



Cognitive Psychology

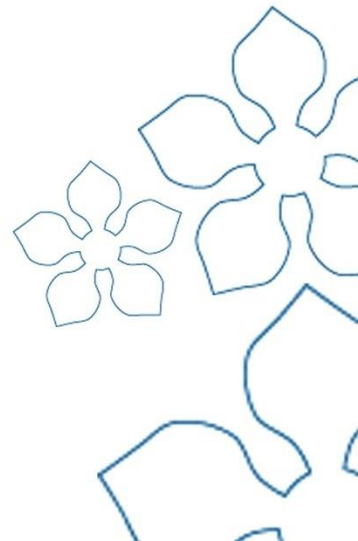
M5X00908 Brain, Behaviour, and Cognition (BBC)

Memory: Context, Errors, and
influences on function

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Essential Reading!!!!

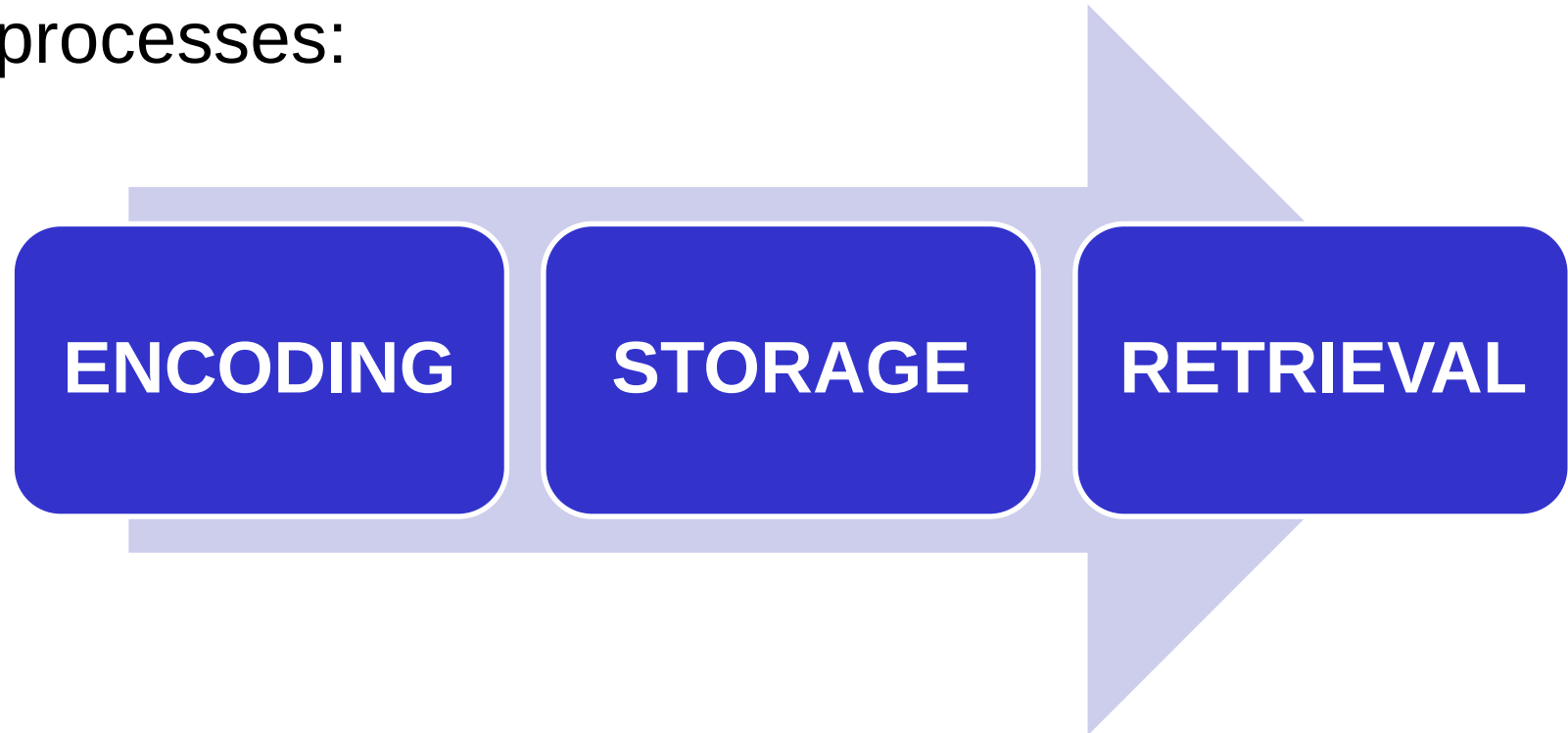
- Eysenck, M. W., & Keane, M. T. (2015). *Cognitive psychology: Chapter 8.*



