# Memory and Cognition

## Exam 3 Review

- ❖ **Forgetting from LTM**
  - ➢ **Jenkins and Dallenbacj (1924) Sleep Study**
    - ▪ Time of Study **|** Time of Test **|** Amount Remembered
      - • Group A: Study in the morning → tested at night → remembered less
      - • Group B: Study in the night → tested at morning → remembered more
    - ▪ If decay theory is correct then the study should be the same between the two because it was the same amount of time. If interference is correct, then group B will be better because of less interference. Whatever happened to group A during the 8 hours it interfered with their ability to remember the syllables. Interference is proved in this study, disproving decay.
  - ➢ **Retroactive Interference**
    - ▪ **Definition** – New learning interferes with previously learned information. More often happens with episodic memory and not semantic memory.
    - ▪ Experiment
      - • Phase 1 – Dog-room, experiment and control group are given same
      - • Phase 2 – Dog-desk, experiment group is given dog-desk, control group is given nothing or asked to do an unrelated task.
      - • Test – Remember the pair from phase 1. Depending on the amount of practice one group does effects either positively or negatively the interference. If you practice phase 1, you'll do better, if you practice phase 2, you'll remember phase 2.
  - ➢ **Proactive Interference**
    - ▪ **Definition** – Old learning interferes with new learning. E.g. Learning your friends new married name.
    - ▪ **Response Competition**
      - • **Definition** – Occurs when the same cue is associated with two different responses.
      - • Example: If you take two foreign languages at once, you're likely to confuse or not even remember the translated version of cat between both languages.
  - ➢ # Encoding???
  - ➢ **Consolidation Theory**
    - ▪ **Definition** – It's not a theory of forgetting, but rather why the information was never stored in the first place.
    - ▪ **Learning is a 2-stage process**
      - • **Conscious Encoding** – Memories get better over time but subconsciously you are not aware of that.
      - • **Subconscious Strengthening** – Think of jello, there's a limit. There's no difference in the consistency of jello between having it in the fridge for ten hours and ten days.
  - ➢ **Predictions**

- A period of mental inactivity is more conductive to consolidation. If interrupted, the trace cannot be consolidated and the item will not be stored. If consolidation is prevented, the item should never be recalled.

- ➢ **Consolidation**
  - ▪ **Electroconvulsive Shock (ECS)**
    - • One side effect of retrograde amnesia. Inability to recall information just before a traumatic event. Rats were shocked in box 1 to run to box 2, then given a big ECS in box 2 to see if they remembered. The longer the delay between learning, the response, and getting shocked, the stronger the memory should be.
  - ▪ **Electroconvulsive Therapy (ECT)**
    - • Used for depression. There is no number as to how long it takes for memories to be consolidated with ECT. After a while of therapy as they recover, some but not all, of the information will come back. That can be problematic for consolidation theory, if it was never fully consolidated they should never be able to recall it.
  - ▪ Physical Trauma
    - • Trauma – The bigger the injury the more they forget.
- ➢ Enhance Consolidation
  - ▪ Sleep Studies
    - • The process is interrupted by mental activity.
    - • REM sleep is the most important, but sleep can also bring back memories that you forgot throughout the day.
    - • **Rat Study**
      - ♦ **Get from Rachel Clines' notes.**
- ❖ Consolidation
  - ➢ Arousal
    - ▪ **Item-Based Arousal (Paired-Associate Learning Test – Pair a word w/ a number)**
      - • Refers to the items themselves.
      - • Assault – 6 (Arousing); Tree – 2 (Neutral); Vomit – 5 (Arousing); Dance – 3 (Neutral). They were immediately tested after and two weeks later. Subjects learned more the day of than a weeks delay. The arousing words however showed the opposite effect, called reverse forgetting. Consolidation is enhanced by arousal.
    - ▪ **Subject-Based Arousal**
      - • Refers to the individual person. Introverts have a higher level of CNS activity. Because extroverts have lower levels of arousal internally they seek it externally. ADHD kids internally are under-aroused and seek it externally. If you have an extreme introvert and an extrovert in a room, it will sound louder to an introvert. Introverts will learn classical conditioning faster and salivate more.
      - • **Study**
        - ♦ Given a list of neutral items and were tested either immediately or a week later. Their results mirror the item-based arousal effect.

The extroverts, similar to the neutral words, remembered more initially than after a week. However, the introverts remembered slightly more a week later.

