

THE BRAIN, BIOLOGY AND COGNITION

On-campus Session: Structure of LTM

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Long-Term Memory

- Why is LTM important?
- Possible to argue **central** to Psychology
- What areas of Psychology are related to memory?
 - Cognitive function
 - Social Psychology
 - The 'self'
- Related subjects e.g., Counselling/Education

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Long-Term Memory

- Difficult to theorise a 'Psychology' that did not make reference to 'memory'
- Holding of information
- Use of that information in some way
- What we mean by 'understanding' or 'knowledge'
- Also partly related to concepts like 'intelligence' or 'ability'.



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Sub-types of LTM



- LTM: made of separate aspects due to fragmentation of different memory types:
 - Episodic v Semantic memory (Tulving, 1972)
- **Episodic memory**: holds conscious recollection of an episode of encoding
 - E.g., Being at a concert/sports event
- **Semantic memory**: knowledge for a fact without memory for an episode
 - E.g., Capital of France

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Sub-types of LTM



- **Procedural memory**: Procedures and routines
 - E.g., Riding a bike, driving a car
 - (Cohen & Squire, 1980; Schacter et. al, 2000)
- **Autobiographical memory**: Includes memory for events of one's own life.
- **Declarative memory**: knowing something is the case, involves conscious recollection and memory for facts (semantic) and events (episodic). Known as **Explicit memory**.
- **Non-declarative memory**: Influences behaviour but does not involve conscious recollection (procedural). Known as **Implicit memory**.

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Long-Term Memory



- May be more obvious to depict LTM as a 'store' of information (of different forms)
- This represents the 'structure'
 - So, not only a store (passive) but also active
- Accurate retrieval of information
 - Appropriate access and choice of information
- Active in encoding (representing) and storing (organising) forms of information

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• Elaborate Rehearsal needed to pass information from STM to LTM (Craik & Lockhart, 1972).

• **Retrieval**: a crucial process of memory function

• Information needs to be retrieved to be useful

• **Different** ways to access this information?

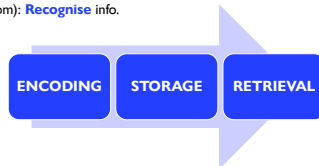
• Imagine task of 'getting to the lecture' today

• Remembering time of lecture

• No external cue: **Recall** information from LTM

• When you reach room and know location is correct

• External cue present (see room): **Recognise** info.



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Organisation

- LTM two key roles:
 - Storage of information (in useful form)
 - Retrieval of information (in accurate way)
- Consider scale of this task in terms of amount and variation of information
- Organisation is key to this ability

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Organisation of semantic memory

• What is the capital of France?

• How did you access the fact 'Paris'?

• Memory retrieval process of stored fact

• Meaningful links to information stored

• Key components: Capital/France?

• Starting to see *organisation* in process and structure

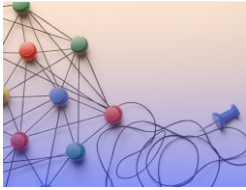
• How about 'Did Henry VIII have feet'?

• Memory retrieval of that as a 'fact'?

• Related semantic information and connections

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Mental representation of knowledge



• Powerful forms of organisation:

- **Categorisation** of information
 - Grouping of information
 - Connections between information

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Answer these questions

- Name a fruit **beginning** with the letter **p**
- Name an animal **beginning** with the letter **d**
- Name a metal **beginning** with the letter **i**
- Name a bird **beginning** with the letter **b**

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Answer these questions

- Name a fruit **ending** with the letter **h**
- Name an animal **ending** with the letter **e**
- Name a metal **ending** with the letter **r**
- Name a bird **ending** with the letter **h**

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Organisation of semantic memory

- How do we access the answers?
- E.g. 'Animal beginning with d'
 - Access category of 'animals'
 - Category of 'beginning with d'
- May interpret as:
 - Previously stored categories of information
 - Created through encoding of previous cases
 - Previously encoded 'dog' as member 'animals'
 - Also stored in category 'd words'

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Evidence for distinct LTM components Famous Case Study – Patient H.M.

- Underwent surgery to hippocampal area of brain to control severe epileptic seizures.
- During surgery, front half of both sides of hippocampus and amygdala removed.
- After Surgery: Had intact STM span and memory for events before surgery - suggesting normal functioning:
 - **HOWEVER:** unable to transfer new information to LTM (Anterograde Amnesia).
 - Amnesiac: The case of H.M. - <https://www.youtube.com/watch?v=7mvx-mAUJL8>

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**IN GROUPS, COMPLETE THE
WORKSHEET ON METHODS
USED TO EXAMINE MEMORY
DEFICITS IN H.M.**

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