Memory

Cont.

- Memory is more than a single process.
- It allows us to acquire, retain and recall information in our memory.
- The process of remembering is affected by a common phenomenon called forgetting.
- Memory allows as to acquire, retain and recall information and the corresponding processes are encoding, storage and retrieval.

Cont.

- **Encoding:** - the process of converting information in to a form that can be entered and stored in memory.

- **Storage:** - the process where by an encoded memory is held for future use.

- **Retrieval:** - the process where by a stored memory is brought in to consciousness.
-

Information processing model of memory stage model

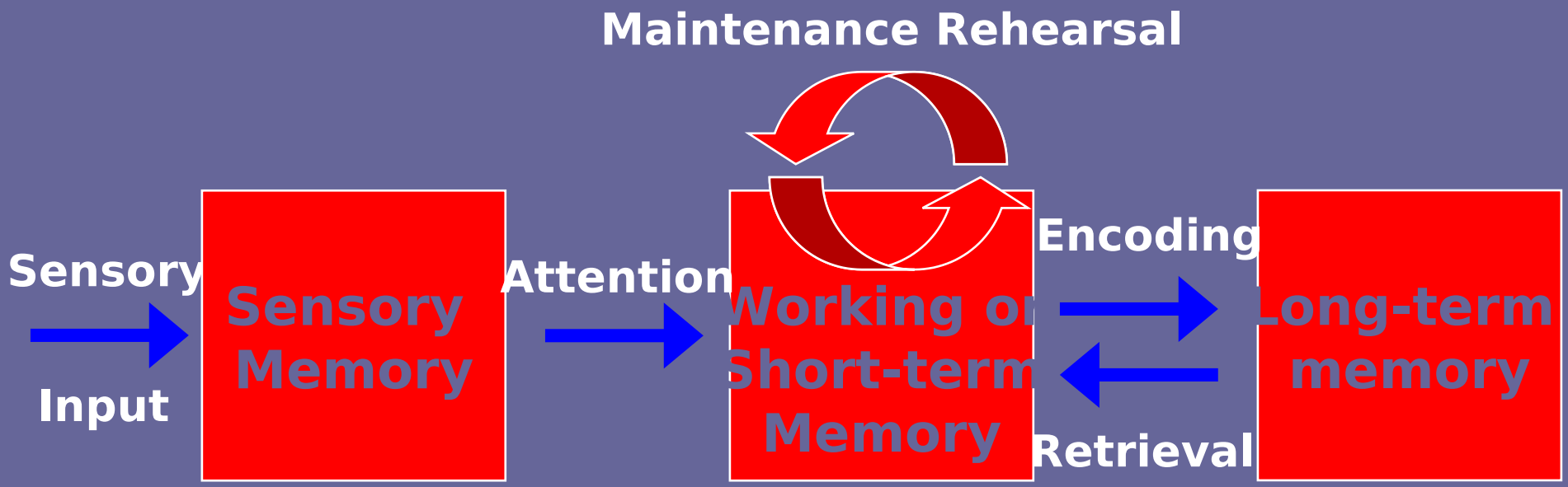
- Memory is currently thought to have three stages very short, short and long. These stages vary.
  - In type of information
  - Function
  - Duration and
  - Capacity

Memory Processes

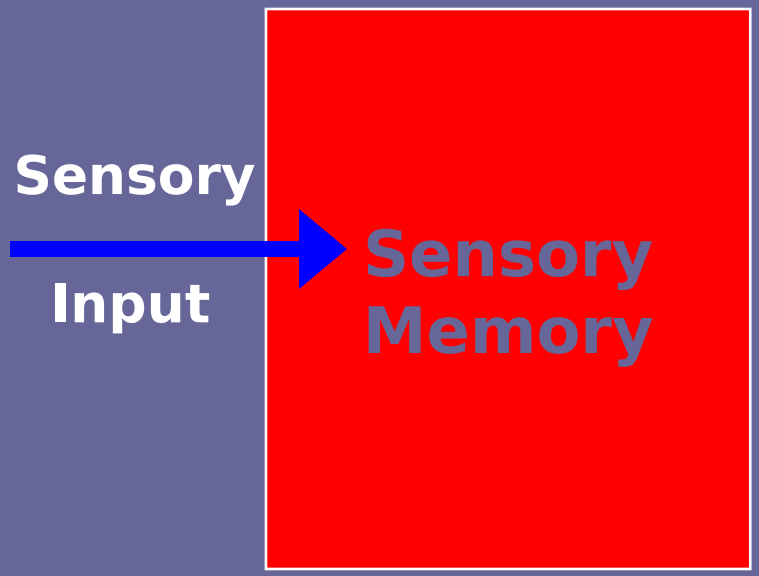
- Encoding--transforming information into a form that can be entered and retained in the memory system
- Storage--retaining information in memory so that it can be used at a later time
- Retrieval--recovering information stored in memory so that we are consciously aware of it

