

MEMORY



AQA
A Level
2025 spec

The Working Memory Model

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The Specification


- The multi-store model of memory: sensory register, short-term memory and long-term memory. Features of each store: coding, capacity and duration.
- The working memory model: central executive, phonological loop, visuo-spatial sketchpad and episodic buffer. Features of the model: coding and capacity.
- Explanations for forgetting: proactive and retroactive interference and retrieval failure due to absence of cues.
- Factors affecting the accuracy of eyewitness testimony: leading questions, post-event discussion, and anxiety; the use of the cognitive interview.

Keep organised to build strong schemas

What is *working memory*?

Working memory is a limited capacity store for processing information for a temporary amount of time within conscious awareness.

The term *working memory* has mostly replaced the use *short term memory* (from the MSM).



The term 'working' suggests memory is active rather than passive like the MSM suggests.

Criticisms of the MSM

Baddeley & Hitch (1974) argued that STM was not a unitary store and that memory was an active processor of information, not a passive store like the MSM suggested.



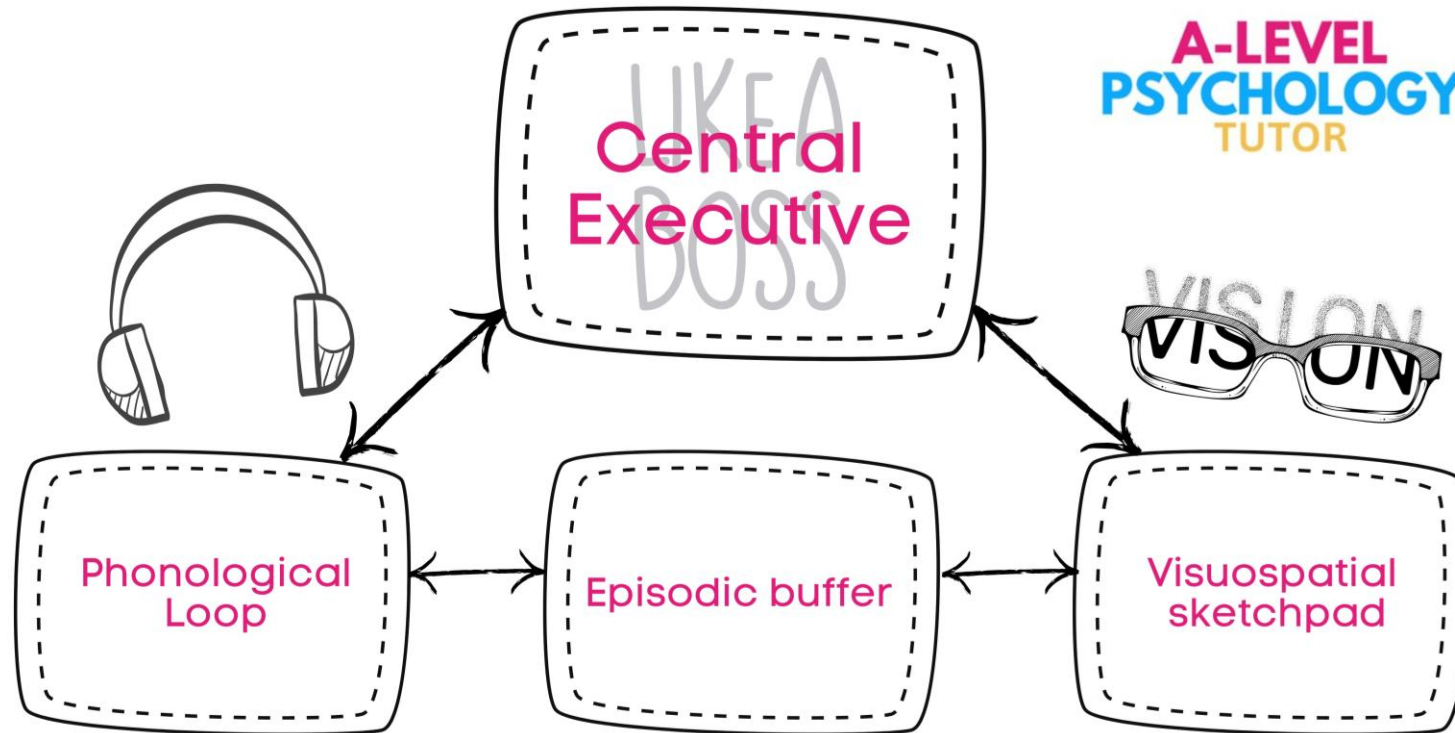
How many windows there are in your home?



