
THE BRAIN, BIOLOGY⁺ AND COGNITION

Schemas and Forgetting

Forgetting from LTM

Could be due to any of the following...

1. Trace-dependent Forgetting
2. Interference
3. Repression
4. Motivated Forgetting
5. Directed Forgetting
6. Cue-dependent Forgetting
7. Encoding Specificity
8. State-dependent Forgetting
9. Context-dependent Forgetting
10. Memory biases



Trace-dependent forgetting:

- Indicates issue with **storage** of info
- Info no longer held in memory
- Memory 'trace' may not be available
- Or memory trace is there, but too weak to be used

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Interference

Ability to remember
disrupted by other learning

- **Proactive interference (PI):**

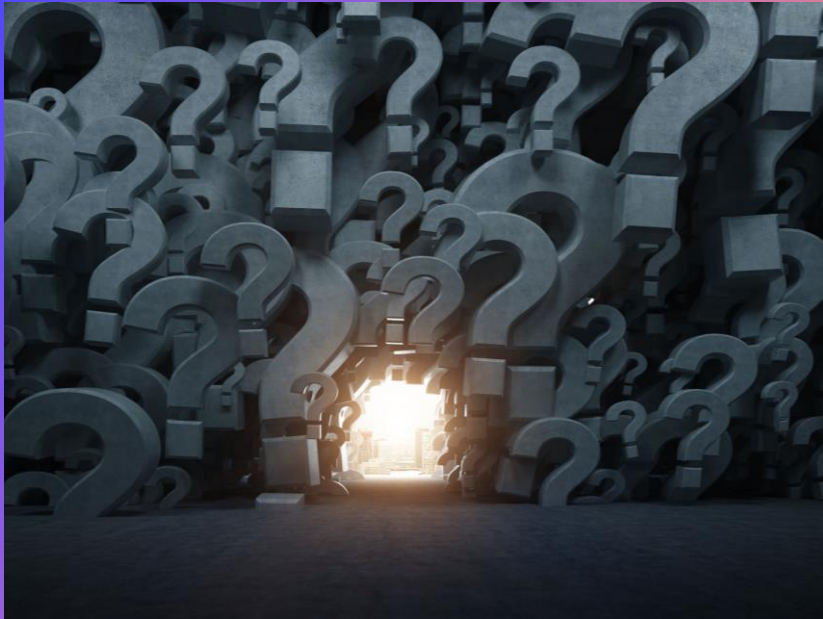
From previous memories

- **Retroactive interference (RI):**

- From later learning

Repression

Suppressing thoughts as defense mechanism



Motivated Forgetting

- Not allow trivial memories to be stored (Hardt et al., 2013).
- Can be useful (e.g., reducing anxiety) if wishing to forget traumatic memories.

Directed Forgetting

- Instruction to forget, causing selective rehearsal of to-be-remembered items.
- Involves active inhibitory processes
 - E.g., Think/no-think paradigm (Anderson & Green, 2011)

Cue-dependent forgetting:

- Indicates issue with **retrieval** process
- Also involves original '**encoding**' stage
- May **not** indicate **storage** problem
- At retrieval we lack appropriate cue present at encoding



Cue-dependent forgetting:

Encoding specificity principle

- Retrieval success relates to degree of overlap between info presented at retrieval and info stored in memory, including context (Tulving, 1979).
 - Context can be:
 - External (environment)
 - Internal (mood)
- Memory is better when retrieval context is same as that involved at learning
- Two types:
 - State dependent memory
 - Context dependent memory

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State- dependent memory

- To retrieve memory, you need to be in same **internal** state at time of encoding.
- State dependent effects shown by manipulating internal mood:
 - Marijuana and ordinary cigarettes (Eich, et al 1975)
 - Odours (Schab, 1990)
 - Noise (Smith, 1985)
- Memory performance better if mood manipulated using same factors before encoding and retrieval

