MEMORY

Revision Notes

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MEMORY

Specification

Memory

- The multi-store model of memory: sensory register, short-term memory and long-term memory. Features of each store: coding, capacity and duration.
- Types of long-term memory: episodic, semantic, procedural.
- 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: misleading information, including leading questions and post-event discussion; anxiety.
- Improving the accuracy of eyewitness testimony, including the use of the cognitive interview.

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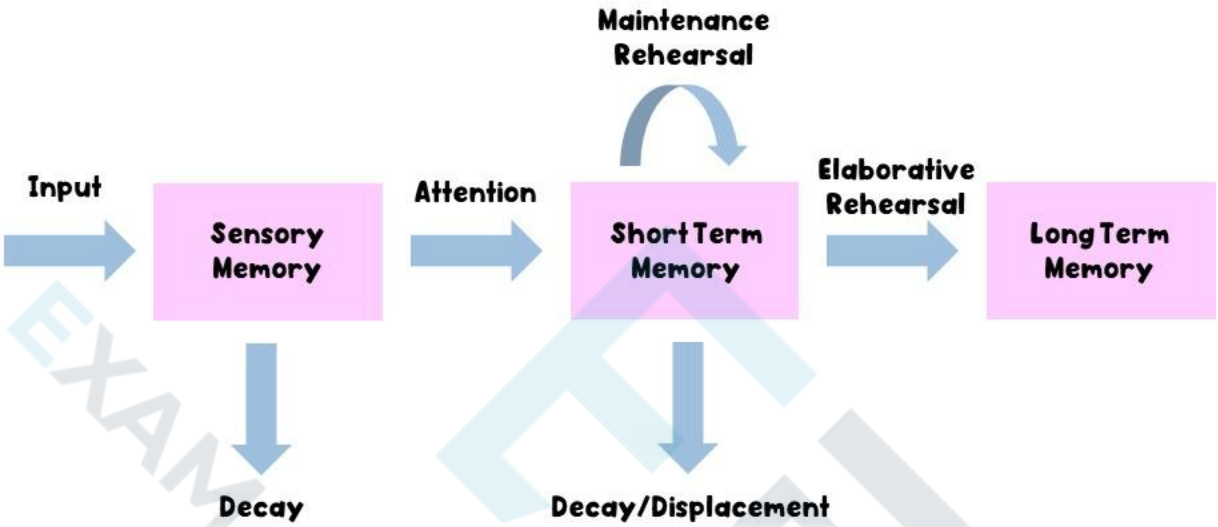
Multi-Store Model



Coding	Capacity	Duration
The format that information is stored in	The amount of information that can be stored	The length of time that information can be held

Features of the Stores

Sensory Memory	Coding: Modality specific (senses) Capacity: Very high Duration: Less than half a second
Short Term Memory	Coding: Acoustically Capacity: 5-9 items Duration: Around 18 seconds
Long Term Memory	Coding: Semantically Capacity: Practically unlimited Duration: Potentially a lifetime

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Multi-Store Model

Evaluation of Multi-Store Model

Research on Coding

Baddeley (1966): Groups were given 1) acoustically similar b) acoustically dissimilar c) semantically similar or d) semantically dissimilar word lists. Those who recalled immediately (STM) found the acoustically similar words harder to recall. Those who recalled 20 minutes later (LTM) found the semantically similar words harder to recall.

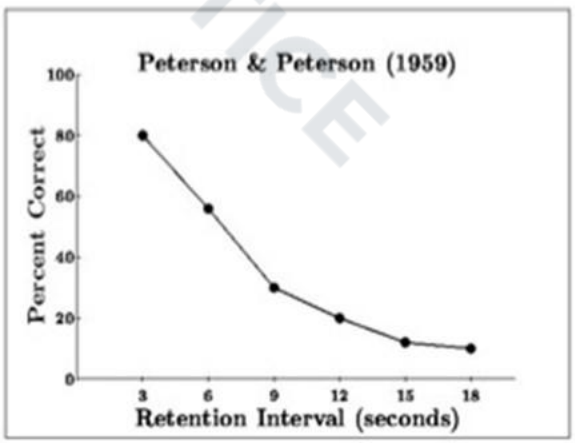
Research on Capacity

Jacobs (1887) read out increasing numbers of digits and asked participants to recall them until they could no longer remember correctly. The mean digit span was 9.3 items and for letters 7.3.

Miller (1956) found that the capacity of short term memory is around 5-9 items but can be increased through chunking.