Could you 'feel' different parts of your working memory whilst completing that task?
What did they feel like?

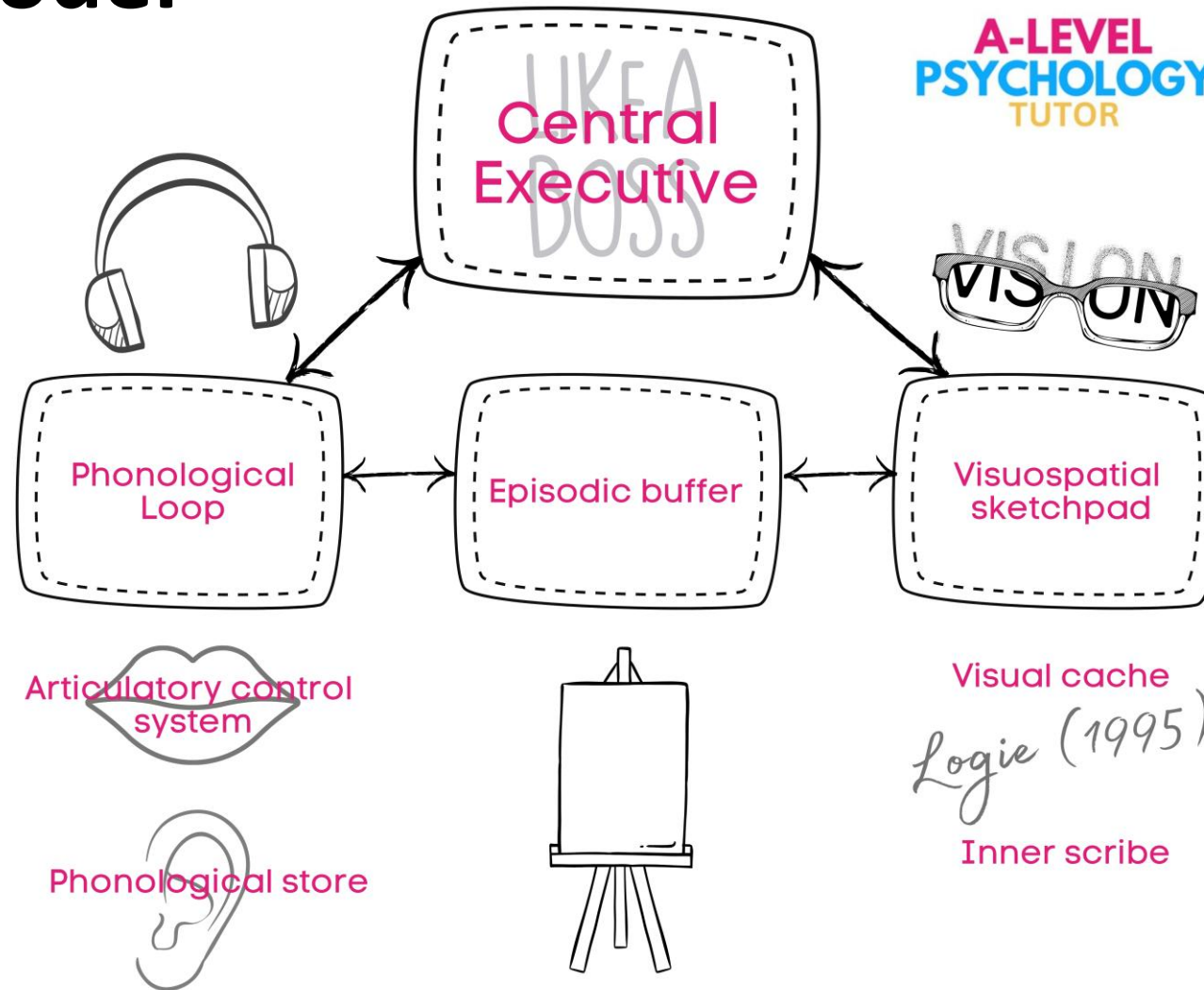


Original Model



Updated Model

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The image will be set up and manipulated in your **visuo-spatial** sketch pad.

