Psychology 260  
Lecture 3-2: Memory & Self

Readings: Kalat, module 13.1 (to p. 399); Rama, chapter 12  (from p. 246)

0. Awareness of Self
- sense of “who you are”
  - what does this do? Why do we have it?
- includes a sense of continuity over time
  - record of your past experiences
  - what you did, and why
- includes a sense of continuity over space
  - what you’re doing, what’s happening to you
  - why you’re doing what you’re doing (motivation)

1. Memory Systems

1.1 Sensory Register (Iconic Memory)
- total-report technique:

```
   a   q   t
  h   k   p
 j   b   z
```

- task: report all displayed letters
- result: observers can report 4-5 items
- Can only 4-5 items be seen? Maybe not. The rest may be forgotten by the time the response mechanism (attention) gets to them.

- partial-report technique (Sperling):

```
   a   q   t
  h   k   p
 j   b   z
```

- task: report displayed letters in signalled row
- result: observers can report 4-5 items from each row, even when several rows are present -> capacity is high

- nature of iconic memory (overview):
  - format of info: literal copy
  - capacity: very high
  - entry of info: preattentive (nonconscious)
  - duration: 250-500 ms
  - maintenance of info: impossible
1.2 Short-term Memory (Working Memory)

- observers in total-report task report 4-5 items.
  - Existence of limited amount of memory?
- Test: briefly present observers with three letters
  - task: when light goes on, report all displayed letters
  - result: observers can report 3 consonants
    - accurate as long as rehearsal is possible
  - Peterson & Peterson: if rehearsal interrupted, memory decays after 15-20 seconds
- capacity of STM: look at how performance varies with number of letters presented
  - the number of digits that can be held in STM is called the digit span
  - more generally, the capacity of STM is called the memory span
- Miller: memory span is 7±2 items
  - “the magical number 7”
  - true for vision, audition, etc
    - vision: about 4 items
- units of STM are chunks
  - groups of items that have a meaning
    - e.g., FBI, MLA, UBC
- short-term memory often used in many perceptual/cognitive tasks
  - examples:
    - tracking items across space
    - doing addition/subtraction
    - remembering phone numbers
  - specialized STM systems for vision, audition, etc
  - Baddeley: combined into a general-purpose “working memory” system
    - auditory STM – “phonological loop”
      - maintenance/manipulation of speech-based information
      - maintenance allows learning of new words
    - visual STM – “visuospatial sketchpad”
      - maintenance/manipulation of visual and spatial information
      - maintenance allows learning of new objects
    - control system – “central executive”
      - selects which STM system to use
      - selects strategies for information manipulation
Central Executive

Phonological Loop
PL & VS are "slave" systems

Visuospatial Sketchpad

- nature of short-term memory (overview):
  - format of info: chunks
  - capacity: magical number 7
  - entry of info: requires attention (consciousness)
  - duration: < 20 seconds (unless rehearsed)
  - maintenance of info: continued attention / rehearsal

1.3 Long-term Memory (LTM)
  - separate from STM.
  - evidence: damage to medial temporal complex (includes hippocampus)
    - HM: hippocampus removed from both sides of brain
    - patients with Korsakoff’s syndrome (thiamine deficiency)
    - for these, long-term learning is impossible. But:
      - normal STM: memory span; scanning speed

Types

Several types of LTM. Those that involve consciousness are:

a. Semantic memory:
  - general knowledge; not connected to a particular time or place
    - meanings of foreign words
    - facts (e.g. Victoria is on Vancouver island)
    - rules of arithmetic (e.g., 2 + 2 = 4)

b. Episodic memory
  i. knowledge that is connected to a particular time or place
    1. the dinner I ate yesterday
    2. the house I lived in when I was 10
    3. what I did last Sunday afternoon
  ii. often has form of autobiographical event

Semantic vs. episodic
  - amnesiacs more affected at level of episodic memory
    1. token formation?
  - only episodic memory forms basis of mental imagery

Reliability of Episodic Memory – not good (cf. Watergate testimony – John Dean)
  - gist was sometimes right; details mostly wrong (= filled in)
Implicit Memory
- there also exist implicit kinds of memory (= formed without awareness)

a. Procedural memory
   - memory for actions, operations, skills
     - how to knit
     - how to ride a bicycle
   - note: often difficult to know how you do something
     - can only start at particular locations
   - note: procedural memory may involve zombie
     - procedural amnesia when striatum damaged
     - striatum part of midbrain near neocortex
     - HM has procedural memory
       - 2. striatum part of midbrain near neocortex
     - 3. Hippocampus gone; striatum spared

b. Priming
   - facilitation of abilities (e.g. to recognize words) based on prior experience
   - presentation so brief, observer doesn’t consciously see it
   - existence of priming shown by indirect tests
     - example: *stem completion*.
       - show observer a word; ask them to complete it
         
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       - look at frequency of chosen words
         - priming: words chosen more often than chance
         - requires presence of neocortex

Summary of LTM systems: