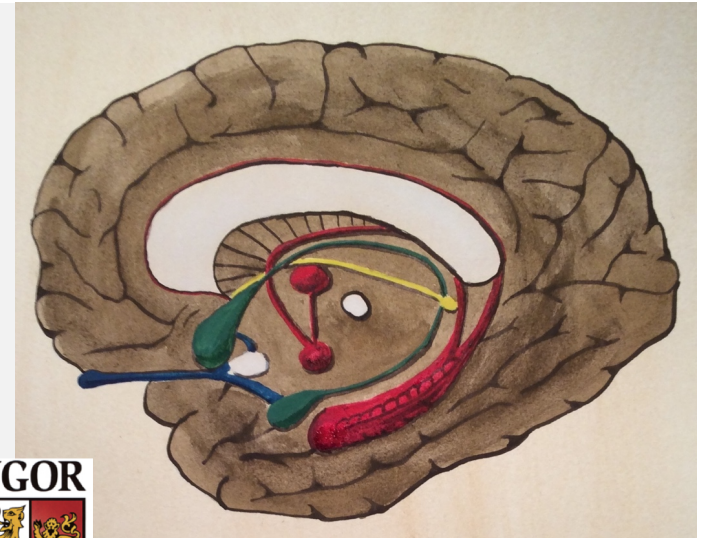


Remembering and feeling

Prof Oliver Turnbull
Bangor University
Wales, UK





BANGOR





Emotion and Brain Injury Lab



Today:

Types of memory

Brain basis

Focus on:

Episodic memory

‘feels’ most like memory

Emotion-based memory

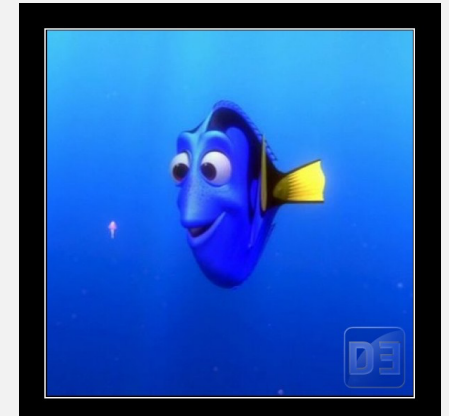
most interest for NPSA

Links to various disorders

...Films about memory loss



Memory loss cinema



“cinematic depictions of amnesia are consistently inaccurate, and usually bear no relation whatsoever to any authentic neurological or psychiatric condition”

Baxendale (2004) *British Medical Journal*

Let's learn from their mistakes!



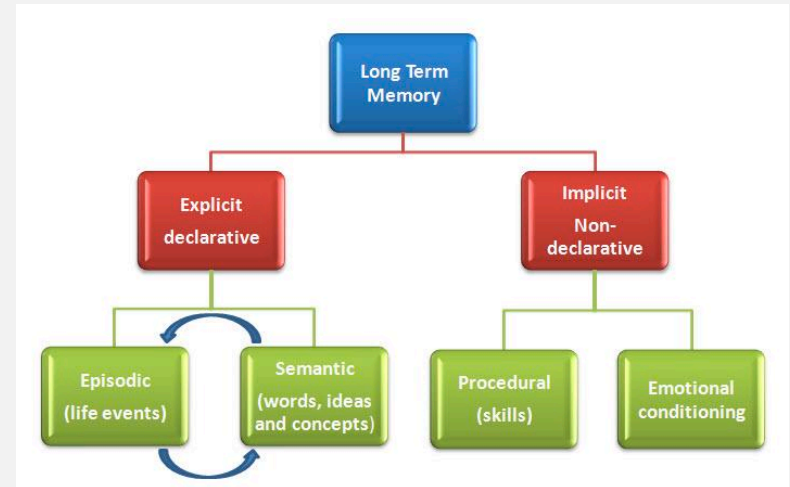
MULTIPLE MEMORY SYSTEMS

Episodic memory

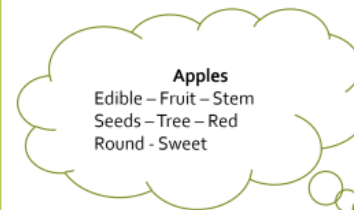
personal, subjective

Semantic memory

words, numbers,
names, concepts, objects...



Semantic memory



- Knowledge learned over many interactions
- Takes effort

Episodic memory



- Memory for specific events that you have experienced
- Just happen - no effort

Episodic (recent) memory

Short time slices (episodes)

first person perspective

often in (visual) *images*

linked to spatial locations

Recollectively (re-) *experienced* when accessed

Support autobiography

narrative of our lives

Can be retained over long periods.