- **Adrenaline**
  - Using adrenaline can either make your memory better or worse through consolidation. If you are injected with adrenaline it can help strengthen that particular memory, but on the flip side if you prevent adrenaline from doing its job.
- **Propranolol**
  - A beta-blocker used in blood pressure, anxiety, and stage fright. It blocks adrenaline and is also used to treat PTSD. It doesn't block your ability to remember but it makes you not remember as much.

➢ **Zeigarnik Effect**
- An incomplete task is remembered better than a completed task.
- **Two Studies**
  - **Study 1** - Each child is given 22 activities to complete, finger painting, etc. 11 of those task s they were allowed to complete, the other half of them were interrupted. The children were given a memory task, the majority of the children remembered the incomplete activities better. The lack of completion causes arousal.
  - **Study 2** – Half were interrupted and half were completed, they were then able to finish the interrupted tasks. They later were tested. If it is interruption and not arousal, then they should still remember the interrupted activity better. They do not see a difference.

➢ **Incubation**
- Sometimes the answer will appear even without thinking of it. The assumption here is that you're searching your memory without conscious awareness.

❖ **Implicit v. Explicit Memory**
➢ **Implicit Memory** – Retention of information without awareness, indirectly tests information.
➢ **Explicit Memory** – Conscious recollection of information, directly tests information.
➢ **Things to Remember**
- Age: Explicit declines, implicit does not
- Amnesia: Explicit declines, implicit does not.

❖ **Population Dissociation (Has a different effect is the difference of dissocation)**
➢ **Amnesia**
- Anecdotal Evidence
  - Anterograde amnesia can only form memories at an implicit level.
- Procedural Memory
  - H.M. would redo "Tower of Hanoi and Mirror Tracing" each day and slowly he would get faster and faster despite the inability to form new memories.

- Priming Experiments
  - Semantic Priming (Doctor → Nurse)
  - Repetition Priming (Nurse → Nurse)
  - Study
    - Study: Table, cat, banana, etc. Not presented in context of memory experiment, incidental learning conditions.
    - Explicit Test: Recall or recognition, results normal > amnesia
    - Implicit Test: Word stem completion. Ban_ _ _ or word fragment completion c_t. If the subjects complete the stem from the word in the study list rather than any other word. Those who were in the study filled in study words more than 50% of the time. The results conclude amnesia = normal.
  - Age (Explicit Declines, implicit does not decline)
    - Study: Picture Naming
      - Priming is measured by how much faster you name it the second time. Old and young use their implicit memory and are primed just as much as the young subjects.
  - Time
    - Study: List of 96 words
      - Test 1 (48 words)
        - Recognition (explicit) or word fragment completion (implicit)
      - Test 2 (48 wrods)
        - Recognition (explicit) or word fragment completion (implicit)
      - What happens over time with the explicit and implicit tests?
    - Study: Read v. Generate
      - Hot – c_ _ _ (Generate)
      - Hot – cold (Read)
      - Generating an item leads to better memory than just reading (explicit)
      - Explicit Test (recall) read < generate
      - Implicit Test (Perceptual identification) read > generate
      - Implicit Test (Word-stem completion) read > generate
- ❖ Theoretical Account
  - ➢ Transfer Appropriate Processing
    - Perceptually Driven Processes (Data-driven) vs. Conceptually Driven Processes
    - Memory performance depends on the match between processes engaged at study and processes required by the test. (Copy from 03252013_notes.docx)
    - The best chance of succeeding is when the same processes are used at study and test.
    - Generate → Conceptual → Requires focus on meaning
    - Reading → Perceptual (Data-driven) → Not focused on meaning
- ❖ Implicit Memory

- ➢ Memory during Anesthesia
- ➢ Cryptomnesia
  - ▪ Unintentional plagiarism
  - ▪ This normally happens when you're distracted in encoding. Then later on you will remember the idea and assume that it is your own. In the laboratory this is studied by having people sit in a circle, generate words that are part of a specific category (Sports), told not to use words previously used. A couple days later they'll be asked to recall the four words you generated plus four new items.
- ➢ Implicit Attitude Test (Implicit Association Test)
  - ▪ We might alter our responses so we may be more politically correct. Explicitly people may claim that they are not prejudice, however they may show it on the implicit test. With age prejudice is faster, when young/pleasant share a key. The interpretation here is that we think that young is good and old is bad.
  - ▪ Prejudice Reduction – Always been viewed as a conscious process.
- ❖ Semantic Memory (Reason, solve problems, decision making, etc.)
  - ➢ What is the function of knowledge?
    - ▪ When you are interpreting new information, what you know ahead of time is important. We use previous knowledge in LTM. Having this knowledge gives you a framework for organizing new material. The more you know about the topic the easier it is for you to learn new concepts. The more psychology classes you take the easier it is to learn new concepts.
  - ➢ Context
    - ▪ Contexts helps you interpret ambiguous information. Words often times have more than one meaning, in normal situations, most of the time we are not aware of the ambiguity. We must be choosing the most appropriate meaning without even being conscious about the ambiguity.
  - ➢ Theories of Semantic Memory (Hypothetical Theories)
    - ▪ Associative Network Models – Concepts are connected through associations
      - • Semantic Network Model
        - ♦ Hierarchical organization in which related concepts are connected by associations.
        - ♦ Cognitive Economy
          - ➢ Each property is only stored one time at the highest node, preventing overload.
        - ♦ In this theory it is assumed that we store information about concepts in two ways:
          - ➢ Directly Associated Property – e.g. Canaries can sing
          - ➢ Inheritance – Can inherit properties form the subordinate – have wings, can fly, and have feathers.
        - ♦ If this theory is correct it makes predictions on how quickly information can be retrieved from LTM. The closer the property is,

