# Memory

Objective's for Today's Class:

- Encoding memories
- Storing memories
- Retrieving memories

1

Memory is a *constructive process* through which we actively organize and shape information.

Thinking and memory are flexible and capable of constant change…this can lead to errors.

2

Information processing model focuses on how information is cognitively organized:

- Encoding
- Storage
- Retrieval

3

## The Study of Memory

- How does information get into memory?
  - ENCODING
- How is information maintained in memory?
  - STORAGE
- How is information pulled back out of memory?
  - RETRIEVAL

4

## Encoding

- *Encoding* is the organizing of sensory information so the brain can process it.
  - This is the first step in the flow of memory
- Learners must *encode* information to store it.
  - If encoding is successful we are able to retrieve the information from *storage.*

5

## What did you say?

- Encoding requires *attention*
- Divided attention during encoding hurts performance on memory tasks, especially during retrieval.

6

## Divided Attention Exercise

- Listen to the following recipe…

7

## Do You Know the Answers?

1. How many times should you shake the shaker when making a Cosmopolitan?
   **Shake twice**
2. What type of garnish is used to finish a Cosmopolitan?
   **lime twist**
3. What type (s) of alcohol are used to make a Long Island Ice Tea?
   **gin, rum, tequila, triple sec, vodka**
4. What type of glass is a Long Island Ice Tea served in?
   **highball glass**

8

## Information Processing Model suggests that memory is very similar to a computer

9

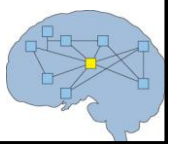
## Limitations of the information processing model

- Memories are described as literal, "hard" data stored on a computer disk or hard drive.
- But human memories are often fuzzy and fragile.
- Also, computers process one piece of data at a time ,while human memory can process a lot of information at the same time

10

## Parallel Distributed Processing (PDP)

The brain performs multiple, *parallel* operations all at once, allowing memory is spread (distributed) throughout a network of processing units



## It suggests that memory relies on how *deeply* we process information.

By adding meaning, developing organizations and associations, or relating it to things we already know, it can be stored for a lifetime.

12

# STORAGE:

## Maintaining Information in Memory

- Three-Stage Memory Model

13

## Storage

- *Storage* involves maintaining the information available in memory
  - Whenever people have access to information they no longer sense, memory is involved

14

## It's a memory when...

- Example- if you look up a phone number, go to the telephone, and dial the number then memory is involved- even if for only seconds.

15

## There are 3 Separate *Memory Stores*

- **Sensory Memory** performs the initial encoding of sensory information for a brief time, usually only a fraction of a second.
- The sensory memory recodes a complete memory of the image, but it fades too rapidly for people to "read"

16

People have a special capacity for briefly retaining relatively large amounts of information

This capacity is called the Sensory Memory

17

## Sensory Memory

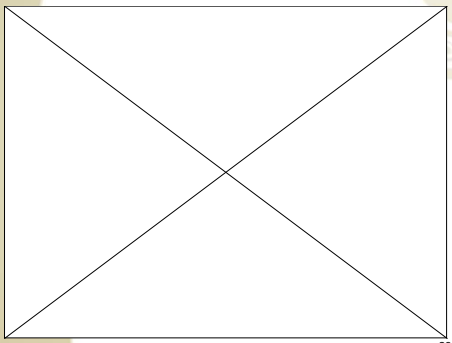
- Preserves information in its original sensory form for a brief time – usually only a fraction of second
- *Iconic Memory* is a visual icon of the original visual stimulus
  - Capacity: $4 \pm 2$ bits of info
- *Echoic Memory* is the auditory sensory memory
  - Capacity: about 6 bits of info

18

## Test Your Sensory Memory!

| | | | |
|---|---|---|---|
| F | P | W | J |
| Y | K | M | A |
| R | Z | O | F |
| E | A | B | Q |
| X | C | S | N |

19



20

## Working memory is where active thinking occurs.

- Computing solutions to math problems
- Allows you to comprehend what you are reading
- Figure out the meaning of what has just been said to your in a conversation.

21

## The working memory has many limitations

- Short-term (working) memory is a limited-capacity store that can maintain unrehearsed information up to 30 seconds
- Capacity:
  - **"The magic number"** (George Miller)
  - Humans have the ability to retain 7 ± 2 items of information (in adults).

22

## Why is it that…?

- Phone numbers are 7 digits?
- Social security numbers are 9 digits?
- Commercials use words in the phone numbers?

23

- People can group information in ways to expand their short-term memory capacity called "Chunking."
  - "Chunking" allows for easier encoding

24

## How could you chunk these examples?

1 8 0 0 2 2 5 5 2 8 8

1-8 0 0-2 2 5-5 2 8 8
1-800-CALL-ATT

C B S I R S M T V P B S D M V

C B S  I R S  M T V  P B S  D M V

1-4-9-2-1-7-7-6-1-9-9-9-2-0-0-5

1492-1776-1999-2005

25

## How long can this information stay in STM?

- Memories disappear unless:
  - You continually rehearse them
  - They are really meaningful so they get stored quickly into long-term memory
- *Rehearsal*:
  - The process of repetitively verbalizing or thinking about information

26

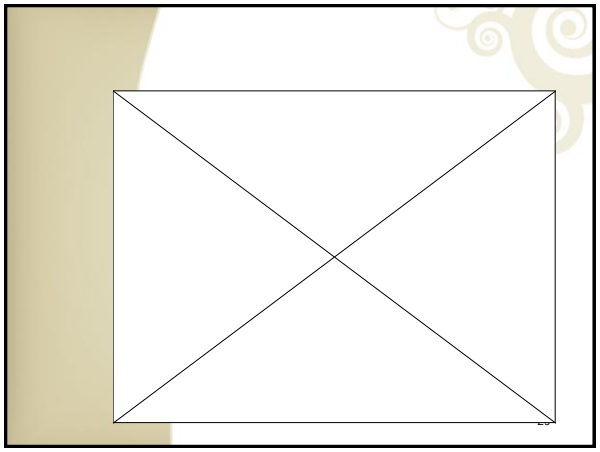
## What do you remember?

27

## Long Term Memory

- An unlimited capacity store that can hold information over length periods of time
  - Capacity: Unlimited
  - Duration: Relatively permanent
- Information can be stored in separate units and some information can be retrieved without retrieving others
  - Tip of the tongue phenomenon (temporarily inaccessible)

28



## Next class

How Do We Get Information Out of Memory?

RETRIEVAL

Ch.7-Memory

30