The tally of windows will be held in the **phonological loop** as you count them sub-vocally.

The whole operation will be supervised by the **central executive** which will allocate the tasks and recognise when the final total has been reached.

The **episodic buffer** would have allowed you to integrate the visual and auditory information together.



Central Executive

The CE has a **supervisory** role. It does not store information.
It has very **limited processing capacity**.

Functions

- Directs attention to tasks and makes decisions
- Allocates tasks to the slave-systems (sub-components)
- Makes decisions

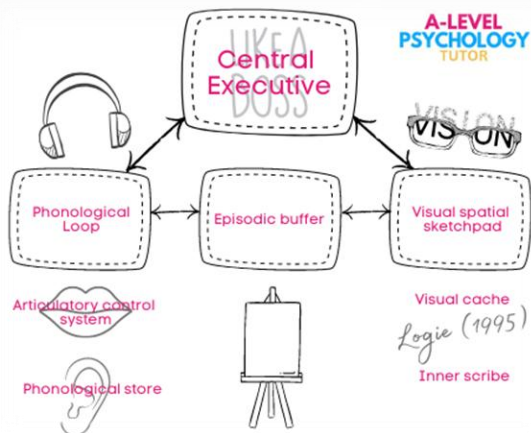
Phonological LOOP (PL)

The PL processes auditory information. It codes information acoustically and has a limited capacity. It can hold approximately **2 seconds** worth of information.

Baddeley (1986) further subdivided the PL into:

Phonological store: holds words heard

Articulatory control process: inner voice (maintenance rehearsal)



When you are reading you are still using your PL as you turn the written words into an internal monologue.

Visuo-spatial *sketchpad*

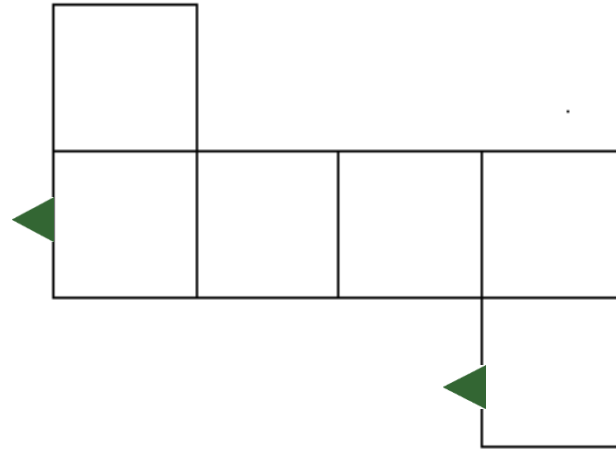
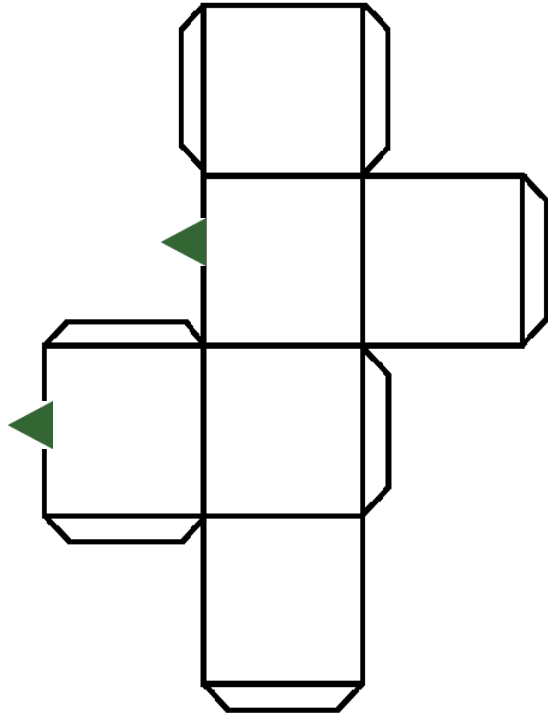
The VSS processes visual and/or spatial information. Visual refers to what things look like and spatial refers to relationships between things. It has **limited capacity of 3-4 items**.