the faster you should be able to identify it. A canary can sing is going to be retrieved faster than it has wings.

- ♦ Evidence For:
  - ➢ Semantic Verification Test – You're given a series of statements; you have to decide as quickly as possible if those statements are true or false.
- ♦ Evidence Against:
  - ➢ Some inherited properties may be stored directly with the concept, if the property is frequently encountered.
  - ➢ Can't account for typicality effects
    - ▪ All you have to do is look at the concepts and see if there is a link between canary and an ostrich to a bird.
    - ▪ Your response time should be the same regardless if you're being asked about a canary or ostrich, but they're not. We can respond quickly to false statements, with this model it states that canary → bird → animal even if you're asked "is a canary a fish?"

- ▪ Spreading Activation Model
  - • Lengths of associations represent the strength of the relationship between concepts. Nodes can become activated in two ways.
    - ♦ Perceptual (Bottom-up) input
    - ♦ Spreading activation from associated nodes (top-down)
  - • Semantic Priming
  - • Expertise
    - ♦ More knowledge facilitates getting knowledge throughout the network of nodes.
  - • This model will differ for every person. Someone who is a doctor will have more knowledge that is complex and organized.
- ▪ Feature Overlap Model
  - • Concepts are represented by a set of features – defining and characteristics.
    - ♦ A blue jay will be represented by having wings, nest in trees, etc. Some of these features are defining and some are characteristics.
    - ♦ Defining – Absolutely crucial, you absolutely have to have these defining features. E.g. Living, have feathers, lay eggs, etc.
    - ♦ Characteristics – Fly, relatively small, nests in trees, likes to eat worms.
  - • Typicality Effect
    - ♦ A blue jay should be verified faster than a penguin when asked if they're birds. Highly typical items are verified faster.
  - • Linguistic Hedges
    - ♦ "Technically Speaking" – There's a match on defining features only; a penguin is a bird but it's not a great match.

- ◆ "Loosely speaking" – There's a match on characteristic features only; a bat is a bird. It's not actually a bird but we think of that because they're like birds.
    - ▪ Prototype Theory
        - • Argues that concepts are represented by an abstraction of certain features. As you experience different examples of a category, you take away the common attributes and that becomes a prototype. That's not necessarily a specific bird, but rather an abstract idea. A prototypical fish is about the size of a trout, has scales, lives in water, and that doesn't have to be a specific type of fish – a general idea of what a fish looks like.
- ❖ Priming
    - ➢ Prime -> Target
    - ➢ Repetition Priming
        - ▪ Doctor -> Doctor
    - ➢ Semantic Priming
        - ▪ Doctor -> Nurse
        - ▪ Sometimes the reaction can be inhibitory if you're given a misleading prime.
    - ➢ Across Trials Priming (Long term priming)
        - ▪ Lexical Decision Task – Given a series of letters, decide as quickly as possible if it's a word. This occurs for repetition priming, for semantic priming this will not work at all.
    - ➢ Within Trials Priming (Short Term Priming)
        - ▪ How long is the prime presented will make a difference. If you're presented with doctor, the critical manipulation is how long you're exposed to the word doctor. The longer the prime is presented, then reaction time to that is shortened.
    - ➢ Expectations (Controlled Priming)
        - ▪ This can explain subliminal semantic priming. Priming generally is automatic, however it can have a controlled aspect to it. Your expectation can effect priming as well.
            - • Body – "Building Part"
    - ➢ Priming with episodic memory
        - ▪ Study: City – GRASS
        - ▪ Lexical Decision Task – GRASS (Is GRASS a word) **or** city – GRASS (is GRASS a word?)
    - ➢ Reconstructive Memory
        - ▪ You don't passively soak up information; you're actively organizing this material.
        - ▪ Native American folk tale it followed different narrative conventions than that of the English subjects. From the British perspective it was more coherent, the supernatural elements disappeared and it ended up being more traditional like.
    - ➢ Schemas

