

Memory

MULTI-STORE MODEL

This model was proposed by Atkinson and Shiffrin. They suggested that memory consisted of THREE DISTINCT COMPONENTS: sensory store, STM and LTM. They suggested that information travels in a 'FIXED SEQUENCE'. Information first enters the sensory store - this consists of 5 stores one for each sense. Attention is required for information to be transferred from the sensory store into STM. STM memory is only able to hold a limited amount of information (5-9 items) for a brief period of time (approximately 20 seconds) and it encodes information acoustically. In contrast LTM has an unlimited capacity, has an indefinite duration (e.g. a memory could last a few minutes or a life time) and finally it encodes information semantically (via meaning). In order for info to travel from STM to LTM it has to be rehearsed. Forgetting can occur at any one stage.

<u>Name</u>	<u>Method</u>	<u>Findings</u>	<u>Conclusion</u>	<u>Evaluation</u>
Peterson & Peterson's nonsense trigrams (STM capacity)	<ul style="list-style-type: none"> • P's given a NT and count back in 3s from a number to stop rehearsal. • After intervals of 3, 6, 9, 12, 15 or 18 seconds, P's were asked to recall the trigram. 	<ul style="list-style-type: none"> • P's 80% after 3s, got worse, 10% at 18s 	STM is very short (18s) if we do not rehearse. R needed to stop info vanishing and that info in STM fades away if rehearsal is prevented	<ul style="list-style-type: none"> ☺ High level of control (as lab) so less distractions ☺ Issue of ID eliminated as RMD used ☹ Trigrams not real so do not reflect well no generalisation ☹ Order effects as P's get better/bored
Bahrick et al (LTM duration)	<ul style="list-style-type: none"> • 392 HS grads tested over 50 years • Photo re, name to photo, free recall 	<ul style="list-style-type: none"> • Good up to 34 years (90%) better on re than free recall • Decline after 47 years 	Some information can be remembered for a lifetime and LTM appears to be measured better on recognition tests than free recall tests	<ul style="list-style-type: none"> ☺ Meaningful material so reflects on real life so generalisation ☹ Issue of ID (some Ps' naturally better memory)

Baddeley (STM & LTM encoding)	<ul style="list-style-type: none"> • STM: P's asked to recall immediately in order list of 5 words taken from word pool • LTM: Same except 20 mins interval time and 10 words <ol style="list-style-type: none"> 1) Acoustically similar 2) Acoustically dissimilar 3) Semantically similar 4) Semantically dissimilar 	<ul style="list-style-type: none"> • STM: Acoustically similar words were harder to recall than dissimilar words • LTM: Semantically similar words harder to recall than dissimilar words 	STM relies heavily on acoustic coding while LTM relies heavily on semantic coding	
--	--	---	---	--

Evaluation of Multi-store model

☺ PRIMACY RECENCY EFFECT

The tendency for people to remember the first set of words in a list supports the Multi-store model, as the first set of words are likely to have been transferred into the LTM as they would have been rehearsed. The last sets of words are still likely to be circulating in the STM and so P's would be likely to recall it, unlike the middle words. This again supports the idea that there distinct stores within Memory.

☺ BRAIN SCANS

There is also support for this model from brain scans. For instance it has been found that when people use their STM their Pre-Frontal cortex is active. However when they use their LTM their Hippocampus is active. This highlights that there are indeed 'different components' to our memory just as suggested by Atkinson and Shiffrin.

☺ CASE OF Clive Wearing

This person had brain surgery and as a result his STM was impaired. was no longer able to make new Long term memories. This supports the multi-store model as it suggested that in order for new long term memories to be created you need to transfer the info from STM to LTM; and as STM is impaired this pathway is not possible.

☹ REHEARSAL

There is also the debate about whether rehearsal is as important as Atkinson suggested. For instance there are many cases where we do not need to recall information in order for it to be transferred to

long term memory. Such as flash bulb memories, which suggest that when emotions are attached we are more likely to remember the event?

☹ **WORKING MEMORY MODEL (MSM IS SIMPLIFIED)**

Baddeley and Hitch argued that the Multi-store model was too simplified and suggested that the STM consisted of sub-parts as opposed to being a unitary system.

☹ **CASE OF KF**

The multi-store model cannot explain why K.F. who had his STM impaired was still able to recall visual information but not auditory.

WORKING MEMORY MODEL

This model was proposed by Baddeley and Hitch. They suggested that STM consisted of sub-parts namely, **central executive**, **phonological loop** and **Visuo-spatial sketch pad**. The central executive is thought to be the main component which is in control of the other two parts as well as dealing with higher order tasks (e.g. problem solving tasks). The phonological loop deals with auditory information and it consists of 2 parts, the Phonological store (inner ear) - which holds sounds and the Articulatory control system (inner voice) - this is where sub-vocal rehearsal takes place. Finally the Visuo-spatial sketchpad (inner eye) deals with visual and spatial information.

