

# Block 3.

# Learning & Memory

## Artificial Intelligence

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# Memory

# Memory

- 1 Learning, memory and forgetting
- 2 Short-term and Long-term memory
- 3 Working memory
- 4 Forgetting - Amnesia
- 5 Declarative versus non declarative
- 6 Episodic and Semantic (Concepts)



# How memory Works in 3 diferent situations?



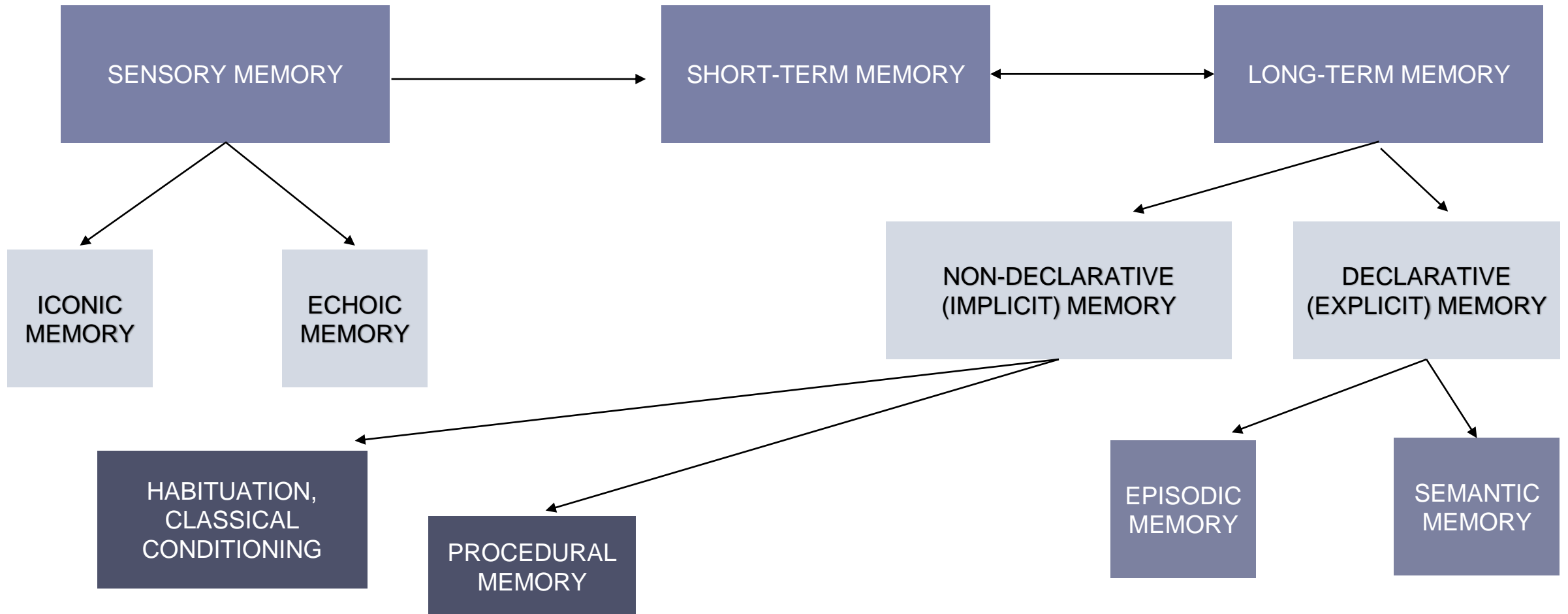
# The basics of memory...

- **Encoding** involves transforming presented information into a presentation that can be subsequently stored
- **Storage** involves keeping the information previously encoded
- **Retrieval** involves recovering information from the memory System

-- Memory is our capacity of encoding, storing and retrieving information from the past

- **Forgetting** occurs when our attempts at retrieval are unsuccessful

# Memory



# Sensory memory

- **Iconic** memory: A sensory store that holds **visual** information for between 250–1,000 milliseconds following the offset of a visual stimulus.
- **Echoic** memory: A sensory store that holds **auditory** information for approximately 2–3 seconds



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**Short-term /  
working  
memory**



# Short-term memory

- Very limited capacity
- The maximum number of ~~items~~ **chunks** recalled without error is typically about seven.
- Chunks: Stored units formed from integrating smaller pieces of information to increase the memory span

IBMCI AFBI  
PSOE PPVOX



9 Items  
3 chunks  
Different chunking



# Long-term memory

# Long-term memory

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- First proposal of a single long-term memory store (Atkinson & Shiffrin, 1968)
- The remarkable variety of information and procedures stored in LTM advocates for a **more complex proposals**:
  - (Explicit) Declarative vs. (implicit) Non-Declarative (Squire & Zola-Morgan, 2015)
  - Episodic, Semantic, Perceptual representation, Procedural (Schacter & Tulving, 1994)
- **The study of LTM has been widely related to the concept of amnesia** (different from forgetting).