Logie (1995) suggested subdivision of:

Visual-cache which stores info about visual items e.g. form and colour

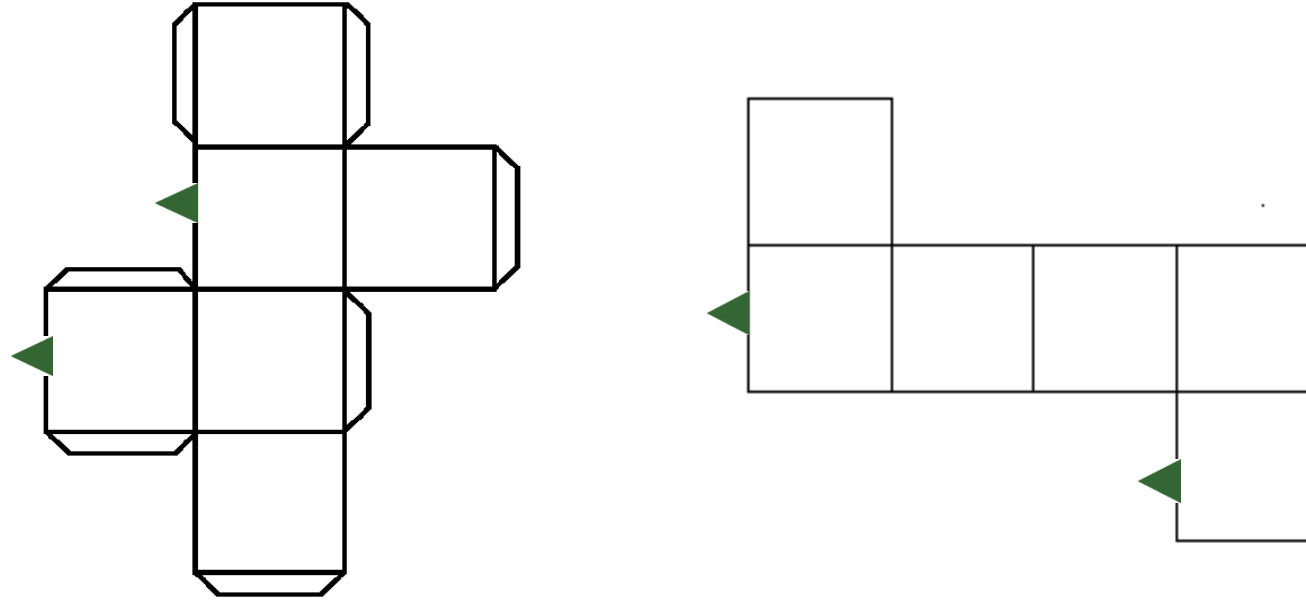
Inner scribe which stores the arrangement of objects for spatial relations

Visuo-spatial *sketchpad*



Imagine folding these shapes into cubes. Do the arrows meet?

Visuo-spatial sketchpad



Imagine folding these shapes into cubes. Do the arrows meet? At the same time try to calculate how many windows are in your house. **Is this easy? Why?**

Try calculating the windows in your house while listening to music. **Is this easy? Why?**

Episodic Buffer (EB)

The EB is a temporary store which integrates information from other slave systems.

Baddeley (2000) later added episodic buffer as he realised model needed a more general store as the slave systems deal with specific types of information and the central executive has no storage capacity.

The EB has a limited capacity of approximately 4 chunks and it maintains a sense of time sequencing – recording events that are happening. It also sends information to the LTM store.

Dual Task Technique

Dual-task techniques are ones in which performance is measured as participants perform **two tasks simultaneously**. This technique has been used a lot to test the WMM.

Baddeley et al (1975) found that if **one store is utilised for both tasks** then task **performance is poorer** than due to the store's limited capacity.

If the tasks are using the same parts of the same component processing will slow down.

Try *this*

Using arrows draw your journey from home to college. Whilst doing so, recite 'twinkle, twinkle little star'.



Now using arrows draw your journey from home to school but whilst doing so describe the journey backwards.



This is a dual task technique often used in lab experiments.

Look at the two letters in the middle of the next sheet, for each one you must circle whether the statement about the two letters is true or false, whilst also reciting the numbers below throughout.

