2.4 The Working Memory Model: Central Executive to Episodic Buffer

AQA 7182 · about 55 minutes · Write-in edition

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer in full sentences for all extended and 6-mark or higher questions. Short 2-4 mark answers may be brief bullet points. Allow approximately 55 minutes for the whole pack.

1 Identify a limitation of case-study evidence and suggest how to address it.

(Total for Question 1 is 4 marks)

2 Explain the visuo-spatial sketchpad and give one task example.

(Total for Question 2 is 3 marks)

3 Identify which working memory components Erin uses for each activity and explain.

(Total for Question 3 is 6 marks)

4 Discuss and evaluate the working memory model.

(Total for Question 4 is 16 marks)

5 Describe and explain how the phonological store and articulatory process work together.

(Total for Question 5 is 4 marks)

6 Outline the episodic buffer and explain why it was added to the model.

(Total for Question 6 is 4 marks)

7 Explain how the KF case supports separate STM components.

(Total for Question 7 is 4 marks)

8 Outline a weakness about the central executive and explain its implications.

(Total for Question 8 is 4 marks)

Mark scheme · 2.4 The Working Memory Model: Central Executive to Episodic Buffer

Question 1

identifies a limitation, e.g. case studies have low generalisability because they involve a single or small number of unusual patients oe	**M1**
explains why this matters, e.g. patterns seen in one patient may not represent typical cognitive architecture oe	**M1**
suggests a way to address it, e.g. replicate findings across multiple patients or use controlled experimental groups and neuroimaging to corroborate findings oe	**A1**
explains how this helps, e.g. larger or converging-sources studies improve confidence that the dissociation reflects general cognitive processes rather than idiosyncratic damage oe	**A1**

Answer: A limitation is low generalisability: a single case like KF may not represent typical cognitive processing. Researchers can address this by replicating patterns across multiple patients and combining case-study data with controlled experiments and neuroimaging, which increases confidence that observed dissociations reflect general cognitive mechanisms.

Question 2

states the visuo-spatial sketchpad stores visual and spatial information oe	**M1**
mentions it has limited capacity and helps with manipulation of visual images oe	**B1**
gives an example task, e.g. mentally rotating an object or navigating a route oe	**B1**

Answer: The visuo-spatial sketchpad stores and manipulates visual and spatial information with limited capacity; for example, it is used when mentally rotating an object or planning a route.

Question 3

identifies the visuo-spatial sketchpad for copying the complex diagram oe	**M1**
justifies that copying a diagram requires visual and spatial processing, which is the visuo-spatial sketchpad's function oe	**A1**
identifies the phonological loop for repeating the list of seven words aloud oe	**M1**
justifies that repeating words subvocally or aloud uses the articulatory process and phonological store oe	**A1**
identifies that listening to a podcast may also engage the phonological loop or the episodic buffer depending on whether Erin is processing meaning oe	**M1**
explains that if she is processing the podcast's meaning it may involve the episodic buffer integrating verbal input with other information, but if just passively hearing words it is mainly phonological loop processing oe	**A1**

Answer: Copying the diagram uses the visuo-spatial sketchpad because it requires visual and spatial processing. Repeating the list aloud uses the phonological loop, specifically the articulatory process and phonological store. Listening to the podcast could engage the phonological loop for surface acoustic processing, and if Erin integrates the podcast meaning with her notes it may recruit the episodic buffer.

Question 4

Level 4 Knowledge of the working memory model is accurate and detailed. Evaluation is thorough, balanced and well developed, using relevant empirical evidence interactively to support both strengths and weaknesses. Arguments are clearly focused and coherent, with appropriate use of specialist terminology and effective application of evidence such as dual-task studies and KF.	**13-16**
Level 3 Knowledge is generally accurate with some detail. Evaluation is present and mostly balanced, referencing appropriate evidence, though some points may be less developed. Reasoning is generally clear with relevant terminology used.	**9-12**
Level 2 Knowledge is present but limited or partially inaccurate. Evaluation is superficial or one-sided, with limited use of empirical evidence. Answers may lack clear organisation and specialist terminology may be used inconsistently.	**5-8**
Level 1 Very limited knowledge and evaluation. Little relevant evidence or reasoning. Answer may be disjointed and lacks coherent structure and terminology.	**1-4**
Level 0 No creditable content.	**0**