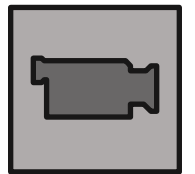
# Amnesia



# Amnesia

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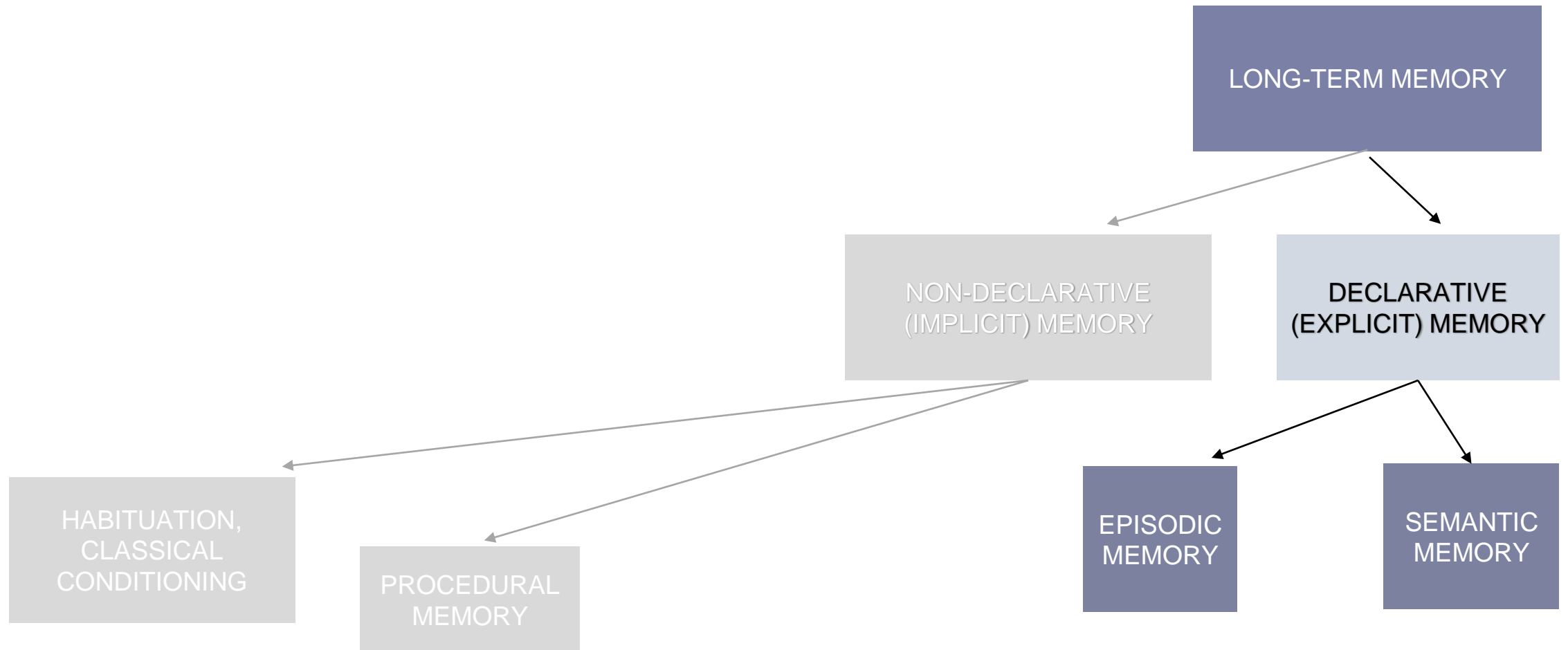
- A condition caused by brain damage in which there is severe impairment of long-term memory (**mostly declarative memory**)
  - **Anterograde amnesia:** Reduced capacity for new learning (and subsequent remembering) after the onset of amnesia.
  - **Retrograde amnesia:** problems in remembering events prior to amnesia onset



# LTM: Declarative (Explicit) vs. Non-Declarative (Implicit)

- **Declarative**: A form of long-term memory that involves knowing something is the case; it involves **conscious recollection and includes memory for facts (semantic memory) and events (episodic memory)**; sometimes known as explicit memory.
- **Non-declarative**: Forms of long-term memory that influence behaviour but **do not involve conscious recollection; also known as implicit memory**.
  - **Procedural memory**: knowing how, it includes the knowledge required to perform skilled actions.
  - **Priming**: Facilitating the processing of (and response) to a target stimulus by presenting a stimulus related to it shortly beforehand.

# Declarative (explícit) memory



# Declarative (Explicit) memory: episodic

- “It makes possible mental time travel through subjective time from the present to the past, thus allowing one to re-experience . . . **one’s own previous experiences.**” Tulving (2002, p. 5)
- The **3 “Ws”** of episodic memory: remembering a specific event (**what**) at a given time (**when**) in a particular place (**where**) (Nairne, 2015).



