Study Guide 1 - Summary Introduction To Cognitive Psychology

Introduction To Cognitive Psychology (University of Minnesota, Twin Cities)

Study Guide for Cog Midterm

1. Introduction

a. Key questions

Why is introspection not sufficient for understanding cognition?

- Reason #1 - Disagreements between different individuals, regarding different aspects of mental capacity (e.g., visual perception of gist vs. details)
- Reason #2 - Introspection accesses conscious thoughts, which are incomplete and misleading.
- Can't really ask ourselves why we think the way we think?
- How to understand thought processes:
    - Introspection
    - Do scientific experiments
- Introspection says:
    - Vision is effortless - b/c all it takes is to open your eyes
    - Memory is a slightly blurred replica of the past
    - Humans think logically owing to language and consciousness

Testing the Introspection:

- Titchener's introspection → Tells a person to say a word (book, earth) and asks them what's the first thing that comes to their mind.
- Mary Potter's Studies RSVP→ Vision is effortless - Rapid serial visual presentation → A sequence of complex images presented very fast tapping into our upper limit of the speed of visual perception.
    - Ex.) Was this image in the RSVP sequence?
    - Results: 150 milliseconds is long enough for humans to perceive complex scenes.

b. Some paradigms & Phenomena

i. Change blindness

- **Simons:** Change detection studies → when people were switched on a campus when asking for direction and they did not notice they were talking to a different person.
    - observer's inability to detect changes in scenes they are looking at directly
- Results: Vision is not automatic, efficient, or foolproof.

ii. Different efficiency of remembering scene gist and remembering details

- Mary Potter -- says vision is efficient; Gist comprehension is fast.
- Simons -- Vision is coarse; Change blindness; Visual details are hard to retain.
- **Both are right! But with respect to different aspects (gist or details) of vision.**

iii. Neglect syndrome: some unconscious processing occurs in the neglected visual space

- Stroke in the right parietal lobe
- Neglects left side of space. Ex. copies only right half of an image, eats only right half of her plate, neglects people in her left visual field.

iv. Split-brain patients: left versus right hemispheres

- Cut the corpus callosum
- Left hemisphere controls speech, right does not. When the right and left hemis are unconnected in pts with severe epilepsy this can occur:
    - **Control group:** Show word on the right and left hemisphere sees it and and they "say" why they did it -- speech controlled by left
    - **Experiment group**: Left side screen shows word and the right hemisphere sees it, but there is no communication to the left side which controls speech. And they are asked why? -- but the right hemisphere does not control speech -- in split patients there is **NO** communication between left and right hemisphere.

2. Themes

a. Key questions

- Cognition is induction (know evidence)
    - Induction is "semantic"
    - Deduction is "syntactic" -- start with general statement and then get a specific statement from that.
    - **Inductive reasoning** moves from specific instances into a generalized conclusion
    - Human Cognition is inductive
    - To solve for ambiguity (the fact that many things can have many meanings) we must add assumptions (use heuristics)
    - Assumptions may be innate or acquired
- Some cognitive processes are modular and others are non- modular/central paradigms and phenomena
    - Modular cognitive processes are:
        - **Fast & efficient, Automatic, Critical for Survival, restricted set of inputs.**
            - Playing chess? -- NOT modular
            - Creating as scientific theory? - NOT modular
            - Determining if someone is looking at you? - YES modular
            - Using sound as a cue for time of arrival? - YES modular

B. Some paradigms and phenomena

- Classical conditioning in rats is constrained by assumptions (e.g., stomach sickness is preferentially associated with taste)
    a. **The "Garcia Effect"**
        - Rats faced a problem with ambiguity
        - Rats solved this ambiguity problem with assumptions
            - Stomach illness = taste, not enviroment
            - Physical pain = enviroment, not taste

