

Sensory memory,
Primary memory

Today

- Sensory memory and its characteristics
- Working memory--a specific model of primary memory.

We've talked about perception. . .
how much of what you perceive and
attend to do you remember?

Example

Pick a card, any card



Concentrate.

No, really. Concentrate!



Alakazam!

I have removed your card!



The “trick”



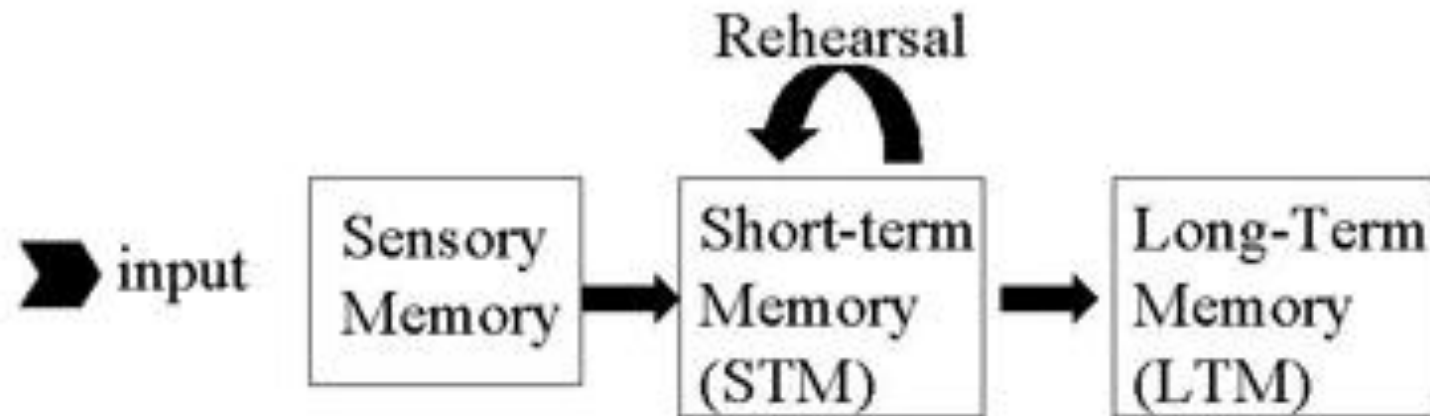
The point

This trick is based on your not remembering something that you just encoded. . . A failure of primary memory

These examples begin our study of memory—how we retain experience.

Today we'll talk about memory over very short periods of time—from 1 second to about 30 seconds.

Modal Model



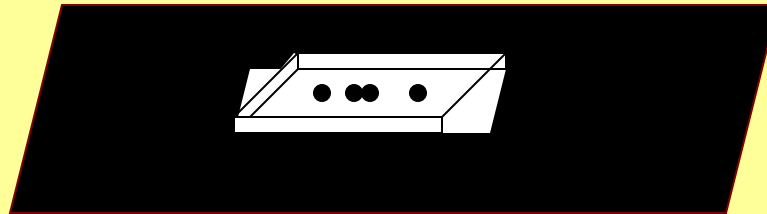
About 1 second

About 30 seconds

BUT there are caveats on both of these. . .

Early span of apprehension studies

Background: introspectionists were interested in how much information could be in consciousness at one time.



Jevons' estimate = 100 % accuracy with 5 beans or less
50% accuracy w/ nine beans

Span of apprehension

Work like this continued in the early part of the century; span estimates were always the same, but there was a nagging feeling that something was missing from these experiments.

Subject frequently said they felt that they saw more stimuli, but quickly forgot them. As they were reporting some stimuli, they were forgetting others.

Sperling to the rescue!

Report as many stimuli as possible

G 9 W X

Q P 4 0

2 N 7 Z

Report

Now try again, but I'll ask you to report only one of the rows.