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Errors in memory

- Errors in memory may involve any of the three main processes:



- If any stage fails memory may not function correctly:
 - Encoding: Way in which information originally placed and represented in memory
 - Storage: How well maintained in memory
 - Retrieval: How can information be accessed

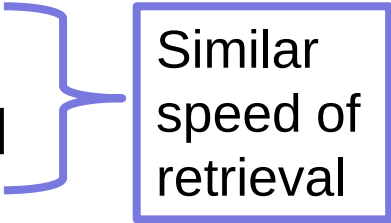
Interference

Interference: Ability to remember can be disrupted by what we have previously learned or by future learning.

- Interference by previous memories: **proactive interference**
- Interference by later learning: **retroactive interference**

- Proactive Interference caused by:
 - Competition between correct + 1/more incorrect responses
 - More competition when incorrect responses are associated with same stimulus as correct response
- Jacoby et al. (2001): PI occurs for two reasons:
 - Problems in retrieving the correct response (discriminability)
 - Strength of initial incorrect response (bias or habit)

Interference

- Bäuml & Kliegl (2013): PI depends on retrieval processes – searching memory tends to be too broad – PI should be reduced if memory search is restricted to relevant items.
 - Ps presented with list(s) followed by free recall: 3 conditions:
 1. **Remember** (PI condition): Ps told to learn 3 lists.
 2. **Forget**: Ps told to forget 1st 2 lists before studying 3rd
 3. **Controls** (no PI): Learned and tested on only 1 list.
 - Findings:
 1. Remember = Recalled 41% of words
 2. Forget = Recalled 68% of words
 3. Controls = Recalled 68% of word

Similar speed of retrieval
 - Conclusion:
 - Instruction to forget 1st 2 lists meant it was easier for Ps to limit retrieval effort on 3rd list.

Interference

- Retroactive Interference (RI)
 - Evidence comes from research on Bilinguals
 - Misra et al. (2012): Studied Ps with native language Chinese, 2nd language English.
 - Ps named pictures in Chinese more slowly if they had previously named the same pictures in English.
 - ERPs suggested Ps were inhibiting English names whilst naming the pictures in Chinese.
 - Lustig et al. (2004) argued that in pair-association learning RI is due to strength of incorrect response as oppose to the incorrect response being highly accessible.

Evaluation of Interference Theory

- Strong evidence for both PI & RI.
- However: Most research based on the probably incorrect assumption that individuals *passively* allow themselves to suffer from interference.
 - Kane and Engle (2000): individuals with high attentional or working-memory capacity would be better able to resist proactive interference unless they were performing an attentionally demanding task at the same time as the learning task.
- Anderson (2003) argued for the role of control mechanisms, which allow us to select certain memories whilst inhibiting others.

Evaluation of Interference Theory

- Research is limited in several ways:
 - Few studies of processes used to minimise interference.
 - Theory largely ignores the role of inhibitory processes.
 - Implicit memory information is lacking.
 - Special (non-real-life) conditions are needed to see substantial interference.
 - Associations learned outside the lab seem less liable to interference than those learned inside.



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Other forms of forgetting

- Motivated forgetting: Think/no-think (Anderson & Green, 2001)
- Cue-dependant forgetting (Tulving & Psotha, 1971).
- State-dependant forgetting (Eich, et al., 1975; Schab, 1990)
- Context-dependant forgetting (Godden & Baddeley, 1975)
- Encoding specificity: Evidence from brain-imaging studies:
 - Park & Rugg (2008): Ps presented with pictures & words.
 - Each item tested with congruent (word-word) or incongruent (word-picture) cue: memory better in congruent
 - Brain activity analysed at learning for items that were subsequently recognised: Areas of brain active for processing words or pictures important for successful recognition if cued with word or picture at test
 - Processing at learning should be similar to that at retrieval.

