

Week 4: Memory

Test #1 Next Class

Monday, Feb 6th

AGENDA

- Business/Housekeeping
 - Memory Encoding, Storage, Retrieval
 - Eyewitness Testimony
-
- Improving Memory
 - Test Discussion & Sample Questions

What is Memory?

- Ability to recall past learning, events, images, and ideas
- Retention of information over time
- A storage system

Brain as Information Processor

Three Domains of Memory

1. *Encoding*

2. *Storage*

3. *Retrieval*

1. ENCODING

Two Methods of Processing

1. Automatic Processing

- Requires little or no effort
- Difficult to shut off
- Space, time and frequency

2. Effortful Processing

- Remember only with effort and attention
- Level of effort varies with varying results
 - How deeply information is analyzed:
 - Shallow Processing
 - Deep Processing

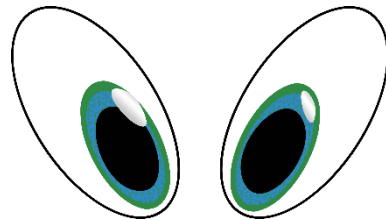
Note these processing effects:

1. Rehearsal effect
2. Next-in-line effect
3. Spacing effect
4. Serial position effect

How Information is Encoded

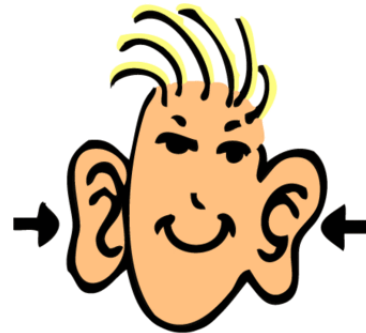
- Encoding Meaning
- Encoding Imagery

Encoding Meaning



Visual encoding

Acoustic encoding



Semantic encoding

Encoding Imagery

- Visual imagery or mental pictures
- We remember words that lend themselves to pictures better than we remember abstract, low-imagery words

Mnemonics: Encoding Aids

Specific visual and/or verbal memory aids

3 Types of Mnemonic Devices

1. *Method of Loci*

- e.g., rooms in houses or stores on street

2. *Keyword Method*

- Attach vivid imagery to important words

3. *Acronyms*

- Create a word from first letters of items to be remembered
- E.G.: HOMES used to remember Great Lakes

Organizing Information for Encoding

CHUNKING:

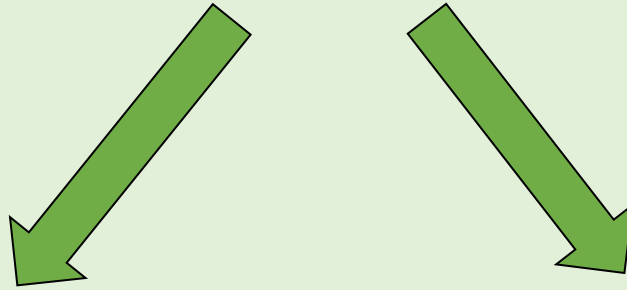
- Organizing items into familiar, meaningful, manageable units
- Often occurs automatically

HIERARCHIES:

- A system in which items are organized from general to specific (e.g. the textbook is organized hierarchically)