L R 3 U

Y 8 F 2

C 1 D 6

Sperling 1960

A Q 6 8
T P W 1
2 Y 6 L

50 ms



Immediate
report

Subjects get
4 correct
(33% of
array)

A Q 6 8
T P W 1
2 Y 6 L

50 ms

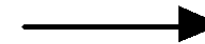


Immediate
tone cue for
which row
to report

Subjects get
3 correct
(75% of row)

A Q 6 8
T P W 1
2 Y 6 L

50 ms



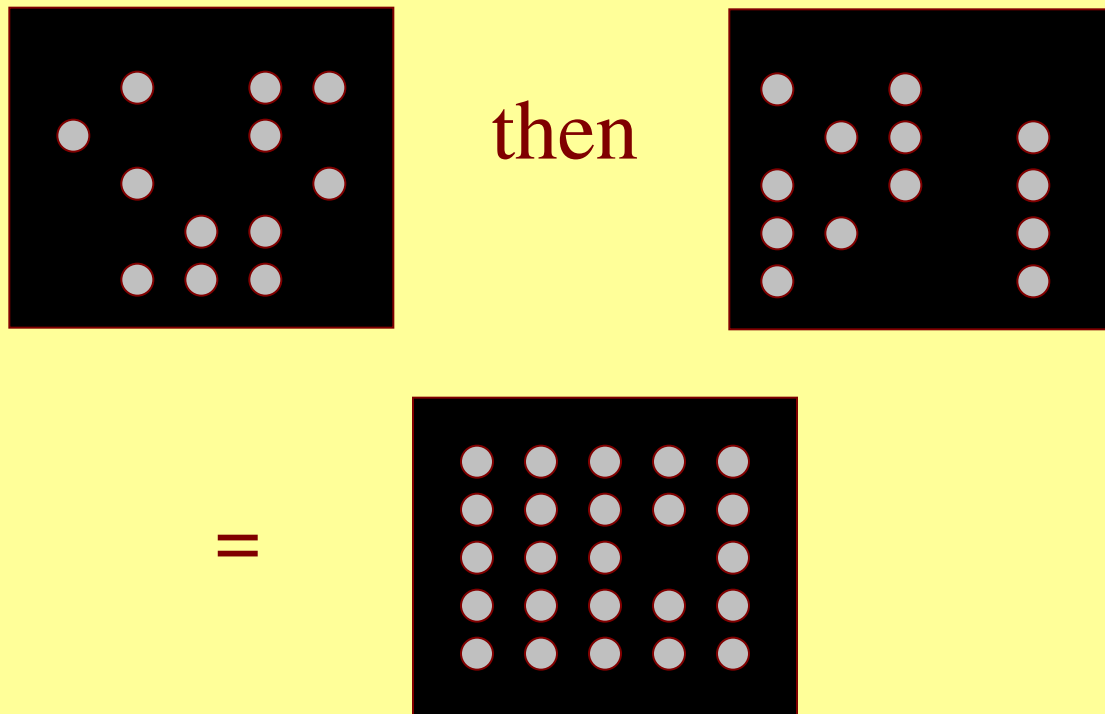
Tone cue
delayed for
1 second

Subjects get
1 correct
(25% of row)

