

## Brain Laterization

hemisph. joined by **corpus callosum** (cut in split-brain pts.)

**Left**  
lang processing  
- Wernige?

**Right**  
Visual/spatial info



long-term potentiation:  
more you think about smthn  
better you learn/know it  
what fires together, wires  
together

**Split brain**: sides cant communicate

memory: high yield!  
flash cards!

## Limbic System

both sides of thalamus, under cerebrum  
hypothalamus, hippocampus amygdala  
emotion/memory formation

hypothalamus: homeostatsis!

**Thalamus**: relay/direct sensory info → determines what is important to pay attention 2

**hippocampus**: Store memory  
damage: no new memories (anterograde)

**Amygdala**: anger/frustration

**Hypothalamus**: controls temp/water/hunger/endocrine/SNS

## Piagets stages

## Neuroimaging

LOOK @ structure + fxn of brain

\* **Structural**: what brain looks like  
**CT scan**: cross sectional images  
**MRI**: 3D structure info  
snapshots only

\* **Functional**: what brain is doing  
**EEG**: brain activity

**fMRI**: rapid MRI consec. images  
**PET**: radioactive glucose. more glucose = more activity

<b>Sensory Motor</b>	0-2 yrs.	Coordinate senses w/ motor sense. language used some, obj. permanence developed
<b>Preoperational</b>	2-7 yrs.	Symbolic thinking + proper grammar spoken. Strong imagination + intuition, no complex thoughts. conservation developed
<b>Concrete operational</b>	7-11 yrs.	concepts attach to situations. Time space + quantity understood + can be applied, but not independent concepts
<b>Formal operational</b>	11+	Normal person, all thinking, learns + applies concepts

## Memory Storage

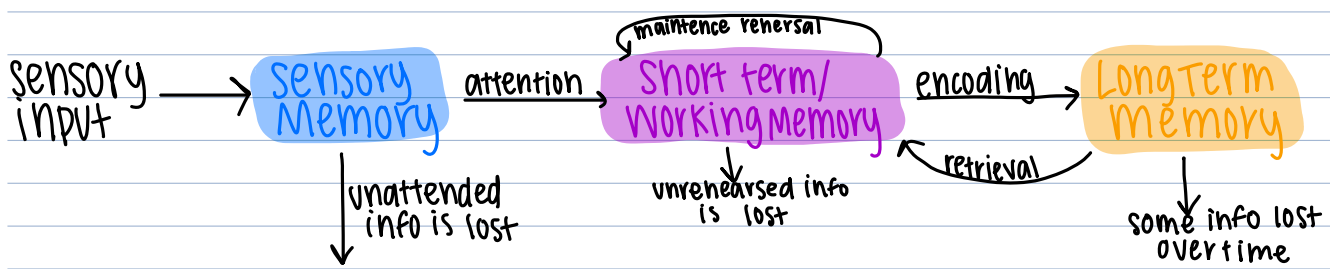
**primacy effect**: remember beginning of list better, more apparent than recency

**recency effect**: remember end of list better

**serial positioning effect**: remember beginning/end of list better

## Memory Elements

1. **Encoding**: info gathered + encoded into signals
2. **Storage**: retain info in STM/LTM
2. **Retrieval**: remember info by getting fm. storage



**Sensory memory**  
Iconic = visual  
< 1 sec  
Acoustic = auditory  
2-4 sec  
recency effect

**STM memory**  
7±2 items  
15-30 sec.  
mainly acoustic  
Primacy effect

**Long Term memory**  
unlimited storage  
Semantic  
Perminant storage

## Memory Encoding

**encoding:** process of turning sensory info into neural impulses that can be stored (?)

<b>Rehearsal</b>	repetition of info over + over again
<b>organization</b>	group info into logical categories
<b>Semantic</b>	organize info in a way that makes sense (BAPAN)
<b>chunking</b>	group info into larger chunks
<b>Dual encoding</b>	linking various sensory modalities (usu. visual + verbal)
<b>Mnemonics</b>	any technique for improving retention (BAPAN)
<b>Self-Reference</b>	making info personally relevant