Usually subject to rapid *forgetting*



Forgetting:

Hermann Ebbinghaus (1885)
logarithmic loss...

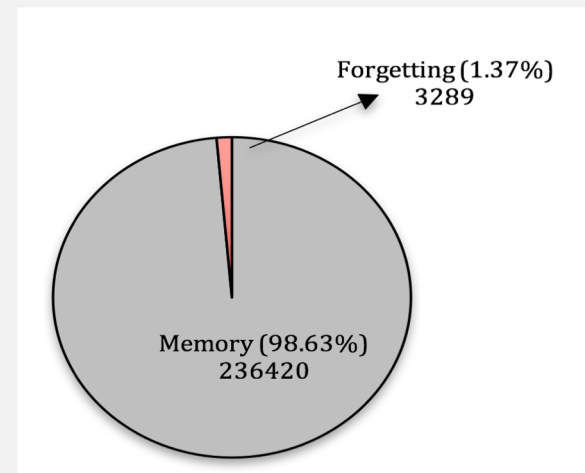
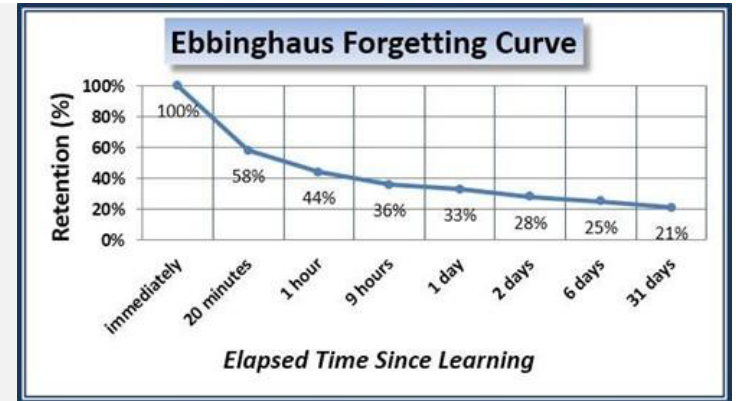
Cognitive explanations

Trace decay

Lack of consolidation
interference

Retrieval failure (cue/context dependence)

Hugely enhanced by
attention
rehearsal



Forgetting and emotion:

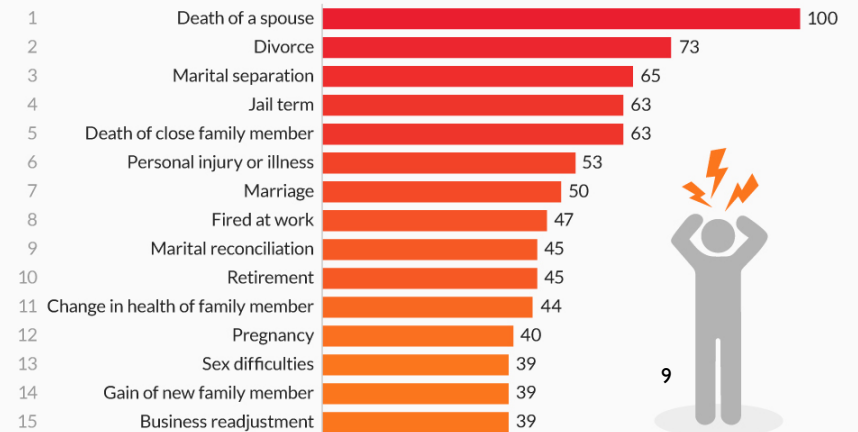
Emotional things attract attention...

Emotional things are rehearsed...



Life's most stressful events in one chart

Impact score of stressful life events (100 = most stressful)



Buying a house



Getting married



Getting divorced



Becoming a parent



Approaching retirement



Starting work, changing jobs, losing a job



Round-number birthdays



Death of a spouse, family member or close friend

A wish to forget?

