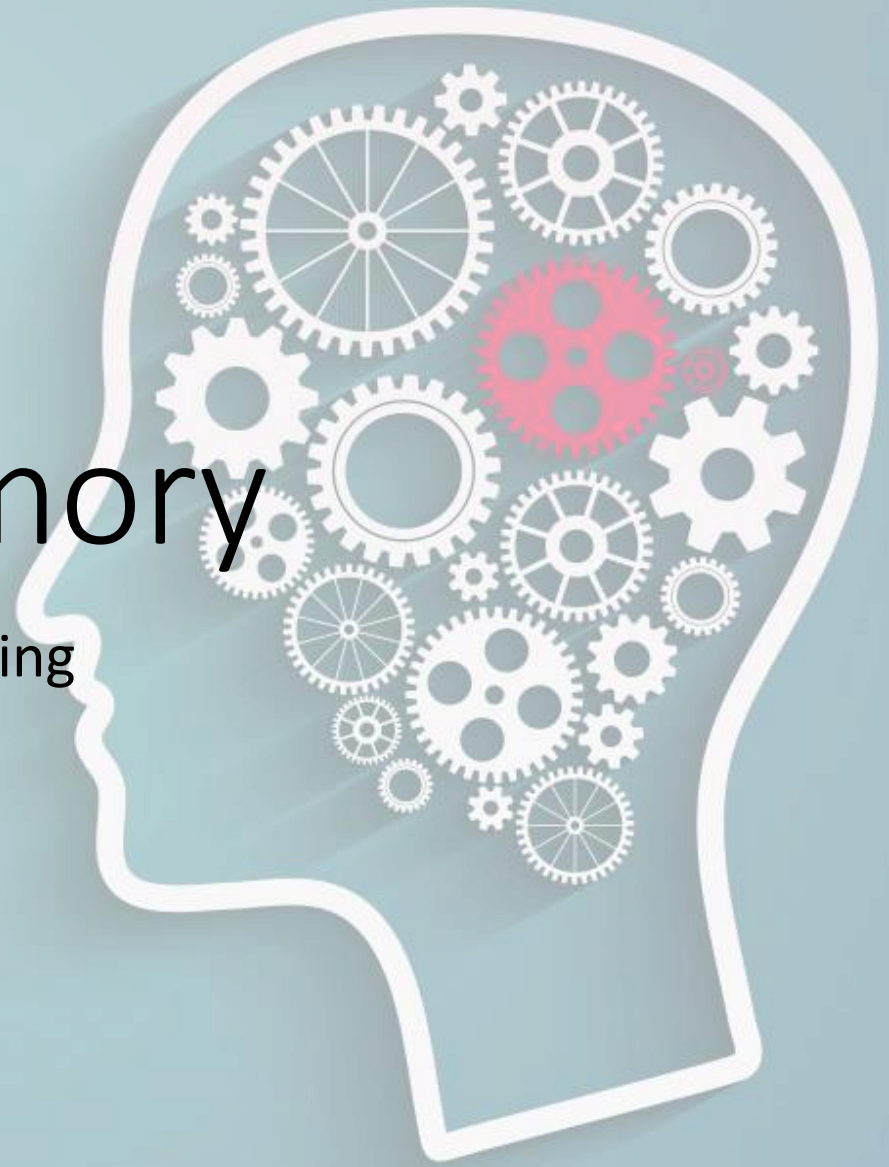
Human Memory

The Principles of Learning

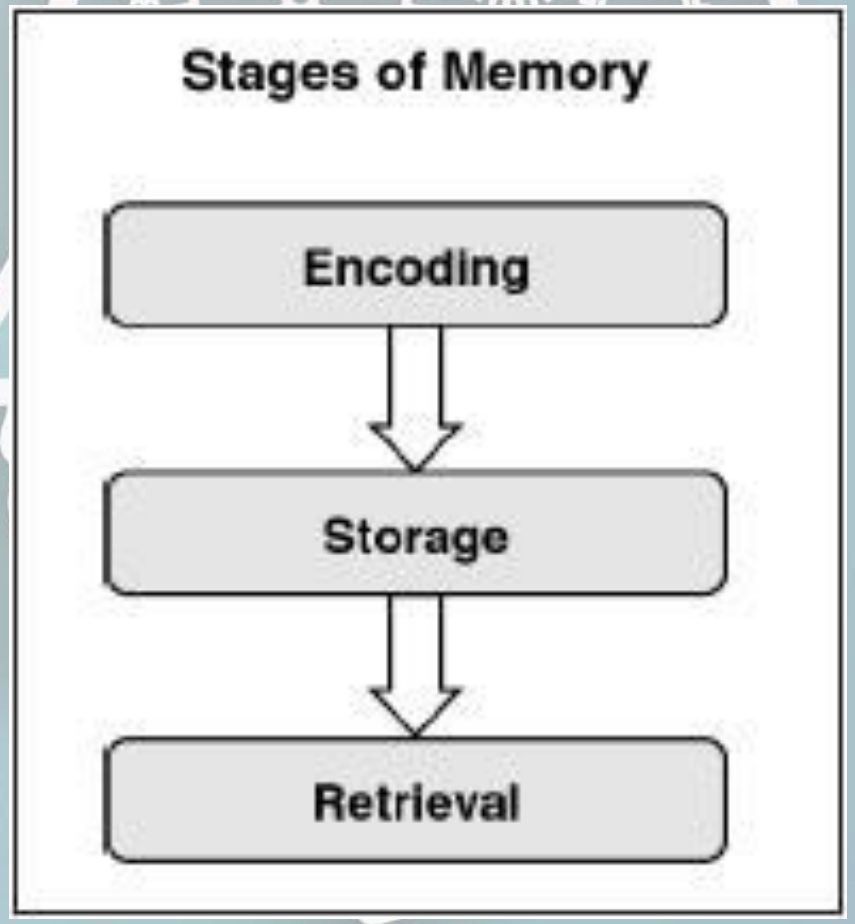


Basics of Memory

- Since all human's brains are different, there are many different ways that humans are able to learn and remember information
  - **Visual Learners**
    - Learn by seeing
  - **Auditory Learners**
    - Learn by hearing
  - **Read-Write Learners**
    - Learn by reading and writing
  - **Kinesthetic Learners**
    - Learn by doing

The Process of Processing Information

- **Encoding** – Getting information into the memory system
  - Process of Learning Information
- **Storage** – Retaining information in memory over time
  - Process of Remembering Information
- **Retrieval** – Getting information out of memory storage
  - Process of Recalling Information