# Declarative (Explicit) memory: Episodic

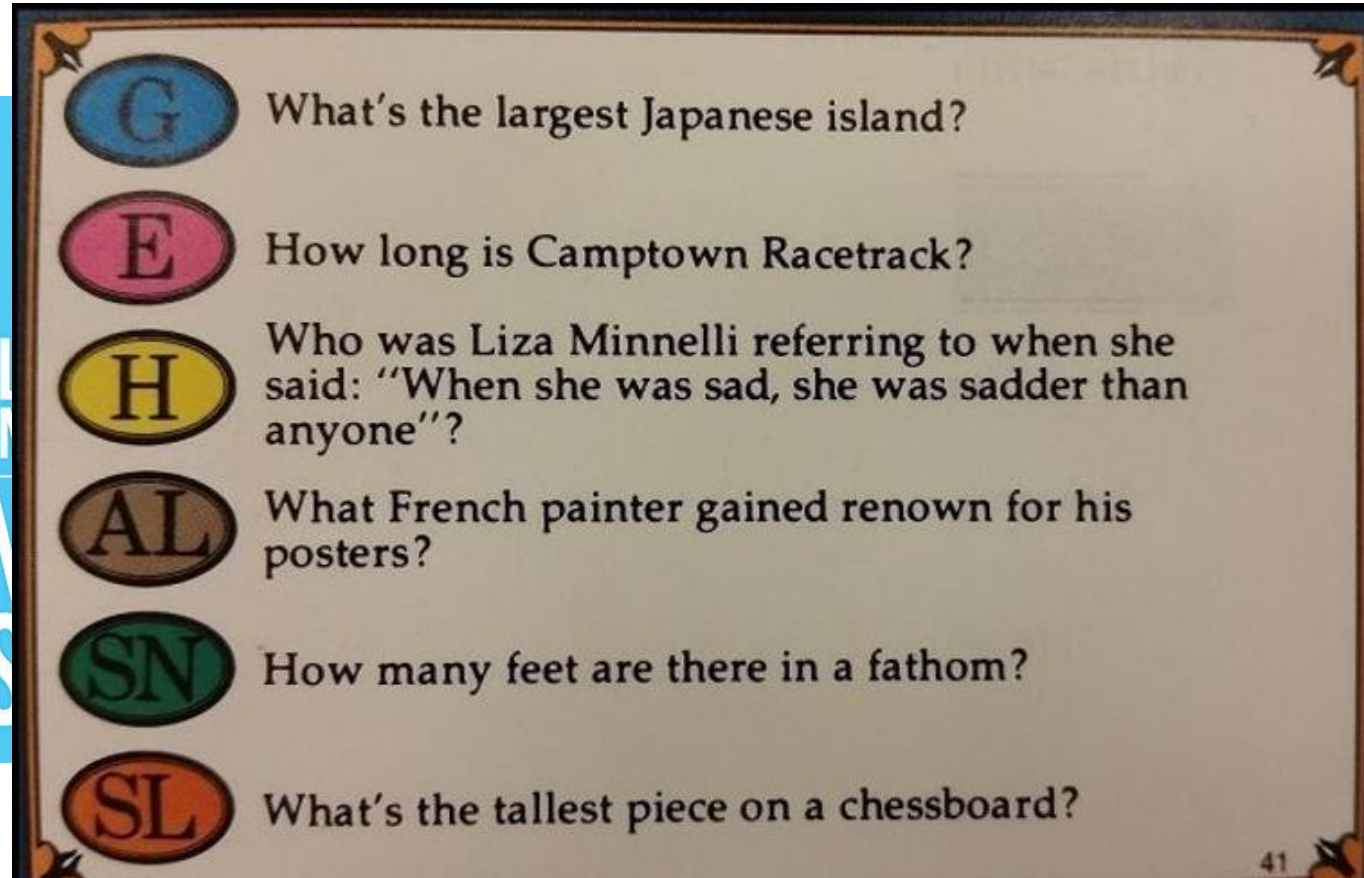
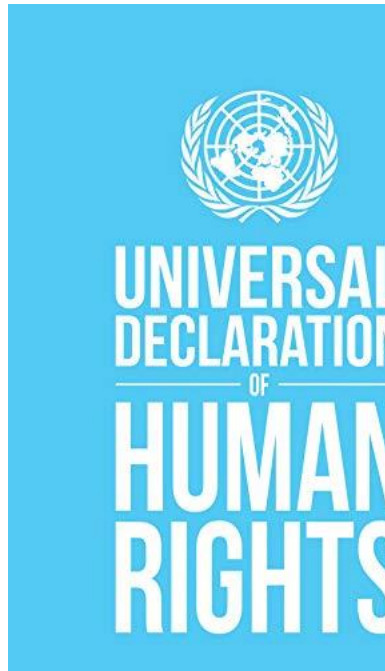
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- **What:** Betis winning the cup
- **When:** April 23<sup>rd</sup> 2021
- **Where:** Estadio de la Cartuja- Seville

