

HL IB Psychology



Your notes

Cognitive Processing

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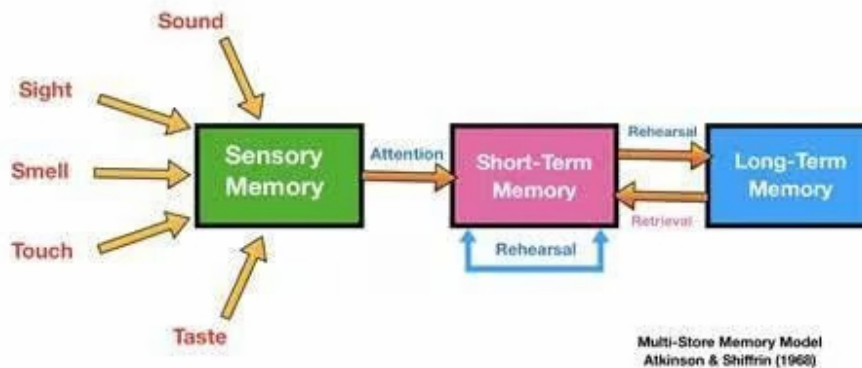
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What is the Multi-Store Model of Memory

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The MSM

- The **multi-store model of memory (MSM)** was devised by **Atkinson & Shiffrin (1968)** as a way of **conceptualising** the processes by which memories are **encoded** and stored
- The model encapsulates the **flow** i.e. from one storage facility to the next, whereby information reaches the **senses** and is then translated into memories
- The model is a **linear representation** of the ways in which information is either retained and stored in the memory or lost, e.g. due to lack of **rehearsal**
- The model consists of three separate storage units:
 - the **sensory memory/register**;
 - **short-term memory (STM)** and
 - **long-term memory (LTM)**



What is the Sensory Register?

- The sensory register (SR) is the point at which **environmental stimuli** are picked up by the five senses (sight, sound, smell, touch, taste)
- Sounds are encoded in the SR as **echoic memory** and images are encoded as **iconic memory**
- This environmental information is held onto for a fraction of a second i.e. its **duration** is tiny – half a second at most



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- Any information in the SR that is noticed or paid attention to is then passed onto STM i.e. if we ignore or don't pick up specific items of sensory information then they will not be transferred to STM

What is Short-Term Memory?

- The STM store is a temporary storage facility which has a limited **duration** and **capacity** for holding onto information that may – or may not – then be transferred to the LTM
- The capacity of STM is 7 items, plus or minus two, according to **Miller's 'magic number 7' theory**
- The duration of STM is up to around **30 seconds**
- New information entering the STM from the SR pushes existing information out (the 'FIFO' or 'first in, first out' idea) due to the limited duration and capacity of the STM
 - *For example, if you go into a room to find a book then you notice that your cat is on your bed, then by the time you have moved the cat from your bed you may well have forgotten what it is you came into your bedroom for*
- In order to hold on to information it is necessary to **rehearse** it so that it is able to be passed on to LTM
- **Maintenance rehearsal** is a **shallow** form of rehearsal as it simply requires you to repeat information verbally for long enough to be able to use it, e.g. on the way to the shop you keep telling yourself 'Don't forget to buy milk' but once the milk has been bought you don't need the information any more so you can stop rehearsing it
- **Elaborate rehearsal** is a **deep** form of rehearsal as it requires you to learn information in several ways e.g. repetition, **re-framing** the information, writing the information down, **re-interpreting** the information
- Elaborate rehearsal would be used to revise for an exam or to learn lines for a play as you need the information to be **embedded** in your memory and for it to endure over time
- Information which is not rehearsed will be lost from STM via **displacement**
- Encoding in STM happens **acoustically** i.e. via sound
- STM can be improved by the process of '**chunking**' information e.g. a phone number can be chunked into groups of three digits (e.g. 485 362 971 886) so that it is easier to 'digest' and thus to recall

What is Long-Term Memory?

- LTM is, metaphorically a huge Amazon-type warehouse holding a vast number of memories, some of which you may not even know are there
- Both the **capacity** and the **duration** of LTM is not really known but researchers agree that both may be limitless
- LTM is difficult to research (unlike STM which can be studied using **lab experiments**) due to its 'slippery' nature

- Information may **decay** in LTM if it is not visited frequently or if the **cues** to **retrieve** it are missing, however there is no definitive evidence that any items from LTM are lost forever (just think of times when you suddenly recall something that you didn't even know you knew!)
- Encoding in LTM happens **semantically** i.e. via meaning

Which research studies support the MSM?

- Glanzer & Cunitz (1966)** – prevention of rehearsal erodes the **recency effect** in STM
- The case of HM (Milner 1958; Corkin 1997)** – the **case study** of a brain-damaged patient provided evidence of two separate memory stores for STM and LTM

Glanzer & Cunitz (1966) is available as a separate 'Key Study' – just navigate the 'Cognitive Processing' section of this topic to find it along with the Key Study for the 'Working Memory Model' (Two Key Studies of Models of Memory)

Evaluation of the Multi-Store Model of Memory

Strengths

- This was the first model to attempt to conceptualise memory and it paved the way for further research in this field
- The existence of separate memory stores has been supported by lab experiments and by more than one case study (see also the **case of KF** for further information)

Limitations

- As the MSM is a linear model it lacks **flexibility** and **dynamism** i.e. it presents STM and LTM as static stores without explaining how they operate
- Subsequent research has identified that there is more than one type of LTM:
 - episodic memory** contains information from your own **personal** history e.g. birthday parties;
 - procedural memory** contains information that helps you to **perform** actions such as riding a bike or playing the piano;
 - semantic memory** contains information as to **meaning** e.g. knowledge about the world (e.g. Paris is the capital of France)



Examiner Tips and Tricks

Remember that you can 'double up' the case of HM as it can also be used in the Biological Approach for questions on techniques to study the brain and localisation of function



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Worked Example

SAQ (Short Answer Question – 9 marks)

Describe one study which supports the Multi-Store Model of Memory. [9]

Here is part of a response to the above question. The focus of this paragraph is on linking the study to the question which is a really important skill for you to practise:

Case studies of brain damage to the hippocampus such as the case of HM support the MSM as they provide evidence for there being two separate memory stores for STM and LTM. HM's LTM was intact, but he had no ability to update it i.e. to make new memories, which means that his STM was severely impacted.

Without STM HM could not transfer data to LTM but he could still use parts of his LTM (e.g. procedural and some semantic memory - he knew who he was and some real-world information e.g. 'this is a cat'). In short, HM was unable to rehearse new content to transfer to the LTM. This case study provides evidence for the MSM because it suggests that the hippocampus may be a specific location for the production of STM and that LTM may be stored differently or in a different specific location to STM.



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