LO - The Multi Store Model of Memory

BATs

All must - Describe the Multi Store Model (D)
Most should - Analyse research to evaluate the MSM (B)
Some could - suggest how 2-3 pieces of research help to support the MSM (B+)
Jog your memory!!

From Memory (!) write down the differences between STM and LTM ....

<table>
<thead>
<tr>
<th></th>
<th>STM</th>
<th>LTM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encoding</td>
<td>acoustic</td>
<td>semantic</td>
</tr>
<tr>
<td>Capacity</td>
<td>7+/- 2</td>
<td>unlimited</td>
</tr>
<tr>
<td>Duration</td>
<td>&lt;18s</td>
<td>lifetime</td>
</tr>
</tbody>
</table>
The Multi-Store Model

Short-term Sensory store (STSS)

Short-Term Memory Store (STM)

Long-Term Memory Store (LTM)

Information not attended to will be lost

Maintenance rehearsal

Consolidation & transfer

retrieval

(encoding) attention

Memories lost through trace decay and displacement

Response output

Memories lost through decay and interference

Atkinson and Shiffrin 1968
How can we avoid losing memories in STM?

- To keep things in STM, and lengthen duration, we tend to **REHEARSE** it.
- This keeps the memory active and therefore easier to recall.

Atkinson and Shiffrin termed this –

**Maintenance Rehearsal**
Why can’t we always recall memories in LTM?

- Memories last a long time, however we are not always able to RETRIEVE the info.
- Memory traces can DECAY if not used much
- Memories INTERFERE with each other.

Everyday I park my car in the same place. On the days I park it somewhere else I go first to my usual spot!!
BAT - Describe the MSM

- Fill in the diagram of the MSM and differences between STM and LTM.
- Write a description of the MSM (half a page - this would be a 6 mark question - 6 mins to write it!!)

Look at the sample answer - how many marks would you get?
What evidence is there for separate memory stores?

- Many experiments have been done to test out the existence of SSTS, STM and LTM
- Case Studies
- Brain Imaging e.g. MRI’s
Experimental Evidence

- SSTM - Sperling 1960
- STM - Capacity - Miller/Jacobs
- STM - Duration - Peterson and Peterson 1959
- STM - Encoding - Conrad, Baddeley
- LTM - Duration - Bahrick
- LTM - Encoding - Baddeley
- Separate Stores - Glanzer and Cunitz
Short-term sensory store (STSS)

- Info enters through each of the senses, which have their own STSS. (Modality specific)
- Vision – ICONIC
- Sound – ECHOIC – acoustically represented
Look at the matrix of letters

A F Y I
Q H J M
G Z N U
Write down all the letters you can remember

AFYI
QHJM
GZNU

How many did you get right?
Look at the matrix of letters

\[
\begin{array}{cc}
S & G \\
Y & C \\
\end{array}
\]

\[
\begin{array}{cc}
X & R \\
J & K \\
\end{array}
\]

\[
\begin{array}{cc}
L & W \\
M & O \\
\end{array}
\]
Group 1 write out all the letters you can remember from the top line only

Group 2 write out all the letters you can remember from the bottom line only

S G Y C
X R J K
L W M O

How many did you get this time?

This is a replication of an experiment done by Sperling in 1960
Testing STSS

• Sperling found that the mean recall was 4.32 letters in condition 1 (whole matrix)
• 3.04 letters for condition 2 (1 row)

Any reasons why so few remembered?
The suggestion is that although PPs had a clear image of the whole matrix, the memory had faded (decayed) in the time it took to report about 4 letters.

So this suggests that we have a visual (iconic) short term memory of 0.5 seconds, and we can hold at least 12 pieces of info in that time.

Echoic tests by Treisman – (1964) suggest that duration = 2 seconds (longer than iconic)
Positive Criticisms of the MSM

• An early model that has proved useful and influential.
• There is considerable evidence that there are distinct types of memory store (STM and LTM).
• Study by Sperling (1960) – info decays rapidly in Sensory Store.
• Serial Position Effect: Murdock (1962), later supported by Glanzer and Cunitz (1966)
Listen carefully to the words I read out.

Group 1 - Write down all the words you heard in any order you like (free recall)

Group 2 - After the list has been read count backwards in 3s from 100

Now free recall the list.
# Data Collection

<table>
<thead>
<tr>
<th>Serial position of word</th>
<th>Tally for each correctly recalled word</th>
<th>Total Frequency for each word</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
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<td>4</td>
<td></td>
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<td>5</td>
<td></td>
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<td>6</td>
<td></td>
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<td>7</td>
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<td>8</td>
<td></td>
<td></td>
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<tr>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Now record your results on the graph.

What will you put on the x axis? (IV)

What will you put on the y axis? (DV)

Can you see a trend?

What conclusion can you draw?

Glanzer & Cunitz (1966)
Glanzer & Cunitz (1966)

Serial position experiment

PPs hear a list of words. Asked to recall them in any order (free recall)

Cond 1: immediate free recall

Cond 2: free recall after interference task

To obtain results, plotted position of each word in the list against how many of the PPs recalled it
Glanzer & Cunitz (1966)

% recall by PPs

Position in word list

Primacy Effect: LTM
Recency Effect: STM

Without interference task
With interference task
Results:

- PPs recalled more words at beginning (primacy) and end (recency) of the list.
- The interference task removed the recency but not the primacy effect.
- Implies that primacy words were stored somewhere different to recency words.
- We have two separate memory stores.
Positive Evidence from Case Studies

• Case Studies - Amnesiacs caused by Korsakoffs Syndrome brought on by chronic alcoholism display sound STM functioning but impaired LTM. This suggests separate and distinct memory stores.

• Scolville & Milner (1957), Wicklegren (68) – The case of HM Loss of LTM after surgery for epilepsy. Severe problems with making new long term memories. STM mostly unaffected
The Case of Clive Wearing

Read p 18 and 19 of Exploring Psychology.

Answer the questions on p19

Does this case show evidence for or against the MSM? Give reasons for your answer.

http://www.youtube.com/watch?v=WmzU47i2xgw
http://www.youtube.com/watch?v=OmkiMlvLKto
Brain Imaging as Positive Evidence for the MSM

STM and LTM can be linked to specific areas of the brain.

PET and fMRI scans take images of active brain.
Prefrontal Cortex

• Prefrontal cortex active when working on a task in STM.

Part of brain where thoughts and actions are orchestrated - Executive Function
Squire et al. (1992) – Hippocampus

- Hippocampus is active when LTM is engaged.

Plays a part in memory and spatial navigation.
Get Creative

- Using your preferred learning style
- Create a model of the MSM for display or presentation at the end of the lesson

poster, 3D model, role play, rap, poem
Plenary

Share MSM’s you have created

Which is the best and why?

Short Answer questions:
Can you…?
1. Explain the differences between duration, capacity and encoding in relation to memory (6 marks)
2. Explain the difference between acoustic and semantic similarity. (2 marks)
3. Identify 6 pieces of info about the MSM (6 marks)
4. Explain what is meant by maintenance rehearsal. (2)
5. Outline 2 pieces of research evidence that supports the distinction between STM and LTM. (3 +3 marks)
6. Give a brief account of the STSS (4 marks)
7. Outline one case study related to the study of memory (2 marks)
8. Describe the primacy and recency effect (2 marks)