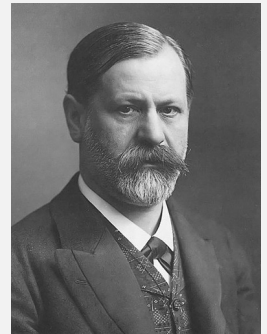
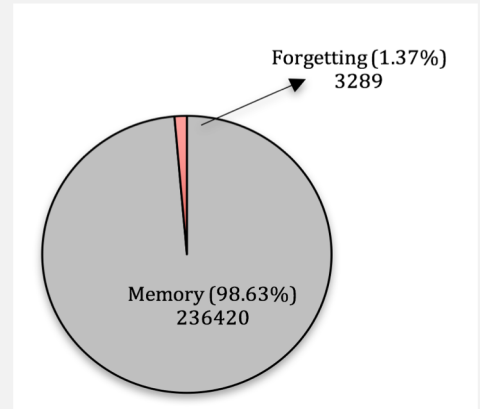
Is forgetting important?

Keeping experiences out of conscious awareness
a protective/defensive role

Originally described as ‘repression’
often now ‘suppression’ or ‘**motivated forgetting**’

Does the phenomenon exist *at all*?
anecdote *versus* experimental evidence

Until early 2000s...
not been tested empirically
Mike Anderson... Robert Bjork... Martin Conway...



Think/No-Think (TNT) task

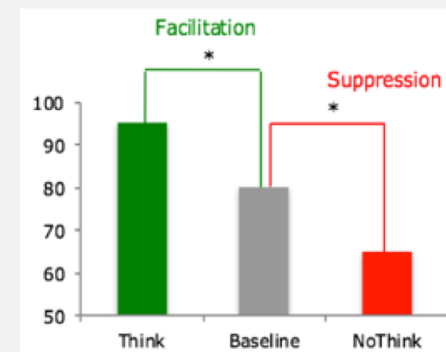
Word pairs

lawn-beef, jogger-collie...
(not emotionally charged)

Three conditions

Think, No think, baseline

Training and Retrieval phase



Two processes?

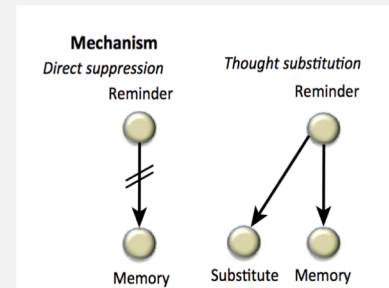


Figure 1.7. Direct suppression and thought substitution involve distinct networks result in forgetting, but have differing effects on the hippocampus (Benoit & Anderson, 2012; Anderson & Haslmayr, 2014)

Direct suppression

Direct inhibiting of the unwanted memory

Thought substitution

Replace with another competing thought

May be supported by different brain regions?



SHORT/LONG/WORKING MEMORY

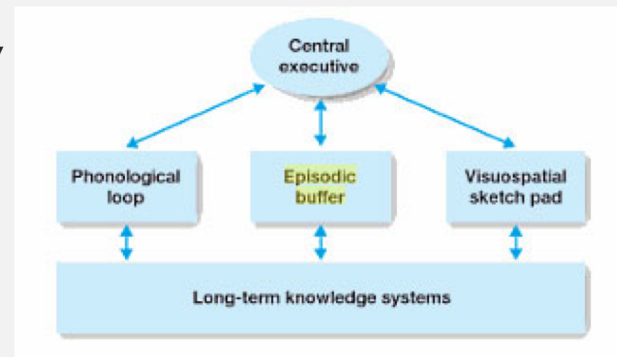
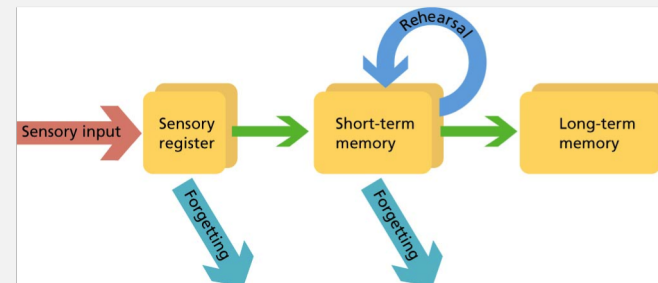
The (incorrect) 'modal' model (gateway)
Atkinson & Shiffrin (1968)

'Working' memory
(Baddeley & Hitch, 1974)

'Immediate' memory

- 1) phonological loop, audio-verbal memory
- 2) visuo-spatial sketchpad

In the order of seconds, tens of seconds
sustained through rehearsal
capacity 7 ± 2 , 4 ± 1 ...
very different from the lay-use of 'short term'