Indicative content:

- AO1: Outline of the model, including the central executive as an attentional controller, the phonological loop (phonological store and articulatory process), the visuo-spatial sketchpad (visual cache and inner scribe) and the episodic buffer added in 2000.
- AO1: Description of coding and capacity where relevant, for example acoustic coding in the phonological loop and limited capacity of each component.
- AO3 Strength: Dual-task studies show less interference when tasks use different subsystems, supporting separate components of working memory; example reference to Baddeley et al. style findings.
- AO3 Strength: Neuropsychological evidence such as KF, who had impaired verbal STM but intact visual STM, supports the fractionation of STM into specialised stores rather than a unitary store.
- AO3 Weakness: The central executive is underspecified and lacks clear internal structure, making it difficult to operationalise experimentally and risking being a catch-all explanation.
- AO3 Weakness: Heavy reliance on case studies and small-sample neuropsychological evidence limits generalisability; single-patient dissociations may reflect idiosyncratic damage.
- AO3 Further critique: Some later research questions aspects of the visuo-spatial sketchpad subdivisions and the exact capacity of the episodic buffer, and alternative models argue for more distributed or embedded processes.
- AO3 Strength: The model has clear real-world applications, for example understanding how multitasking affects learning and informing strategies for instruction and revision, which matters because it translates theory into practice.
- AO3 Evaluation balance: Consideration that converging methods, including experiments, neuroimaging and case studies, provide stronger support than any single method alone; implications for the model's continuing refinement.

Question 5

describes the phonological store as holding speech-based sounds for a short time, coded acoustically oe	**M1**
describes the articulatory process as a rehearsal mechanism that refreshes items in the phonological store oe	**M1**
explains that the articulatory process subvocally rehearses words so they are kept active in the phonological store oe	**A1**
explains this interaction prevents decay of verbal information for a few seconds unless rehearsal is disrupted oe	**A1**

Answer: The phonological store briefly holds speech-based sounds coded acoustically. The articulatory process rehearses items subvocally and refreshes the phonological store, preventing verbal information from decaying for a short period.

Question 6

states the episodic buffer is a temporary, limited-capacity store that integrates information from the other sub-systems oe	**M1**
states it is capable of holding multi-modal chunks or episodes and is linked to long-term memory oe	**M1**
explains it was added to provide a general store that could hold integrated information and account for findings that the phonological loop and visuo-spatial sketchpad alone could not explain oe	**A1**
explains that it helps explain how information from different modalities can be bound into a single episodic representation oe	**A1**

Answer: The episodic buffer is a temporary limited-capacity store that integrates information from the phonological loop, visuo-spatial sketchpad and long-term memory into multi-modal episodes. It was added to explain how different types of information can be bound together and to act as a general store linking working memory and long-term memory.

Question 7

identifies the key finding: KF had impaired verbal short-term memory but relatively intact visual short-term memory oe	**M1**
states this suggests separate verbal and visual stores rather than a single STM store oe	**M1**
explains that KF's pattern is consistent with the phonological loop being damaged while the visuo-spatial sketchpad remained functional oe	**A1**
links this to the working memory model claim that STM comprises multiple specialised components, supporting the model's fractionation of STM oe	**A1**

Answer: KF suffered impaired verbal STM but preserved visual STM, suggesting that verbal and visual information are processed by separate STM subsystems. This pattern is consistent with damage to the phonological loop while the visuo-spatial sketchpad remained intact, supporting the working memory model's proposal of multiple specialised components.

Question 8

states a recognised weakness, e.g. the central executive is described vaguely and lacks detailed explanatory mechanisms oe **M1**

explains that this vagueness makes it difficult to test or to specify distinct processes within the central executive oe **M1**

explains why this matters: without a clear specification, the central executive can be a catch-all for unexplained findings, reducing the model's scientific precision oe **A1**

may give an example such as inconsistent operationalisations in experiments trying to measure central executive function oe **A1**

Answer: A key weakness is that the central executive is vaguely specified and lacks clear internal structure. This vagueness makes it hard to operationalise and test experimentally, so the central executive risks becoming a catch-all explanation for any attentional control effect the model cannot otherwise explain, reducing the model's precision and falsifiability.