Three Stages of Memory

- Three memory stores that differ in function, capacity and duration

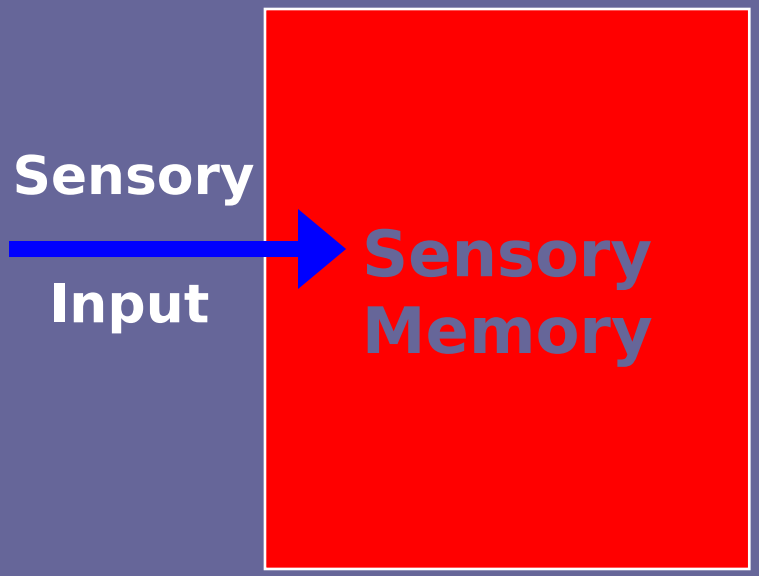


Sensory Memory



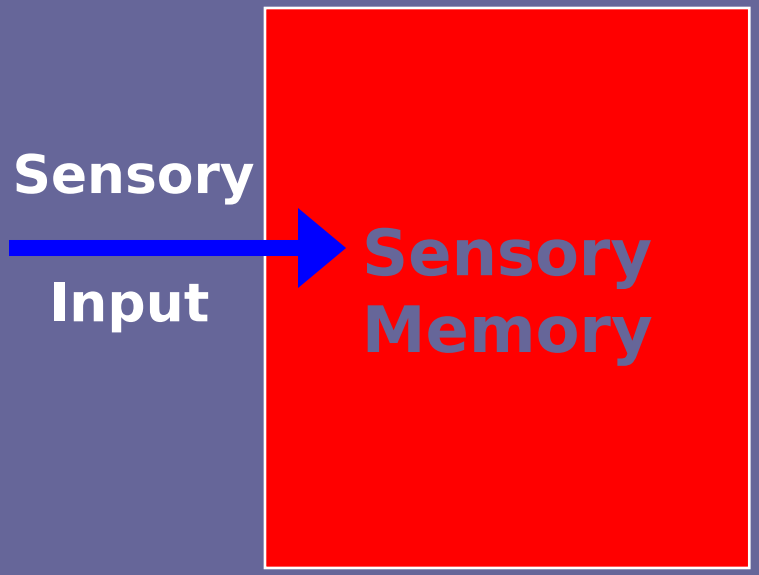
- Function—holds information long enough to be processed for basic physical characteristics
- Capacity—large
  - can hold many items at once
- Duration—very brief retention of images
  - 3 sec for visual info
  - 2 sec for auditory info

Sensory Memory



- Divided into two types:
  - iconic memory– visual information
  - echoic memory– auditory information
- George Sperling studied iconic memory

Sensory Memory

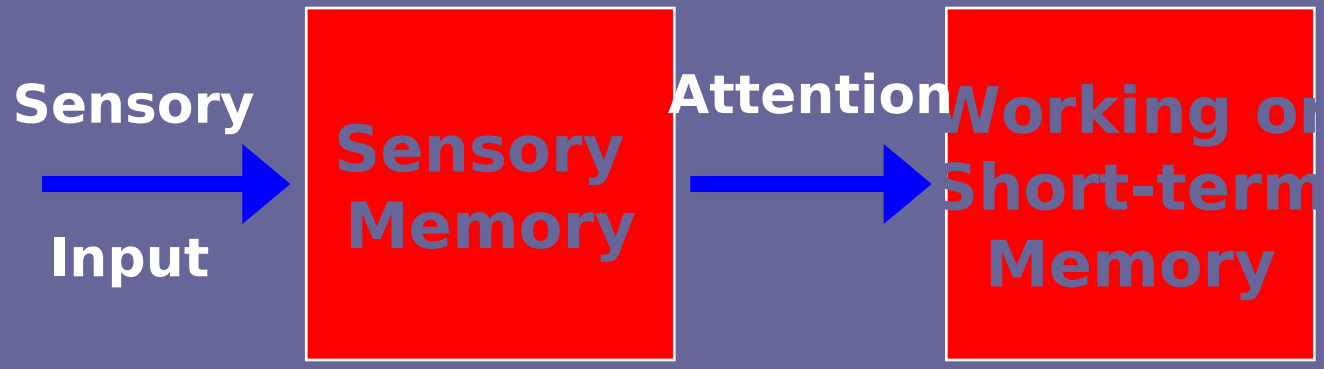


- Sensory memory forms automatically, without attention or interpretation
- Attention is needed to transfer information to working memory

Sensory Memory

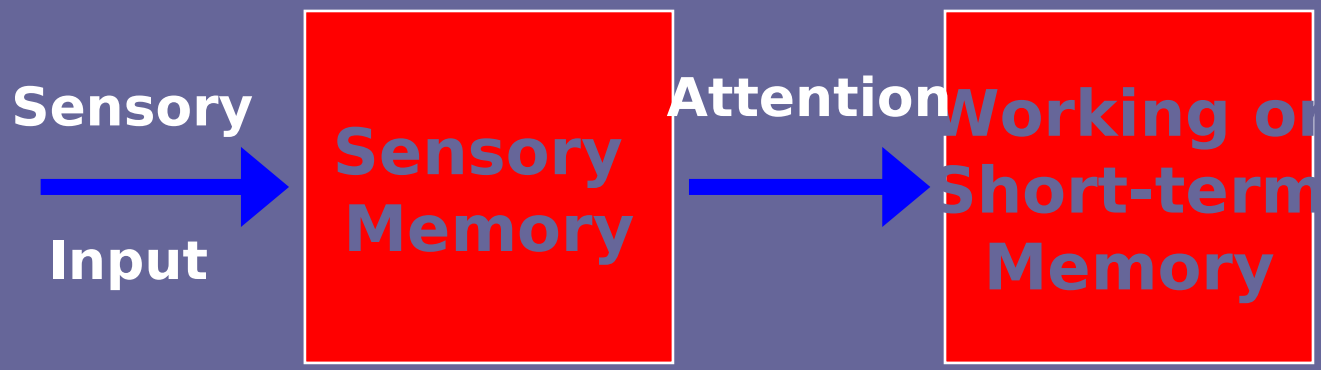
- Visual sensory memory—brief memory of an image or icon. Also called iconic memory.
- Auditory sensory memory—brief memory of a sound or echo. Also called echoic memory.
- Auditory sensory memories may last a bit longer than visual sensory memories