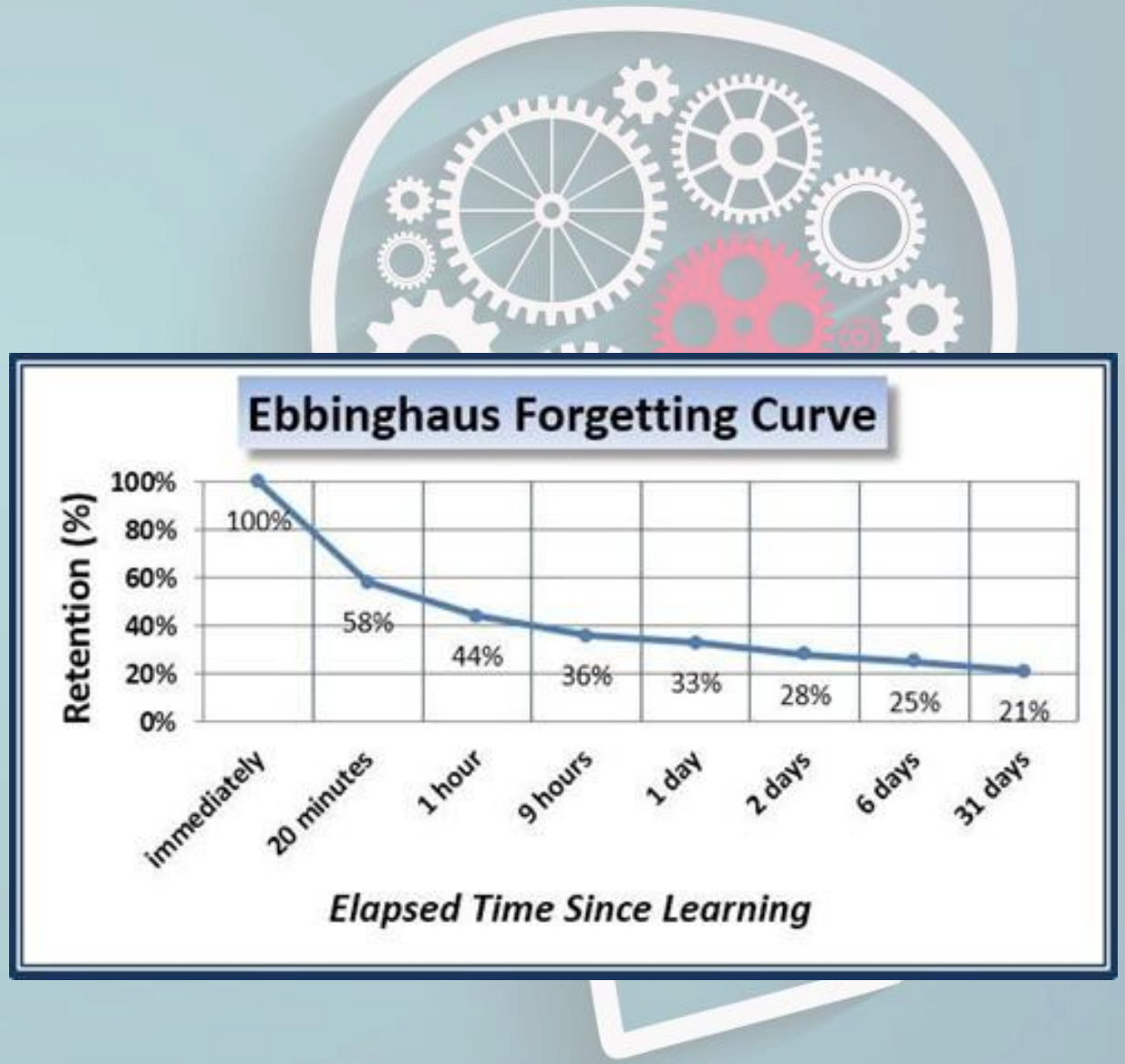


Encoding Information

- Humans have two main ways of remembering information and skills
- **Automatic Processing** - The unconscious encoding of some information without effort
  - Ex. Riding a bike, you remember how to do it, but have not taken any step to remember how
- **Effortful processing** - Encoding that requires attention and conscious effort
  - Rehearsal - Conscious repetition of information
    - Ex. Practicing the Piano
  - Overlearning - rehearsal of info beyond the point where it has been learned
    - Ex. Memorizing the names of the Presidents by studying what each is famous for

Retaining Information

- Psychologist Hermann Ebbinghaus theorized the Forgetting Curve in 1885
- Related the amount of information retained over time
- Found the more time spent of learning the longer it is retained
  - Revisiting information leads to greater/longer retention