Two views of forgetting

- Trace-dependent forgetting:
 - Indicates the **storage** of information
 - Information no longer held in memory
 - Memory 'trace' not there or too weak
- Cue-dependent forgetting:
 - Indicates the **retrieval** process
 - Also involves the original '**encoding**' stage
 - May not indicate **storage** problem



Factors in memory

- Cue dependent forgetting (Tulving and Psootka, 1971)
- Access to a memory often uses a 'cue' to that memory
 - *E.g. Remember a name of a person when see face*
 - Cue: encoded at time of original memory encoding
 - Not present at time of retrieval
- Information may be **stored** in memory but not accessible
 - e.g. 'tip of the tongue' phenomena
 - Name of a person you've met previously elsewhere
 - Word is present in memory but retrieving is difficult
- Example of a problem that involves **encoding** and **retrieval** processes



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Context and memory

- **Encoding specificity principle:**
 - Retrieval cue works best if it is encoded at the time of encoding the whole event (rather than given afterwards) (*E.g. Tulving, 1983*)
 - Overlap of information at **encoding** and **retrieval**
 - Distinguish between two types of cue dependent factors
 - State dependent memory
 - Context dependent memory



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State dependent memory

- In order to retrieve you need to be in the same **internal** state at times of encoding and retrieval.
- State dependent effects have been shown by manipulating internal mood with for example:
 - Marijuana and ordinary cigarettes (Eich, et al 1975)
 - Odours (Schab, 1990)
 - Noise (Smith, 1985)
- Memory performance better if manipulated mood using same factors (above) before both encoding and retrieval



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Context dependent memory

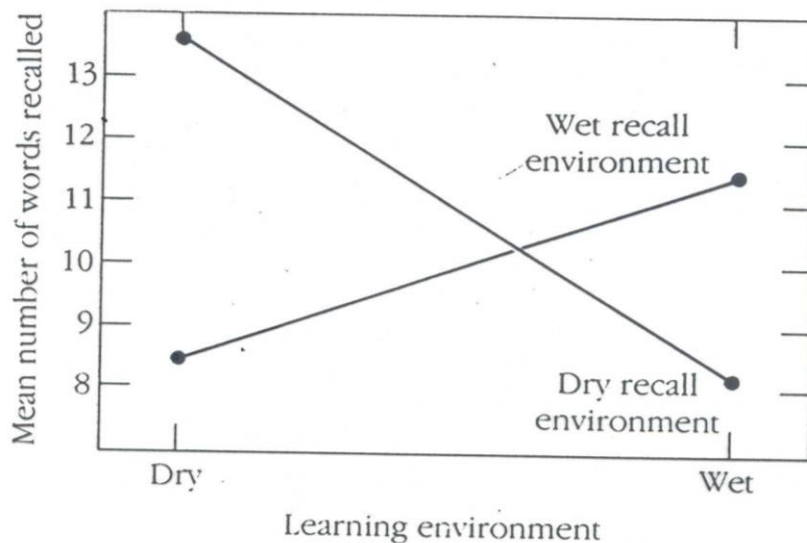
- Memory is enhanced if the physical context of retrieval matches that of learning
 - E.g. Remembering your dentist's name just as you arrive at the dental surgery
 - Location where you encoded the name
 - Could also be 'state-dependent' (i.e. mood when at dentist!)



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Context Dependant Memory

- Godden & Baddeley (1975): Divers listened to 40 words presented on the beach or 10 feet under water
 - Tested either in same environment or opposite
 - Recall was better when tested in same environment.



- But no effect of context when study was repeated in 1980 using recognition rather than recall – reason?
 - The learned items being present on the test provided better cues that outweighed impact of context.

Context in memory

- Implications of findings:
- Items to be stored and retrieved are encoded along with the context (Wiseman & Tulving, 1976)
 - Source monitoring and encoding (Mammarella & Fairfield, 2008)
 - E.g. Remember watching a film you like
 - Where were you when you saw the film?
 - Home?
 - Cinema?
 - Other's house?
 - Likely you have memory for context as well as for information from the film
 - Memory for **origin** of information (useful generally!)