Evaluation of the Working memory model

☺ DUAL TASK

Baddeley carried out an experiment in which there were two groups. One group had to follow a pointer on a board (visual task) whilst answering questions about the angles of different letters (another visual task). The other group was required to also carry out the pointer task (visual task) whilst recalling a string of digits (verbal task). The second group performed better than the first group as the tasks required them to use different components of the STM - the Visuo-spatial sketchpad and Phonological loop. However the first group was unable to complete the task properly as the two tasks were using the same part of the STM which has limited capacity. This provides evidence that there is more than one component in STM.

☺ CASE OF KF

Due to a motorcycle accident KF impaired his STM as a result he experienced problem with auditory verbal information but not with visual information. This again supports the idea that there are different sub-parts to STM which work independently of each other.

☺ REHEARSAL

This model is better than the multi-store model in that they propose a more realistic role for rehearsal in the memory process as it is only part of the process - the articulatory control system.

☹ MULTI-STORE MODEL

However the working memory model is limited in that it only considers STM and ignores LTM which the Multi-store model had at least considered.

☹ RESEARCH INTO THE CENTRAL EXECUTIVE

Research into the central executive is limited so there are still many questions in regards to how it works.

EYEWITNESS TESTIMONY

This term refers to instances where a witness of a crime has to give a statement in court in relation to what they had seen.

MISLEADING QUESTIONS: LOFTUS

She wanted to test whether leading questions could affect the accuracy of ones recall.

In her experiment she got 45 psychology students to watch a number of video clips of traffic accidents. Participants were then asked to answer a series of questions in relation to the clips. There was one critical question (leading) - 'What speed were the cars travelling in when they smashed into each other'. In other groups the word 'smashed' had been replaced with either 'hit, contacted or bumped'.

The results showed that participants in the 'smashed' group gave the highest estimates of 41mph. whereas the contacted group gave the lowest estimates of 32mph.

This shows that the wording of a question can have a significant effect on one's recall. Additionally this raises serious implications for eyewitness testimony and police interrogation processes.

Evaluation of Loftus' key study on MISLEADING QUESTIONS

☺ DID YOU SEE THE BROKEN GLASS

Loftus carried out her above study again but this time added an additional leading question in which she asked participants 'did you see the broken glass'. In the video clips there was no broken glass, yet participants in the 'smashed' condition were likely to say 'yes' they had seen broken glass. Thus supporting Loftus' claim.

☹ VIDEO CLIPS

However there have been a number of criticisms that have been made in regards to Loftus' work. A major flaw is that Loftus' study lacks ecological validity. It is merely based on participants recall of video clips had this been a real life event recall is likely to have been more accurate.

Cutshall interviewed 13 people who had witnessed an armed robbery in Canada. He then re-interviewed those four months after the crime and included 2 misleading questions. Despite these Q's the witnesses provided accurate recall that matched their initial reports. Therefore suggesting that the wording of a question might not affect the accuracy of someone's recall.

Christianson interviewed 110 witnesses to bank robberies. Those who had been face-to-face remembered more details than those who had been onlookers therefore less emotionally aroused.

☹ **SIGNIFICANT VERSUS INSIGNIFICANT**

Also there is the issue of insignificant versus significant details. Loftus carried out another study where she showed P's a series of pictures in which a man steals a red wallet from a woman's bag. Afterwards 98% of the participants identified the colour correctly. Furthermore when P's were given a description stating that the purse was brown Participants persisted with their original answer. Again showing that misleading questions might not distort someone's memory.

☹ **OTHER FACTORS**

Remember to argue that there are factors that determine how accurate someone's account of an event is for instance what was the visibility like, what were their ages etc...

FACTORS THAT AFFECT THE ACCURACY OF EWT

1) Anxiety

WEAPONS EFFECT: Loftus

- P's asked to sit outside a laboratory where they thought they heard a genuine conversation
- In one condition, they heard a convo about equipment failure. A man with greasy hands and a pen came out. In the second condition, they heard a hostile convo and sound of breaking glass. A man with a bloody knife came out.
- P's given 50 photos and asked to identify the man who came out

Findings: P's who had witnessed the man holding the knife identified the man correctly 33% of the time while the other group identified the pen-holding man 49% correctly. Loftus believed anxiety from seeing a weapon narrowed the focus of attention from the face.