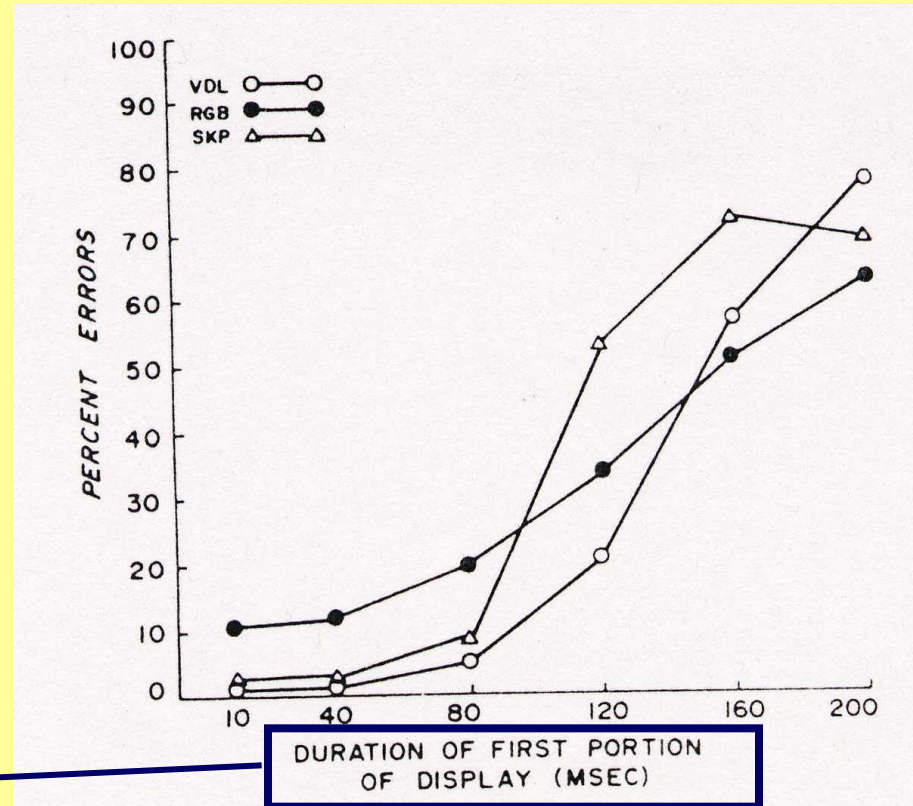
Properties of Iconic memory

- Large capacity--can be pretty accurate on arrays up to 20 characters
- Physical properties; probably little semantic.
- Lost through *decay* or *masking*

Decay actually starts when the stimulus first appears:
decay doesn't start when the stimulus disappears.

