

Memory

- What is memory for?
- Short term memory (STM)
- Characteristics of STM

Who has a better memory?

- Do people have better memories than computers?
 - Many people would say no.
- Why?
 - Standard memory task:
 - Give someone a list of 20 3-digit numbers
 - Give them 2 minutes to study the list
 - Their recall is poor
 - Computers can give verbatim recall with no errors.
 - Is that a good memory?

Yes and no...

- How many situations require verbatim recall?
 - Eyewitness testimony perhaps
 - College exams
- What is memory for?
 - Retrieve related items
 - Temporally related (events in sequence)
 - Conceptually related
 - Retrieve information, even though it is impossible to know in advance why or when it will be important
 - Much information is used to comprehend a situation
 - We must be able to remember spatial locations

Overview

- The next section of the course is about memory
- We start with some basic distinctions
 - Short term vs. long term memory
- Describe memory systems
- Discuss some complex effects in memory
Finish with an examination of visual memory.

STM and LTM

- And now for some jargon
 - Short term memory (STM)
 - Long term memory (LTM)
- Today, we focus on short term memory.

Short-term memory

- You know many things
 - Facts about history, science, and mathematics
 - Events in your life
 - Motor skills
 - This information is in long term memory
- A small amount of this is relevant at any moment
 - Thinking about irrelevant things would interfere
- Short term memory
 - Used to keep track of what is currently relevant
 - Limited capacity
 - Short duration

The capacity of short term memory

- About 7 chunks of information
 - Miller (1956)
 - Some controversy, some say closer to 3 items
- What's a chunk?
 - Information grouped into a meaningful unit
 - Words are chunks of letters
 - Multi-digit numbers are chunks of single digit numbers
 - Routes are chunks of locations

NA SAI RSB LTG OP

NASA IRS BLT GOP

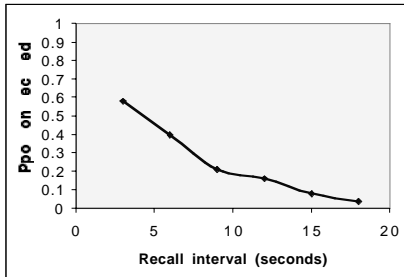
Applications

- Limitations of working memory are important in technology
 - Phone numbers must be short enough to remember
 - If numbers get too long, they must be chunked.
- Strategies for chunking can help you remember
 - Method of loci
 - Use a familiar route to remember new items
- Use the world as a source of memory
 - Why do we write things down?

Rehearsal

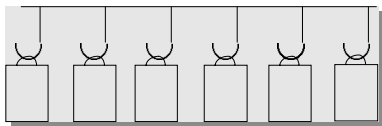
- Verbal information is rehearsed in STM
 - We do this when we remember a phone number
- Interfering with rehearsal interferes with STM
- Brown-Peterson paradigm
 - Learn a list of trigrams
 - (GBX, FRH, KP, ...)
 - Count backward by 3s from some number
 - 874, 871, 868...
 - Prevents rehearsal

Brown-Peterson results



Is STM just a set of hooks?

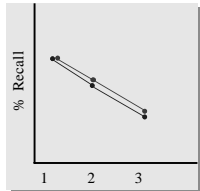
- Are there just 7 hooks in STM to hold information?
- What is the purpose of STM?



Proactive interference

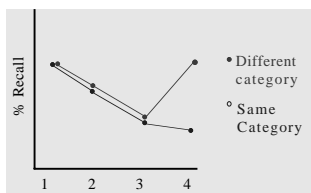
- STM is influenced the content of long term memory
- Proactive interference
 - Hear 3 items (from the same category) and recall them
 - Robin, Sparrow, Starling
 - Then here 3 more items from the same category
 - Bluebird, Crow, Seagull
 - Then 3 more items from the same category
 - Cardinal, Parakeet, Pigeon

Proactive interference (PI)



- Does this finding reflect memory organization?
 - Perhaps it is just fatigue
- Give a fourth block with new categories

Release from PI



- Recall improves when category changes
- Release from Proactive Interference
 - Suggests STM is organized around long term memory

So, what is STM?

- Working memory (Baddeley)
 - Phonological loop
 - Visuospatial sketchpad
- Phonological loop
 - Verbal short term memory (about a 2 second loop)
 - Useful for language comprehension
- Visuospatial sketchpad
 - Visual short term memory
 - Important for spatial tasks

Evidence for these components

- Phonological loop
 - Speed of rehearsal
- Interference effects
 - Visual tasks interfere with other visual tasks
 - Verbal tasks interfere with other verbal tasks
 - Visual tasks interfere less with verbal tasks (and vice versa)

moon jar fan

moon jar fan ball ham rat

What is STM for?

- Back to constraints
- We know many things
 - STM ensures that we do not consider too much information at once.
- Example: Communication
 - If we talk about cats, it would be useful if we focused only on information relevant to cats
 - Differences in what we know about other things (like the New York Giants) should not affect our conversation.