        - Assumptions are often correct, but not always.
- Children's word learning is assisted by three assumptions (know what they are and the experimental evidence) - Ellen Markman
    1. **Taxonomic assumptions**
        a. Children will relate the new word to something that looks like it rather than something that is thematically related to it.
            i. Ex.) Is this a bif? (image of spider) → more likely to relate it to a bug than spider web.
    2. **Mutual exclusivity assumptions**
        a. Children resist assigning a new label/word to an object that already has a name.
    3. **Whole object assumptions**
        a. A new label/word is associated with the entire object vs part of the object.
            i. Ex.) "Gavagai!" as the person points to the rabbit -- they dont say its the ear or leg rather it's the entire rabbit that is *Gavagai*.
- Visual perception is assisted by prior assumptions (e.g., a single source of light from above; children's gravity assumption)
    a. Using heuristics → There is a single light source that comes from above (when an image is darker at the bottom and lighter at the top.)
    b. Using Children's Gravity Heuristics → when things fall they fall straight down.
- Added assumptions may be innate or acquired
- Fodor's criteria for a cognitive module: domain specificity
    1. **Domain Specificity** → a module only processes a certain kind of information.
        a. ex.) Frog's bug detector = best responds to a specific stimuli
    2. **Innately specified** → Genetically determined, NOT learned.
    3. **Hardwired** → part of the brain is specially designed for this function
    4. **Informational encapsulation** → Only receives input from certain other modules.
        a. Ex.) Knowledge cannot overcome visual illusions (you know they are the same but it looks different)
    5. **Mandatory** → Works automatically (word meaning is processed automatically)

3. Attention

a. Key questions

i. What is the consequence of attending to a stimulus as opposed to ignoring it?

- Attention can change psychological experience even though stimuli remain the same
    - Cognition is not enslaved by external stimuli.

ii. Does attention act early, filtering information out before semantic analysis, or does it act late? (Early selection theory, late selection theory, & perceptual load theory)

- ❖ **Early Selection Model** → says that attention is the gate to subsequent brain processes.
    - ➢ Attention affects information processing at early stages of perception.
    - ➢ Generally notice the physical properties of the ignored stimuli.

- **Late Selection Model** → we do allow all sensory processing to go through the earlier processing but what attention does is that if you did not attend to it: you cannot report it.
  - ➢ Attention affects information processing at later stages such as memory or response selection
  - ➢ Some semantic (inductive) processing of ignored stimuli can still occur
- **Perceptual load theory** → Increasing the difficulty of the primary task of attended stimuli, will reduce the processing of ignored stimuli. **Leads to early filtering.**

Basically --- harder it is to attend to something the less the ignored stimuli will be processed.

→ Brain activity **low** to the ignored when attending to harder task.
→ Brain activity **high** to the ignored when attending to the easy task.

B. Some paradigms and phenomena

i. Neisser's inattentional blindness video

- Famous video of White/Black Shirt basketball players and attending to one team while a lady passes by -- most times we **ignore** the lady bc we are **attending** to the specific team.

ii. Dichotic listening and typical findings (what tends to be noticed and what tends not to be noticed from the ignored channel?)

- Two messages to different ears -- attending to one and ignore the other
  - Selective listening is easy
- What about the ignored message?
  - **Noticed:** we know that sound is present. We know the gender of the speaker. We know the change in tones.
  - **Fail to notice:** Language change (English to German), speech presented backwards, same words list repeated many many times.

iii. Inattentional blindness

- Selective Seeing: Attend to the cross and judge whether the horizontal or vertical line is longer.
  - On the 4th trial something else appears in the screen and subjects asked "did they notice anything else?"
    - 25-75% fail to notice the other object.

iv. Effects of attention on conscious perception, explicit memory, & neural activity (know evidence)

- **There is no conscious perception without attention.**
- **Memory:** Attention gates conscious memory
  - ***Rock & Gutman (1981)***
  - See shape pairs and say if they like it or not. (red and green overlap)
  - Later surprise memory test: whether they liked it or not ---> now black and whites
  - **Findings:**
    - **Can sort out attending shapes from new ones.**
    - **Cannot distinguish unattended shapes to new ones.**
- **Neural Activity:** Attention modulates brain activity
  - Uses fMRI

- Task: two pictures of faces and behind two pictures of houses and asked if the houses are the same and the faces are the same or different
- **Findings:** Higher activity when faces are attended.

v. Evidence that ignored information may also receive semantic processing

- **Sometimes ignored information is noticed, at least sometimes.**
  - **Ex. Own name effect**