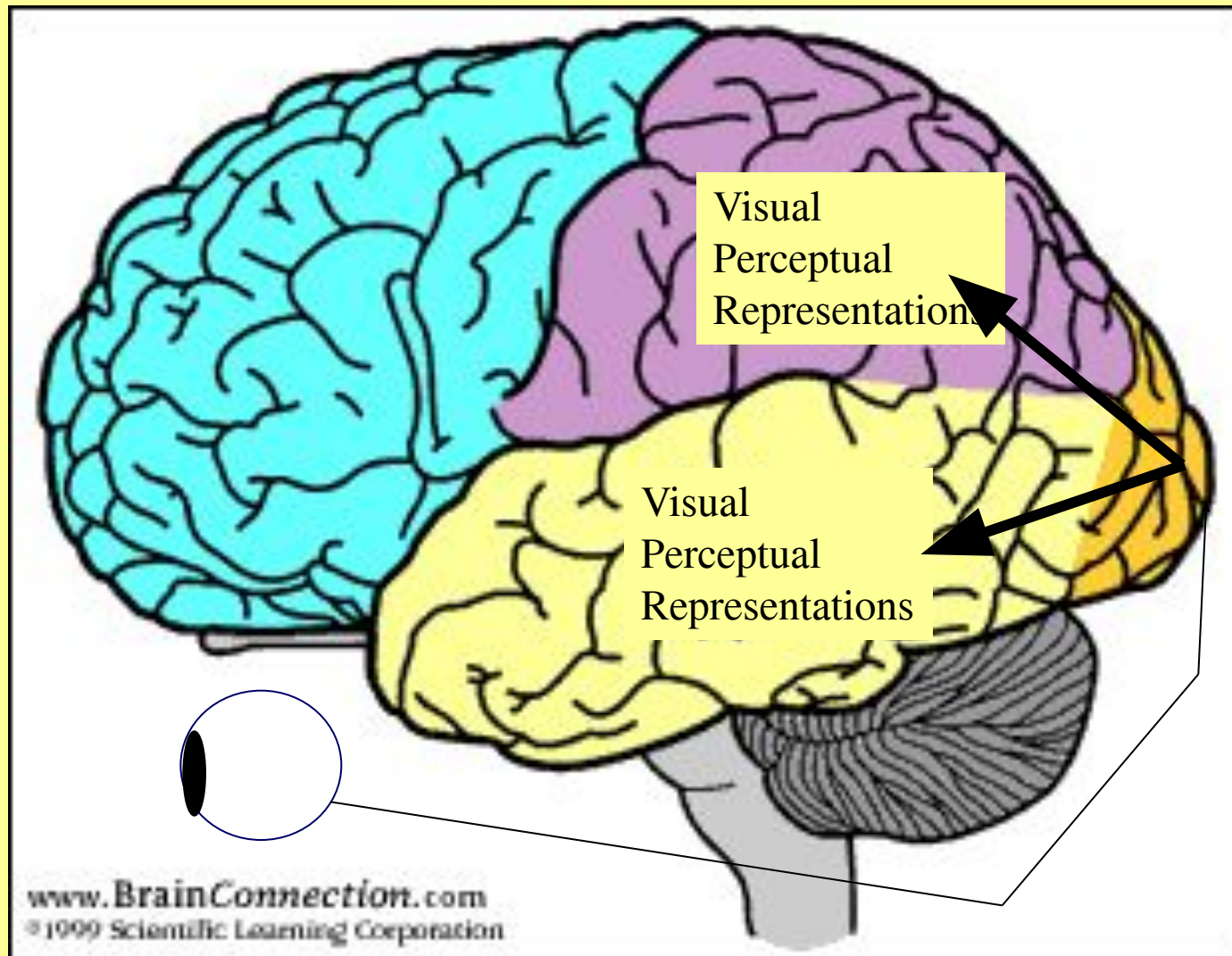


Iconic memory decays at onset of stim



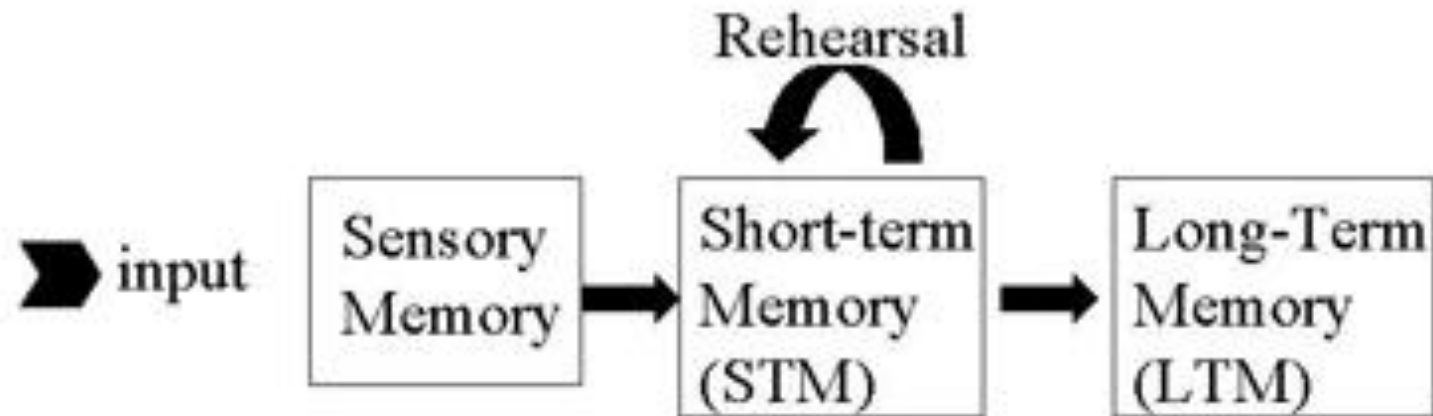
Errors increase as duration of first display increases

You might think it is sustained activation of *representations*



It is probably sustained activation of *processes*

How about primary memory?