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Picture study

Look at the following picture of a lecturers office

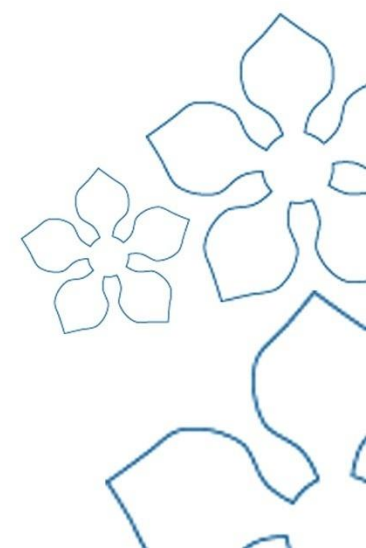


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Memory biases

- Now recall as many items as you can
 - Potential responses:
 - Chairs
 - Desk
 - Table
 - Boxes
 - Bottle of wine
 - Picnic basket
 - Row of books
 - Skull
 - Brewer & Treyens (1981): 30% of subjects (falsely) recalled that books were present



Schema effects in LTM

- Storing information in schema can cause errors in memory retrieval
- Schema-consistent information may be activated in memory
 - False positives (recall information not present in reality)
- Schema-inconsistent information may not be activated
 - False negative (fail to recall)
- New influences on how memory organised
 - Misleading information (after encoding)



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Misleading information effect

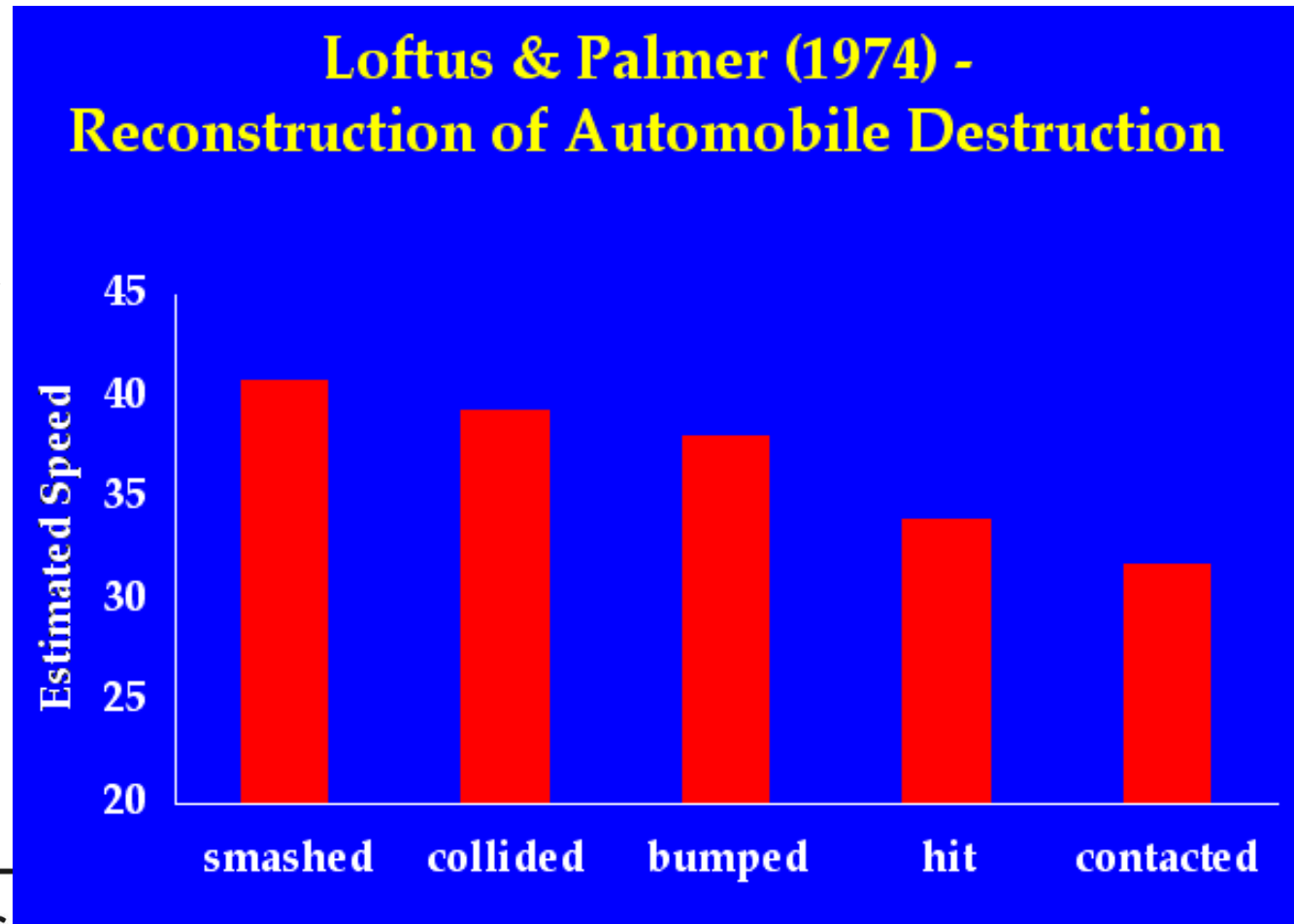
- Loftus & Palmer (1974)
 - Students viewed films depicting vehicle accidents
 - After each film, students asked to give an account of the accident they just saw
 - Questions were asked to elicit additional information