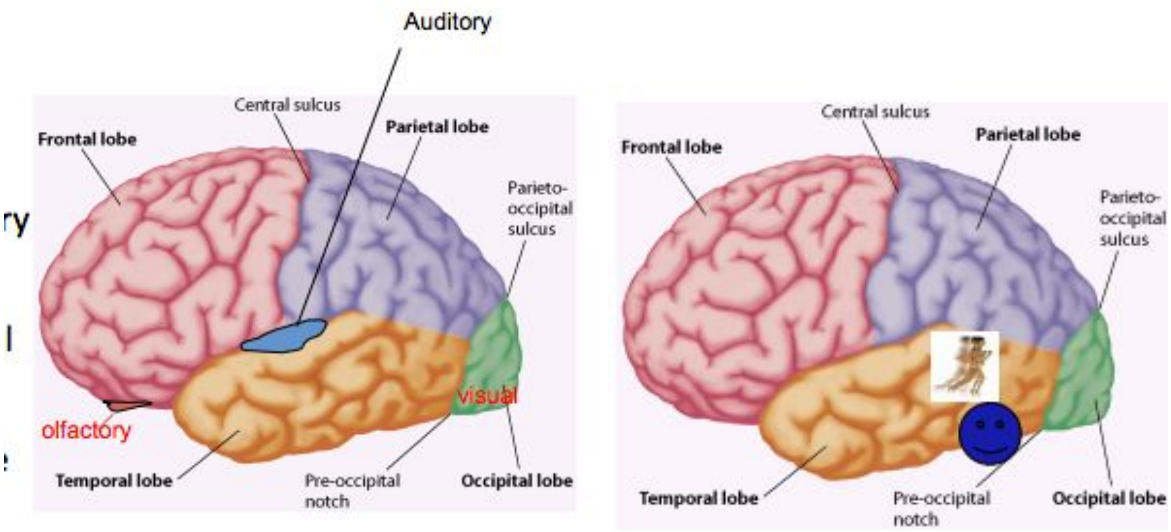
vi. Own name effect

- **Auditory:** Subject notices their own name even when not attending to it.
  - However, effect not strong.
- **Visual:** Name needs to be spelled same to be noticed. If not it goes unnoticed.

vii. Brain: be able to identify left vs. right hemispheres, front, back, top, and bottom; know the names and locations of the four lobes and their major cognitive functions

---> Brain Facts to Know:

1. 2 Hemispheres -- separated by **longitudinal fissure**
2. From side view - brain looks like a glove where the thumb is the **temporal lobe.**
3. **Auditory cortex** -- where the ears are; **Olfactory bulb** -- where nose is; But **visual cortex** -- far from eyes as possible.
4. Face-selective **fusiform gyrus** is in the **inferior temporal cortex;** motion-sensitive (MT) area is in the **middle temporal lobe.**



4. Object-based attention

a. Key questions

What does it mean that attention is object-based and what is the experimental evidence?

- Attention spreads along an object.
- Multiple features of the same object is easier to attend together.

B. Some paradigms and phenomena

i. Posner cueing task, typical findings, exogenous vs. endogenous cueing

- Space-based attention - Attention can be allocated to spatial **locations** independent to eye movement.

- Anything that is in the region is being attended to.
- Invalid cue → gives you a "hint" that is incorrect.
    - Ex.) tells you Right when the object is really on the Left
- **Exogenous (reflexive/involuntary)**
    - Peripheral cues
    - Fast (100 ms)
    - Occurs even with uninformative cues
- **Endogenous (voluntary)**
    - Engaged by central cues (words -- that tell you left or right)
    - Slower (300 ms)
    - Occurs **only** with **informative cues.**

ii. Adult behavioral evidence for object-based attention

- Attentional shifting is affected by object structure (spreading of attention along an object)
- Dividing attention b/w two properties (Features) is easier on one object than multiple.
    - Duncan -- Dividing attention b/w 2 features
        - Box: short or tall & Gap to left or right
        - Line: dotted or dashed & tilted to left or right
    - Baylis & Driver - Performance better when paying attention to the white shape vs the darker shape.

iii. Neglect syndrome & extinction (where are the brain damages; what are the typical syndromes; what's the evidence in these patients for object-based attention)

- Damage to **right parietal lobe** pts fail to perceive or respond to stimuli in their left visual field.
- Consequences: fail to dress their left side, ignore food on the left of the plate.

From *Neglect to Extinction*

- Extinction is **milder** form of neglect
    - Can see a stimulus presented on either the left or right visual field
    - However, when presented at the same time --- they **fail to notice the object closer to the left side.**
        - Competing for attention

iv. Young infants' knowledge about objects (continuity, coherence, permanence, solidity)

- Know that things that move together are parts of the same object → **Cohesion**
- Solid objects cannot pass through each other → **Solidity**
- Hidden objects continue to exist → **Permanence**
- An object cannot move from one point to another without passing through the points in between → **Continuity**

Brain

- Parietal cortex is important for -- **Spatial attention**
- Unilateral parietal damage → leads to **Neglect**

5. Lab 1: Visual Search

- *Our results indicate that in the feature search it was easier for the participants because it did not require attention. Moreover, in the conjunction search participants did poorly as the set size increased because it required more attention. Furthermore, through our data* ***we can conclude that the more attention that a visual search needs, the harder it is for the participant to succeed.***