Primary memory

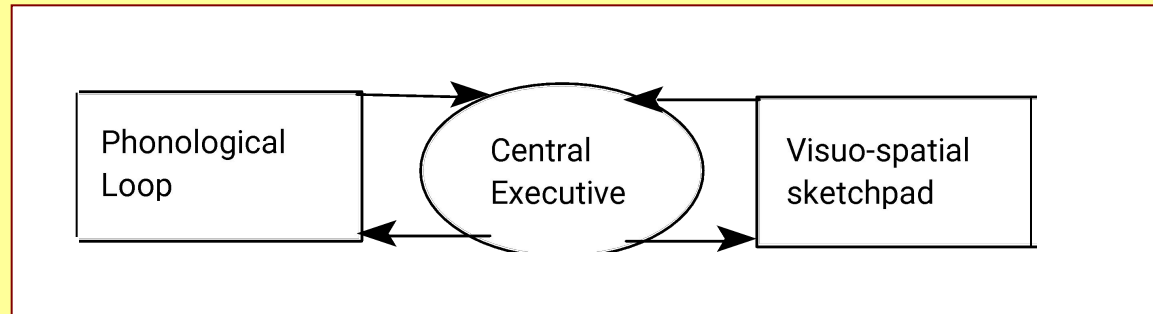
Best theory of primary memory is

The *working memory model*

This is better than short term memory from modal model (which sounds generic, but is a specific model).

The Working Memory model

Much of what we know about primary memory was inspired by a particular model of primary memory called **Working memory**

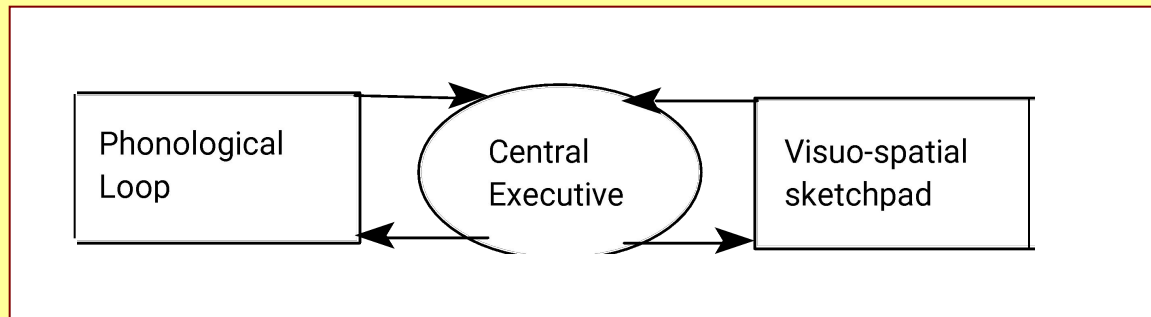


Try this:

Try to remember:

9 4 2 7 9 6 1

Most people will code this *auditorily*,
that is, in terms of sound



Phonological Loop

The **phonological loop** has two components

The **phonological store** stores about two seconds worth of auditory information.

Information can enter the phonological store from the environment.

Information can also be entered into the phonological store via the **articulatory control process**; it is literally the process of talking to yourself.

Predictions

- Since the store lasts 2 seconds, people who can talk fast have larger capacity
- Since the store lasts 2 seconds, anyone has small capacity for long words
- Since the store is auditory, you should confuse words that sound alike (cap, cat, can)
- If you busy the articulators (blah blah blah) the articulatory control process can't put anything on the phonological store, so you're forced to code the words some other way: lo and behold these effects disappear.

How else to code?