Research on Duration

Peterson & Peterson (1959) gave students consonant syllables to remember and asked them to count backwards from a 3 digit number, stopping at different time intervals. Average recall dropped to 3% after 18 seconds



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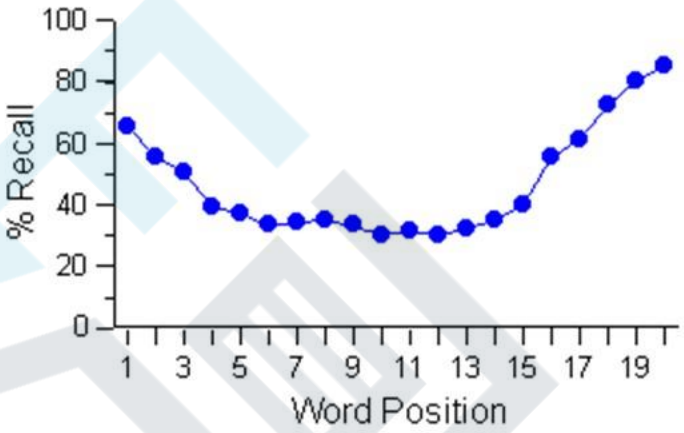
Multi-Store Model

Evaluation of Multi-Store Model

Serial Position Effect

Glanzer & Cunitz (1966): Read out list of words to participants and asked them to recall as many as possible. They could recall more from the start and end of the list, supporting the idea of distinctly separate short term and long term memory stores.



Elaborative Rehearsal

Prolonged rehearsal is not always needed for information to pass to the long term memory. Craik & Watkins (1973) stated that it was the type of rehearsal (elaborative) that was more important. Therefore, the multi-store model does not effectively explain how some memories transfer more quickly than others.

Case Study

KF had a motorbike accident and his short term memory was impaired but not his long term memory. His memory for digits was poor when read out loud to him but was better when he read them out himself. He seemed to still have STM for visual material, suggesting there may be more than one STM store.

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Long-Term Memory

Types of Long-Term Memory

Episodic	Explicit memories of events. These memories also include the time stamp, the context and emotions associated with the event. We make a conscious effort to recall these.
Semantic	Memory for facts and knowledge. This is a type of explicit memory. Semantic memories usually start as episodic memories but progressively lose their association with particular events and only the knowledge remains.
Procedural	Memory of how to do things. These memories require a lot of repetition and practice. They are implicit, meaning we find them very difficult to explain even if we find the actions easy to perform. Procedural memories are automatic.

Evaluation of Long-Term Memory

Brain Scans

Tulving (1989) performed brain scans on volunteers and found that when the they used their episodic memory, part of the frontal cortex (frontal lobes) was active, compared to when the participants were using their semantic memory when the back cortex was active.

Clive Wearing

Clive Wearing had impaired episodic impairment from a viral infection but his semantic and procedural memories were intact as he could still understand meanings of words and play the piano.

Real World Application

Belleville et al. (2006) devised an intervention to improve episodic memory in older people.

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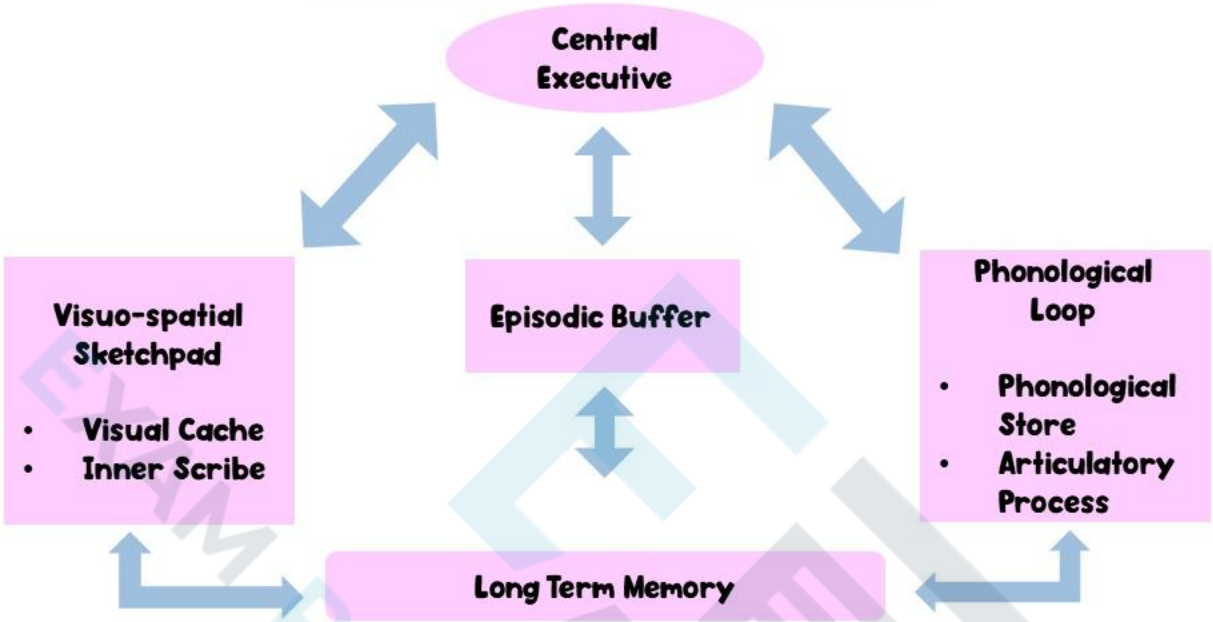
Working Memory Model



