Overview of the Adaptive Problems

- We need some kind of internal process to help us remember information over the short term.
- Once information leaves the present, we need to store it internally so that we can recover it quickly at the right place and time.
- As we interact with the world, we need to recover information from the immediate and distant past.
- Forgetting also has adaptive value - it keeps us current and prevents us from acting in ways that are no longer appropriate.

What These Adaptive Problems Require: Memory

- Memory: The capacity to preserve and recover information
- Involves several important processes:
  - Encoding: How memories are formed
  - Storage: How memories are kept over time
  - Retrieval: How memories are recovered and translated into performance
Remembering over the Short Term: Overview

- Sensory memory
  - The "icon" and the "echo"
- Short-term memory
  - The "inner voice" and the "inner eye"
  - Short-term forgetting
  - Short-term memory capacity
- Working memory
  - Distinct mechanisms that handle short-term retention

What's the Evidence That We Have Iconic Memory

- Whole report of a briefly presented array: Only a small percent recalled
- Partial report (Sperling):
  - T one cues participants which row to report
  - Tone comes after the array is gone
  - Much larger percent recalled, regardless of which row
Short-Term Memory

- A system we use to temporarily store, think about, reason with information
- Example of adaptive value: Language
- The “inner voice”
  - We tend to recode (translate) information into inner speech to keep it in short-term memory
- The “inner eye”
  - We can also code information visually, using images

What’s the Evidence that We Use the Inner Voice/Inner Eye?

- Inner voice:
  - Mistakes made during short-term recall tend to sound like, but not look like, the correct items
  - Example: Might mistake “B” for “V”
- Inner eye:
  - Judgments made based on mental images are similar to those based on actual pictures
  - Example: When you picture something as being larger in your mind’s eye, easier to “see” small details in it

How Long Do Short-Term Memories Last?

- Can prolong short-term memories indefinitely through using rehearsal
  - A strategic process of internal repetition
  - Can prevent rehearsal with another task, such as counting backwards
- Without rehearsal, memories disappear after 1-2 seconds
What's the Capacity of Short-Term Memory?

- Memory span: Number of items that can be recalled from short-term memory, in order, on half of the tested memory trials
  - It's about 7 plus or minus 2 items
- Not absolute; also depends on:
  - How quickly items can be rehearsed
  - Chunking
    - Rearranging incoming information into meaningful or familiar patterns
    - Example: Chess experts can recall meaningful arrangements of pieces on a board (but not random arrangements)

Working Memory: A System for Short-Term Retention

- Several distinct mechanisms:
  - Phonological loop: Like the inner voice, stores word sounds
  - Visuospatial sketchpad: Stores visual and spatial information
  - Central executive: Determines which mechanism to use, coordinates among them
- Brain damage can selectively affect a single mechanism