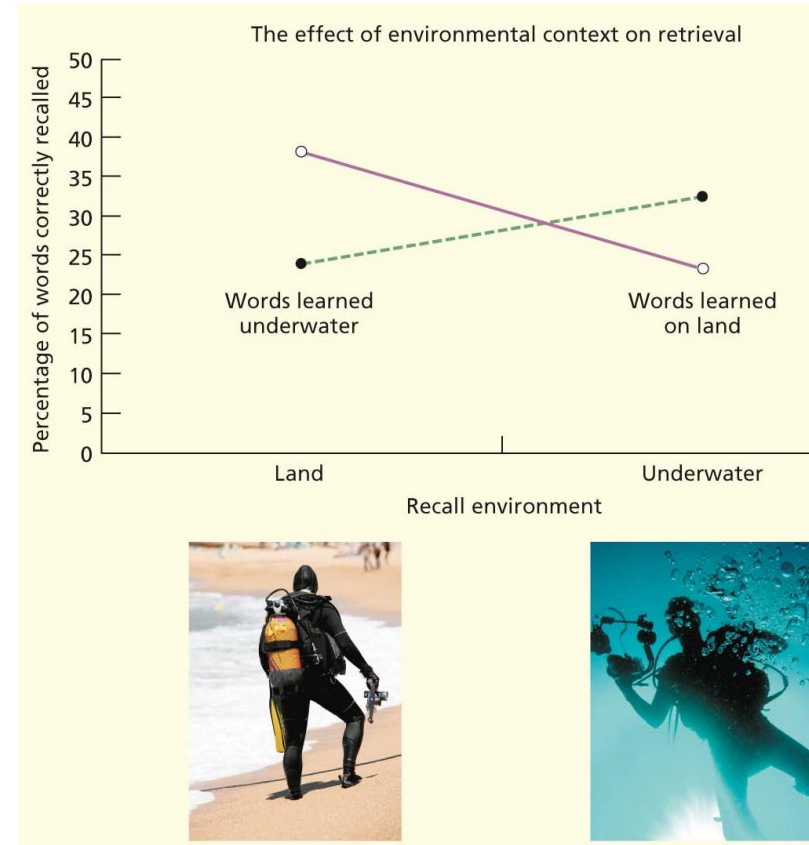
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Context- dependent memory

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

Context-Dependant Memory

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



- But no effect of context when study was repeated using **recognition** rather than recall – **why?**
- Learned items presented on test provided better cues that outweighed impact of context.



Memory biases

- Process of altering content of what we remember due to deviation from rational judgement.
- Can be linked to schemas in terms of how we process information based on our understanding of the world.

Look at the following picture of a lecturer's office



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% (falsely) recalled books were present
- Suggests **Memory biases and Schemas** can influence what we think we have remembered

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Mental representation of knowledge

- **Schema** for information:

- **Five** main aspects

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1. A way of storing info - not stored ad-hoc
2. Structures 'readied' for certain information
3. Relations between information intrinsically stored
4. Heavy influence on how information retrieved
5. Involve scripts containing info about sequences of events



Schema effects in LTM

- Schema-consistent information may be activated in memory
 - False positives (recall info 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)

How comprehensible is the following paragraph?

“The procedure is actually quite simple.
First you arrange things into different groups depending on their makeup.
Of course, one pile may be sufficient depending on how much there is to do.
If you have to go somewhere else due to lack of facilities, that is the next step;
otherwise you are pretty well set.
It is better to do too few things at once than too many.
Remember mistakes can be expensive.
At first the whole procedure will seem quite complicated.
Soon, however, it will become just another fact of life”

(Bransford & Johnson, 1973 / Bransford 1979)

- Without schema difficult to encode or retrieve information
- With schema of ‘ironing’ far easier to store and retrieve

Reconstructive memory

- Memory modified to conform to post-event information (Morton et al 1985)
- Destructive actualisation hypothesis
 - New info destroys, or over-writes actually stored memories
- Bleak view of human memory
 - May be no such thing as true memory
 - Or how can we tell from memory alone?
 - Relation to autobiographical memory?

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 foetuses 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)



Aliens and false memories

- Clancy et al. (2002) - three groups of participants:
 - Abductees with no autobiographical memory for event
 - Abductees claiming memories had been 'recovered'
 - Non abductees
- Given **critical lure** test
 - Exposed to items such as 'sour, sugar, honey, tart' etc
 - Would they falsely recognise 'sweet' as the critical lure?
- Results
 - **Recovered memory** alien abductees: **more** likely to **falsely recognise** words not seen before
- Argued problem could be of source monitoring
 - Judging where information originated:
 - Misattribute internally generated memory as externally generated memory
 - E.g. From TV!
 - Makes more vulnerable to schema-effects?



INTERACTIVE MEMORY ACTIVITIES