Short Term or Working Memory



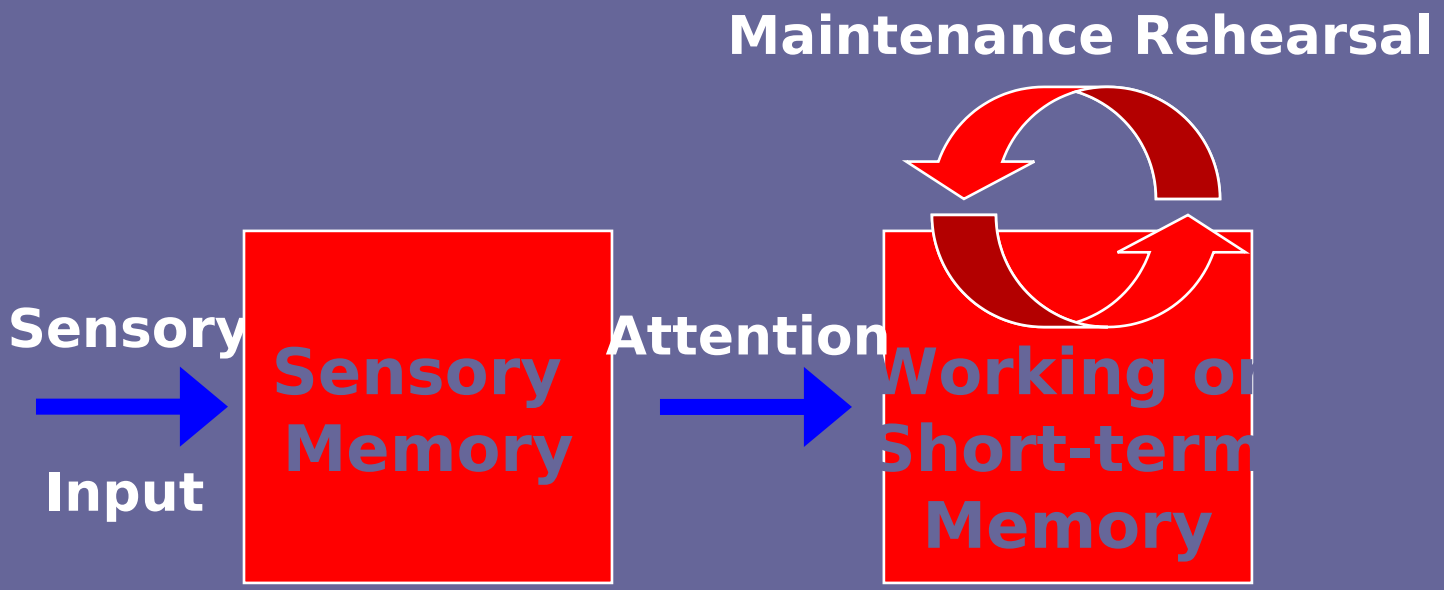
Short-Term Memory

- Function—conscious processing of information
  - where information is actively worked on
- Capacity—limited (holds 7+/-2 items)
- Duration—brief storage (about 30 seconds)



Maintenance Rehearsal

- Mental or verbal repetition of information allows information to remain in working memory longer than the usual 30 seconds

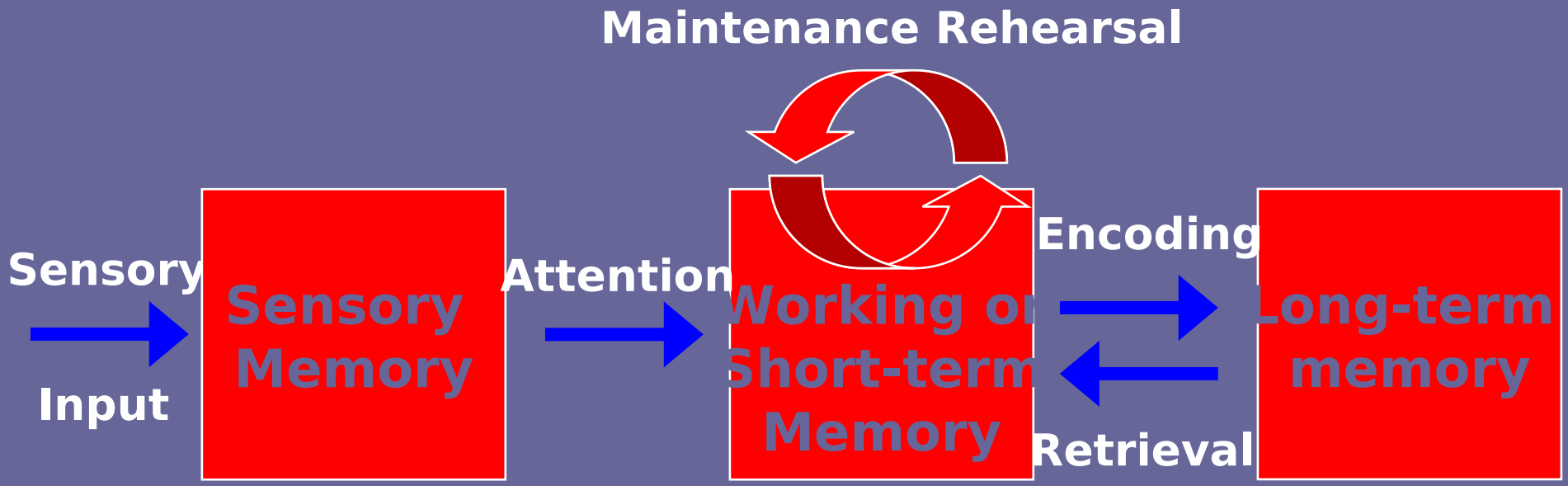


Chunking

- Grouping small bits of information into larger units of information
  - expands working memory load
- Which is easier to remember?
  - 4 8 3 7 9 2 5 1 6
  - 483 792 516

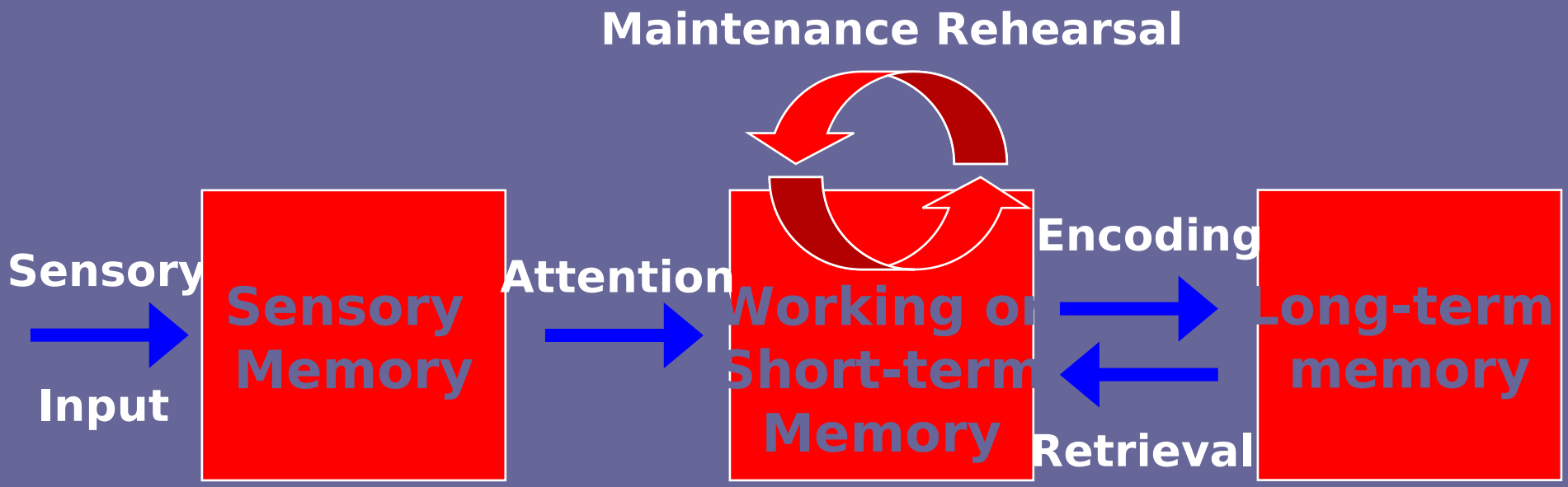
Long-Term Memory

- Once information passes from sensory to working memory, it can be encoded into long-term memory



