GENERAL PSYCHOLOGY (PSYC 210)
Study Guide: Memory and Forgetting
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Do classical and operant conditioning explain human behavior?
--Critics of the behaviorist approach note that the principles of conditioning discovered in animal research apply to humans in cases where the human behaviors are "simpler" (i.e., not "complex"—What does this mean?) or closer to animal behavior (e.g., the mentally retarded or children or emotionally disturbed). These critics argue that behaviorist descriptions omit what is most uniquely human (e.g., planning into future and the use of symbolic and abstract systems).

A. One of first psychological studies was on verbal learning and memory: Hermann Ebbinghaus (1885—first psychologist to conduct experiments on a "higher mental process"
    1. For Ebbinghaus, the only difference between learning and memory is the **timing** involved: (a) if one focuses on the immediate aspects of an experience, one is studying learning; (b) if one focuses on later consequences of the experience, one is studying memory
    2. To study learning, Ebbinghaus knew he had to have materials to be learned that were totally new/novel to his subject. He chose "nonsense syllables" and used the method, "serial anticipation" whereby the subject learned the syllables and the experimenter waits for some period of time ("retention interval") before retesting the subject.
    3. The resulting curve is Ebbinghaus' famous "curve of forgetting" with its characteristic shape.
    4. Ebbinghaus also studied interference and decay: (a) proactive interference occurs when something learned at an earlier time interferes with something learned recently; (b) retroactive interference occurs when something learned recently interferes with something learned at a previous time.
    5. Ebbinghaus also found "serial position effects:" (a) "primacy effect" occurs when something learned at an earlier time is more readily recalled; (b) "recency effect" occurs when something learned at a later time is more readily recalled.
    6. Ebbinghaus also found another result: (a) "distributed practice" is better than "massed practice;" thus, it is better to spread out practice sessions rather than to lump them all together (n.b. You practice "massed practice" when you cram before an exam!).
B. Paired associates learning was developed by Mary Calkins (1894). In PAL, the subject must learn to give a particular response to a particular stimulus. The stimuli are generally presented in random order. Calkins' studies showed, in part, that "meaningfulness" is not defined simply as "familiarity" but may be defined as the average number of responses given to an item in 60 sec in a word-association task (see Noble, 1963; also Thorndike & Lorge, 1944). The most common uses of the paired-associates method have been in the study of interference and transfer ("positive transfer" and "negative transfer").
C. "Incidental learning" may also occur. This area of investigation often discussed in association with information processing frameworks.
D. "You are all wired up!" Memory is an **active** system that receives, stores, organizes (perception), alters, and recovers information. In some ways, memory is like a computer; in some ways, it is not. It is, however, an "input-output" device. Incoming information is first **encoded** or **changed** into a usable form (what?)—like typing data into a computer. Information is then **stored** or held in the system (where?). Memories must be **retrieved** or taken out of storage. **Why is this necessary in order for <u>learning</u> to occur?**
    1. First memory system is **sensory memory:** sensory memory holds, for a few seconds or less, an exact copy of what is seen or heard (icon, echo). Sensory memory holds information long enough for it to be transferred to second memory system.
    2. **Short term memory (STM):** selective attention, controls what information is moved to STM. STM;s are also brief, but longer than sensory memories. How are STM's stored? Stored as sounds but also images. STM acts as temporary storehouse for small amounts of information. STM filters out unimportant information and provides **working memory** where we do much of our thinking. STM very sensitive to interruption or interference,

as, looking up a phone #. STM can hold 7± 2 bits of information. This implies that STM can be "filled up"—only so much space in it. However, "chunking" appears to increase capacity of STM ("chunking" recodes information into larger units). STM's appear to weaken and disappear very rapidly, but rehearsal increases likelihood that memory will stay (e.g., telephone numbers) and increases memory's chances of being stored.

3. How do we remember for longer periods of time? Long term memory (LTM): information that is important or **meaningful** is transferred to the third memory system, LTM. LTM acts as a permanent storehouse for information, containing everything you know about the world. LTM has nearly limitless storage capacity—the more you know, the easier it is to add new information to LTM. LTM not encoded as sounds but on the basis of meaning and importance. LTM is relatively permanent [n.b. studies of Penfield (brain surgery experiments)]. Penfield's studies led to realization that as new LTM's are formed, older memories are often updated, changed, lost, or revised (see movie, *Rashoman*; also errors, as, "pseudomemories"). Types of LTM: (a) Skill memory (basic elements of conditioning, learning, and memory—"Know how." (b) Fact memory (words or symbols): (1) semantic memory (mental dictionary of basic knowledge); (b) episodic memory (autobiographical memory of personal experiences—more easily forgotten than semantic memories because new information constantly pours into episodic memory).

E. Memory is not "all or none"!
F. How to measure memory?—recall, recognition (e.g., multiple choice tests), relearning (savings score)
G. Other forms of memory: "tip of the tongue" state; "feeling of knowing" state (*déjà vu*)