Features of the Working Memory Model

Central Executive	Drives the system and decides how attention is directed. It allocates the slave systems to tasks. It has no storage capacity and limited processing capacity.
Phonological Loop	Deals with auditory information. The phonological store stores the words you hear and the articulatory process is used to rehearse verbal information with a capacity of about 2 seconds.
Visuo-Spatial Sketchpad	Stores visual and spatial information. The visual cache stores visual data and the inner scribe records the arrangement of objects in the visual field.
Episodic Buffer	General storage space for the other stores and it integrates information from these and the long-term memory. It has limited capacity of 4 chunks.

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Working Memory Model

Evaluation of Working Memory Model

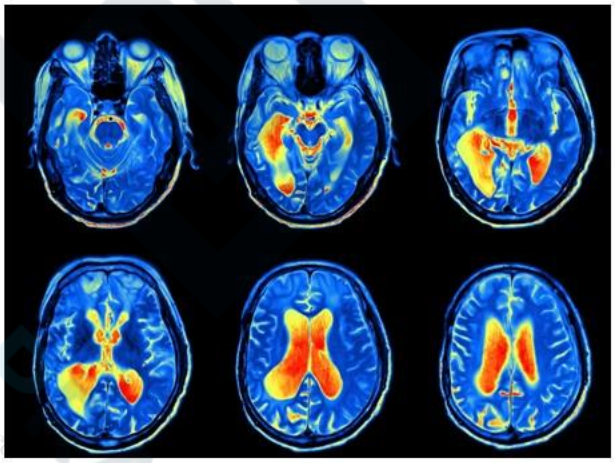
Case Study

KF had a motorbike accident and his short term memory was impaired but not his long term memory. His memory for digits was poor when read out loud to him but was better when he read them out himself. He seemed to still have STM for visual material, supporting the existence of separate visual and acoustic memory stores.

Dual Task Performance

Dolcos et al. (2007) showed effects of dual task performance using fMRI scans.

Different areas of the prefrontal cortex were activated when performing 2 tasks affecting the same store than when completing 2 tasks from different stores



Central Executive

There is little clarification as to what the Central Executive's role is. Some believe it consists of separate components and needs clearer research into it. This means the Working Memory Model is not fully explained.

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Explanations for Forgetting

Interference

Proactive Interference

An old memory trace disrupts new information.

Retroactive Interference

New information interferes with an old memory.

Similarity

Interference is worse for both types when the memories or learning are similar. McGeoch & McDonald (1931) asked participants to learn a list of words until they were 100% accurate in recall. Then they learned a new list with either similar meanings, opposite meanings, unrelated words, nonsense syllables, a 3 digit number or no new list. Then they recalled original list and found that those who had words with similar meanings produced the worst recall.

Evaluation of Interference

Baddeley & Hitch (1977)	Asked rugby players to recall the names of the teams they had played in fixtures. Some played all the games, some missed games due to injury. Those who played the most games forgot more.
Tulving & Pstoka (1971)	Gave participants lists of words in categories. The more lists they were given the worse the recall. But if they were given the names of the categories recall improved, suggesting interference causes only a temporary loss of memory.
Underwood (1957)	Asked students to learn nonsense syllables and found that a group that had taken part in earlier memory experiments were more likely to forget the new list. This is an example of Proactive Interference.