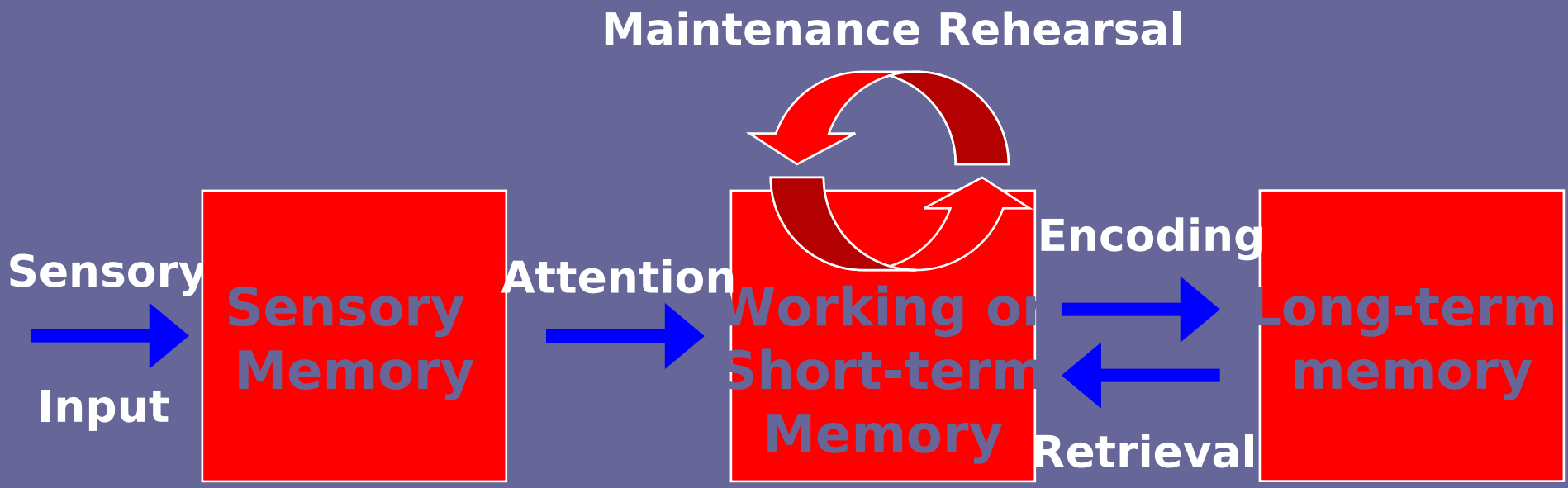
Long-Term Memory

- Function—organizes and stores information
  - more passive form of storage than working memory
- Unlimited capacity
- Duration—thought by some to be permanent



