

Exercise walk-through

Storing Memories ■ 2.5

eXercise

You must be able to

- distinguish **episodic** 情景 from **semantic** 语义 memory
- describe the role of the **hippocampus** 海马 and of the **cerebellum** 小脑
- explain **long-term potentiation** 长时程增强 in outline
- state what **consolidation** 巩固 is and when it happens

Method — Episodic and semantic

Episodic memory stores personally experienced events, with a time and place.

Semantic memory stores facts and general knowledge, usually without any memory of learning them.

Method — Where storage depends

The **hippocampus** is essential for forming new explicit memories; damage prevents new learning while leaving old memories and skills intact. Skill memory depends more on the **cerebellum** and basal ganglia.

Method — Long-term potentiation

Repeated stimulation of a neural connection makes it fire more readily afterwards. This strengthening of specific synapses is the leading physical account of how a memory is stored.

Method — Consolidation

A new memory is initially fragile and becomes stable over hours and days, a process supported by sleep. Interference or injury during this window disrupts the memory more than it would later.

Practice 2.1 ■ 2 marks

State the difference between episodic and semantic memory, with an example of each.

Solution 2.1

Method: Episodic and semantic

Worked steps

episodic: a personally experienced event with a time and place, e.g. a birthday **B1**;

semantic: a general fact, e.g. that water boils at 100 degrees **B1**.

Practice 2.2 ■ 2 marks

Explain what long-term potentiation describes.

Solution 2.2

Method: Long-term potentiation

Worked steps

repeated stimulation strengthens a specific synaptic connection **B1**; so it fires more readily afterwards, which is the leading physical account of storage **B1**.

Practice 2.3 ■ 1 mark

A patient with hippocampal damage learns a new motor skill but cannot remember practising it.

- (a) State which structure supports the skill learning.
- (b) State what this dissociation shows.

Solution 2.3

Method: Where storage depends

Worked steps

(a) the cerebellum (and basal ganglia) **B1**. (b) explicit and implicit memory depend on different systems, so one can be lost while the other works **B1**.

Exam-style 3.1 ■ 1 mark

Knowing that Paris is the capital of France without recalling learning it is

A episodic memory

B semantic memory

C implicit memory

D sensory memory

Solution 3.1

Method: Episodic and semantic

A episodic memory

B semantic memory 

C implicit memory

D sensory memory

Worked steps

B. it is a fact without an accompanying memory of the episode.

Exam-style 3.2 ■ 1 mark

A head injury erases memories of the hour before it but not of the previous year. This is best explained by

- A** retrieval failure
- B** disrupted consolidation
- C** the spacing effect
- D** proactive interference

Solution 3.2

- A retrieval failure
- B disrupted consolidation 
- C the spacing effect
- D proactive interference

Worked steps

- B. recent memories were still consolidating and were therefore vulnerable.

Exam-style 3.3 ■ 1 mark

Sleep after study improves recall.

- (a) Name the process this supports.
- (b) Explain why the improvement is greater than for equal time awake.

Solution 3.3

Method: Consolidation

Worked steps

(a) consolidation **B1**. (b) sleep supports consolidation directly **B1** and also reduces interference from new incoming material **B1**.