Memory

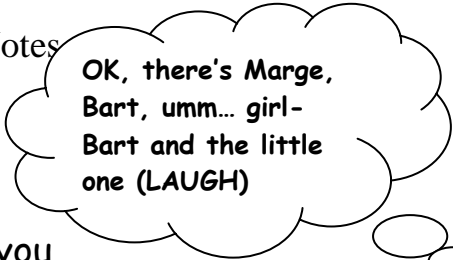OK, there's Marge, Bart, umm… girl-Bart and the little one (LAUGH)

"You cannot truly forget something if you *know* you used to know it!" - is this true?

Information Processing Model (Atkinson-Schiffrin)

VS.

Parallel Distributed Processing Model

Information processing model (3 categories of memory)
Based on how we understand or created computers
Computers do step by step, serial processing

I. Sensory memory / sensory register - Very brief ability to hold accurate representations of the world
- Computer analogy = RAM
- Cognitive analogy = consciousness

A. Echoic memory
- Ability to hear exactly what happened for 1-2 seconds

B. Iconic memory
- Ability to replay images
- Split second referee
- To smooth out the saccades?

Eidetic memory?!
Flashbulb memory?!
PTSD

Flash 12 letters on a screen for 1/20 of a second
    -Most people can only name 4
    -Can they only register 4 in short time?
    -Can they see all 12 but forget them by the time of recall?

X	H	L	O
R	W	M	A
C	Q	F	V

II. <u>Short Term Memory</u> / ==working memory== – based on a attention

- When witnesses to a crime were interviewed most could not recall details about the face of the criminal because there was a gun present.

- Types Encoding MRI evidence suggests different parts of the brain are active when we process information differently
  1. <u>Visual</u> – when taking a test, **can you remember where the answer is in your book**? ISN'T THAT ANNOYING??
  2. <u>Acoustic</u> –   evidence = tip of the tongue
  3. <u>Semantic</u> – Paraphrase, telephone game,
     - "Cultural diversity"
  4. <u>Organizational</u> – putting like with like or using a system

- **Capacity** = ==7 *plus or minus* 2== ==George Miller==
  - Can be increased by using "==**chunks**=="
  - **PHONE NUMBERS**
- **Duration** = ==20 seconds==
- **Displacement** = *REWRITING* over a memory
- **Interference** = not being able to encode due to distraction
  o Try saying the ABC's while remembering a phone number
  o ==Retroactive== - new stuff messes up old
  o ==Proactive== - old stuff messes up new
- Maintenance Rehearsal – Repeating a phone number
- Elaborative Rehearsal / effortful encoding– hmmm…

- **Serial-position curve**
  1. ==Primacy effect== - beginning
  2. ==Recency effect== - end
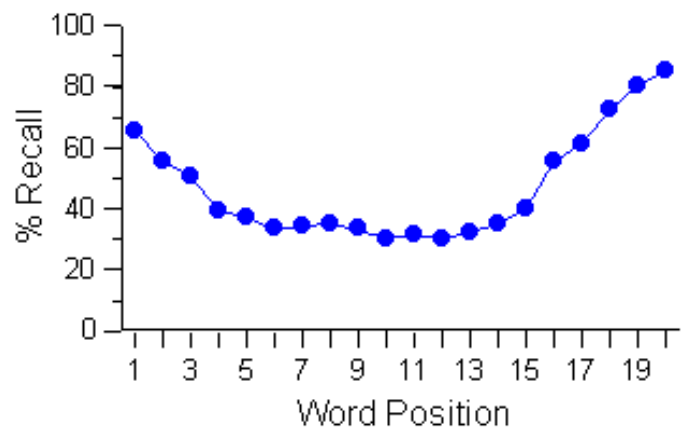
New vocabulary is **working memory** similar to computer

How do you add: **4687**   Don't you have to
                         +7835   remember the rules?

It can be **increased with practice and techniques**.

   Pretty firm ceiling
   Can raise ceiling past 7
   But easier to just use tricks

Some have more natural talent. What do you think is the upper limit? Is there one? Autistic Savants

Long Term
Would you want to remember everything? Who or what decides what gets forgotten? How is the forgetting chosen?

   <u>Visual</u> – Can you recognize your friends? Even in a costume or after a hair cut? How? What about them do you remember?

Memory consolidation - Is a process that occurs after an event *if* you work with the material

   Sleep acts to "cement" what was learned.
   R.E.M. is when synapses are strengthened

Reconsolidation – each time memories are retrieved they become vulnerable to corruption and must be rebuilt

   o Plasticity – whole brain
   o Long term potentiation – neuron by neuron

 neurons strengthens the synapses – or to put it another way –
         "neurons that fire together, wire together."

Distributed practice the opposite of cramming – encoding over a time period.

Over-learning – practicing even when there is mastery to make things implicit or automatic or procedural memory   cerebellum

Content of long term memory – what's in my mind?

A. *Procedural / implicit* – the **"How"** - cerebellum

B. *Declarative / explicit* – the **"what, where, when, who"**

    1. Episodic – personal stuff, emotional stuff

    2. Semantic - fact based stuff

        a. Schema

      a. semantic networks

          i. nodes

          ii. connections

      b. primed

Retroactive amnesia

- **Elaborative rehearsal** / **effortful encoding**– Studying to make meaning not simply repeating

  Linking with other memories = knowledge

  Making new neural connections - plasticity

  ## Mnemonics!!!

  PROBLEM: many students don't know how to study. They use maintenance rehearsal – they don't make:

      links - sound or pictures

      analogies - to what is already known

      similes - like something else

  Is this what you think of when teachers "explain"?

  - Method of Loci ancient Greek orators would visualize themselves moving through familiar locations
  - Peg Method

- 1-gun - Visualize the first item being fired from a gun
- 2-you - Visualize an association between the second thing and you
- 3-tree - Visualize the third item growing from a tree
- 4-door - Visualize the 4th item associated with a door
- 5-hive - Visualize the 5th item associated with a hive or with bees
- 6-bricks - Visualize the sixth item associated with bricks
- 7-heaven - Visualize the seventh item associated with heaven
- 8-weight - Visualize the 8th item on a weight as if you are heavy
- 9-wine - Visualize a glass containing the 9th item
- 10-hen - Visualize the 10th item associated with a chicken.

How is this similar to Watson's &
Pavlov's idea?

==Amygdala== fear
 -==hippocampus== librarian analogy

Levels of processing = the deeper things are processed, the better the
memory of it – duh!
        ==Plasticity==
        ==Long-term potentiation==
Transfer-appropriate processing = matching how you ==encode== with
information with how you try to retrieve it

OLD MODEL: Information processing – data must pass through each
level of memory
        Sensory ⟶   short term memory ⟶   long term memory

NEW MODEL: Parallel distributed processing
- Not digital - like an eco-system one thing changes another
- New memories are not filed in isolation, they fundamentally change
  the information already stored.
- Because the brain and the mind are networks several things happen at
  the same time
- Memories are stored all over the mind because there is no such thing a
  one long term memory space

Photographic Memory:
- eidetic memory – seemingly amazingly accurate recall with meaning
  and understanding
  o Very hard to find true eidetic memory
  o Usually using techniques to "cheat"

- flashbulb memory: seems to be accurate recall of visual details usually emotional stuff from the past   PTSD

Eyewitness Memory: is very bad because perception can be faulty & witnesses often either speculate or use their LTM banks to fill in details that never existed. Elizabeth Loftus

Prospective memory: memory that allows you to remember a planned action or intention at the appropriate time