

FORGETTING

"Forget your phone number, quickly!"



Encoding and retrieval is Influenced By:

Attention: alert focusing on material to be retained.

Stimulants: increase the level of brain chemicals that allow for more rapid learning. *Examples:* caffeine, test anxiety.

This a diminishing results / **inverted U** curve!

Depressants: block the firing of brain nerve cells & will reduce encoding and retrieval.

Encoding Failure never got in the first place

Mood congruent / State-Dependent Learning: material learned in one chemical state is best reproduced in the same state of the body at the time of learning.

Context dependent learning: setting - Smell

However as always, there is conflicting evidence

Encoding specificity principle: how you encode = how you will retrieve

Emotions: emotional involvement increases

learning. *Example:* You remember friends' birthdays and phone numbers, but you have to study to remember dates in history.

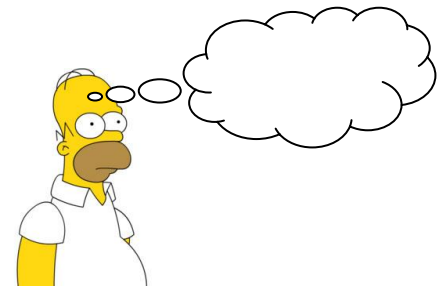
Schema: an organized and systematic approach to answering questions or solving problems.

Reconstructive memory - each time you remember something it is rebuilt according to a schema from bits of cognitive raw material, sensations, and emotions.

Misinformation - including false events into your own memory as if it happened to you **Elizabeth Loftus**

Implanting a false memory

Elaboration: the process of attaching a maximum number of associations to a basic concept or other material to be learned so that it can easily be retrieved. In other words, if you read something dull, try associating it with something important in your life





Mnemonic Devices: unusual associations made to material to aid memory. They are not logical, but can help aid memory. Example: Great Lakes = HOMES (Lakes Huron, Ontario, Michigan, Erie, and Superior)

Principle Learning / semantic learning: You focus on the main/basic idea behind what is being learned.

Positive Transfer: material in one situation transfers to that of a similar situation. Example: pilots flying simulations

Negative Transfer: previous learning task is interfering with the present one due to differences between two otherwise similar tasks. Example: driving automatic vs. stick

Storing and organization

Is our mind a big warehouse (trash can) where we just throw all of our memories and hope to find them later?
YES and NO



The newest theories involve networks. When we learn something new, we attach it to something that is already known.

So when we forget, is the information gone or just misplaced?

Forgetting: an increase in errors when trying to bring material back from memory. = **DECAY** = **extinction**

Philosophy
link

Is forgetting something that happens or is it something that does not happen?

Forgetting Curve: a graphic representation of speed and amount of forgetting that occurs. **Herman Ebbinghaus**

Recognition: the ability to pick the correct object or event from a list of choices. *Example:* multiple choice tests

Recall: the ability to bring back and integrate many specific learned details. *Example:* essay question

Interference Theory: the belief that we forget because new and old material conflict with one another. Bringing new material can cause processing difficulties if we already have somewhat similar material stored in that area.

P.O.R.N. - interference

Proactive interference blocks **O**ld blocks new

Retroactive interference blocks **N**ew blocks old

Biological Basis of Memory

Bidirectional relationship between mind and brain

New memories are linked to 2 types of changes in synapses

1. new synapses are formed between cells whose dendrites and terminals never connected before
2. communication with existing synapses may be improved
 - a. **long term potentiation** - post synaptic
 - i. more sensitive
 - b. more **"spines"** on dendrite- post synaptic



Both of these processes require proteins.

Localization vs. Distributed?

- Episodic? emotional
- Semantic? factual
- Procedural?

*In the **Hippocampus**, increased synaptic activity involves a transmitter called **glutamate**.

Librarian analogy

Acetylcholine - in Alzheimer's patients - there appears to be a deficiency with acetylcholine

- drugs that interfere with the transmission of acetylcholine have been shown to cause memory problems in mice
- **BUT**...there is little evidence that increasing acetylcholine will make people smarter
- **Alzheimer's patients show an increased ability for social contagion**

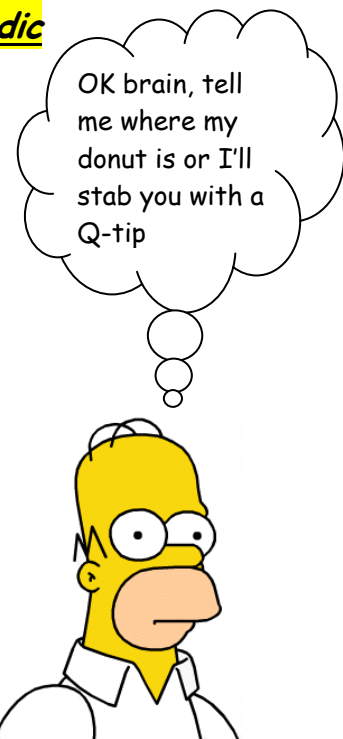
Memories need all parts of the brain but specifically:

1. **hippocampus** and connected part of the cortex - **episodic**
2. **Amygdala** for emotional memories
3. **thalamus**

- damage to these areas causes anterograde amnesia
- they can't make new episodic memories
- **BUT**, they can form procedural ones
- **H.M. (Henry Molaison)** is shown the same puzzle every day. He got faster at solving it, but he insisted he had never seen it before.