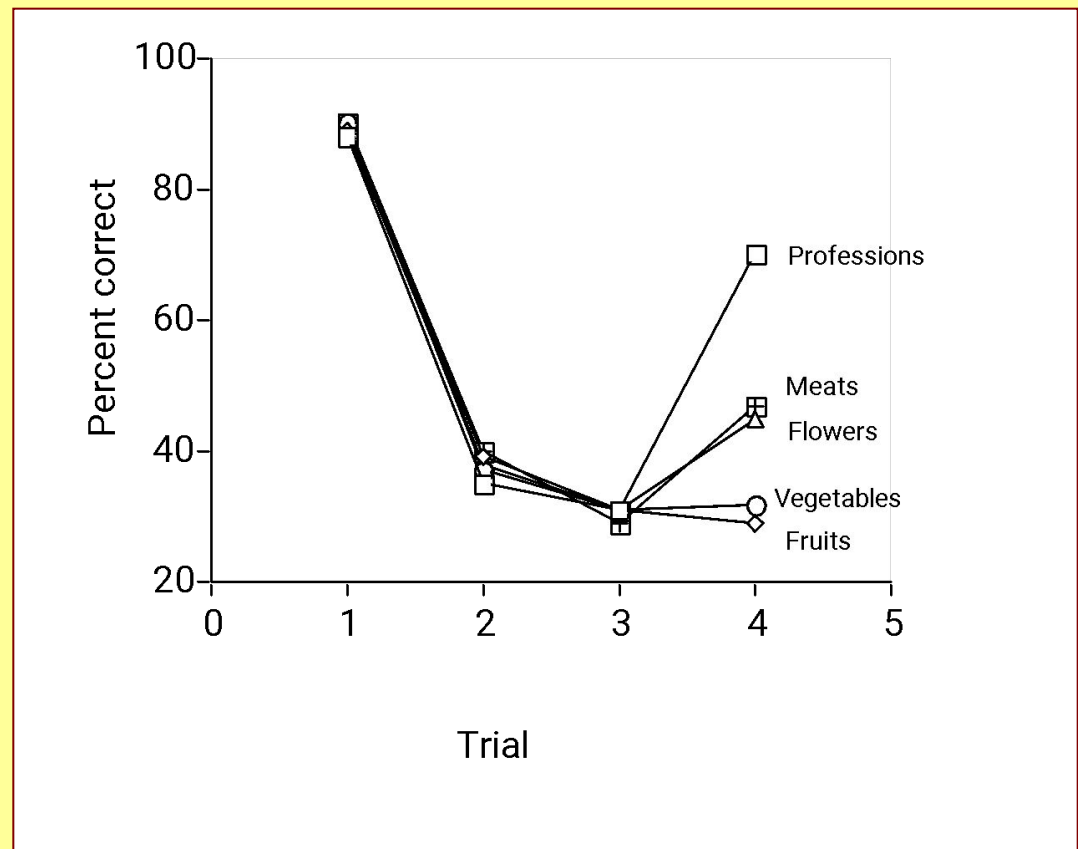
What do you do if you can't code acoustically? You can code in terms of *meaning*.

Demonstration of meaning coding

Primary memory--representation

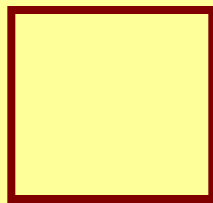
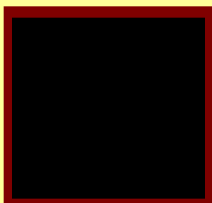
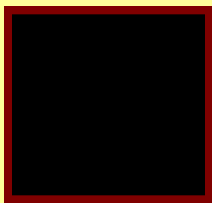
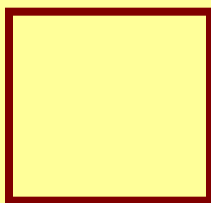
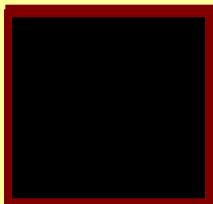
Release from proactive interference.