Anxiety can aid recall

Christianson (110 bank robberies & face-to-face > onlookers) OR Cutshall (13 armed robbery witnesses, after 4 months + MisQ, accurate as before)

2) Age

CHILDREN: Poole and Lindsay's study

- Children aged 3-8 shown science demonstration then parents read a novel that had elements of the demonstration and new information.
- Children questioned about demonstration and found they had incorporated much of new info. From story in answers. Children then asked to think where they got the information from (source monitoring)
- Older children able to revise their answers and extract post-event info (story) while younger children were not able to

This implies that children cannot be relied upon for EWT

CHILDREN: Flin et al

- Questioned children and adults a day after incident and 5 months after.
- No difference in accuracy after a day, but children did worse after 5 months (while adults had not)

This implies that the delay between interview and incident can affect the accuracy of EWT of children

ELDERLY: Memon et al

- People aged 16-33 (young) and 60-82 (old) were used. When there was a short delay (35mins) between incident and interview, no difference in accuracy. When delay was 1 week, the older EW accuracy was significantly worse.

Consequentiality

Most EWT studies had been carried out in lab conditions. P's knew their responses would have little consequences and it was all artificial.

FOSTER et al

- P's watched a vid of bank robbery and asked by police to identify robbers in identity parade.
- 50% of P's told their responses would influence trial and it was genuine. Other 50% were led to believe it was a film situation only.
- Those in first condition were more accurate

You could argue it is difficult to convince P's in an experiment to believe their responses would have genuine importance.

The Cognitive Interview

Fisher's view on the standard (police) interview:

- Studied real police interviews for 4 months
- Found witnesses were bombarded with brief, close-ended, direction questions
- Not allowed to freely talk, interrupted often and sequence of Q were out of sync with event

Fisher felt this was unhelpful as it broke the concentration of witnesses and encouraged short, less detailed answers.

Fisher's suggestions

- Minimise distractions
- Listen to witness
- Ask open-ended Q
- Use of imagery (i.e. imagine you are at scene)
- Adopt language to suit witness (i.e. friendly to kid)

GEISELMAN's cognitive interview

1. Report everything	The witness encourages the reporting of every single detail of the event, even though it may seem irrelevant.
2. Context Reinstatement	The interviewer encourages the interviewee to mentally recreate the environment and contacts from the original incident
3. Recall in Reverse order	The interviewer may try alternative ways through the timeline of the incident – e.g. by reversing the order in which the events occurred.

4. Recall from Changed perspective	The interviewee is asked to recall the incident from multiple perspectives e.g. by imagining how it would have appeared to other witnesses present at the time.
------------------------------------	---

Evaluation of the Cognitive Interview

Geiselman et al showed P's video of simulated crime then tested different groups with a CI, SI and interview under hypnosis. Found that CI elicited more info than other methods. This shows that CI are most effective when interviewing witnesses.

Koehnkan later found witnesses using the CI recalled the most incorrect info than other methods, probably due to the nature of the CI (as it asks to recall as much info as possible)

Keibel et al carried out a survey of police officers in the UK and found CI was widely used (as they found it useful). They had a concern over the amount of incorrectly recalled info and the time it took to carry it out.

Gieselman reviewed a number of studies and found children under 6 reported events less accurately when CI was used, probably because instructions were difficult to understand for young children. He also found out it worked good for children aged 8+

Strategies for improving memory

1) Role of organisation

a. Mnemonics

Verbal mnemonics help remember the order of things. This involves taking a phrase in which the first letter of each word represents a key concept or principle (i.e. Never Eat Shredded Wheat = NESW)

b. Method of loci

Use visual imagery (e.g. a journey from college to home). Each key location/destination represents a key concept or principle, therefore when recalling, a person would use the route to aid recall.

EVIDENCE: Jacobs used VI to teach English speakers learn 400 Spanish words in 12 hours (i.e. learn a foreign language) by associating Spanish words with images (e.g. church is 'Eigles' in Spanish so he told people to think of a church with eagles)

2) Organisation and understanding

BRANSFORD AND JOHNSON'S STUDY:

- Gave P's passage of writing which they had to recall. One group given title "Washing Clothes" other group not given a title.
- Group with title recalled more than group without title
- Supports the idea that understanding material to be remembered is important in later retrieval.

3) Encoding and retrieval strategies

Encoding specificity principle – this term suggests you are more likely to recall something if the retrieval context (where you recall something) is like the encoding context (where you learnt something).

SMITH'S STUDY:

- P's given set of 80 words to learn in a basement.
- Some P's asked to recall in same basement. Some asked to recall in room on 5th floor. Some asked to recall in room on 2nd floor but to imagine they were in basement.
- P's who recalled in basement recalled on average 18/80. 5th floor P's recalled on average 12/80. Imagine group recalled average 17/80
- This supports the idea that environment where info was encoded can aid recall.

4) The role of practice

- The case of SF was able to recall a list of 80 digits in order

- He practised 1 hour a day for 2 years but could not achieve the same with letters/words. Shows that practice could be important for aiding recall.