Based on Atkinson and Shiffrin's ideas about STM (7+ or - 2) how will you perform on this task?

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- | | |
|---|----|
| 1: B is followed by A
True/False | BA |
| 2: A is preceded by B
True/False | AB |
| 3: A is not followed by B
True/False | BA |
| 4: B follows A
True/False | AB |
| 5: B does not follow A
True/False | BA |
| 6: B is not followed by A
True/False | AB |
| 7: A follows B
True/False | AB |
| 8: B is not preceded by A
True/False | AB |
| 9: A is not followed by B
True/False | BA |
| 10: B does not precede A
True/False | AB |

Circle the correct answer on your sheet

Check your *answers*

1: B is followed by A	BA	True
2: A is preceded by B	AB	False
3: A is not followed by B	BA	True
4: B follows A	AB	True
5: B does not follow A	BA	True
6: B is not followed by A	AB	True
7: A follows B	AB	False
8: B is not preceded by A	AB	False
9: A is not followed by B	BA	True
10: B does not precede A	AB	True

Baddeley and Hitch (1976)

Procedure: Lab experiment. Ppts were asked to perform two tasks at the same time (dual task technique). This was a digit span task (repetition of numbers) and a verbal reasoning task (answering true or false).

Results: Ppts were able to complete both tasks at the same time and did not make any more errors in the verbal reasoning tasks as the number of digits increased. Ppts took slightly longer to answer the questions but only by fractions of a second.

Conclusion: The verbal reasoning task made use of the central executive and the digit span task made use of the phonological loop, meaning that the tasks could be completed together.

Topic Summary



AO1

Baddeley & Hitch (1974) made due to limitations of MSM

CE – supervisor, attention, allocates tasks to slave systems, limited capacity

PL – auditory, articulatory control, PS, 2 secs

VSS – visual cache & inner scribe (spatial), 3-4 items

EB – temporary integration of info from PL & VSS

Dual task techniques, 3-4 items

AO3

:) Case study evidence. KF. PL damaged / VSS intact. Shows more than one store.

But limited generalisability.

:) Lab evidence. Baddeley & Hitch – dual task techniques. But lacks mundane realism.

:(CE too vague. Hard to test. Multiple components. But Brave brain scan evidence.

:(Does not explain musical memory.

Add these notes (or your own version) to your Topic Summary Booklet

A03 Case study evidence

KF suffered from brain damage after a motorcycle accident and afterwards he had issues with his STM. He was unable to recall verbal (acoustic) information but could still process visual information including faces. This suggests his phonological loop had been damaged but his VSS was still intact.

PL – damaged /VSS - intact

What does this suggest?

Are there any limitations of the evidence?

A03 Case study evidence

A strength of the working memory model (WMM) is its support from clinical evidence through case studies of patients suffering from brain damage.

KF experienced brain damage following a motorcycle accident and subsequently faced difficulties with his STM. He was unable to recall verbal (acoustic) information but retained the ability to process visual stimuli, including faces. This suggests that his phonological loop was damaged while his visuospatial sketchpad remained intact.

This supports the idea that there are distinct stores for visual and acoustic processing within STM, thereby enhancing the validity of the model.

However, evidence from this case study may be unique, as KF had brain damage following trauma. Additionally, it is unknown how KF would have performed on specific tasks prior to his brain injury. Therefore, caution should be exercised when generalising the findings.

A03 Lab study evidence

A strength of the working memory model (WMM) is the presence of empirical evidence from dual task performance studies.

Baddeley and Hitch (1976) demonstrated that participants experienced more difficulty when performing two tasks that relied on their phonological loop. However, when one task required the use of their phonological loop (remembering numbers) and the other involved their central executive (making decisions), their performance was not significantly impaired.

This suggests that when tasks require the use of two different slave systems, no competition is observed. However, they found that when two tasks use the same slave system it becomes overloaded. This provides evidence for the existence of multiple components within our STM, which enhances the validity of the model.

However, it is important to note that evidence from laboratory studies like this one may lack mundane realism due to the artificiality of the tasks. Therefore, caution should be exercised when generalising the results to real-world scenarios.

A03 CE too vague

A **limitation** of the working memory model (WMM) is the criticism that the central executive (CE) component is too vague.

