

WEEK 5 BRAIN AND COGNITION- long term memory

ENCODING- learning in LTM.

Consolidation- memory records are written over and over till they reach some stability.

Factors for consolidation... exposure, intention, depth of processing, structure of information

- **Exposure** – number of contacts with object. But often we can't remember things we have seen many times! E.g. the penny test! **MURDOCK** tested influences of rate or presentation and of number of items in a list
- **Intention** - **HYDE&JENKINS** used 24 words each shown for 3 secs and asked ptps to tell them if the word contains an 'a' or 'q', then asked to rate the pleasantness of the word (half of ptps were told to recall later). Showed only a very small effect of intention on learning, but big diff depending on level of processing.
- **level of processing** – **CRAIK&LOCKHART** made the distinction between shallow and deep processing- ptps processed lists of words under diff conditions, then were unexpectedly tested on how many words they remembered. Abstract knowledge= abstract thoughts= more thinking
- **Skill acquisition** – follows what is known as the power law of practice- learning to do something... the whole process is consolidation, you need more and more training to keep leaning at the same rate.
- **Interference**- retroactive (new memory interferes with old info) e.g. new phone number= can't remember old number. Proactive (old memory interferes with new info) e.g. old phone number= can't remember new number. Difficulty understanding something new – mixed signals for brain.
 - o **Interference due to format of info**- acoustic confusion
 - o **Interference due to semantic content of info**- closely-related concepts
 - o Three experiments to determine if acoustic/semantic interferences impair recognition of recently learnt items. Ptps shown list of 8 words in 3 conditions; no distractions, phonetic distraction and semantic distractors. Phonetic= more efficient in short periods.

To learn:

- Exposure isn't enough
- Intention isn't enough
- Processing is required
- Structuring info facilitates learning
- Do not get distracted
- Motivation matters

RETRIEVAL - from LTM to STM. It is the process whereby info in working memory accesses LTM- commonly conceived as the transfer of info from one entity (database of knowledge) to another.

- Recognition- means to 'know again; ability to match perceptual input with knowledge.
- Working memory- request of info (conscious process)
- **SHEPARD** – 540 words in learning phase, 60 test pairs of old and new words, 88% correct decisions, same experiment with 612 pics= 97% correct. Performance in recognition tasks are better than recall tasks even after longer retention intervals.
- Retrieval of info from memory depends on cues- TULVIG&THOMSON- encoding specificity principle

- **GODDEN&BADDELEY**- words heard underwater are best recalled underwater- people recall better when conditions are the same for learning and recall

Retrieval as reconstruction- knowledge is used to reconstruct events during recall- problem of source management. **MCDERMOTT** (slides 35-26). Distortion of retrieval can also occur by leading question- e.g. **LOFTUS&PALMER** 'did you see broken glass'. This leads to false memories= problems for EWT. Perception and understanding depends on knowledge

Recognition is interpretation of an object, and this goes through out knowledge- but this is unconscious.

FORGETTING- refers to loss of information and impossibility to access information- it is accessible. **THORNDIKE'S** law of disuse- memories fade away/decay gradually if unused; time plays a critical role, ability to retrieve info declines with time after original encoding- quality of memory decreases.

To remember well, we must sleep! During sleep the brain 'cleans up the mess' and sorts what matters from that info. Every night what we have learnt is refreshed and consolidated meaning we are less likely to forget.

LTM STRUCTURE-

Declarative- can explain/declare. *Non-declarative*- can explain but must use memory and carry out the procedure physically e.g. riding a bike. There is a memory for emotion- but it is nondeclarative.

COLLINS&QUILLIAN- hierarchical network for how memory is structured- sub concepts have all features of super-concepts plus differentiating features. It is based on technical knowledge. Asked ptps to say if a statement was true or not and measured the time taken to respond. Semantic LT memory networks- concepts in memory are linked to each other

Spreading activation- empirical evidence for this comes from priming experiments:

- *Repetition priming*- evidence for activation of the nodes. Priming effects depending on whether the word was heard before or not
- *Semantic priming*- evidence for the spreading of activation over the relations between nodes. Priming effects for words linked to the primed word in the network

FUSING INFORMATION- more likely to remember words if memory fuses together - e.g. 'oteobrtnobeat' more likely to remember if organised 'tobeornottobe' because it has meaning. We fuse together to get 6 words rather than 14 letters.

A process termed *chunking* - **MILLER** - a collection of elements having strong associations with one another, but weak associations with elements within other chunks.

CONCLUSIONS-

Schemas- structures knowledge frameworks, general info about objects and events, they contain concepts, slots and values to guide and help interpret new knowledge and facilitate perception

Scripts- knowledge of what usually occurs in a given situation- we have scripts for routine events e.g. going to the doctors- creates the expectation that the same will reoccur in a similar situation.

Memory tells us what to do, where to do it and how to do it... this is memory guided behaviour.