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Misleading information effect

- Loftus and Palmer (1974)
 - About how fast were the cars going when they 'smashed' into each other?
 - Manipulated word used in questioning
 - Clear effect of information given after encoding



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Lost-in-the-mall

Loftus and Pickrell (1995)

- Participants read a list of childhood events that their family had corroborated as true
 - One of these events was actually false
 - Being lost in the mall for a considerable time when 5-6 years old and being helped by an elderly person and reunited with family
 - 25% of Ps believed this to be a true memory
 - Episodic autobiographical memory implied
 - Around 20% embellish the event with further ‘recalled’ details from ‘memory’
- 

Reconstructive memory

- Memory is modified to conform to post-event information (Morton et al 1985)
- This is termed the 'destructive actualisation hypothesis' – as new information destroys or over-writes actually stored memories
- A bleak view of human memory
 - There may be no such thing as true memory
 - Or how can we tell from memory alone?
 - Relation to autobiographical memory?



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Constructed memories in the real world?

- I woke up in the middle of the night and everything looked odd and strangely lit. At the end of my bed was a four-foot-high grey alien. Its spindly, thin body supported a huge head with two enormous, slanted, liquid black eyes. It compelled me, telepathically, to follow and led me into a spaceship, along curved corridors to an examination room full of tables on which people lay. I was forced to lie down while they painfully examined me, extracted ova (or sperm) and implanted something in my nose. I could see jars containing half-human, half-alien fetuses and a nursery full of silent, sickly children. When I eventually found myself back in bed, several hours had gone by.
- Blackmore (1994, p. 30)



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Aliens and false memories

- Clancy et al (2002) studied 3 groups:
 - Abductees: no autobiographical memory for event
 - Abductees: memories had been 'recovered'
 - Non abductees
- Gave them a **critical lure** test
 - Item consistent with schema
 - Exposed them to items such as 'sour, sugar, honey, tart' etc
 - Would they falsely recognise 'sweet' as the critical lure?

Aliens and false memories

- Results (Clancy, 2002)
 - Recovered memory alien abductees: more likely to falsely recognise words not seen before
- Argued that the problem could be one of source monitoring
 - Judging where information originated from:
 - Misattribute an internally generated memory as an externally generated memory
 - E.g. From TV or reality!
 - Makes more vulnerable to schema-effects?



Flashbulb memories

Brown and Kulik, 1977

- A recollection of an event that is so emotionally powerful that it is highly vivid and richly detailed
- ‘photographic quality’
- Powerful form of memory encoding – no forgetting process?
- Depth of processing better



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Flashbulb memories

- Stronger forms of encoding/retrieval than regular memories?
 - Or do people just believe that they are?
 - Possible that flashbulb memories are a phenomena born of reconstructive memory
 - Discuss them because they are emotionally significant and this rehearsal of the details makes them seem more vivid but is prone to constructive processes
- Talarico and Rubin, 2003



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Conclusion

- Memory involving cued retrieval of information may fail in different ways
- Cue encoded may not be present
- Memory is situated in a context
- Context will effect ability to retrieve
 - External context
 - Internal state
- Memory may be reconstructed under influence
 - Misleading information and schema effects
 - Implications for autobiographical memory



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