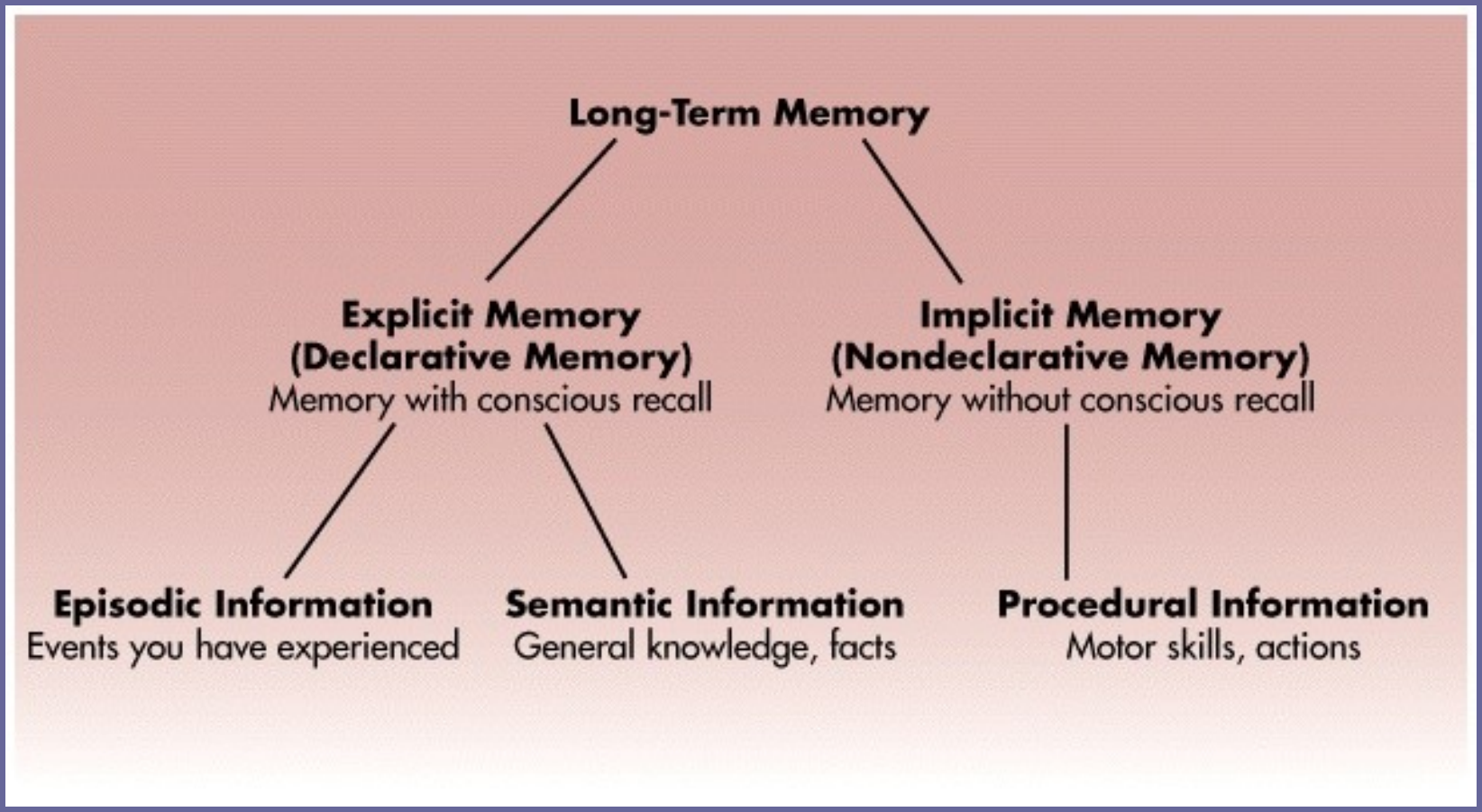
Long-Term Memory

- Encoding—process that controls movement from working to long-term memory store
- Retrieval—process that controls flow of information from long-term to working memory store



Types of Long-Term Memory

- Explicit memory—memory with awareness; information can be consciously recollected; also called declarative memory
- Implicit memory—memory without awareness; memory that affects behavior but cannot consciously be recalled; also called non-declarative memory


Long-Term Memory
Explicit Memory
(Declarative Memory)
Memory with conscious recall
Implicit Memory
(Nondeclarative Memory)
Memory without conscious recall
Episodic Information
Events you have experienced
Semantic Information
General knowledge, facts
Procedural Information
Motor skills, actions

Explicit Memory

- Declarative or conscious memory
- Memory consciously recalled or declared
- Can use explicit memory to directly respond to a question
- Two subtypes of explicit memory

Explicit Memory

- Episodic information—information about events or “episodes”
- Semantic information—information about facts, general knowledge, school work

Episodic Memory

- Memory tied to your own personal experiences
- Examples:
  - What month is your birthday?
  - Do you like to eat apples?
- Q: Why are these explicit memories?
- A: Because you can actively declare your answers to these questions

Semantic Memory

- Memory not tied to personal events
- General facts and definitions about the world
- Examples:
  - How many tires on a car?
  - What is a cloud?
  - What color is a banana?

Implicit Memory

- Nondeclarative memory
- Influences your thoughts or behavior, but does not enter consciousness

Procedural Memory

- Memory that enables you to perform specific learned skills or habitual responses
- Examples:
  - Riding a bike
  - Using the shift stick while driving
  - Tying your shoe laces
- Q: Why are these procedural memories implicit?
- A: Don’t have to consciously remember the steps involved in these actions to perform them
  - Try to explain to someone how to tie a shoelace

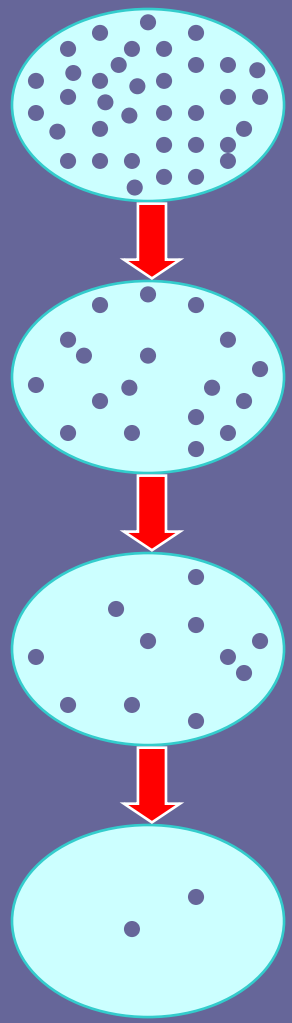
Why do we forget?

Sensory memory
The senses momentarily register amazing detail

Short-term memory
A few items are both noticed and encoded

Long-term storage
Some items are altered or lost

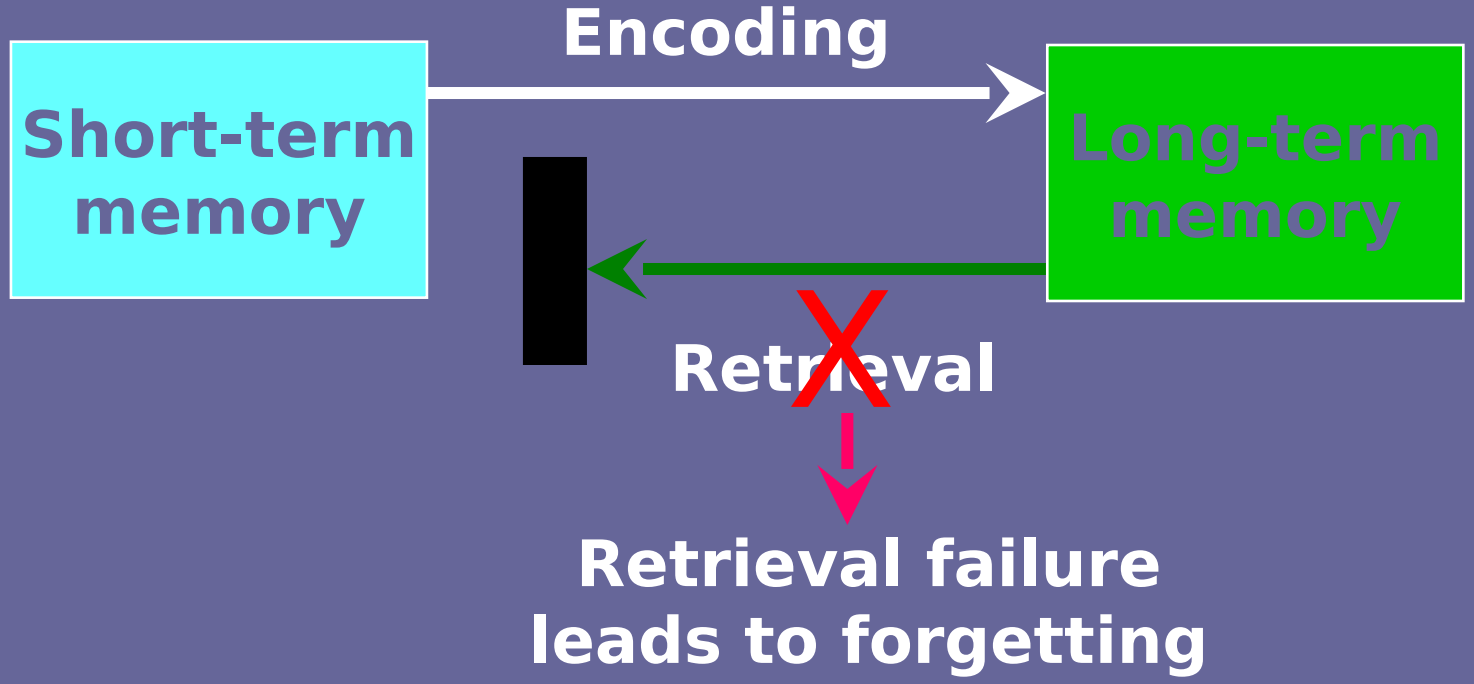
trieval from long-term memo
pending on interference, retriev
cues, moods, and motives, some things get retrieved, some don't



