

**Chapter 7: Memory:
Remembrance of Things
Past – and Future**

Truth or Fiction?

- A woman who could not remember who she was automatically dialed her mother's number when the police gave her a telephone.

- Oh say, can you see? If the answer is yes, you have a photographic memory.

Truth or Fiction?

- Learning must be meaningful if we are to remember it.

- It may be easier for you to recall the name of your first-grade teacher than the name of someone you just met at a party.

Truth or Fiction?

- All of our experiences are permanently imprinted on the brain, so the proper stimulus can cause us to remember them exactly.

- You may always recall where you were and what you were doing on the morning of September 11, 2001.

Truth or Fiction?

- If you study with the stereo on, you would probably do better to take the test with the stereo on.

- Learning Spanish can make it harder to remember French – and vice versa.

Truth or Fiction?

- After part of his hippocampus was surgically removed, a man could not form new memories. Each time he was reminded of his uncle's dying, he grieved as he had when he first heard of it.

- You may improve your memory by sniffing a hormone.

Preview of Chapter Seven

- Memory Systems
- Processes of Memory
- Stages of Memory
- Forgetting
- The Biology of Memory

**Memory Systems:
Pressing the “Rewind” and
“Fast-Forward” Buttons**

Explicit Versus Implicit Memories

- Explicit memory – declarative memory
 - Memory for specific information; that can be stated or declared
 - Information can be autobiographical or general
- Implicit memory – nondeclarative memory
 - Memory of how to perform a procedure or skill

Episodic and Semantic Memory

- Episodic memory – autobiographical memory
 - Memories of things that happen to us or take place in our presence
 - Explicit memories
- Semantic memory
 - General knowledge

Implicit Memory

- Implicit memory
 - Suggested but not plainly stated or verbally expressed
- Procedural memory – Skill memory
 - Things people do, not things stated clearly
 - Things done repeatedly - habits

Priming

- Memory of things that reflect repetition that makes associations automatic
 - Memory of the alphabet or multiplication tables
 - Requires less neural activity

**Retrospective Memory Versus
Prospective Memory**

- Retrospective memory
 - Recalling information previously learned
 - Episodic, semantic and implicit memories
- Prospective memory
 - Remembering things to do in the future

Prospective Memory

- Prospective memory tasks
 - Habitual tasks
 - Easier to remember than occasional tasks
 - Event-based tasks
 - Triggered by events
 - Time-based tasks
 - Performed at a certain time or after a certain time has elapsed

**Influences on Retrospective and
Prospective Memory**

- Age related decline
 - More related to speed of cognitive processing than loss of information
- Moods and attitudes and prospective memory
 - Depressed people less likely to push to remind themselves to do what they intend to do

**Processes of Memory:
Processing Information in Our
Most Personal Computers**

Information Processing: Encoding

- Transforming information into psychological formulas that can be represented mentally
 - Visual – represented as a picture
 - Auditory – represented as sounds
 - Semantic – represented in terms of meanings

Information Processing: Storage

- Maintaining information over time
- Methods of storing information
 - Maintenance rehearsal
 - Elaborative rehearsal

Information Processing: Retrieval

- Locating information and returning it to consciousness
- Retrieval relies on cues

What is Memory?

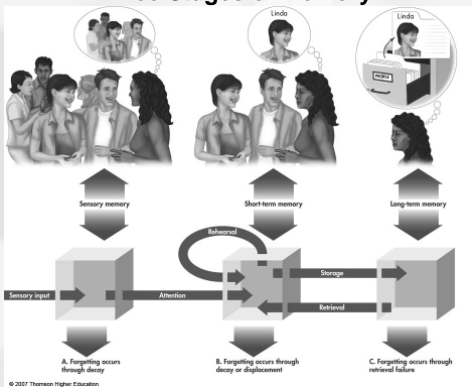
- Memory is the process by which information is encoded, stored, and retrieved

**Stages of Memory:
Making Sense of the
Short and the Long of It**

Atkinson-Shiffrin Model of Memory

- Three stages of memory
 - Sensory memory
 - Short-term memory (STM)
 - Long-term memory (LTM)
- Information progress through these three stages determines whether and how long it is stored

Three Stages of Memory



Sensory Memory

- First stage of memory encountered by a stimulus
- Holds impressions briefly, but long enough so series of perceptions become psychologically continuous
 - Memory trace
 - Decays within a second
 - Sensory register

Iconic Memory

- Sensory register that holds icons
 - Icons are the mental representations of visual stimuli
- Brief, but accurate, photographic memories
 - Photographic or Eidetic imagery
 - mental representations of visual stimuli over long periods of time
- Iconic memory is common, eidetic memory is not

Echoic Memory

- Sensory register that holds echoes
 - Echoes are the mental representations of sounds
- Memory traces of echoes last longer than icons

Short-Term Memory

- Focusing on a stimulus in the sensory register, maintains it in short-term memory (STM) for a minute or so after the trace decays
 - Also called working memory
- Rehearsal allows information to be retained indefinitely

Serial Position Effect

- Tendency to recall the first and last items in a series
 - May be more attention to first and last items
 - May rehearse first item more often and last most recently