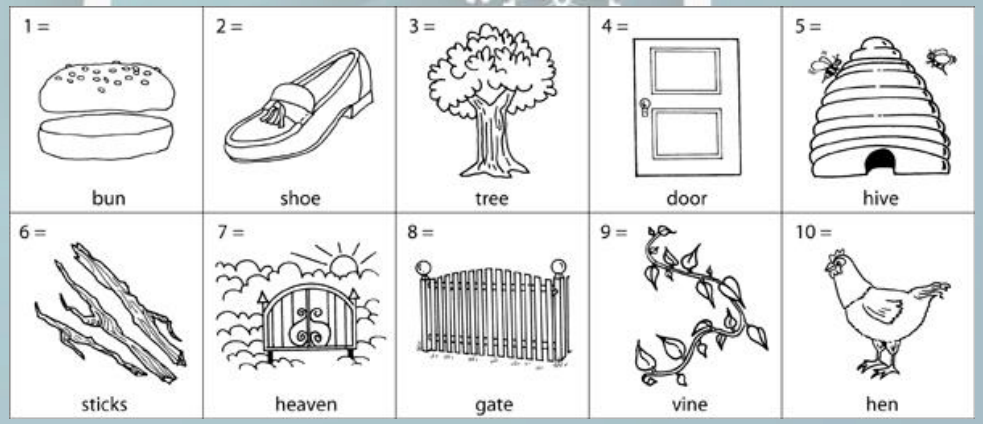


Specialized Memory Tendencies

- **Primary** and **Recency Effect** – The tendency to remember the first (primary) and last (regency) items in a sequence
  - Ex. When listing actors and actresses in a film preview the first and last actors/actresses listed are usually the one that people most relate to the movie
    - Also typically the highest paid
- **Chunking –** Organizing information into meaningful units
  - Remembering States by grouping them together by region

Specialized Memory Tendencies

- **Mnemonic Devices** – memory tricks or techniques
  - Ex. HOMES – way to remember Great Lakes
- **Method of Loci** – Associating items to remember with imaginary places
  - Ex. Remembering birthday by picturing park it was held at
- **Peg-Word System** – Associating items with a list of peg words you have already memorized.