6. Visual Search

a. Key questions

Feature integration theory

- Accounts for the difference b/w feature and conjunction search.
- Treisman says that some parts of the brain process a particular feature (Ex. orientation) and another part a different feature (ex. color).
    - Different parts of the brain handle different features of an object.
- Coded by 2 different types of map:
    - Feature maps
        - **Indicates *what* the object is.**
        - **Has NO info on location**
    - Master map of location
        - **Indicates *where* objects are**
        - **Has NO info on what the object is.**
    - **Attention connects these 2 maps together.**

B. Some paradigms & phenomena -- Evidence for the feature integration theory

- Visual search
    - **Finding a target in space**
        - Feature Integration theory
    - **Finding a target in a time series**
        - RSVP
        - Repetition blindness
        - Attentional blink
- Feature vs. conjunction search
    - **Feature search --** does NOT require attention = efficient
    - **Conjunction search --** requires attention = inefficient
- Search asymmetry
    - The presence of a feature is easier to detect than when it's absent.
        - Ex.) easier to see the line in Q than to find the one without the line or O in the midst of Q.

- Simultagnosia & illusory conjunction
    - **Illusory conjunction:** without attention, features may be incorrectly bound to location.

    - **Simultagnosia**
        - **Balint Syndrome:** patients have brain damage to **both sides of parietal lobe.**
            - See only one object at a time (usually sees the object in motion.)
                - Attention capacity is very limited
                - No difficulty with feature search.
                - Difficulty with conjunction search
                - Commit more illusory conjunction
                    - Ex.) see's orange T and green D; reports green T and orange D.
- Rapid Serial Visual Presentation
    - When shown an image to search for (pre-specified target) is easy → visual perception is FAST
    - When asked after if this was in RSVP sequence is difficult → visual memory is limited.
- Repetition blindness
    - Failure to detect repetitions of **visual** stimuli in lists presented in RSVP.
        - Occurs even when words presented in different case or location
- Attentional blink
    - When one object is detected people often fail to detect a second target (different) within the next 200-500 ms.

7. Dual-task = Multitasking

a. Key questions

- What are the sources of dual-task interference; how might practice affect dual-task interference?
    - The more resources a task draws, the more interference it causes on other tasks.
    - Interference is reduced when two tasks become more different.
    - Even very simple tasks can produce large interference
- Practical implications for driving while using cell phone
    - Driving + Cell phone: 2x as likely than driving-only to miss red light; mean rxn to red light is slowed down by 20%
    - **Interference was more during active talking than listening, but both periods showed interference.**

- Hands-free = Hand-held
- Listening to radio = driving-only

B. Some paradigms & phenomena

- General resources theory, including response selection
  - What sets the limit in multitasking?
    - General attention resources → response selector
- Competition for specific resources
  - Task-specific resources → similar tasks tend to interfere more.
    - Less interference with different tasks.
- Practice effects
  - Interference decreases, but not eliminated.
- Task switching: Is it costly?
  - Patients with **frontal lobe damage** have difficulty switching tasks
- Prefrontal lobe damage, IQ, goal neglect (Duncan's task), and the multiple demand system for attentional control
  - IQ is correlated with the number of failures in switching based on instructions.
  - Patients with **prefrontal damage** perform poorly on this task (Duncan's task).
  - **Multiple Demand system for attentional control** → a set of frontoparietal regions involved in attention, task control, and fluid intelligence.
  - **Fluid Intelligence:** The ability to learn and use the multiple rules of novel, complex behaviour is strongly correlated with fluid intelligence.
  - **Goal Neglect:** Is closely linked to task complexity; as the instructions for a new task are received, and the number of task components increases, the probability of success in adding each new component declines.
    - Failure is manifested in goal neglect.

8. Short-term vs. long-term memory

a. Key questions

i. What is the evidence that short- and long- term memories may be separate memory systems?

- Effects of Brain Damage - medial temporal lobe (MTL) is involved in converting immediate (STM) memories into LTM.