Chunking

- A grouping of stimuli that is perceived as a discrete piece of information
- Number of items held in STM –
 - Seven (plus or minus two)
 - Chunking stimuli allows for semantic coding

Human Memory

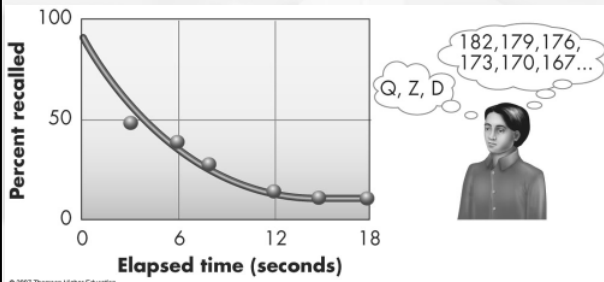


PLAY VIDEO

Interference in Short-Term Memory

- Attention to distracting information interferes with STM
- Appearance of new information in STM *displaces* old information

The Effect of Interference on Short-Term Memory












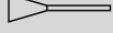


Long-Term Memory

- Long-term memories are reconstructed
 - Schemas bias our memories
- No known limit known for amount of information stored in long-term memory (LTM)
- Long-term memories may last a life-time
 - Not lost by displacement

Video Connections: Reconstructive Memory

- What kinds of factors influence a person's memory? How could these factors affect eyewitness testimony?
- What is a "leading" question? Why does it "lead"?

Memory as Reconstructive

Figures shown	Group 1	Group 2
	 Eyeglasses	 Dumbbell
	 Hourglass	 Table
	 Seven	 Four
	 Gun	 Broom

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Transferring Information from Short-Term Memory to Long-Term Memory

- Maintenance Rehearsal
 - Repeating information over and over
- Elaborative Rehearsal
 - Relating new material to well-known material

Levels of Processing Model of Memory

- Memories endure when processed deeply
 - Attention, encoding, storing, retrieval all involved

Flashblub Memories

- Tend to remember events that are important and emotionally stirring
 - Memories are more distinctive
 - Increased networks of association
 - Elaborative rehearsal

Organization in Long-Term Memory

- Categorization of information
 - Hierarchical structure
 - Superordinate classes of information

Tip of the Tongue Phenomenon

- “Feeling of knowing”
 - Acoustic and semantic coding may help provide a useful retrieval cue
 - May reflect incomplete learning

Context and State Dependent Memory

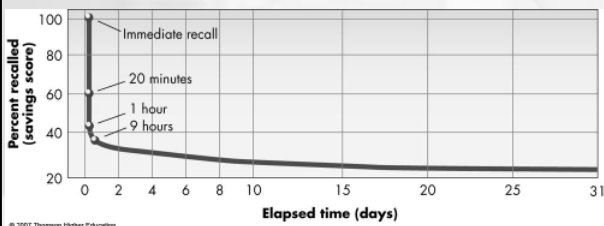
- Context dependent
 - Déjà vu experience
- State dependent
 - Biological or emotional state

Forgetting: Will You Remember How We Forget?

How do We Measure Forgetting?

- Nonsense syllables
 - Depend on acoustic coding and maintenance rehearsal
- Three tasks for measurement
 - Recognition
 - Recall
 - Relearning
 - Method of Savings

Ebbinghaus's Classic Curve of Forgetting



Interference Theory

- Retroactive interference
 - New learning interferes with the retrieval of old learning
- Proactive interference
 - Older learning interferes with the capacity to retrieve more recently learned material

Repression

- Freudian concept of motivated forgetting
 - Automatic ejection of painful memories from conscious awareness
 - Dissociative amnesia

Recovered Memories

- Recovery of repressed memories has little scientific support
- Implanting false memories

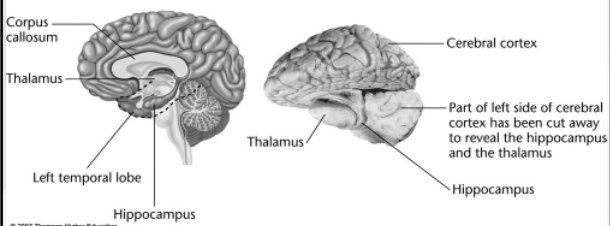
Infantile Amnesia

- Freud – repression
- Immature hippocampus
- Cognitive explanations
 - No interest in remembering the past
 - Specific episodes versus networks of memories
 - Unreliable use of symbolic language

Anterograde and Retrograde Amnesia

- Anterograde Amnesia
 - Unable to remember events that occur after physical trauma
- Retrograde Amnesia
 - Unable to remember events that occur prior to physical trauma

The Hippocampus



The Biology of Memory: The Brain as a Living Time Machine

Neural Activity and Memory

- Experience increases dendrites and synapses in cerebral cortex
- Long-term potentiation
 - Following brief, rapid stimulation an enhanced efficiency in synaptic transmission
- Neurotransmitters and hormones

One Avenue to Long-Term Potentiation (LTP)



Brain Structures and Memory

- Hippocampus
 - new memories; episodic memories
- Cortex areas
 - Store sensory information
- Prefrontal cortex
 - Ability to represent and be aware of past, present and future events
- Thalamus
 - Formation of verbal memories