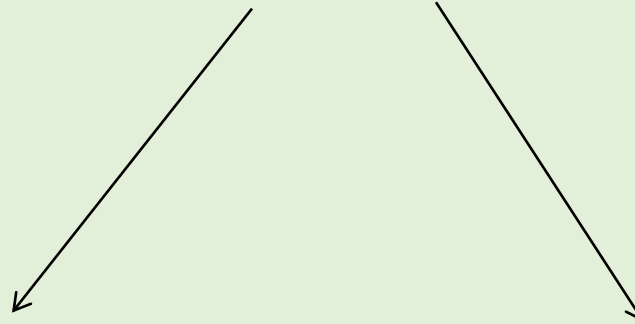
Hierarchy - Example 1

Peripheral Nervous System



Somatic NS

Autonomic NS



Sympathetic NS

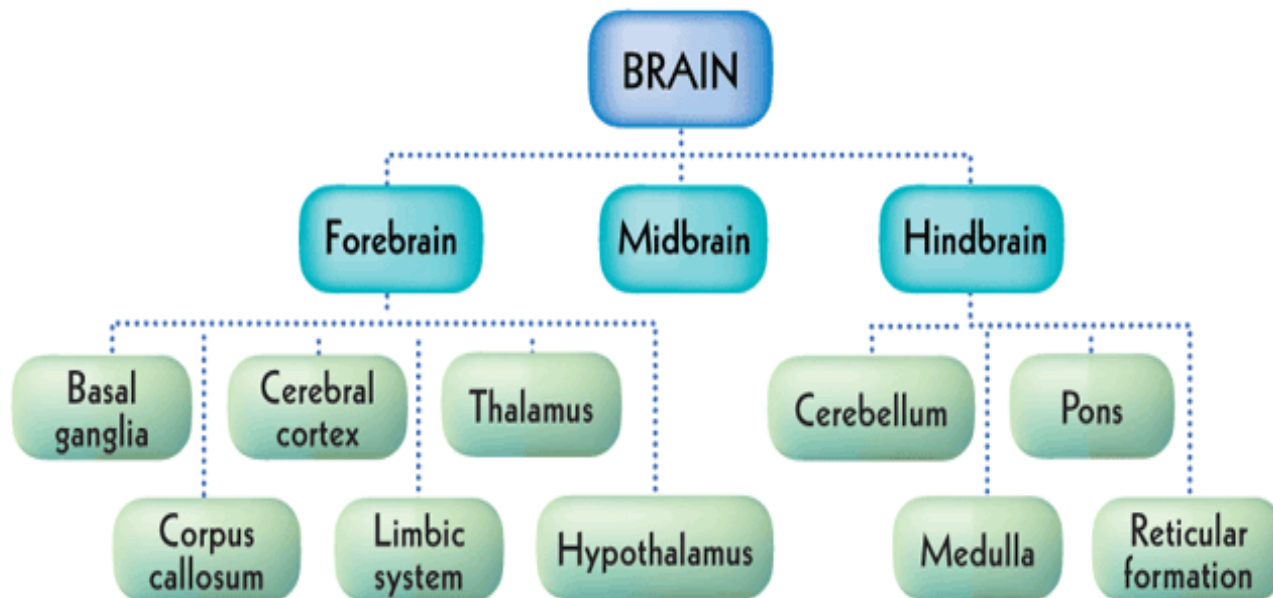
(arouses)

Parasympathetic NS

(calms)

Hierarchy - Example 2

The Brain's Main Divisions



Brain as Information Processor

Three Domains of Memory

1. Encoding

2. Storage

3. Retrieval

2. STORAGE

- Process of maintaining or keeping information readily available
- Three stages:
 - a) sensory memory
 - b) short-term memory
 - c) long-term memory

STORAGE:

a) Sensory Memory

Very brief storage area based on sensory system

Iconic memory:

- fleeting photographic memory
- doesn't last

Echoic memory:

- fleeting memory for auditory sensory images
- auditory echo disappears more slowly

STORAGE:

b) Short-Term Memory

- Also called *working memory*
- Fades quickly
- Info temporarily held for immediate, short-term use (20-30 sec)
- Addition of new information acts as interference
- Limited capacity
 - Memory Span: humans can retain about 7 items (+/- 2) in short-term memory

Short-Term Memory and Rehearsal

Maintenance rehearsal:

- repetitive review of information
- little or no interpretation

Elaborative rehearsal:

- involves repetition plus analysis

STORAGE:

c) Long-Term Memory

- A relatively permanent storage area
- Duration and capacity of long-term memory both infinite
- Our storage capacity is virtually unlimited
- Is complex...

Types of Long-Term Memory

1. Explicit (Declarative) Memory
2. Implicit (Nondeclarative) Memory

Long-Term Memory

1. Explicit (Declarative) Memory

Specific facts or events, communicated verbally

A. Episodic memory:

- Retention of information about the where and when of life's happenings (autobiographical)

B. Semantic memory:

- Person's knowledge about the world, general knowledge learned in school, fields of expertise
- Everyday knowledge: meanings of words, famous people, imp. places, common things

Long-Term Memory

2. Implicit (Nondeclarative) Memory

- Sensory perceptions rather than consciously remembering facts
 - A. *Procedural Memory:*** memory for skills
 - B. *Priming:*** activation of information already in storage to help remember new information better and faster
 - C. *Classical Conditioning:*** automatic learning of associations between stimuli