→ mental visualization

## Long term memory

conscious recall

**Explicit/declarative memory**

**episodic memory**  
events you have personally experienced

**Semantic memory**  
factual info.

no conscious recall

**Implicit/nondeclarative memory**

**Procedural memory**  
HOW TO DO THINGS

## Forgetting

- info can be lost (decay) in sensory memory - never gets encoded to STM
- decay in STM if not rehearsed/encoded into LTM (large amount of info)
- displacement in STM also
- LTM: Decay, Interference, Retrieval Failure

**displacement:** STM, info gets replaced w/ very similar/related info

ex: glass vs cup  
fence vs gate, etc

## Retrieval, Interference + Other Dysfxns

each have our own network of organization, notes

ex: doctor → MCAT → study → iPad → etc.

↳ med school → UTMB → galveston → beach → sahibel → etc.

**Priming:** activating nearby nodes as attempt to reach target info

**retrieval:** finding stored info

1. **Free recall:** remember w/ no hint/cues

2. **Cued-recall:** Aid of hint/clue

3. **Recognition:** pick correct info out of a lineup (mult. choice)

4. **Relearning:** learn something again (usu. easier 2nd time)

**Interference:** other material makes it harder to encode/retrieve information

**Proactive Interference:** already learned info interferes w/ ability to learn

new info. Study ochem, then psych, then practice test + do bad on psych, but good on ochem

**Retroactive interference:** new learned info makes it hard to retrieve old learned info

<b>Source Monitoring</b>	misidentifying origin of knowledge 'where do I know them from!'
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<b>False</b>	distorted recollection of an event that did	leading cause of,
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Memories	not happen. common!!
Anterograde Amnesia	can't make new memories, remember events prior 2 accident (hippocampus!)
Retrograde Amnesia	can't recall anything B4 accident

↓ false convictions!

**Korsakoff Syndrome:** Chronic alc. usage, lead to thiamine deficiency (vitamin B1) causes memory issues

## Memory-Brain Structures

**Temporal:** Processes auditory, by ears

**Occipital:** Processes visual, back of head

**Parietal:** Processes Somatosensory info, top of head

→ sent 2 Prefrontal cortex

**Prefrontal cortex:** STM, working memory is processed, combines + Sends to hippocampus

**Hippocampus:** STM → consolidation → LTM, part of limbic system

→ sent back to resp. lobes for storage

→ **Retrieval:** memories sent back to Prefrontal cortex (working memory) for active retrieval

## Other Memory Terms

**Flashbulb memory:** ppl claim to remember every detail fm. emotional episodic memory

**Eidetic Memory:** Vividly recall images after only a few inst. of exposure w/ high precision. Not everyone has it, not adults.

**Reproductive Memory:** accurate memory retrieval, little distortion

**Prospective Memory:** remembering 2 remember to do something

**Levels of Processing:** deeper processing = longer memory trace will last

**Reminiscence Bump:** old ppl remember events fm 10ylo - 30ylo better than any other time pd.

**Practice Effects:** more exposure = better recall

**Method of Loci:** imagine walking through house, leave visual rep. of obj. to be rememb. in house, recall by walking back through house

**Peg words:** rhymes or something, a 'hook' for remembering words

## Nonassociative Learning

repeat exposure to stimulus

**habituation:** used to stimulus + ignore it

**dishabituation:** stimulus is removed, and no longer habituated. may notice stop, and likely notice start up again

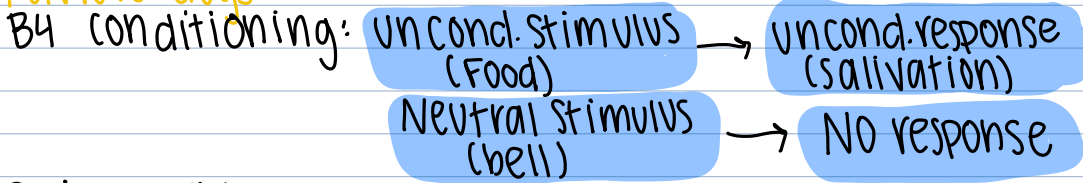
**Sensitization:** stimulus becomes more + more noticeable (barking)

