

LONG-TERM MEMORY



What is LTM?

- Contains our memory for experiences and information that has accumulated over a lifetime



Long Term Memory

Declarative

Procedural

Episodic

Semantic

When did
you last
ride a bike?

What is a
bike?

How do
you ride a
bike?

ENCODING IN LTM

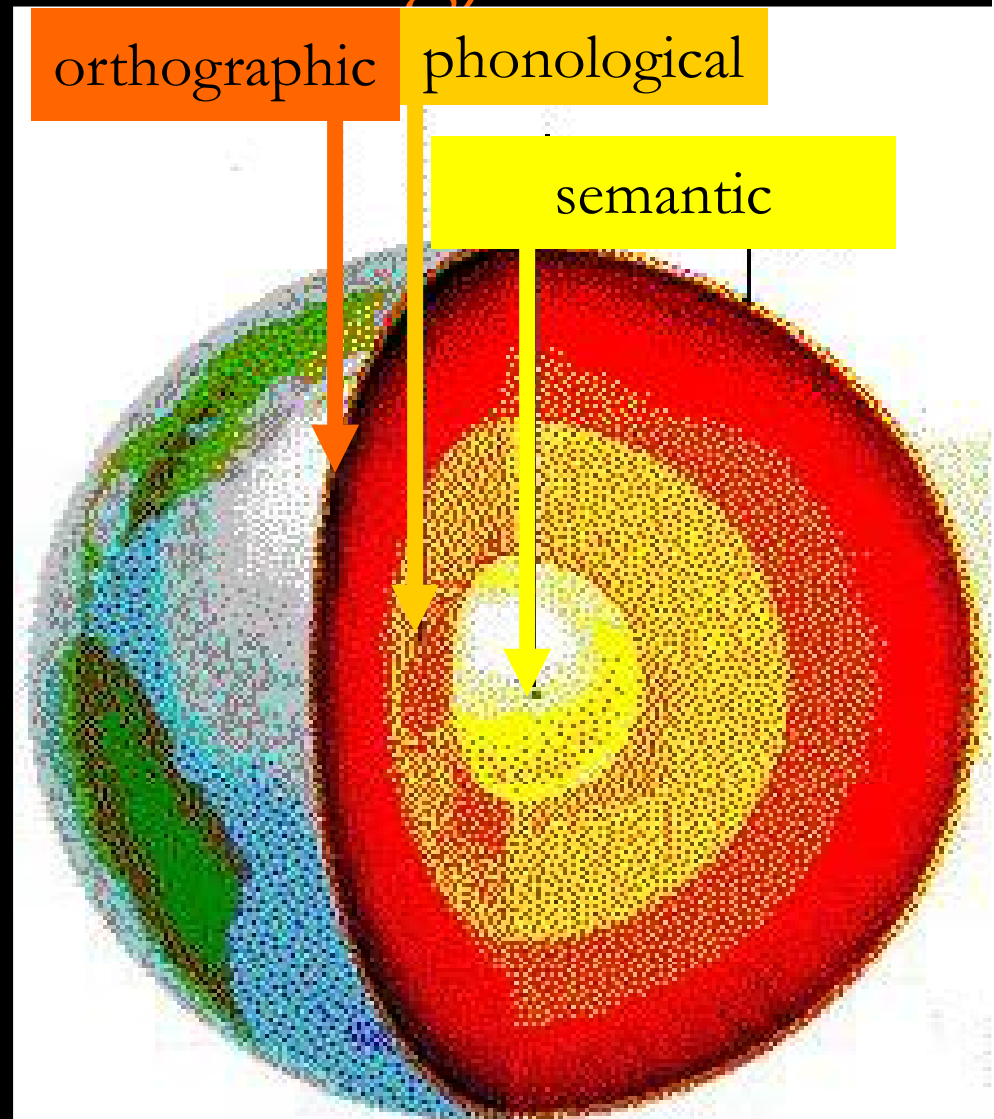
LOP (Levels of Processing)

- Deep meaningful kinds of information processing lead to more permanent retention than shallow processing



LOP (Levels of Processing)

- Stimulus information is processed at multiple levels simultaneously depending upon its characteristics.
- The "deeper" the processing, the more that will be remembered



Orthographic Processing

- Processing only superficial visual characteristics of a piece of information
- Examples:
 - Does “PREY” contain the letter “e”? YES or NO
 - Is “BUTTER” written in all capital letters? YES or NO
 - Is “*Table*” written in italics? YES or NO

Phonological Processing

- Processing only superficial acoustic characteristics of a piece of information
- Examples:
 - Does “small” rhyme with “hall”? YES or NO
 - Does “say” rhyme with “day”? YES or NO