- Capacity - STM stores has limited storage capacity. LTM stores unlimited.
- Serial position effect - better at recall for beginning and last words in list.

b. Some paradigms & phenomena

i. Amnesia: anterograde vs. retrograde amnesiaHM
   a. Anterograde amnesia → Difficulty in learning **new information** (like HM).
   b. Retrograde amnesia → Inability to remember events that happened before the brain damage occurred.

c. Most people have **both.**

ii. Patient H.M.: which part of the brain is damaged, what's impaired what's preserved in behavior

- Removed bilateral (both sides) medial temporal lobe for relief of severe epilpsy.
- After surgery: severely amnesic
  - Normal intellectual ability, personality, good natured, normal conversation, mental arithmetic normal, STM normal.
  - Lost old memories, but kept really older ones
  - **Unable to learn new information**
  - **Cannot find way around new home**

iii. Medial temporal lobe

a. Damage to this part of MTL can cause amnesia.
b. MTL is involved in converting **immediate STM into LTM**
c. MTL is NOT the location of immediate STM
d. MTL is NOT the location of LTM, nor is it necessary for retrieval of LTM.

iv. Karsakoff syndrome

a. A way someone can become amnesic.
b. Severe anterograde amnesia often due to chronic alcoholism bc it leads to Thiamine B1 deficiency
c. Confabulation → reports memories of events that did not take place without the intention to deceive.

v. Digit span; chunking

- Digital span: capacity of verbal STM: recall accuracy depends on a number of digits.
  - Ex.) 3 digits -- 100% recall; 9 digits 20% recall
  - Increases systematically with age: older children rehearse faster.
- Chunking: units of verbal STM: easy to remember groups of items that have a meaning.

vi. Phonological length effect

- The longer the word, the longer it takes to articulate hence less information can be stored and recalled

vii. Serial position curve, primacy, recency, manipulations that affect primacy and recency effects

- Serial position curve:
  - Items at the beginning and end of the list are much more likely to be remembered than items in the middle of the list
- **Primacy effect = LTM**
  - We have time to rehearse the words in the **beginning.**
  - This blocks the ability to encode middle information
    - Reflects **long term memory**
- **Recency effect = STM**

    - Information is still available in STM and can be retrieved easily.
    - Words at the End of the list.
    - Newly placed into STM
- Manipulations that Affect Primacy & Recency:
    - **Negative Recency = Filled Delay effects**
        - ex. if students are forced to wait 30 sec before trying to recall a list that they have just committed to memory, the last few items on the list will not be easily recalled.
            - Don't affect primacy bc they were more rehearsed and more likely to be encoded into LTM
        - How might you prevent the **primacy effect**?
            - Doesn't affect primacy.
        - How might you prevent the **recency effect?**
            - **Affects recency**
            - Delay before recall (30 sec) -- might not be STM anymore
    - **Familiarity of words, rate of presentation**
        - Affects **primacy** not recency.
    - **Amnesic patients**
        - No primacy effect because no long term memory
        - only **recency effect**

viii. Capacity differences between STM and LTM

- STM:
    - Verbal STM is limited.
        - Each chunk affected by its complexities (word length effect)
    - Visual STM used everyday and has a limited capacity
        - Capacity is 4 items at a time. (accuracy is affected by the complexity of the items)
            - Unit of visual and verbal STM capacity is "chunk"
- LTM:
    - Verbal & Visual LTM has no limited capacity

9. Lab 2: Serial position effect

*Through this empirical information and the serial position curve we can say that l**ong term memory** helped the participants retain the first words on the list through the **primacy effect.** This effect was caused by **greater rehearsal** of words. Similarly, **short term memory** enabled them to remember the last words on the list though the **recency effect**. Whereas the words in the middle of the list were often missed because participants were trying so hard to get the first list into their memory that the middle words were forgotten.*

10. Declarative vs. nondeclarative memory

a. Key questions

- How should human memory be subdivided and what's the evidence for the division?
    - Human memory can be subdivided into **perceptual learning, affective learning**, **stimulus-response learning**, and **motor learning.**
        - **Perceptual learning** → the process by which the ability of sensory systems respond to stimuli is improved through experience
            - Recognizing broken drawings (Gollin 1960)
            - Least complete to most complete
        - **Affective Learning** → growth in feelings or emotional areas (attitude or self)
            - Melody (Johnson et. a; 1985
            - Good guy vs. bad guy based on description and appearance
            - Receiving: the learners sensitivity to the existence of stimuli
            - Responding: the learners active attention to stimuli and his/her motivations to learn, willing response or feelings/satisfaction.
            - Valuing: the learners beliefs and attitudes of worth
        - **Stimulus-response learning** → something that can elicit or evoke a physiological response in a cell, tissue, or an organism.
            - Can be internal or external
            - Conditioned eye blink response (Woodruff-Pack, 1993) → patient H.M
                - Puff of air → eye blink
                - Tone + puff of air → eye blink
                - Result: Tone → eye blink
        - **Motor learning** → The process of improving motor skills through practice, with long-lasting changes in the capability for responding
            - The cerebellum and basal nuclei play a major role in coordination
            - Mirror Tracing:
                - H.M. showed normal performance on mirror drawing - tracing a star observed through a mirror (Milner 1965)
            -