Brain as Information Processor

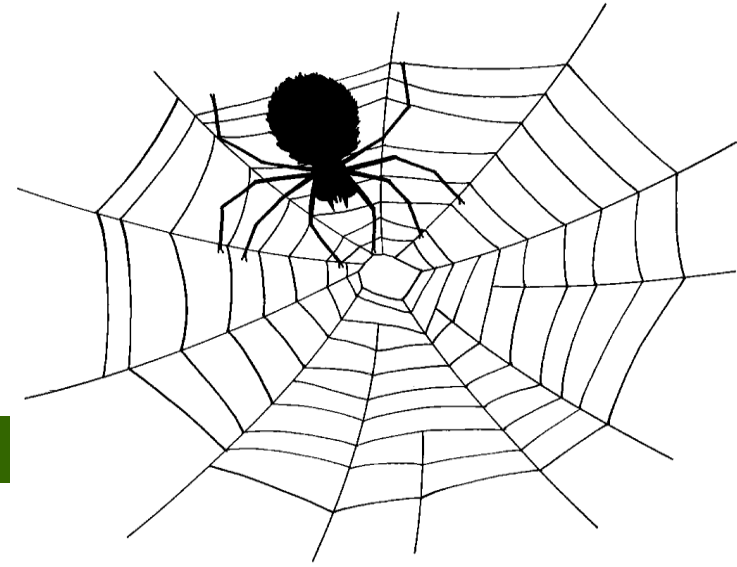
Three Domains of Memory

1. *Encoding*
2. *Storage*
3. *Retrieval*

3. RETRIEVAL

- The process by which stored information is recovered from memory
 - *Recall*
 - *Recognition*

Retrieval Cues



Priming:

- Associations often without our awareness
- “Memoryless memory”

Context Effects:

- Memory aided by putting self back in the context where one experienced something

Mood:

- Specific emotion may later prime us to recall its associated events
- *State-dependent memory*

RETRIEVAL:

Primacy and Recency Effects

- In serial position studies, participants are asked to recall a list of words
 - **Primacy Effect:** recall is high for words at the beginning of the list
 - AND
 - **Recency Effect:** recall is high for words at the end of the list

FORGETTING

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Key Causes of Forgetting

1. Encoding Failure
2. Storage Decay
3. Retrieval Failure
4. Motivated Forgetting

1. Encoding Failure

- Failed to encode the info thus never entered long-term memory
- Age
- Selective attention

Encoding failures are really cases of not noticing

2. *Storage Decay*

- Even after coding well, we forget
- Ebbinghaus: *Forgetting Curve*
 - forgetting initially rapid, then levels off with time
 - recall falls from 'perfect' to <50% w/in 20mins
- Explanations:
 - gradual fading of the physical memory trace
 - accumulation of other learnings disrupts retrieval

3. *Retrieval Failure*

- Forgetting = not memories discarded but memories unretrieved
 - e.g., “tip of the tongue” effect
- Theories of causes:
 - prob’s with the info in storage
 - effects of time
 - personal reasons
 - brain health
 - **THEORY OF INTERFERENCE:** *other info gets in the way*

3. **Retrieval Failure**

...Two Types of Interference

Proactive (*forward-acting*):

- when something learned earlier disrupts recall of something learned later
- “Pro” = “forward in time”

Retroactive (*backward-acting*):

- when material learned later disrupts retrieval of info learned earlier
- “Retro” = “backward in time”

4. Motivated Forgetting

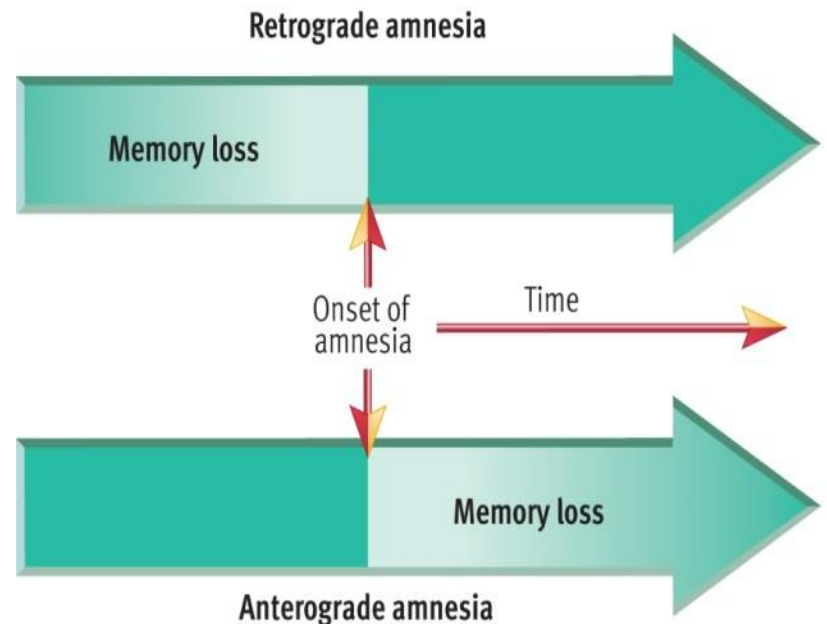
- Memories as ‘revisionist history’
- Repression (Freud)
 - When something is so painful or anxiety-laden that remembering is intolerable
 - E.g., personal trauma (victims of rape or physical abuse)

AMNESIA

- Amnesia = loss in memory
- The inability to remember information usually because of physiological trauma
- 2 types...