Semantic Processing

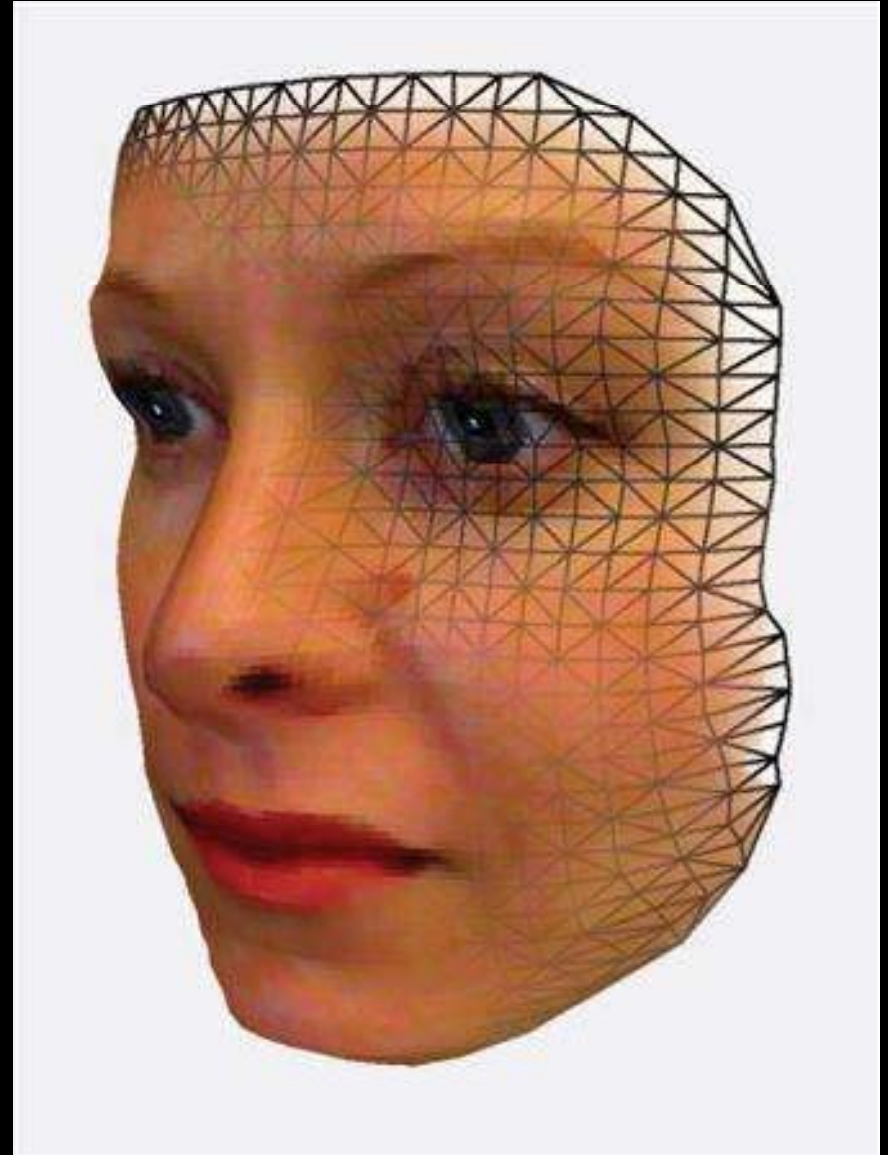
- Processing the meaning of a piece of information leads to deeper more *distinctive* and more *elaborate* processing.
 - Relating the information to your long term memory, and focusing on the meaning

The Self-Reference Effect

- Relating information to yourself helps you remember better.
 - Tends to encourage deeper processing
 - Rich set of cues that are related to the self

Memory for Faces

- Engaging in deeper level of processing in learning a person's face, helps recognize the face later.
 - Focusing on distinctive features in the face
 - Engaging semantics



Encoding Specificity (Context Effect)

- Retrieving something successfully from memory requires a match between how the information was originally encoded and the information available when trying to retrieve the memory



Encoding Specificity (Context Effect)

- Geiselman and Glenny (1977)
 - Visually presented words
 - Imagine being spoken by male or female voice
 - Recognition: words read by a female or male voice
 - Results:
 - Better memory if gender of voice in encoding and retrieval matches.

Levels of Processing vs. Context Effects

- Encoding specificity effects can override levels of processing effects
 - Depending on the testing environment deeper processing may not give you the best results all the time.
 - Better match between encoding and retrieval is the key.

Emotions, Mood and Memory

- *Emotion*: given in reaction to a specific stimuli
- *Mood*: more general and long-lasting state
 - Take out a piece of paper, make 3 columns from 1 to 10
 - List colors, fruits and friends from college
 - On a separate piece of paper, put these lists in alphabetic order
 - On the second list, give rankings to items: 1 is most favorite
 - Now transfer these ratings to your first list

The Pollyanna Principle

- Pleasant material is processed more efficiently and more accurately, and also remembered better.
- Experiment:
 - Learn a list of words. Pleasant, neutral, unpleasant
 - Delay: minutes or months
 - Results: Pleasant items are remembered better, particularly if the delay is longer.