B. Some paradigms & phenomena

- Preservation of nondeclarative memory in amnesic patients (evidence)
    - Preserved at:
        - Perceptual Learning
        - Stimulus-response learning
        - Motor learning
- Amnesic patients vs. patients with amygdala damage
    - Bechara et al. (1995)
        - Random series of red, green, yellow, blue lights •
        - Blue light: loud boat horn → emotional reaction

- **Amnesic Patients:**
  - Patient WC: bilateral hippocampal damage
    - Has emotional reaction: skin conductance
    - Doesn't know blue + boat horn
- **Amygdala Damage:**
  - Patient S.M.: bilateral amygdala damage
  - No emotional reaction
  - Knows that blue + boat horn

- Declarative memory vs. nondeclarative memory
  - **Declarative Memory**
    - Explicit Memory
      - Explicitly available to conscious recollection as facts, events, specific stimuli
  - **Nondeclarative Memory**
    - Implicit Memory
      - Instances of perceptual, stimulus-response, motor learning that we are not necessarily conscious of
- Episodic memory vs. semantic memory
  - **Episodic Memory**
    - Collections of perceptions of events organized in time and identified by a particular context.
      - E.g., "When did you first hear of Eric Kaler?
  - **Semantic Memory**
    - Facts, do not include info about the context in which the facts were learned.
      - E.g., "Who is the president of the University of Minnesota?
- Word stem completion
- Semantic dementia vs. early-onset hippocampal-damage
  - **Semantic Dementia**
    - Damage to the lateral temporal lobe
    - Lateral temporal lobe is important for storing semantic information
    - Hippocampal formation and the rest of the medial temporal lobe are not affected
    - Patient A.M.:
      - Does not understand functions of commonplace objects
      - Loss of semantic information
      - Episodic memory ok.
  - **Early-onset hippocampal-damage**
    - Results in the in diminished capacity for episodic memory

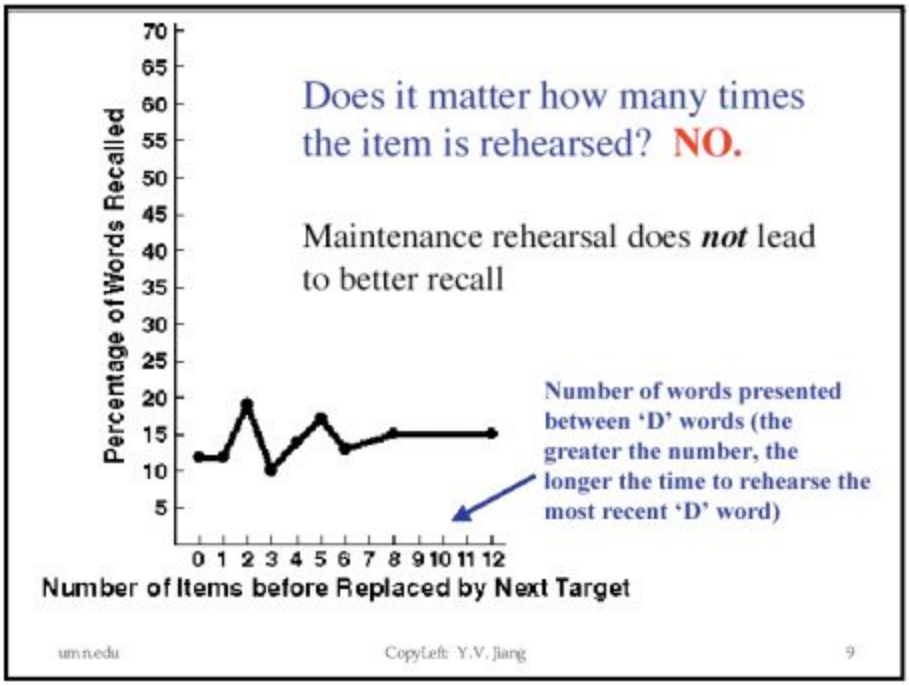
11. Encoding, retrieval & forgetting

A. Key questions

- Encoding specificity principle & levels of processing theory
  - A procedure that transforms something a person sees, hears, thinks, or feels into a memory.
    - We remember only what we have encoded
    - What we encode depends on who we are
      - Past experiences, knowledge, and needs all have a powerful influence on what we retain.