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Explanations for Forgetting

Retrieval Failure

Encoding Specificity Principle	A cue has to be present at encoding and at retrieval for it to aid memory. If they are different, or a cue is absent, then forgetting occurs. Some cues are linked in a meaningful way i.e. mnemonics and some are encoded at time of learning.
Context-Dependent Forgetting	Abernathy (1940) tested students each week in the same or different rooms and same or different instructors. Those in the same room with same instructor did best (familiar context acted as cues).
State-Dependent Forgetting	Hardman (1998) found that those who learnt a list of words on an exercise bike could remember them better when exercising again.

Evaluation of Retrieval Failure

Divers

If divers learnt a list of words underwater or on land and then recalled them on water or on land. Recall was better when the context matched recall.

Real World Application

We can use strategies to improve our recall in our daily lives by trying to match context or state.

State

Goodwin et al. (1969): People who were drunk when learning words had better recall when drunk again!

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Eyewitness Testimony

Misleading Information

Leading Questions

Loftus & Palmer (1974) asked American students to watch film clips of car accidents. After, they received a questionnaire and one of the questions was the critical question "About how fast were the cars going when they _____ each other?" The word used in the blank space was either smashed, hit, bumped, contacted or collided. Smashed had the highest speed estimate (40.8mph) and contacted the lowest (31.8mph). This shows the form of a question can alter the response of a witness.

Evaluation of Leading Questions

Control

There was a high level of control in study. This enabled them to establish a cause-and-effect relationship. E.g. "that leading questions do affect memory"

Mundane Realism

Because the study attempts to simulate the experiences of an eyewitness to a car crash, and they could be asked leading questions in court, the study has mundane realism.

Follow Up Study

Lofts & Palmer followed their study up. This time they asked the critical question just using 'smashed' and 'hit'. One week later they were asked 'Did you see any broken glass?' Those in the smashed condition were more likely to say yes. This shows that the leading question can alter an eyewitness' memory for an event.

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Eyewitness Testimony

Misleading Information

Post Event Discussion

Gabbert et al. (2003) paired up participants and gave them a film to watch but each was given a different view. They were then told to discuss what they saw. 71% recalled things they did not see, compared to a control group, which was 0%. This shows the effect of post event discussion on eyewitness testimony.

Evaluation of Post Event Discussion

Ecological Validity

The participants knew they were taking part in a study. In real life they would probably be given less information as an eyewitness.

Conformity

It is hard to conclude if the distorted memory was due to the poor memory or because of social influence, in particular conformity.

Population Validity

Gabbert et al. used two different samples of university students and then older people. They found little difference in the results suggesting the study affects different ages in the same way.

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Eyewitness Testimony

Anxiety

Weapon Focus Effect

Evidence suggests that in violent crimes arousal may focus the eyewitness on central details (i.e. the weapon) rather than peripheral details. Johnson and Scott (1976) called this the 'weapon-focus effect'.

In their study participants heard a discussion in adjoining room. In one condition the man emerged with a pen and grease on his hands and in the other the discussion was more heated, and the man emerged with a bloody paperknife. Participants then had to identify the man from 50 photos. Those in the pen condition were 49% accurate but those in the knife condition were only 33% accurate.

Evaluation of Anxiety

Eye Movement	Monitored eye movements and found the presence of a weapon causes their attention to be physically drawn towards the weapon and away from the person's face.
Christianson & Hubinette (1993)	Questioned 58 real eyewitnesses of bank robberies. Those who had been threatened were more accurate and remembered more details – even 15 months later.
Pickel (1998)	Participants were shown a video of man paying a receptionist in a hair salon holding either scissors, a gun, a wallet or a raw chicken. EWT was similarly poor for the chicken and the gun. This suggests high unusualness, not anxiety, caused the inaccuracy in recall.

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Cognitive Interview

Cognitive Interview Techniques

1. **Report Everything:** Small details may trigger important memories.
2. **Mental Reinstatement of Original Context:** Encourage the interviewee to imagine the environment and feelings from the original incident. Related to context dependent forgetting.
3. **Recall Events in a Different Order:** Stops people reporting their expectations of how it happened and from being dishonest.
4. **Change Perspectives:** "If you were standing at a different angle, what would you have seen?" Prevents the disruption of schemas on recall.

Evaluation of Cognitive Interview

Kohnken et al. (199)

Conducted a meta-analysis of 53 studies. They found Cognitive Interview increased the amount of accuracy by 34% compared to standard interviewing.

How Effective?

Milne and Bull (2002) and police officers report that recall is similar across each one but found it improved with a combination of report everything and reinstatement.

Age

Geiselman (1999) found children under the age of six reported things slightly less accurately when interviewed using the CI. It could be that the children did not understand the instructions properly.
It was found that the CI was only effective for children aged 8+