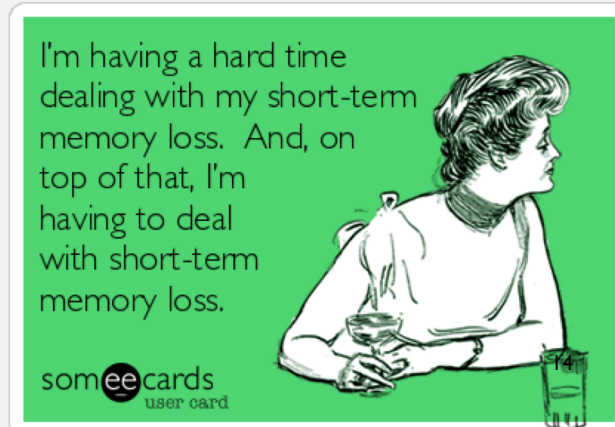
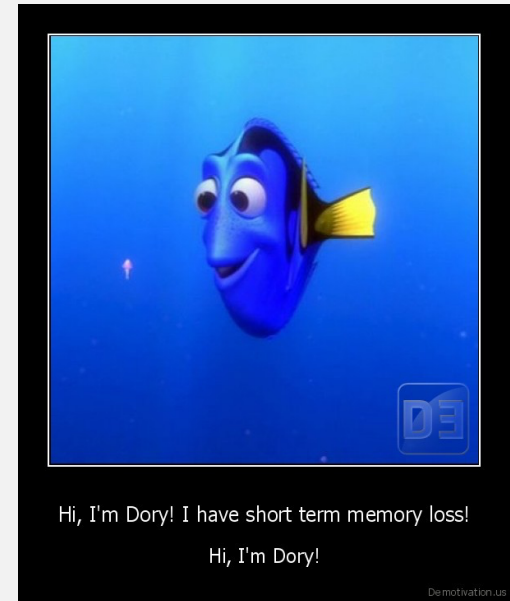


'SHORT' VS 'LONG' TERM

'Recent episodic' memory
in the order of minutes, hours, days
sustained through semantic association
'levels of processing'
heavily linked to emotion and meaning
a result of regular *rehearsal*
capacity substantial

What *psychologists* call 'long term'
recent memory

What the *public* describe as 'short term'...



REMOTE MEMORY

In the order of weeks, months, years, decades

Heavily over-learned

regular rehearsal

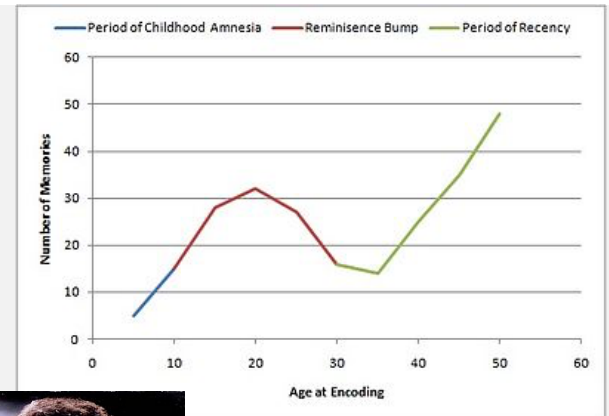
through semantics/meaning

Capacity enormous

the *public* describe as 'long term'



REMOTE MEMORY

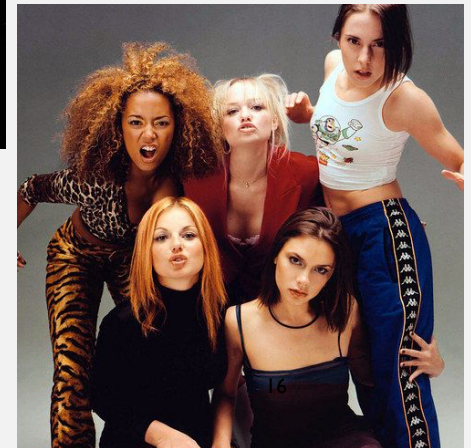


Highly personal

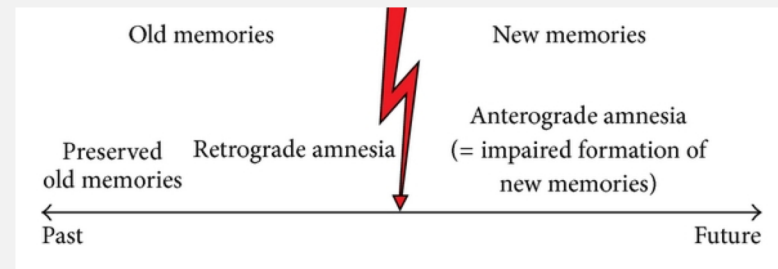
depends on life circumstances and history

remembrance bump

'flash-bulb' memory events (JFK, AIDS, 9-11, Brexit...)