**desensitization:** actively take steps to not be sensitized to stimulus anymore, tell dog to be quiet

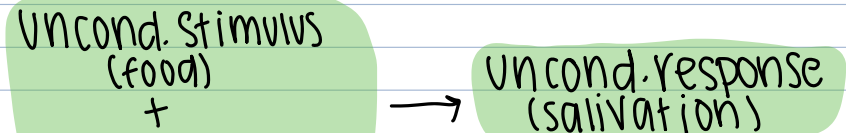
## Classical conditioning

2 stimuli paired, response to one of them changes

**PAVLOV'S DOGS**



**During conditioning:**

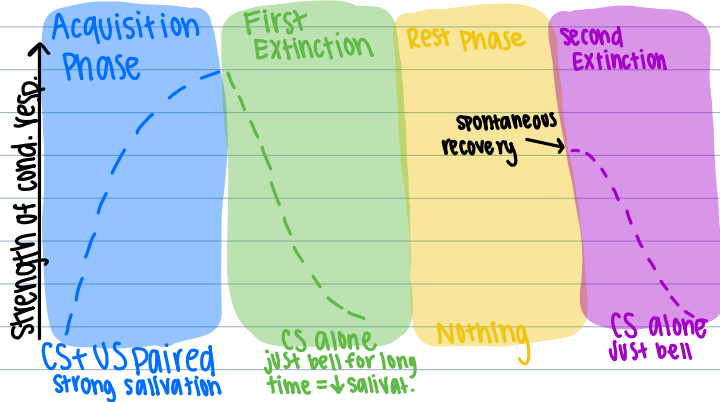


Neutral stimulus (bell)

After conditioning:

Cond. Stimulus (bell)

Cond. Response (salivation)



**Generalization:** stimuli other than og stimuli (beep) elicits conditioned response. vs. similar stimuli (beep vs bell)

**Discrimination:** ONLY the conditioned stimuli elicits a response

**Taste aversion:** When you get nauseous/sick after eating something + you learn to hate whatever you ate

- can happen after only one instance! other conditioning needs repetition
- vsu takes a long time / never extinguishes

**Operant conditioning: Reinforcement/Punishment**

**Operant conditioning** reinforcement (pleasurable consequence) and punishment (unpleasant consequence) used to mold behavior

**BF Skinner**

Skinner box, admin food/shocks  
push lever - get food or shock until lever pushed

**Reinforcement:** ↑ chances of behavior happening again

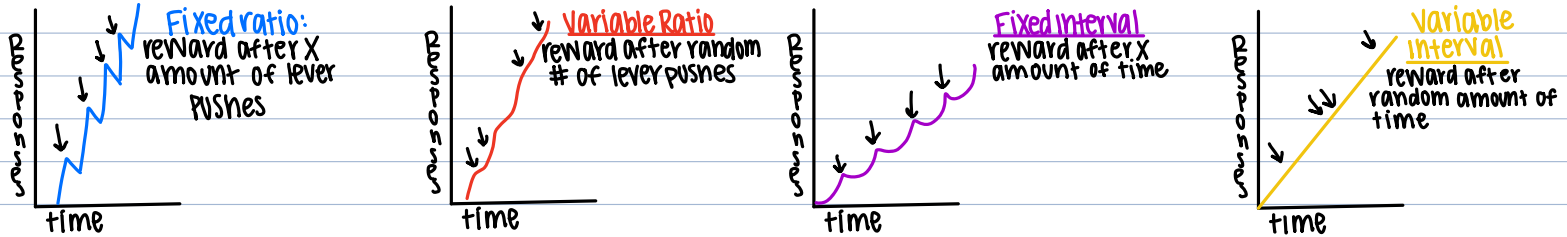
**Punishment:** ↓ Chances of behavior happening again