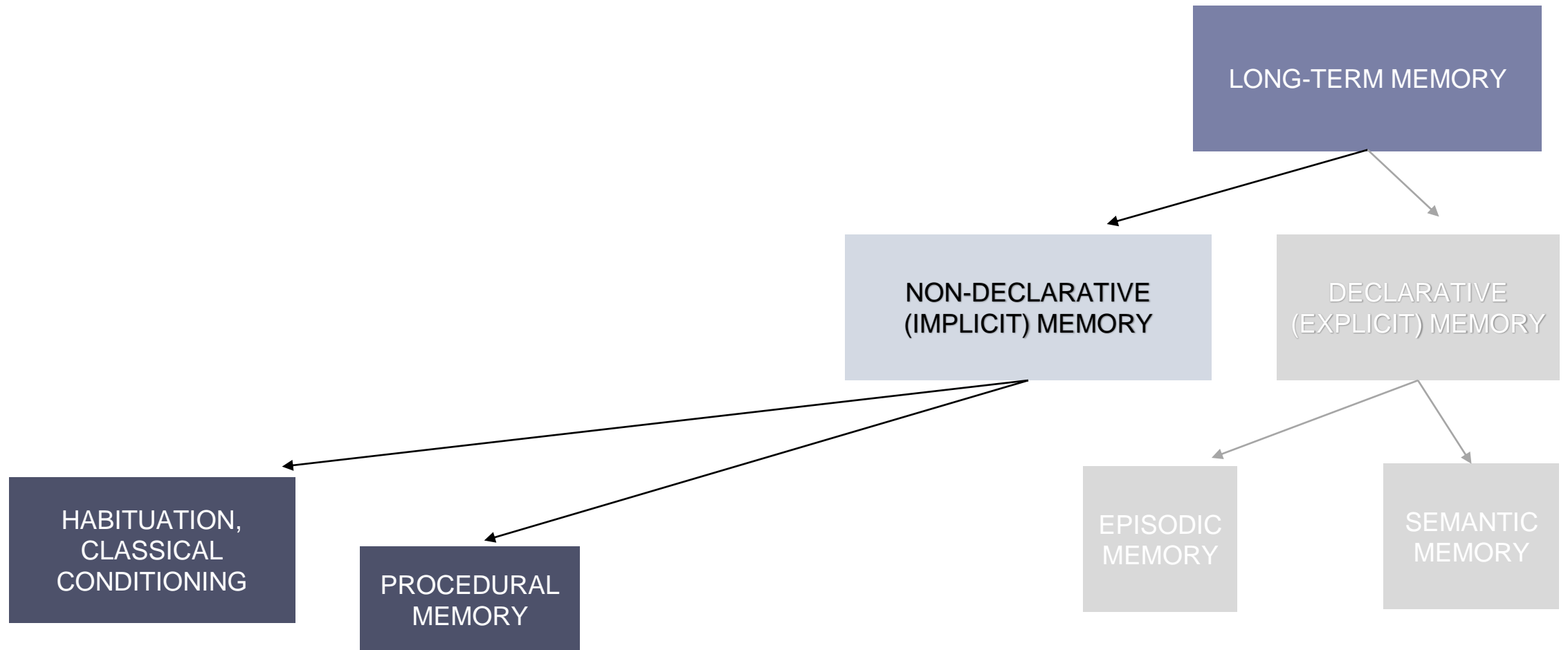
# Declarative (Explicit) memory: Semantic

- **Information we are aware of and call recall**
- “an individual’s **store of knowledge about the world**. The content of semantic memory is abstracted from actual experience and is therefore said to be **conceptual**, that is, generalised and without reference to any specific experience” (Binder & Desai, 2011, p. 527).
- Much of this information consists of **concepts**: mental representations relating to objects, people, facts and words (Lambon Ralph et al., 2017).

# Declarative memory: Semantic



# Non-declarative (implicit) memory



# Non-declarative memory (Implicit)

- **Does not involve conscious recollection** but instead reveals itself through behaviour
- **Habituation and classical conditioning:** forms of learning that, once learned, become associations stored in long-term memory
- Procedural memory of skill learning
  - Playing instrument, word processing, playing sports, riding a bicycle

# Forgetting is not so bad.... (Norby, 2015)

1. It can enhance psychological well-being by reducing access to painful memories
2. It is useful to forget outdated information
3. When trying to remember it is most useful to forget specific details and focus on the overall gist or message