B. Some paradigms & phenomena

- Maintenance rehearsal vs. elaborative rehearsal
  - **Maintenance Rehearsal**
    - Little effort, mechanical
    - Ineffective retrieval
    - Craik & Watkins, 1973
      - List of words were presented to participants and they had to repeat the last word they heard that started with a letter "D"



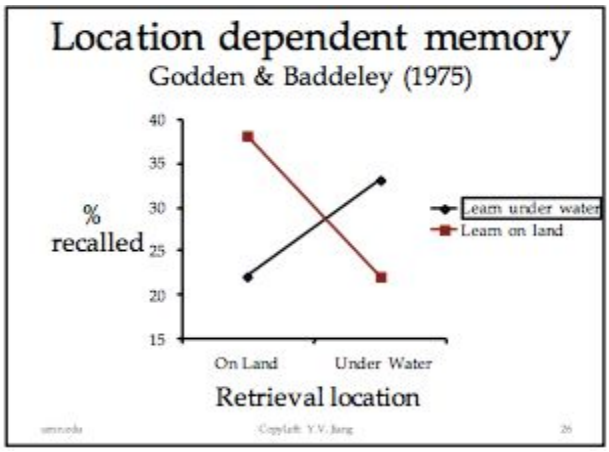
  - **Elaborative Rehearsal**
    - Requires effort, difficult
    - Effective retrieval

- Evidence for levels-of-processing theory
  - **Shallow processing**: surface characteristics
    - Can take two forms:

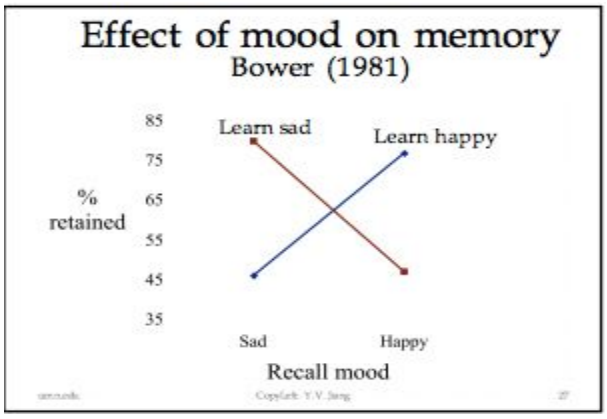
            - Structural processing: when we encode only the physical qualities of something i.e. how letters look or the the typeface of a word
            - Phonemic processing: when we encode its sounds
        - Involves maintenance rehearsal (repetition in order to help us hold something in the STM).
        - Leads to short-term retention of information
    - **Deep processing**: meaning
        - Involves semantic processing: happens when we encode the meaning of a word and relate it to similar words with similar meanings.
        - It involves elaboration rehearsal: more meaningful analysis of information
        - Leads to better recall

- Study: Craik and Lockhart (1972)
    - "The memory trace can be understood as a byproduct of perceptual analysis and that trace persistence is a positive function of the depth to which the stimulus has been analyzed."
    - Deeper encoding leads to better memory,
    - Elaboration is critical

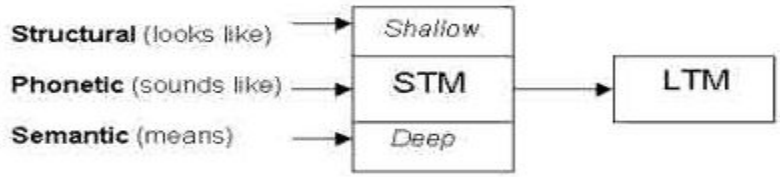
- Experts vs. novices
    - It takes 10 years to become an expert
    - The knowledge base allows better elaborative encoding
- State-dependent retrieval (encoding specificity)
    - Retrieval of an item from memory is linked to the context at encoding (Thomas & Tulving)
    - Retrieval is better when context is identical at study and test
    - Cue Dependent
        - Importance of the perspective at the time of encoding and retrieval
            - Locations (underwater or on on land)



- Mood (sad or happy)



- Fisher & Craik's study pitting levels of processing against encoding specificity
  - The study: participants were presented with word pairs and asked to remember the second word. the first word served as a context cue. the word pairs were either semantically related or rhymed. during testing, the prime words (context words) were presented as hints.
  - Comparing semantic and phonemic cues
  - Study: make judgements about phrases and words.
- Role of intention to learn
  - The intention to learn has an indirect effect
    - If the subject applies the right strategy
  - LTM (declarative)
    - Organized by meaning:
      - Wider (?) is better
      - Deeper (understanding) is better



