Long-Term Memory

Organization

Mnemonics

The Problem of Organization

- The capacity of long-term memory is extremely large.
- Consequently, locating information in LTM poses a serious challenge.
- A random search through “memory space” would take much too long; by the time you located the information, it would be far too late to use it.

Illustration of the Problem

- Imagine that books in the library were placed on the shelf as they came in, with no computer index or card catalog provided to aid in locating them.
- On average, you would have to search through half of the books in the library before you found the title you were looking for!
- We have the same problem with LTM
Computer Solution

- Digital computers assign each piece of information to a specific location ("address") in memory space.
- The computer stores the address and, when the information is needed, pops the address off the stack and uses it to retrieve the information.
- But biological computers (brains) do not use such an addressing scheme.

Associative "Addressing"

- Our brains store and locate information by using what is called "associative addressing."
- Associative addressing uses part of the information itself as a key for locating the rest of the information.
- Related information is linked by associative connections.

Retrieval Via Associative Addressing

- What is the first word that comes to mind when I say the following word: "Table."
- There’s a good chance it’s “chair.”
- Table and chair have become associated in your brain, so that the sound of the word “table” now activates an associative link connected to the word “chair.”
- When this link becomes active, you remember “chair.”
An Associative “Tree”

- Once an item has been located in memory, it activates associative links to other information with which it has become associated.
- These in turn activate yet other associative links.
- One only has to search through these links to recall this information, not through all of memory space.

Knowing Whether You Know Something

- If you are asked whether you know a certain thing, you can immediately say “yes” or “no.”
- This is because an associative link has or has not been activated that provides the answer.
- Yet sometimes you do know it when you don’t think you do.
- This is because the information is not directly linked to the cue provided.
- You must find another cue that is before you can retrieve the information.

The “Tip of the Tongue” Phenomenon

- You are asked for some information.
- You can’t quite remember it, but
  - You know that you know it, and
  - You are getting partial information, like the number of syllables in a word you are trying to remember.
- This occurs because the associative link you need is weak or temporarily malfunctioning, and there are other links, containing partial information, that are being activated.
Types of Long-Term Memory

- Declarative Memory
  - Memory for facts and events
  - Two types of declarative memory
    - Semantic Memory - facts
    - Episodic Memory - episodes
- Procedural Memory
  - Memory for sequences of action; "muscle memory"

Mnemonics

- Mnemonics are aids to memory
- Mnemonic techniques date back at least as far as the ancient Greeks
- Here we will cover two mnemonic techniques:
  - The method of loci
  - The pegword system or method

The Method of Loci

- "Loci" is Greek for "Locations."
- Technique for memorizing and recalling items in a given order.
- Items are imagined as being placed in specific, familiar locations, usually in an unlikely way.
- Later, you recall the items by visualizing each location.
Pegword System or Method

- Memorize a list of rhyming words to go with each number:
  - One is a bun; two is a shoe; three is a tree; four is a door; five is a hive; six is a stick; seven is heaven; eight is a gate; nine is a line; ten is a hen.

- Picture new item to be remembered associated with rhyming word for number.

- Can be used to recall the item when given the number, or *vice versa*. 