- Schemas are organized mental frameworks (general knowledge base) that we use to interpret and filter new information.
- Office Schema
  - They setup an atypical office.
  - Good memory for objects in office schema and in this office
  - Poor memory for objects not in office schema, but in this office.
  - False memory of objects in office schema, but not in this office.
- Schemas for People
  - Stereotypes for people. Preexisting knowledge effects your memory of the passage like Carol Harris being named when in reality it was about Hellen Keller.

❖ Scripts
  ➢ Subjects tend to falsely remember likely inferences. During a restaurant script they were asked to identify information from the passage but they mistakenly believes they read about a menu despite it never being mentioned.
❖ Reconstructive Memory
  ➢ Generic Memories
    - No-Suspense and Suspense
      - Given a semantic memory test, they're not worried about the accuracy but rather the time it takes to respond. We are somehow able to ignore the information as it would ruin the suspense.
  ➢ False Memories
    - Deese-Roediger-McDermott Paradigm (DRM)
      - People will incorporate false words. Using spread activation model. A PET scan can tell the difference between a real emmory and a false memory, when they recall a real word their hippocampus is activated. The hippocampus is responsible for forming new memories.
    - Lost in mall study
      - You are able to convince people of false events, like being lost in the mall.
  ➢ Memory Distortion
    - Grades
      - The grades received in high school are distorted. Accuracy drops from A from C's and D's. You tend to forget the lower grades. When an error is made it always seems to be in the upper direction, you almost always error to a higher grade.
    - Food Preferences
      - You can implant false memories that you got sick after eating a certain food. It seems to only work on universally unflavored food.
    - Personality
      - We tend to remember ourselves different than we were. We distort the memories of our past. We tend to look poorer of us in the past. We assume more psychologically adjusted today. It makes us feel better to

think we are happier today than we were when we were younger.

**Random Stuff (Some repeated info I am afraid I might not remember)**
- **Decay Theory** – Suggests that information simply weakens or is lost over time if not used.
- **Interference Theory** – Forgetting is a direct result of more learning.
- **Retroactive Interference** - New learning interferes with previously learned information. More often happens with episodic memory and not semantic memory.
- **Proactive Interference** - Old learning interferes with new learning. E.g. Learning your friends new married name.
- **Response Competition** - Occurs when the same cue is associated with two different responses.
- **Consolidation Theory** - It's not a theory of forgetting, but rather why the information was never stored in the first place.
- **Retrograde Amnesia** - Inability to recall information just before a traumatic event
- **Reverse Forgetting** – Seen in item-based arousal, where arousing words are remembered better after a weeks delay than immediately after.
- **Hypermnesia** – The opposite of amnesia. Primarily only seen for pictures, not for classroom material. That information is becoming consolidated.
- **Cryptomnesia** – Unintentional plagiarism.
- **Arousal can facilitate consolidation**!

# Book Notes

## Chapter 6

- ❖ **Classical Conditioning (Pavlov)**
  - ➤ In classical conditioning, an organism learns that certain stimuli are reliable predictors of the imminent onset of other important stimuli.
  - ➤ **Three types of structures under classical conditioning**
    - ▪ **Abstract**
      - • Over time the organism associates the neutral stimulus with the oncoming unconditioned stimulus. As a result the organism makes a preparatory response, as if the US were about to occur. The NS is now the CS and the response that is made in the presence of the CS is CR. This can be used to conquer phobias because it provides a sense of calmness for each step closer you become to conquering the phobia.
      - • **Associative Structure**

- ◆ **Stimulus-response association** – The CS is directly associated with the CR. That is, the CS directly causes the CR to occur.
- ◆ **Stimulus-stimulus association** – The CS is directly associated with a memory representation of the US, which then leads to the production of the CR. In other words, the CS is interpreted as a predicting the onset of the US, so this elicits a CR in preparation for the CS. Majority of the time it is stimulus-stimulus association.
- ▪ **Concrete**
  - •
- ▪ **Experimental**
  - •
- ➢ **Important Features for Classical Conditioning**
  - ▪ **Acquisition Period / Learning Curve**
    - • It takes a period of time for an association to be learned.
  - ▪ **Forgetting / Extinction**
    - • When a CS is presented many times without a US, responses to that CS will stop.
  - ▪ **Spontaneous Recovery**
    - • When, after extinction, there is a long delay, and then the CS is presented again. The CR, which was extinct, reemerges, but it is not as strong as before.
  - ▪ **Savings**
    - • Savings shows that after extinction has occurred, when relearning a previous association, less time is required to do so than the first time it was learned.

- ❖ **Procedural Memory**
  - ➢ **Skill Acquisition**
    - ▪ Skills include activities where expertise is widely recognized, such as being able to play a sport, instrument, or craft a best-selling novel.
    - ▪ **Stages of Skill Acquisition**
      - • Cognitive Stage
        - ◆ A person consciously and deliberately does the skill action. Comparing the current state with the desired state and taking those actions that bring one closer to the desired state.
      - • Associative Stage
        - ◆ A person more quickly retrieves the knowledge needed for the task. Different memories are directly associated with different aspects of the skill. The need to mentally verbalize to think things through is less necessary. Information is quickly and easily retrieves into consciousness, although some deliberate and conscious effort is still needed.
      - • Autonomous Stage
        - ◆ Skill execution becomes more proceduralized and becomes largely unconscious. A person's memories and knowledge have moved

from being dominated by declarative knowledge to nondeclaritive knowledge.

## ❖ Implicit Memory

➢ Any form of memory that does not require consciousness and can potentially operate without a person being aware that memory is being used.

➢ **Incidental Learning**
- A form of implicit memory because a person is not consciously aware at the time the knowledge is being stored in memory. E.g. Seeing a cloud in the sky as an example of data-driven processing.

➢ **Indirect Tests of Memory**
- **Definition** - A person must show an influence of prior experience (memory) without consciously being aware of doing so. That is, we need an indirect way of testing memory.
- **Data-driven Processing** – Mental activity is driven more by information in the environment than the contents of a person's thoughts.
- **Priming**
  - Priming occurs when a person is faster and/or more accurate at retrieving target information that has been facilitated by an earlier prime trial.
    - ♦ **Repetition Priming** – Priming of an item that was encountered recently. If you saw the word *assassin* earlier, you recognize it faster and more accurately when you see it again later. Repetition priming is better when the information is presented in the same way it was encountered. This suggests that seemingly irrelevant details can influence the ability to remember them later. Repetition priming is associated with decreased activity in the visual cortex.
- **Other Verbal Tasks**
  - Word-Stem Completion
    - ♦ People are given the initial few letters of a word (the word "stem), with the task of completitng it with the first word that comes to mind. Here, people are more likely to complete these stems with words they had seen previously, even though they are unaware that they are using prior knowledge.
  - Word-fragment completion
    - ♦ People are given words with missing letters, such as A _ _ A _ _ IN, and are to complete the words. Again, people do better if they saw the words before.
  - Anagrams
    - ♦ "tderhun" for the word "thunder"
  - Lexical Decision
    - ♦ A person is given a string of letters as is to indicate whether it is a word or not. What is often of interest is how fast people respond to the words depending on what occurred earlier. People respond faster when they have been exposed to them recently or to words

that are related to ideas that they have been thinking about recently.
- Naming Task
  - ◆ People simply name aloud, as quickly as possible, visually represented words. Words are named faster if they were seen before, or were unconsciously activated by a person thinking about related concepts.

## Chapter 9

❖ **Semantic Priming**
  - ➤ **Salient Characteristics** – Organized and regular structure.
  - ➤ **Priming –** When a concept is activated, this activation spreads to related concepts such as if there is then a need to use them, they are now closer to awareness and can be used more quickly. Semantic priming occurs because concepts are not understood in isolation but in terms of how they relate to other ideas. It is structured on shared aspects of meaning. Similar concepts are metaphorically stored closer in semantic memory.
  - ➤ Controlled Priming
    - ▪

## Definitions

**Nondeclarative Memories** - Unconscious memories that are so far removed from awareness that is very difficult, if not possible, to accurately talk about them.
**Classical Conditioning** – An organism learns to respond to signals that are predictive of future outcomes, thereby showing memory for previous environmental contingencies.
**Contiguity Learning** – The idea that learning occurs when a NS and a US occur near each other in time. Deriving some cause-effect relationship drives learning.
**Contingency Learning** – Involves sensitivity to the underlying casual structure.
**Mere Exposure Effect** – People prefer things they already have been exposed to one or more times. Some change in context (chewing gum or not chewing gum in front of paintings) makes the information more distinct and, therefore, more preferable.

## Random Stuff to Remember

- Repetition priming is associated with decreased activity in the visual cortex, whereas semantic priming is associated with decreased activity in the frontal lobes.
-