- Forgetting can occur at any memory stage

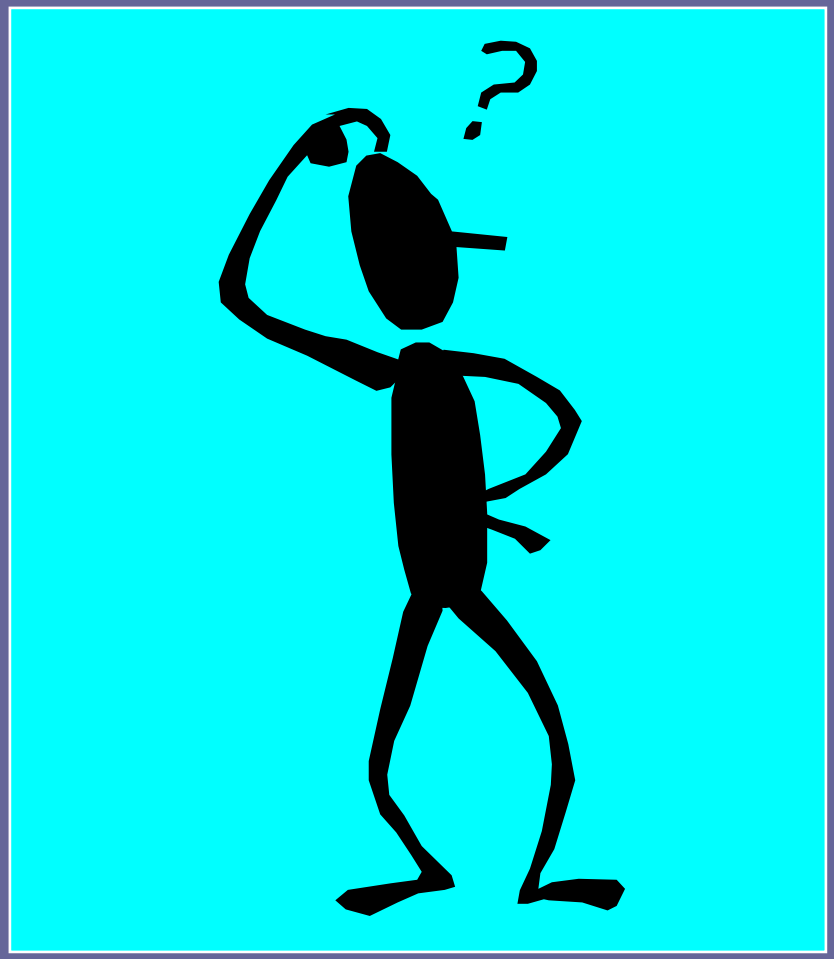
Forgetting as retrieval failure

- Retrieval—process of accessing stored information
- Sometimes info IS encoded into LTM, but we can't retrieve it