Rehearsal and Retention

- Effectiveness of rehearsal depends on when you do it. Research shows Distributed rehearsal more effective than Masses.
  - **Distributed rehearsal** – Spreading rehearsal out in several sessions separated by periods of time
    - Ex. Studying for a test by reviewing pieces of information every day the week leading up to the test
  - **Massed rehearsal** – putting together rehearsal time in one long session
    - Ex. Cramming for a test by studying everything the night before a test

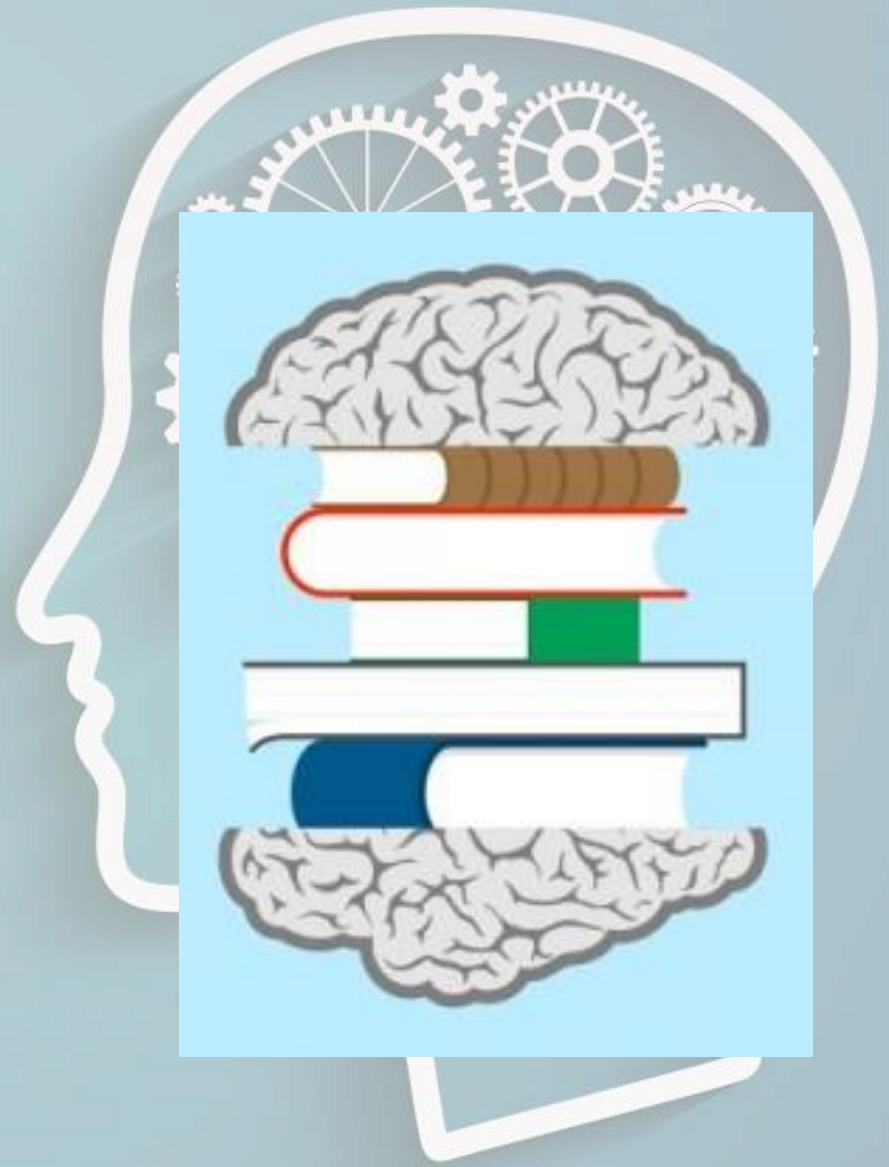
Associating Meaning to Memories

- Rehearsal is important to encoding, but the meaningfulness of the information is also important. Associating memories with other methods helps greater retention
- Semantic Encoding – The encoding of memory by associating it with a picture, sound, smell, etc…
  - Ex. Associating screeching tires with memory of car accident
- Self-Reference Effect – Enhanced semantic encoding of information that is personally relevant
  - Ex. Victim is able to remember event much more vividly than bystander since event happened to them

Ex. Associating effects of Meth use with picture

Methods of Storage

- Humans have 3 distinct storage systems:
  - Sensory memory (least permanent)
  - Short-term/working memory
  - Long-term memory (most permanent)
- Separated into Explicit and Implicit Memories
  - **Explicit** - Memory of facts and experiences
  - **Implicit** - Memory of skills and procedures



