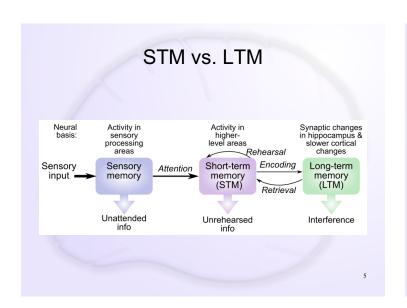
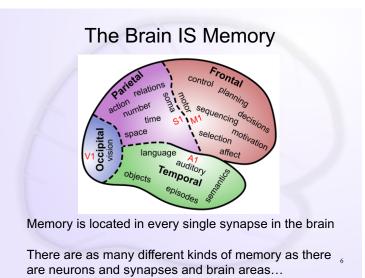


Major Types of Memory • ?

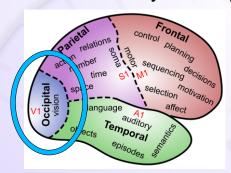
Two Neural Forms of Memory: Activation vs. Synaptic Changes Activation = Neurons continue to fire action potentials, "remembering" what you were just seeing, thinking But when firing stops.. You forget..

Major Types of Memory • Weight-based (changes in synapses) • Long lasting, persist over distraction, etc • Very high capacity • Activation-based (sustained neural firing) • Transient, easily lost • Very flexible: mental arithmetic, etc.



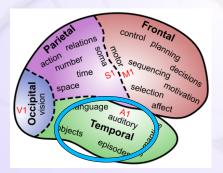


Where is Sensory Memory?



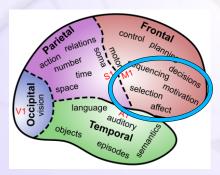
Surprise! It is just neural firing in **sensory** brain areas – those neurons just keep on firing away (briefly..)

Where is Short-Term Memory?



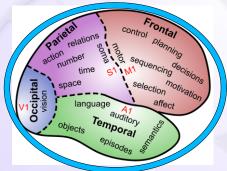
Surprise! It is neural firing in higher level brain areas that represent specific thing you're remembering – those neurons just keep on firing away (briefly..)

Where is Short-Term Memory?



Extra surprise! And it usually requires contribution from prefrontal cortex – has extra holding power to keep those neurons firing longer!

Where is Long-Term Memory?

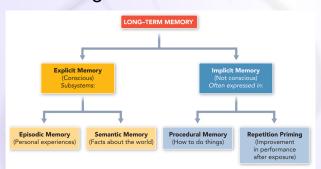


Surprise! It is in the relevant brain area(s) that encode the specific information! LTM is the sum total of all those synaptic weight changes!

Major Types of Memory

- · Episodic Memory: events, facts, etc
 - Hippocampus
- Familiarity-based recognition
 - Perirhinal cortex: you look familiar, but...
- Weight-based priming
 - Subconscious, can be very long-lasting
- Activation-based priming
 - Also subconscious, but transient..

Organization of LTM



Is this the best way to organize LTM? Can you think of any other ways?

1

Where is Long-Term Memory? "Explicit" vs. Long-Term Memory "Implicit" is unreliable distinction Episodic = hippocampus Conditioning Semantic = rest of Procedural brain (mostly) Procedural = Parietal Priming happens everywhere.. 13

Episodic Memory

- Autobiographical memory (life events)
- Arbitrary new memories (lab tasks)
-

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Classic Lab Task: AB-AC

- · Learn AB paired associates:
 - window-reason
 - bicycle-garbage

- ...

- Then AC paired associaties:
 - window-locomotive
 - bicycle-dishtowel

- ..

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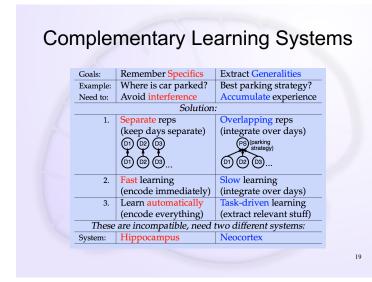
AB-AC

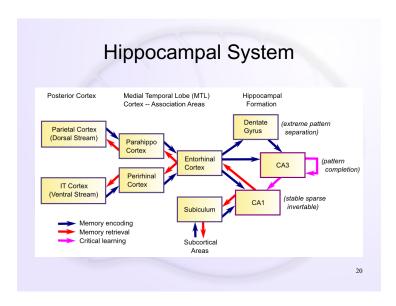
- · Test on AB list:
 - Window?
 - Bicycle ?
- · And AC list:
 - Window?
 - Bicycle ?

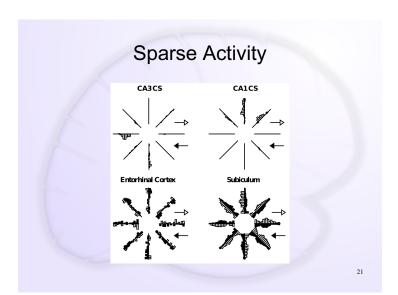
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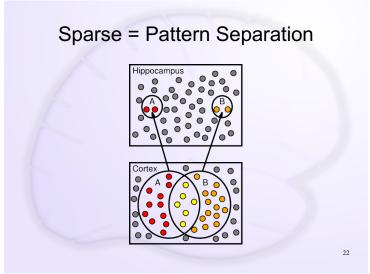
Demo AB-AC cortical model

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Hippo Project • Run hip.proj

Priming Can a brief subliminal message influence your behavior?

Two Forms of Memory

- Priming provides good window onto weight vs. activation based memories.
 - Demos: wt, act priming

More Robust Activation-Based Memory

- In Executive Function Chapter:
 - PFC robust active maintenance over secs to mins
 - BG provides dynamic gating signal for updt vs. maint
 - Used for "working memory", cognitive control..

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