Baddeley has acknowledged that it is the "least understood" component of the WMM. This is mainly as the CE delegates tasks and has very limited storage it is hard to isolate and therefore test in lab settings.

Some psychologists have even suggested that the CE may consist of separate stores, further complicating its conceptualisation. The lack of clarity surrounding the CE raises questions about the validity of this part of the model, as it remains inadequately explained and developed.

However, there is brain scan evidence from **Braver (1997)** that supports the existence of the CE. In a task involving the CE, activity was observed in the prefrontal cortex, with increased activation corresponding to higher task difficulty. Nonetheless, further research is required in this area to deepen our understanding.

A03 Musical memory

A **limitation** of the working memory model (WMM) is its failure to account for **musical memory**.

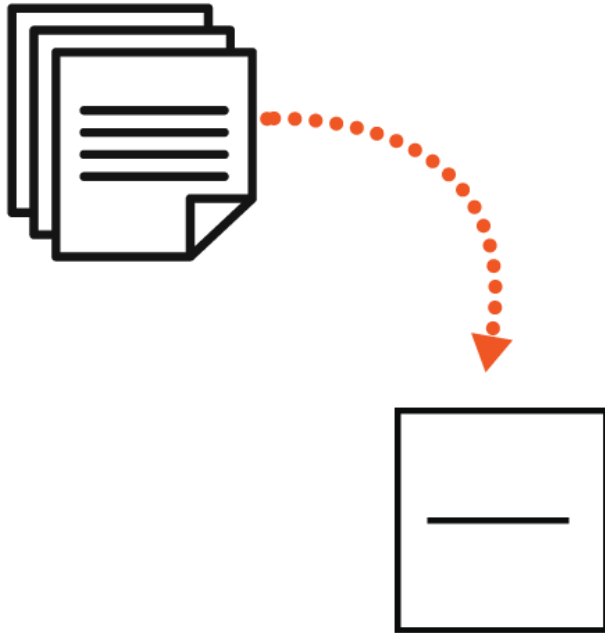
While the model provides a framework for understanding various components of working memory, it does not adequately explain how individuals can engage with and process musical information without experiencing impairment in performance on other acoustic tasks.

Therefore, it does not provide a comprehensive framework to understand the unique processing and storage mechanisms involved in musical memory and fails to capture the complexities and nuances of all types of memory.

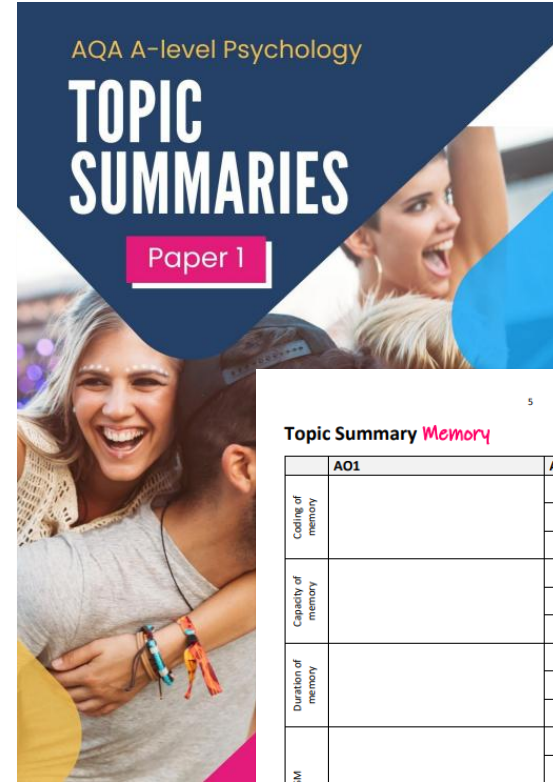


Topic Summary

Complete the key terms in the **A01**



Complete the + and - in **A03**



5

Topic Summary *Memory*

	AO1	AO3
Coding of memory		
Capacity of memory		
Duration of memory		
MSM		
Types of long-term memory (LTM)		
WMM		

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Essay Planning



7

Title	Discuss research into the features of the different memory stores. (16 marks)
AO1 6 marks	
AO3 10 marks	
AO3	
AO3	

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Complete your essay in your
Essay Planning Booklet

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