No part of the brain holds declarative memories. It seems that since memories are made of different bits of info, sound, color, words and emotions, they are spread out over the whole brain.

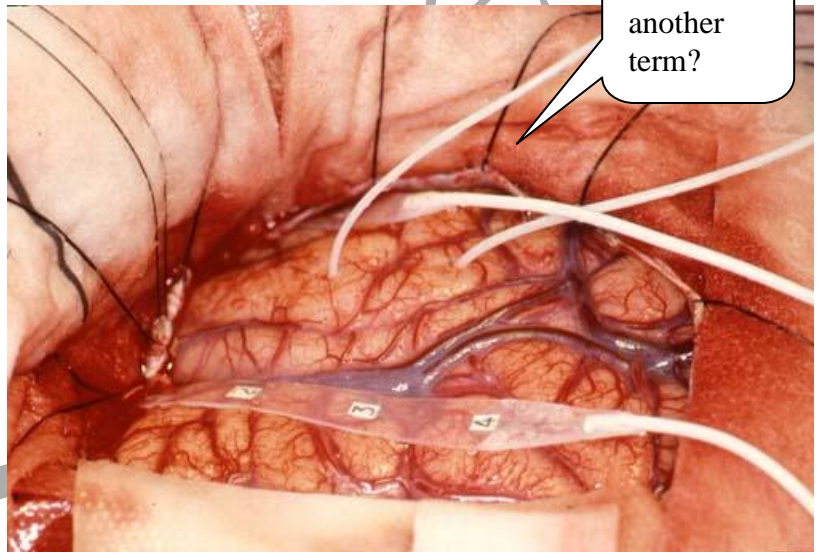
However, some research has shown that learned behaviors are



localized in the cerebellum

Mechanisms of Memory: memory is stored in some kind of physical chemical code, but we are not sure about the physical details. One theory is that nerve cells fire in certain sequences (temporal coding) and can reproduce any memory desired. As they fire in sequence, they produce what we call "thought."

Engram - physical traces of memories in the brain ~ very difficult to find episodic~ though some areas of the brain are responsible for some thoughts, memories are spread out over all parts of the brain.

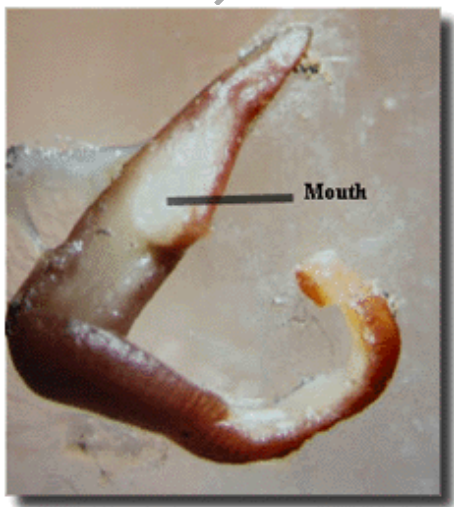


What is another term?

1940 **Wilder Penfield** was treating people with epilepsy by removing small parts of their brains. When he stimulated different parts of their brains they reported experiencing long lost memories. (They were awake during the operation, your brain has no pain receptors!)

- Problem:
1. Very rare - hard to duplicate it
 2. Memories might have been dreamlike illusions.

ETHICS!!



Flatworm Study

Ok, some sick scientists taught some worms to do a

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maze. Eventually they learned the maze. Then, the sick Hannibal-style scientists cut up the ones that learned the maze and fed them to other worms. The worms that ate worm guts who had learned the maze learned much faster than worms who did not eat their family and friends. MMM... how 'bout a nice stack of pancreas?

- Amnesia:**
1. the blocking of older memories **retrograde** amnesia
 - Going backward to mess up old stuff
 - Very common
 2. inability to make new ones. **Anterograde**
 - Rare - problem with hippocampus
 3. can't remember before age 4.7 = **infantile amnesia**
 - Brain is not mature enough to encode
 3. you don't want to remember **psychogenic amnesia**
 3. retrograde amnesia does NOT seem to affect **procedural memory**.

5. retrograde does affect **episodic** and **semantic**

Possible Causes

- *Poisoning - especially alcohol
- *A blow to the head - from aunt Jenny's mule
 - Concussions are additive!
- *Infection - both viral and bacterial
- *Temporary reduction of blood supply to the brain.
 - A. Infarct
 - B. Aneurism
 - C. Asphyxiation
 - D. suffocation

WHY DO PEOPLE FORGET?

1. Encoding- retrieval = disorganization theory
2. decay
3. interference
 - proactive - prior knowledge inhibits ability to learn new stuff
 - retroactive - new material disrupts ability to remember old stuff
4. repression - Freudian defense mechanism

5. reconstruction

Dr. Swope