	Reinforcement	Punishment	↑ poss. of behavior	↓ poss. of behavior
			Reinforcement	Punishment
<b>Primary</b>	Something happens that is innately desired • food (candy) • Praise/affection	Something innately undesirable • electric shock • Spanking • Loud noises	<b>Positive</b> adds something Add something (+) to ↑ poss. of behavior • candy + finish hwk • money for chores	Add something (-) to ↓ poss. of behavior • SPANK + bad grade • Speeding ticket
<b>Secondary</b>	something that is cond. to desire • money • good grades • gold star, tokens	something conditioned to be undesirable • tickets / fines • bad grades	<b>Negative</b> takes smthn. away Remove something (-) to ↑ poss. of behavior • finish hwk = no final • good grades = no curfew	Remove something (+) to ↓ poss. of behavior • grounding + bad grades • taking phone for hitting sibling

conditioned by pairing w/ primary reinforcers

**Operant conditioning: Reinforcement Schedules**

**reinforcement schedules**



**Fixed ratio** is best for learning, even better if its **continuous** (after each behavior)

**Variable ratio** is best for **maintaining** learned behavior (slot machine)

## Other types of learning

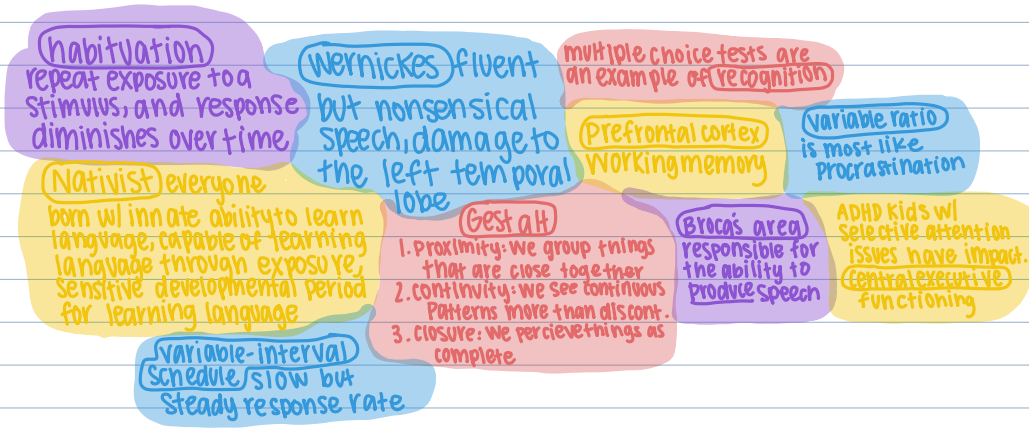
**Observational learning** person observes behavior + replicates it

**Bandura:** bobo doll aggression

**Insight learning:** solution to problem happens in a flash of insight

**Latent learning:** doesn't seem like you're learning, but when you need the learned behavior, you can do it

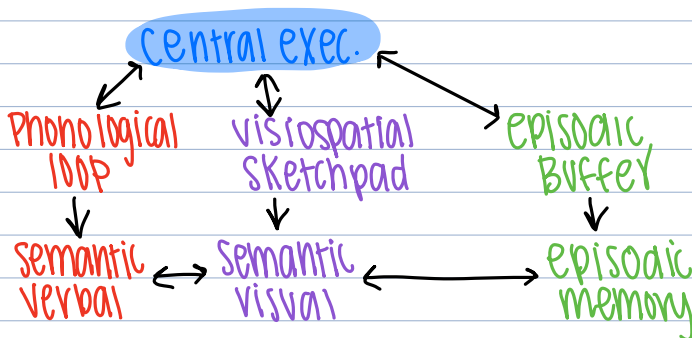
## Before class diagnostic: 60%



## Multi-store Model



## Baddeley's



Reward pathway starts in **ventral tagmental area (VTA)** and connects to **nucleus accumbens**

**Variable ratio:** addiction (gambling, slots)

**fixed ratio:** teaching

## After class

**explicit memory:** episodic + semantic (facts), conscious

**implicit memory:** procedural, unconscious

STM capacity = 5-9 item capacity, 15-30 sec duration

Variable interval: reward after random time, produces slow steady response rate

Prefrontal cortex: exec. fxn, behavioral inhibition, planning + decision making

Personal, emotional memories are just as subject to reconstruction as non-emotional memories

Korsakoff's syndrome: long term memory gaps + difficulty remembering recent events

Autobiographical memory is related to episodic memory

Elaboration: organizing info + associating it with info already in LTM, helps keep things in LTM

Pre conventional	6 yrs	reward/punishment self-interest
Conventional	6-11 yrs.	law + orders pleasing others
Post conventional	11+ yrs.	Principles social contract