Sensory Storage

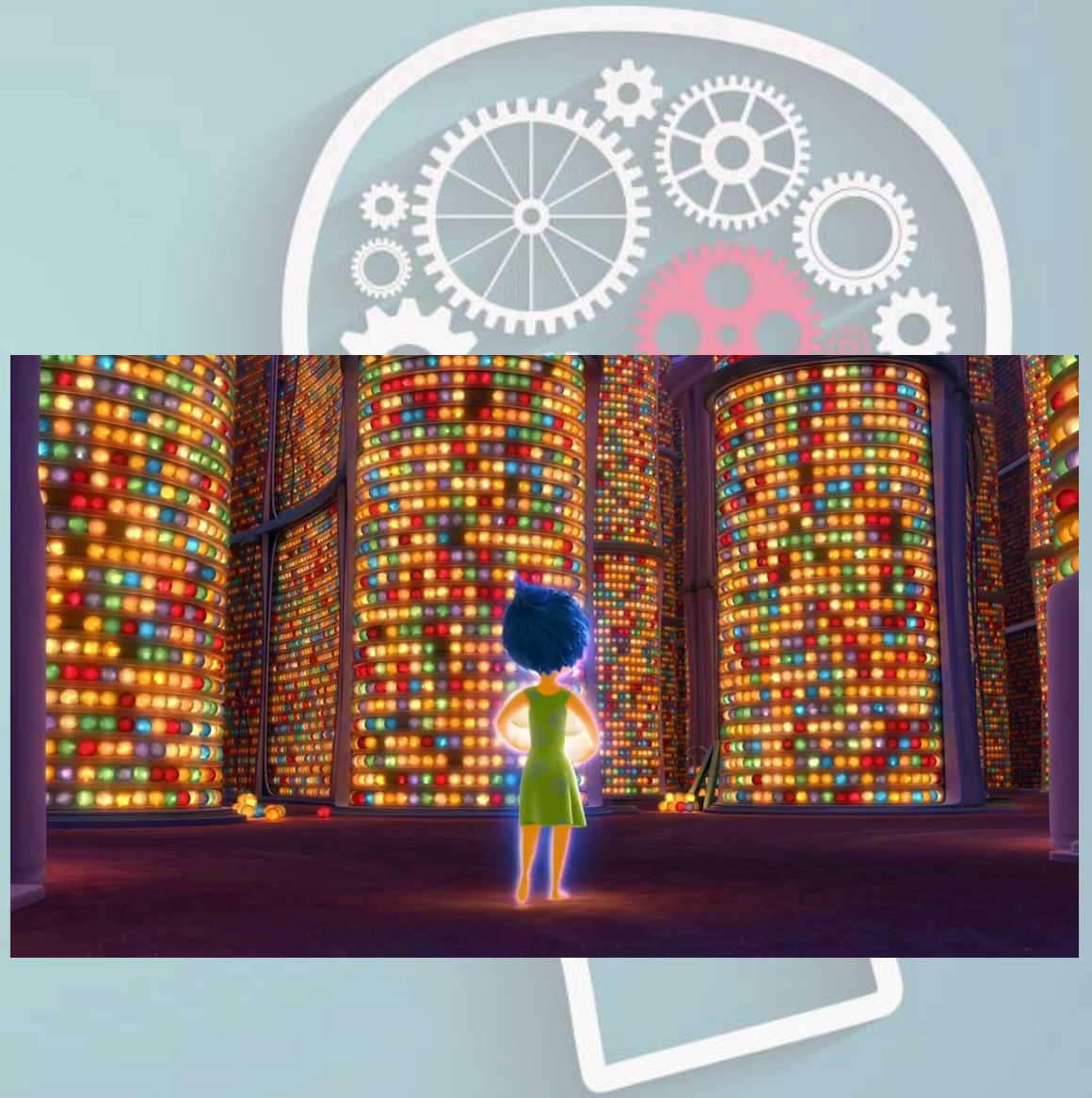
- The brief, initial coding of sensory info in the memory system
  - **Iconic Store** - Storing of visual images until another picture replaces it
    - Usually lasts for about ½ a second
  - **Echoic store** - Storing of auditory information
    - Usually lasts for about 3-4 seconds

Short-Term/Working Memory

- Part of your memory system that contains information you are consciously aware of before it is stored more permanently or forgotten
  - We can only hold a few pieces of information in our short-term memory (maybe 4-7 items)
  - Rehearsal dictates how long you can retain info in this portion of our memory

Long-Term Memory

- Relatively permanent and limitless storage of the memory system
  - You can remember countless facts and events you have been encoded and stored at some point in long term memory.
  - Possibly lasts up to a century



Recalling Memory

- Ability to get information out of memory storage
  - **Recall** - Searching for information you previously stored
  - **Recognition** - Must identify items you learned earlier
- **Context Effect** - Ability to retrieve information when you are in an environment similar to the one in which you encoded the information
- **State Dependency** - Ability to retrieve information when you are in the same physical and emotional state you were in when you encoded the information