- Passage of time leads to memory consolidation & memory forgetting
  - Forgetting: The process whereby information is lost over time
    - Crovitz procedure
      - Word association with specific memory in your lifetime
      - More recent time periods yield the most memories
      - More distant time periods yield the fewest
      - Passage of time makes memory less accessible
    - Effects of memory delay
      - **Retroactive interference:** new experiences interfere with recall of old memory
    - Decay: memories may fade or erode away

            - Diminution in the strength of connections among neurons that represent particular experiences
    - Consolidation: The process whereby information becomes more strongly represented
        - Medial temporal lobe is important for consolidation
        - Sleep helps → studies showing that REM sleep can enhance memory
        - Long-term consolidation
            - Over periods of months, years, decades,
            - Retrograde amnesia: retained distant past (loss of memory before disruption)
            - Head injury, electroconvulsive therapy; lost memory for recent events (1-2yrs)
        - Short term consolidation
            - Interrupted by serious head injuries
                - 30 sec after head injury: disoriented correct recall of the events
                - 20 mins later: gains orientation, no memory of the injury of the event
- Double dissociation; why it's important; examples of double dissociation
    - Double Dissociation: when two related mental processes are shown to function independently of each other.
        - When we make one manipulation and it affects brain function A and not B
        - Then we make another manipulation and it affects B but not A.
    - Example:
        - Speech and Language are related but function independently in the brain.

12. Memory errors

a. Key questions

- Why is memory considered a reconstructive process?
    - Memories are reconstructions of past events
    - Normalization: making a story more coherent and consistent than it was
    - Reconstruction can take place at retrieval
    - Deese-Roediger-McDermott (DRM) effect
    - Source Memory
    - Suggestibility
    - Children's memory

B. Some paradigms

- Bartlett's studies; normalization of memory
    - "Remembering" 1932

    - "War of ghosts"
        - Introduced idea of schemas
        - Aim of the study: determine how cultural and social factors influence schemas and can lead to memory distortions
        - Found that participants tended to alter/distort stories in various ways making it more conventional and acceptable to their own cultural perspective
        - Findings:
            - Memory is very inaccurate → always subject to reconstruction based on pre-existing schemas
                - When people remember stories they tend to omit some details, introduce rationalisations and distortions, because they reconstruct the story so that it makes more sense in terms of their knowledge, i.e culture in which they were brought up in and experiences in the form of schemas.

- Bransford & Johnson: effects of script on memory encoding
    - Study: "If the balloon is popped, the sound….."
    - Findings:
        - Some subjects: read paragraph without seeing any context → remember very little
        - Some subjects: saw the proper context before reading → remember well
        - Some subjects: saw the proper context after reading → remember very little
    - Schemas simplify information processes
- Dooling & Christiaansen: reconstruction during memory recall
    - Study:
        - Provided a story with a girl named Carol Harris who was unmanageable (violent, stubborn etc). So her parents hired her a private teacher
        - One week later, participants given the sentence " She was deaf, dumb, and blind"
        - Asked if they recognized this in the original passage
            - Group 1: were not provided no new info at testing. Rejected the given sentence
            - Group 2: before recognition, they were told that "Carol Harris was Helen Keller's real name." Now many answered that the given sentence was in the original passage.
    - Findings:
        - Memory reconstruction can take place at retrieval
- Lead questions; suggestions
    - The way a question is worded can influence what a person claims to remember
    - Loftus & Palmer 1974
        - Participants asked to watch a short video segment of a car accident

- Asked how fast were the cars going when they (smashed, hit, collided, bumped, contacted) each other?
- Immediate estimate:
    - Smash: 41 mph
    - Hit: 33 mph
- One week later participants were asked if they had seen any broken glass
    - Hit: 14% yes
    - Smashed: 32% yes
    - Correct answer: no

- Source memory; DRM procedure
    - Source Memory:
        - Memory of precisely when and where an event occurred → root of information acquisition
        - Extremely fallible
    - Deese-Roediger-McDermott (DRM) effect
        - Accurate retention of the gist
        - Inaccurate retention of the specific item
            - A procedure in cog. Psy used to study false memory in humans
            - Done by giving participants a list of closely related words and then asking them whether a specific conspicuous, but absent, word was included in the list.
- Children's memory
    - Leichtman & Ceci 1995
        - Study:
            - 2 min visit to a preschool
            - Following immediate interview
                - Half of the children: misleading questions
                    - 10 weeks later: memory highly suggestible
                - Other half: no misleading questions
                    - 10 weeks later: memory was ok.