The Pollyanna Principle

- Neutral material that is *associated* with pleasant stimuli is remembered better
- Experiment:
 - Violent movie and non-violent movie
 - 2 commercials inserted in these movies
 - Results: better memory for the brand name if it is in a non-violent movie.

The Pollyanna Principle

- Faster recall for pleasant stimuli.
 - Pleasant items seem to be stored more accessibly in memory
 - Did you list your favorite colors and fruits first?

The Pollyanna Principle

- Unpleasant memories fade faster.
 - Diary studies show us that pleasant information is better retained.
 - People with a tendency toward depression do not show this effect.

Mood Congruence

- Better memory for material that is congruent with the persons current mood.
 - You remember pleasant things when you are happy

Mood Dependent Memory

- More likely to remember material if you mood during retrieval matches your mood in encoding

RETRIEVAL IN LTM

Explicit vs. Implicit

- **Explicit Memory Task:**
 - Subject is instructed to remember the information
 - Subjects know their memory is tested
 - Requires intentional retrieval
 - Example tasks:
 - Recall
 - Recognition

Explicit vs. Implicit

- **Implicit Memory Task:**
 - Subject is NOT instructed to remember the information
 - Subjects do not know their memory is tested
 - Requires indirect retrieval, no conscious effort
 - Example tasks:
 - Word completion
 - Priming

Explicit vs. Implicit

- Performance is better when tested with implicit tests
 - Memory for abstract shapes
 - Memory for information registered under anesthesia
- Levels of Processing effects disappear with implicit tests

Amnesia

- Retrograde amnesia
 - Memory loss for events *before* the damage
- Anterograde amnesia
 - Memory loss for events *after* the damage

Anterograde Amnesia

- The infamous H.M.
 - Part of temporal lobe and hippocampus removed to cure epilepsy
 - Very poor performance on explicit memory tests
 - Close-to-normal performance in implicit memory tests

Expertise



- Consistently superior performance on a set of tasks that are relevant for a specific skill or topic, which is achieved by *deliberate practice* over a period of *at least 10 years*.

Expertise- Context Specificity



- Chess masters have outstanding memory for chess positions, but not other memory tasks
- Memory experts do not score especially high on IQ tests

Experts vs. Novices



- Well-organized knowledge structures stored in LTWM
 - Form more meaningful chunks
 - Rehearse differently
 - Better at reconstructing missing parts of information

Source Monitoring

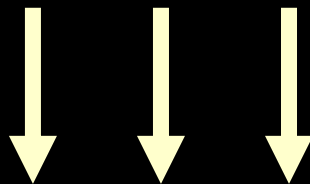
- Identifying the source of memories or beliefs.
 - Item and source memory are distinct from each other.
 - You might remember something but forget or misremember the source of that information.

Memory as a Constructive Process

- “Memory is the result of constructive processes that are prone to errors, distortions, suggestions and illusions.”
- The construction process may lead to creation of false memories.

Memory as a Constructive Process

- There is considerable research on constructive aspects of memory due to interest in:
 - Increased suggestibility of children and older adults
 - Reliability of eyewitnesses in courts
 - Reliability of memories “recovered” in therapy settings



False Memories

What are False Memories?

- Mental experiences that are mistakenly taken as real representations of past experiences.



Why Study False Memories?

- The nature of these memory errors give us information on:
 - how memory is organized
 - to what manipulations memory is vulnerable to
 - in which situations memory errs the most

The Misinformation Paradigm

– Procedure

- Witness an event
- Encounter additional (mis)information about the event
- Have memory tested on the event.

How does misinformation work?

- Source Confusion Hypothesis
 - Suggestibility effects occur when we cannot discriminate between the details from the misinformation and the details in the original event.

When are we more susceptible to misinformation?

- Aging
- Divided Attention
- Time Pressure
- Stress

Eyewitness testimony

➤ Loftus -- subjects watched a video of a car accident and then were asked “how fast was the car going when it”

- Smashed 40.8
- Collided 39.3
- Bumped 38.1
- Hit 34.0
- Contacted 31.8



Eyewitness testimony

- Leading questions may bias the estimates
- The questions may literally change the way people remember the event

Eyewitness testimony

- 1 Week subjects were later asked “did you see any broken glass”?
- Most answered “no” correctly, but
 - 32% said yes if asked “Smashed”
 - 14% said yes if asked “hit”
 - 12% said yes in control group
- The memory of the video and the question were fused together into one memory.



Viewer

THE END