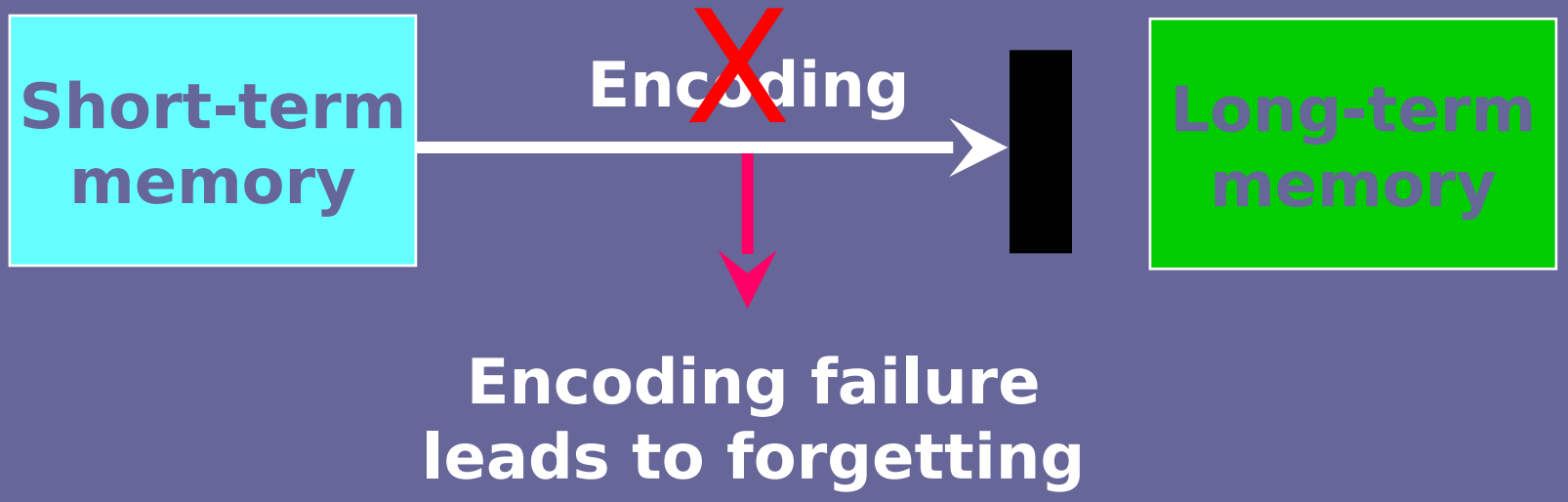
Forgetting Theories

- Encoding failure
- Interference theories
- Motivated forgetting
- Decay



Forgetting as encoding failure

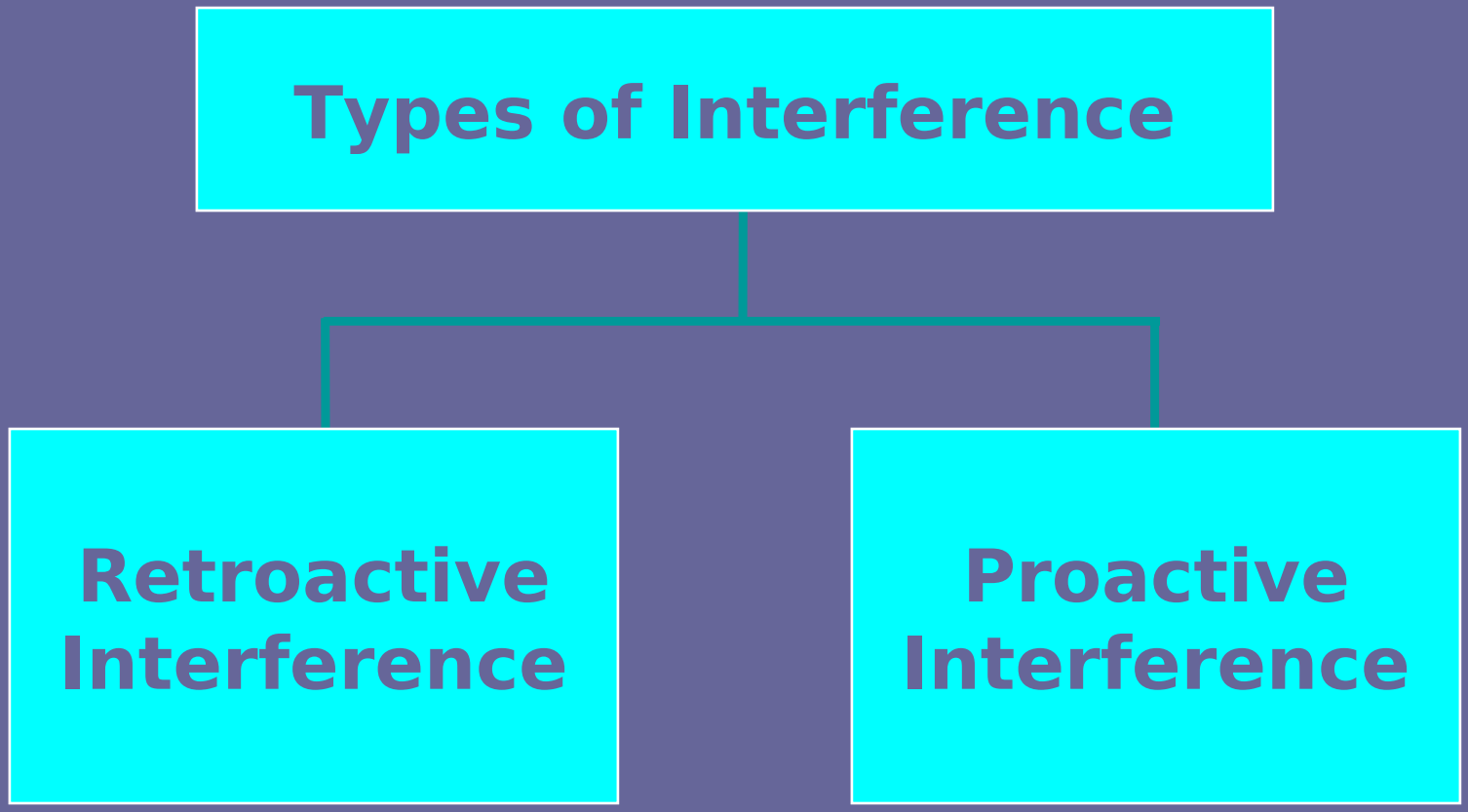
- Info never encoded into LTM



Interference Theories

- “Memories interfering with memories”
- Forgetting NOT caused by mere passage of time
- Caused by one memory competing with or replacing another memory
- Two types of interference

Two Types of Interference

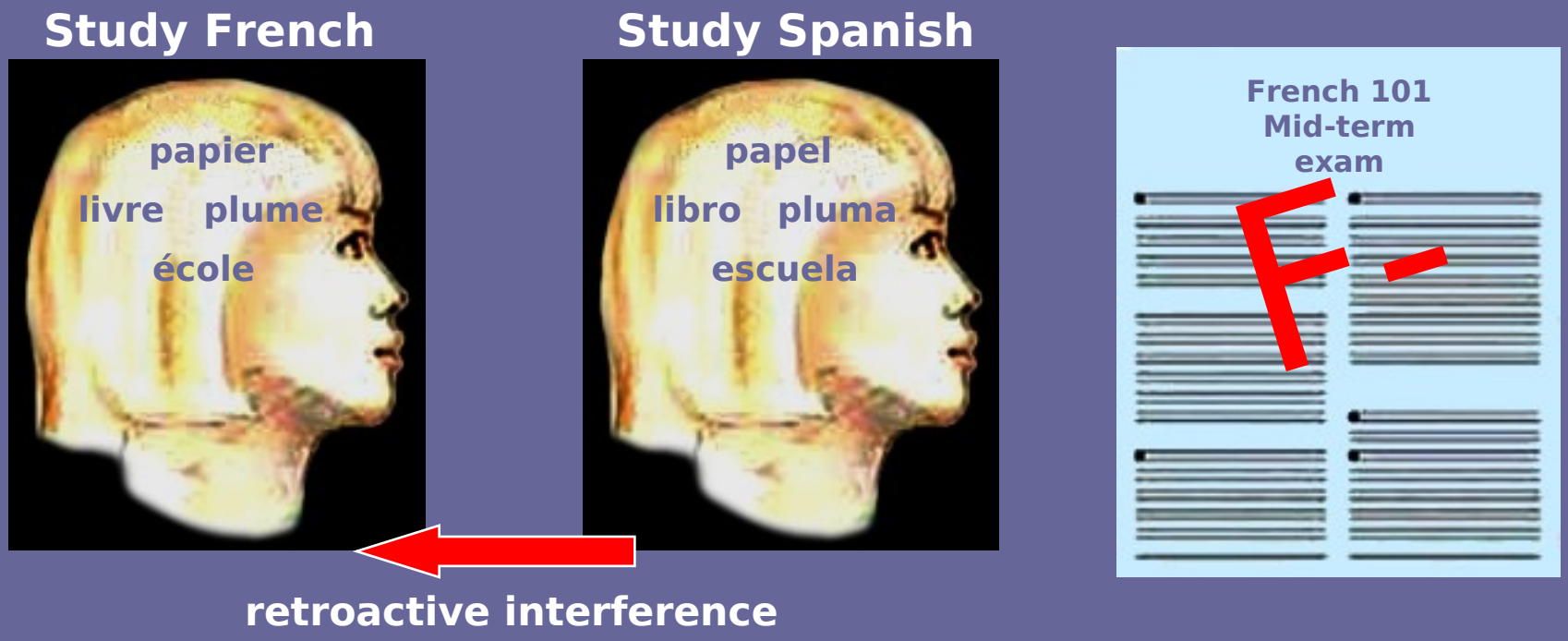


Retroactive Interference

- When a NEW memory interferes with remembering OLD information
- Example: When new phone number interferes with ability to remember old phone number