This result indicates that there is also a semantic code in primary memory *Note that working memory doesn't have a good account.*



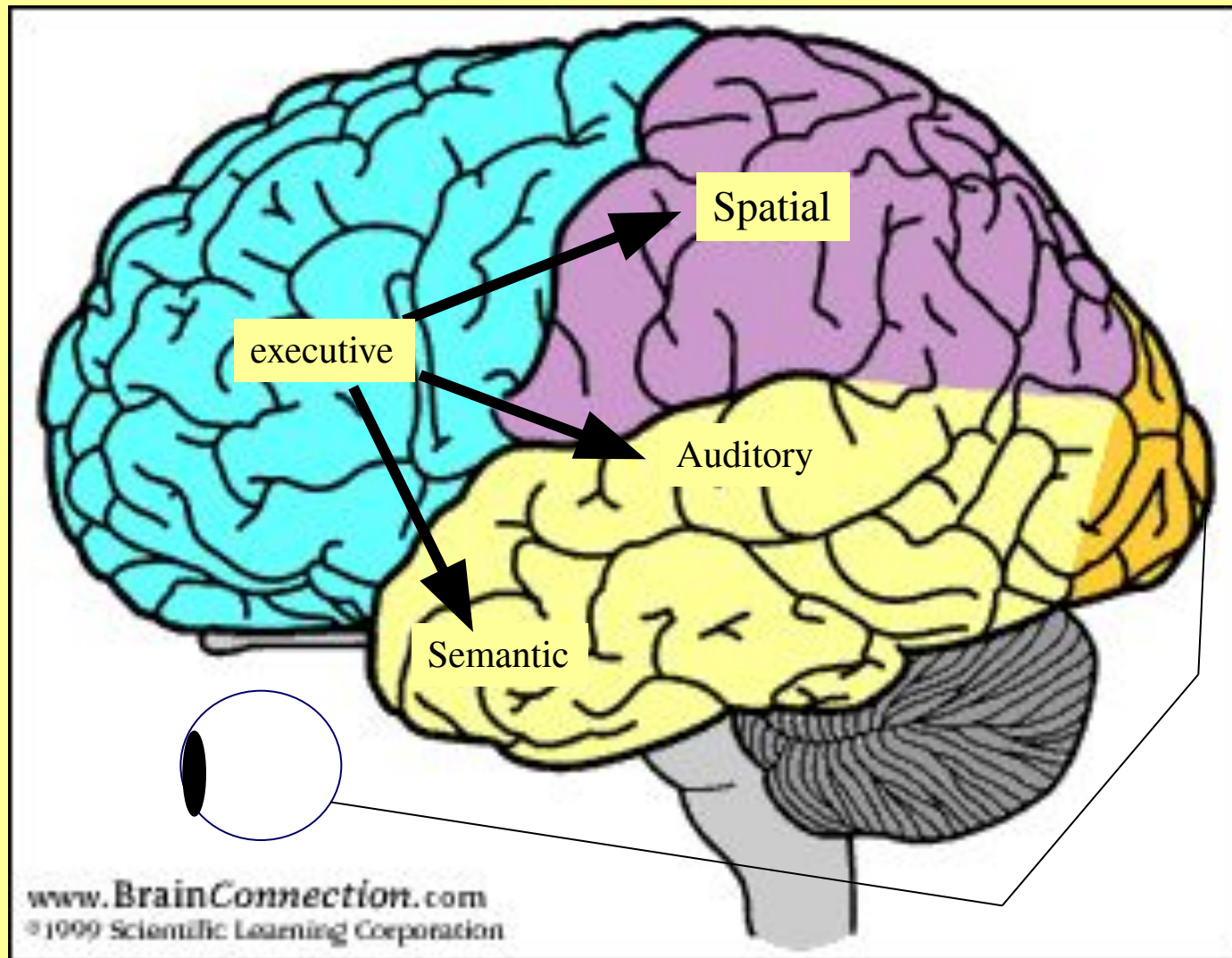
Visuo-spatial sketchpad

This is where you store visual or spatial information. It is similar to mental imagery, which we'll discuss later.



Central executive

Working memory = sustained activation of representations.



Working memory is important not only for keeping information around, but as a *staging ground* in which thought happens.

Central executive

Cognitive supervisor and/or scheduler, integrating information from multiple sources and making decisions about strategies to be used on tasks