Memory Fallibility and False Memory Syndrome

There are numerous ways in which our memories are unreliable.
- False memories can be easily fabricated, sometimes by misguided therapists.
- Our real-time experience of the world is fleeting.
- Think of a vivid childhood remembrance: that memory is probably mostly, or even entirely, fake.
- Memories are constructed from imperfect perceptions filtered through our beliefs and biases.
- Over time they morph and merge.
- Our memories serve more to support our beliefs than to inform them.
- People involved in the identical experience have a different memory of what happened.

Research suggests that short-term and long-term memories may form at the same time, but the short-term memory dominates initially and then fades quickly.

Kinds of Long-term Memory:
1. **Declarative Memory** is factual knowledge stored in long-term memory and consciously recalled.
   a. **Episodic Memory** is memory of events and our own experiences (what has happened in our own lives).
   b. **Flash-bulb memory** is an unusually vivid memory of an emotionally significant event.
   c. **Semantic memory** is factual memory about the world, not specific to your own experiences.

**Procedural Memory** is more automatic and involves learning how to do motor tasks such as shooting a basketball or writing in script.

Memories are Malleable
- Each time we recall a memory we are actually reconstructing and updating it.
- We alter memories to fit our internal narratives about reality.

Some ways we mold our memories along the road:

**Fusion:**

We fuse the details of different memories, mixing them up or even combining two separate memories into one.
Confabulation:
We make stuff up!
• People with dementia tend to confabulate more because their failing memory and cognition creates more gaps to fill.
• Imagining an event is often enough to create the false memory of that event.

A memory of the imagination may over time become indistinguishable from a memory of a real event!

Many adults can be convinced that they committed a nonexistent crime after just three hours of interrogation by authorities.

Personalizing:
There is a tendency to shift memories from happening to other people to happening to ourselves.
When people discuss an event together, sharing details, they are likely to contaminate each other’s memory.

Distortion:
Memory details may simply change and become distorted.
Memories can be distorted by suggestion.
We remember the “truth status” of facts separately from the facts themselves.

False Memory Syndrome
• The construction of entirely fake memories accomplished through guided imagery, hypnosis, suggestion, and group pressure.
• Belief systems and myths have incredible cultural inertia.
• Sometimes we refer to such things as “myths”.
• Recovered memory syndrome is mostly, if not entirely, a fiction.
• We should not lead someone by putting words in his/her mouth.

The Fallibility of Perception
“Our beliefs do not sit passively in our brains waiting to be confirmed or contradicted by incoming information. Instead, they play a key role in shaping how we see the world.” - Richard Wiseman
• The act of perception is a complex, highly filtered, and active constructive process by your brain.
Optical Illusions

- We’re disconcerted by really good optical illusions because they force us to directly confront a reality we tend to ignore as we go through our daily lives.
- What we think we see is not objective; it is a process of our brains, and that process can be fooled.

Perception is Constructed

- Your real-time perceptions are not a passive recording of the outside world. Rather, they are an active construction of your brain.
- This means that there is an imperfect relationship between outside reality and the model of that reality crafted by your brain.
- Constructed perception is not optimized for accuracy but rather for functionality.
- Only a minute fraction of information from the outside world even makes it to the portions of your brain that construct your perception.

Faces in Clouds

- Visual processing is a two-way street: the basic visual information is processed up the chain as your brain constructs a meaningful image.
- Then the brain communicates back down the chain to tweak the construction so it fits better.
- If your visual association cortex thinks you are looking at an elephant, it communicates back to the primary visual cortex and says, “Hey, make that look even more like an elephant.”
- It changes what you actually see, not just how you interpret it.
- Think about your reaction when you get up in the middle of the night prior to realizing that you left your coat draped over a chair.

Now What?

- Once the brain has created a tweaked image of an object, it proceeds to assign meaning to it.
- The brain will assign an emotional significance to the image.

Animation:

- As objects move through your visual field, their images morph, and light plays across their surfaces.
- You deal with this confusion when your brain smooths it out so you see one object moving through your vision.
• By the time we see a baseball flying at our face, it might have hit us, so our brains project movement a little bit into the future to compensate for the delay in processing time.
• Does time seem to slow down for you when you’re in a crisis situation?

A Complex Process

Our brains are simultaneously processing auditory information, sensation from our bodies, vestibular information about gravity orientation and acceleration, and feedback from our muscles to tell us how we are moving.
• Our brains favor continuity and internal consistency over accuracy.
• Thus, our brains are constructing a narrative about what is happening, and making that narrative make sense to us.
• In addition, your brain will bring into account prior knowledge as well as expectations.

Glitches

We know elephants are big, so when we see a small elephant our brains tend to assume it is an elephant, and therefore it must be far away, but it could be small and close up (a miniature elephant?).
• Glitches occur when the stimulus is ambiguous or contradictory.
• We call these glitches *illusions*.

The McGurk Effect:
• When you listen to someone speak, you look at how their lips are moving, and if the sounds you hear are ambiguous, you will not only read their lips, your brain will change what you hear so that it matches how the lips appear to be moving.

Even the most basic components of your existence are actively constructed by your brain.
• Each component can be disrupted and erased, which may result in what seems to be an out-of-body experience.
• How can the disruption occur?
  • Hallucinogenic Drugs
  • Seizures
  • Virtual Reality Goggles

We should be wary of statements such as, “I know what I saw!”
• Perhaps we don’t know what we saw.
• We have a constructed memory of a constructed perception based on filtered partial sensation and altered by our knowledge and expectations.

**Attentional Blindness:**
We don’t see what we are not paying attention to, even if it happens right before our eyes.

- Selective attention test (YouTube)
- Distracted Driving: day dreaming, eating, texting, etc.

**Change Blindness:** the inability to notice changes in detail.
Eye witness experiment: A stranger walks up to a person and asks for directions. Another person walks between them carrying a door. Then the original stranger is swapped with a different person.

**Brain Glitches:**
We encounter brain glitches all the time, like mishearing what someone said, but they are usually not consequential.

- The moment we perceive something, it becomes a memory.
- The fallibility of memory and perception are a one-two punch to any hubris we may harbor about the reliability of what we think we know.

**Pareidolia:** the perception of familiar yet meaningless patterns in random stimuli or noise.

- When we “see” a bunny in a cloud, we are just imposing that pattern onto randomness.
- Sometimes the term is used to refer to other sensations, such as sound. “What did I hear you say?”
- **Apophenia** is the tendency to see illusory patterns in noisy data.

Neurologically there are two important reasons for our tendency to see patterns in noise.

1. Our brains are organized for massive parallel processing. This is an ideal arrangement for finding patterns, making associations, and sifting through large amounts of data.
2. Our perception is an active constructive process. It consists of taking an image and then quickly sifting through our catalogue of all possible matches, finding the best match, and then assigning it to the image.
“That blob looks like a horse.”

So, your brain matches it to a horse and then backfills the details to make it look even more like a horse.

This works for speech as well.

You hear sounds that your brain interprets as phonemes (parts of speech); then your brain searches through its database of phonemes and words until it finds the best match, which becomes what you hear.

While pareidolia can manifest itself in many ways, involving any of our senses, it is the human face that is the poster child for this phenomenon.

- We have an especially sensitive knack for seeing faces.
- The fusiform face area (FFA) of the visual association cortex specializes in recognizing and remembering them.
- Damage to the FFA may cause a condition known as prosopagnosia, an inability to recognize faces.

Is it any wonder that we are able to conjure up faces on the moon, on Mars, or even on watermelons?