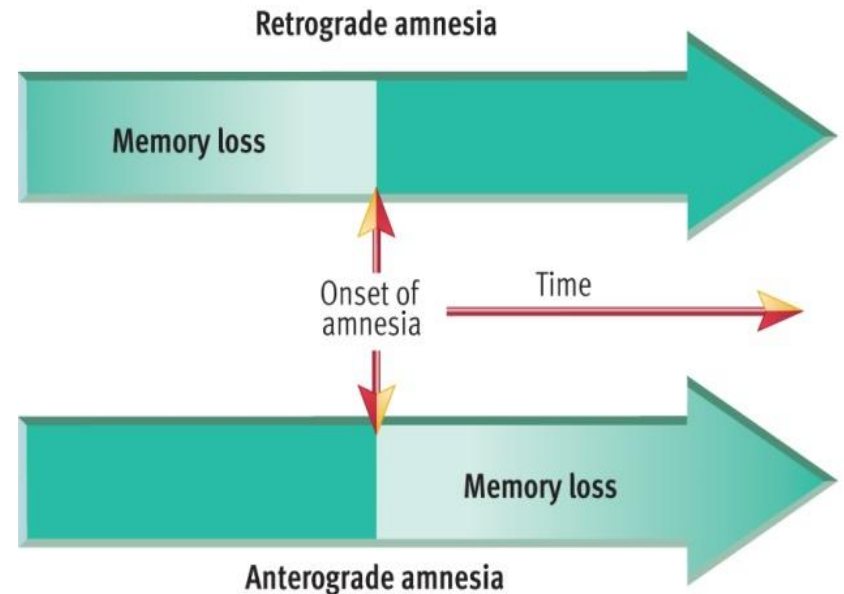
Anterograde Amnesia

- Antero – indicates amnesia that moves forward in time
- Affects retention of new information and events
- Usually injury or brain damage



Retrograde Amnesia

- Retro – indicates amnesia that moves back in time
- Involves memory loss for a segment of past, but not for new events
- Much more common
- Frequently occurs from electrical shock or physical blow



How are memories constructed?

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Memory Construction

1. *Schema:*

- preexisting mental concept or framework that helps people organize and interpret information

2. *Misinformation Effects:*

- Exposure to subtle misinformation – many people misremember
- Elizabeth Loftus conducted over 200 experiments involving more than 20,000 people
- Showed consistently how eyewitnesses similarly reconstruct their memories when questioned

Memory Construction cont'd

3. *Imagination Effects:*

- Even repeatedly imagining nonexistent actions and events can create false memories.

4. *Source Amnesia:*

- among frailest parts of memory; “Misattribution”

5. *True/False Memories:*

- Can't be sure whether memory is real by whether it “feels” real or by how persistent it is
- Real memories – more detail
- Memories from imagination more general (the ‘gist’)

Eyewitness Recall & Testimony

- If memory is a reconstructive process, then how reliable is eyewitness testimony?
- Age & developmental stage (child, older adult)
- Accuracy & confidence in memory are NOT strongly linked .. *BUT confidence is compelling*
- ‘Cognitive Interview’ technique:
 - increases accuracy in recall by about 50%

Improving Memory

1. Encoding Strategies

- Be a good time manager and planner
- Pay attention and minimize distraction
- Understand material rather than employ rote memorization
- Ask yourself questions
- Take good notes
- Use mnemonic strategies

Improving Memory

2. *Storage Strategies*

- Organize your memory
- Spread out and consolidate your learning

3. *Retrieval Strategies*

- Use good retrieval cues
- Use the PQ4R Method:

P Q 4 R

•Preview
•Question

•Read
•Reflect
•Recite
•Review

Now get to storing!

- Please store tonight's information for future retrieval and use 😊

Testable Material for TEST #1 Ends Here

**TEST: Monday, February 6th
6:30pm-8pm, SJ2 Room 1004**

6:30pm - 8pm:

PART A - Test #1

In class

8:10pm - 9:20pm:

PART B - Lecture

**Behaviourism: *Learning
& Conditioning***
*(Pavlov, Skinner, and the
squad)*

TEST #1 (in-class test)

Testable Material

- **Test #1 Content**
 - Chapters 1, 2, 3, 4, 5, 7
 - Weeks 1- 4 Lecture Material (up to and including tonight's memory content)
- Multiple Choice: Approx. 80 questions
- No aids permitted
- Bring you **watcard/ID**, pencil, eraser
- Wait outside the classroom until you are called in (both upper and lower doors will be used for entry)

Test Content

- ~**75%** of test questions will be based on material that overlaps TEXTBOOK and LECTURE
- ~**25%** of test questions will be based on
 - material in the TEXT that was NOT COVERED IN LECTURE and/or
 - material presented in class that is not in the text (this will vary from unit to unit across the term).