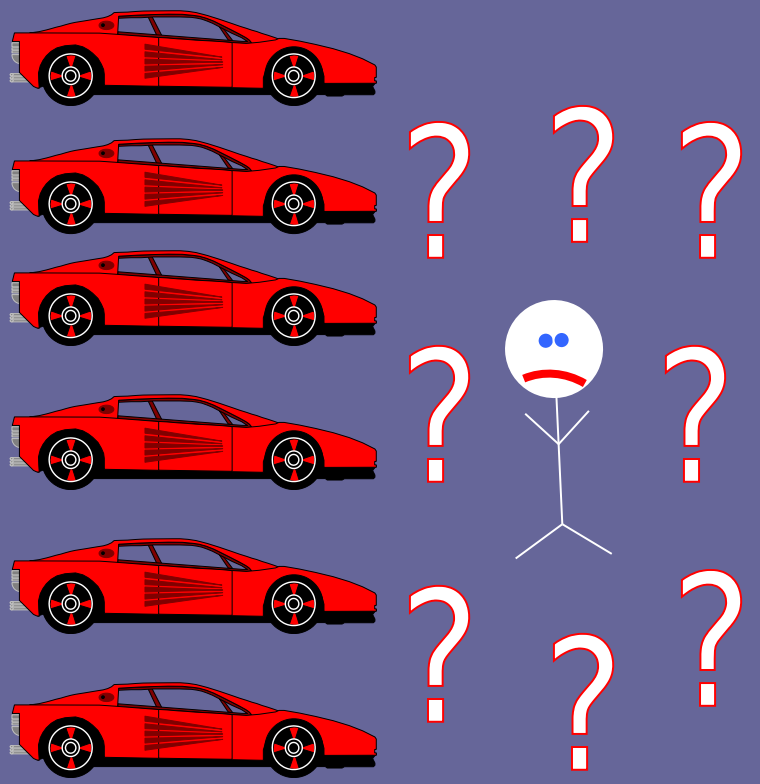
Retroactive Interference

- Example: Learning a new language interferes with ability to remember old language



Proactive Interference

- Opposite of retroactive interference
- When an OLD memory interferes with remembering NEW information
- Example: Memories of where you parked your car on campus the past week interferes with ability find car today

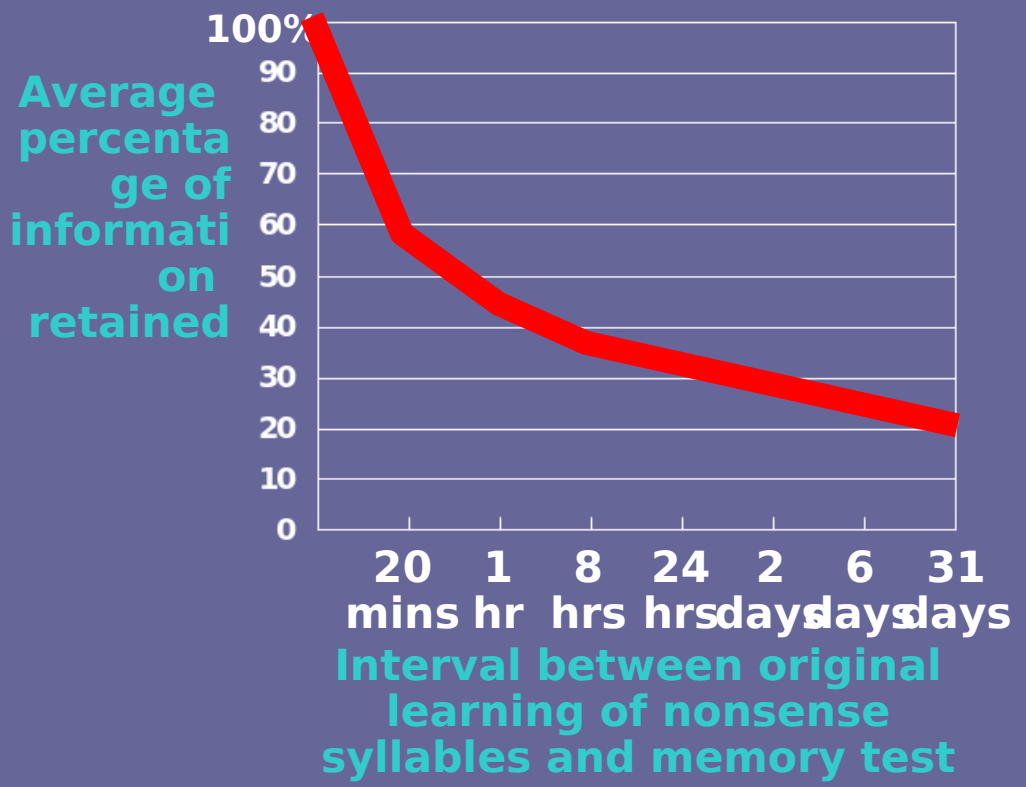


Motivated Forgetting

- Memories that would cause unhappiness or suffering if brought to mind are often forgotten.
- There may be cases in which we would like to forget so making, such as a trauma, painful insult, threats to our like, high way collision and other such experiences.
- Undesired memory is held back form awareness
  - Suppression—conscious forgetting
  - Repression—unconscious forgetting (Freudian)

Decay Theories

- Memories fade away or decay gradually if unused
- Time plays critical role
- Ability to retrieve info declines with time after original encoding



Decay Theories

- Biology-based theory
- When new memory formed, it creates a *memory trace*
  - a change in brain structure or chemistry
- If unused, normal brain metabolic processes erode memory trace
- Theory not widely favored today

Amnesia

- Amnesia—severe memory loss
- Retrograde amnesia—inability to remember past episodic information; common after head injury; need for *consolidation*
- Anterograde amnesia—inability to form new memories; related to hippocampus damage