memory, a process called encoding. (Repeating something multiple times, like a phone number, helps us attend to it long enough to hopefully encode it correctly.) Encoding is a complex and frequently messy process. Very simply, neurons (brain cells) send the item to be remembered to the logical place in the brain (usually the hippocampus), which stores the item in synapses (the tiny spaces between neurons). Many neurons may be connected to a synapse, which, in theory, helps you find the item when you need it. Unfortunately, attaching the item to other items can also incorrectly attach other "things" to that item, thereby distorting the memory. (More on this in a moment.)

Long-term memory can be further broadly divided into semantic memory and episodic memory. The former is information we don't need to think about to use. You don't need to review your lessons about how to drive a car once you've used that information for decades (although perhaps some drivers should). Episodic memories are things that happen to you. Burnett uses the example, "Remembering the capital of France is Paris is a semantic memory, remembering the time you vomited off the Eiffel Tower is an episodic memory."

Let's pause for a moment to see some of this in action in an experiment devised by Leonard Mlodinow (op cit). "Read the following list of words, and please pay close attention: candy, sour, sugar, bitter, good, taste, tooth, nice, honey, soda, chocolate, heart, cake, eat, and pie. If you read only the first few words carefully and then skimmed the rest because you lack the patience and feel silly ... please reconsider – it is important. Please read through the list. Study it

⁴ J. S. Nicolis and I Tsuda (1985), "Chaotic dynamics of information processing: The 'magic number seven plus or minus two' revisited," in *Bulletin of Mathematical Biology*.

⁵ You used to need an operator's assistance to dial to a different area code.

for half a minute. Now cover the list so you can't see the words and keep it covered while you read the next paragraph.”

If you were someone like Schereshevsky (see fn 1), you'd have no trouble memorizing such a list and could spit it back without a problem. Mlodinow begs you to attend to the words on the list to create the conditions whereby they might be encoded to long-term memory. Now identify which of these three words appear on the list: taste, point, sweet. It could be all three, two, one, or none. Uncover the original list. How'd you do? The most frequent result is people correctly identify taste is on the list and point isn't, but many misidentify sweet as appearing on the list. This is one of those damnable distortions; there are a lot of “sweet” words on the list, but the word sweet is not one of them.

Our working memory is bombarded with sensory perceptions we must rapidly sift through while simultaneously deciding which to attend to more closely to encode into long-term memory. Consequently, gaps inevitably occur that we fill in ourselves. Hugo Münsterberg, the psychologist handpicked by Henry James to succeed him as the first chair of psychology at Harvard, fashioned a theory of memory still embraced today. He recognized that our memory mistakes come from this common origin of gap-filling and found they “include relying on our expectations and, more generally, on our belief systems and our prior knowledge. As a result, when expectations, beliefs, and prior knowledge are at odds with the actual events, our brains can be fooled” (Mlodinow, op cit).

By the time Münsterberg wrote *On the Witness Stand: Essays on Psychology and Crime* (1908), he had refined his theories, the broad strokes of which modern researchers have confirmed. Mlodinow highlights the three key points: “first, people have a good memory for the gist of events but a bad one for the details; second, when pressed for the unremembered details, even well-intentioned people making a sincere effort to be accurate will inadvertently fill in the gaps by making things up; and third, people will believe the memories they make up.”

Both Mlodinow and Burnett use John Dean's Watergate testimony as a celebrated example of this phenomenon. Dean gave damning oral testimony during the hearings detailing the events of White House meetings which he attended. His account was so detailed and precise that its veracity was generally accepted. Then it was discovered, however, that Nixon had secretly taped the meetings in question. The tapes show Dean got the gist right, but nearly all the

details (like who said what to whom) wrong. He hadn't lied; he wasn't attempting to avoid self-incrimination; he remembered inaccurately.

Dean fell prey to egocentric bias, whereby people tend to present events in a way that makes them look better. As I said, Dean wasn't trying to avoid self-incrimination; in fact, the tapes showed that he was only a minor figure in events, not the major player his oral testimony indicated. The unconscious self-aggrandizement of his role reveals Dean's egocentricity. A number of other memory biases are ego-based.⁶ Burnett summarizes them: "There's choice-supportive bias, when you remember it as being the best of all available options, even if it wasn't at the time[;] ... the self-generation effect, where you're better at recalling things that you've said than at recalling things other people have said[;] ... [and] the own-race bias, where people struggle to recall and identify people from other races than their own." Most of the effects of these biases are harmless. (Who really cares if you weren't the high school athlete you remember yourself to be?) In instances like court testimony, however, they can be downright dangerous.

As Münsterberg learned, we tend to believe our memory alterations even when confronted by other evidence. Mlodinow tells about the experiment of Emory University's Ulric Neisser, who had a group of students write about how they learned about the Challenger explosion shortly after the event. "Then, about three years later, he asked the forty-four students who were still on campus to again recall that experience. Not one of the accounts was entirely correct, and about one-quarter of them were entirely wrong. ... Many insisted their later memories were more accurate. They were reluctant to accept their earlier description of the scene, even though it was in their own handwriting. Said one, 'Yes, that's my handwriting – but I still remember it the other way!'" Most of their distortions clearly demonstrate one or more of the biases Burnett defined for us. Some added dramatic effects, like someone screaming in the hallway, which made the recollection more interesting for the listener, even though they never happened.

Why would we evolve to have such a flawed system of memory? The first and most obvious answer is that remembering the gist is "good enough." The better memory system of theoretical ancient ancestors offered them no significant survival advantage over the others. To survive to pass on your genes merely required you remember the broad strokes, not the details.

⁶ All of these, including egocentric bias, are usually entirely unconscious.

A second reason may be that it is actually advantageous, at least for our primordial ancestors, to forget some details. To vividly remember every terror of a predator attack may have incapacitated them with fear to ever go about the necessary actions again for survival. The most important take-away from the predator encounter is that they survived, not how they almost died. A perhaps subtle but significant psychological difference. We also constantly need to make decisions, so winnowing down our billions of perceptions to a manageable number to encode is helpful and efficient.

As I stated earlier, our faulty memory system largely does no harm, if we can remember the details of our memories and reminisces are mostly inaccurate. As Burnette says, “Sadly, the words ‘reliable’ and ‘accurate’ can rarely be applied to the workings of the brain, particularly for memory. The memories retrieved by the brain are sometimes comparable to a hairball coughed up by a cat, the product of a lot of alarming internal mangling.” The inaccurate elements actually become reinforced as we tell and retell these memories, and further distortions occur as we emphasize this or that detail because of our audience’s response. This is a problem if we’re called upon to identify a bank robber, less so if we’re recalling a childhood family vacation.

Given all these vagaries surrounding memory, perhaps we should lean into them and consider our memories as fictionalized accounts rather than any sort of objective truth. For personal stories and reminiscences, we should accept our deviations from reality as literary license serving the story. Johan Huizinga identifies our ability for playmaking as the source of human art and culture;⁷ Joyce Carol Oates speculates our contemplation of the grotesque as a manifestation of the sublime is the origin of art.⁸ Instead, maybe it’s the wiring of our brain’s memory system that makes us all born storytellers and story consumers, even when we’re both within our own heads. Isn’t it pretty to think so?

In any event, if you find yourself with a doctor or lawyer who doesn’t take notes of your encounters, either written or in another medium, perhaps you should get a second opinion before you make a life altering decision.

⁷ Johan Huizinga (1950), *Homo Ludens*.

⁸ Joyce Carol Oates (1994), “Afterward,” in *Haunted: Tales of the Grotesque*.