PRE-MORBID VS POST-MORBID



Anterograde Amnesia

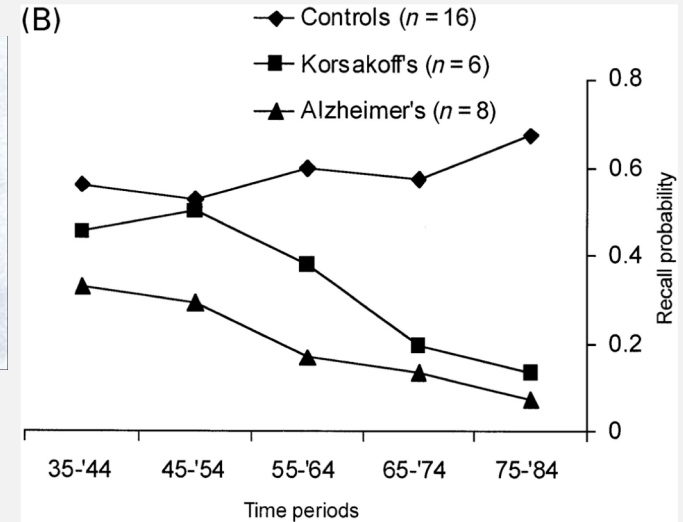
Inability to remember new information

Exposed to *after* the onset of brain injury.





PRE-MORBID VS POST- MORBID



Retrograde Amnesia

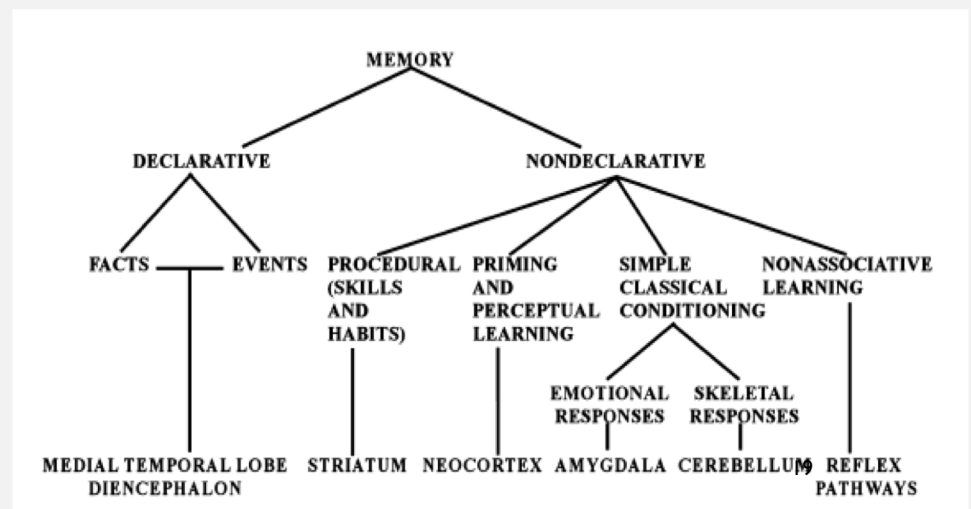
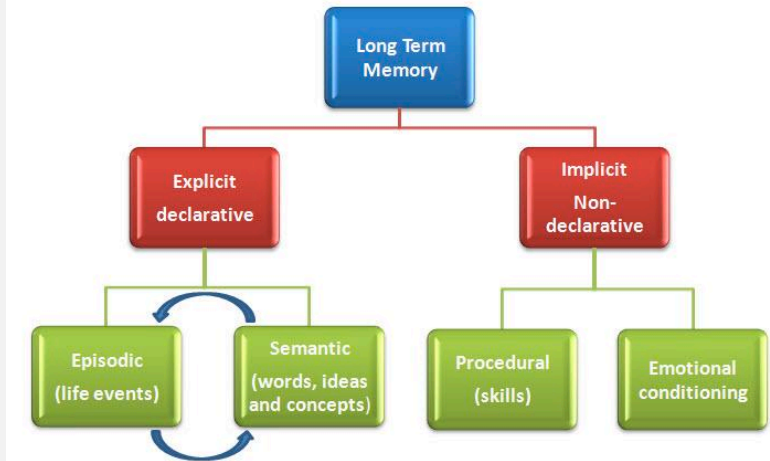
- events that occurred *prior* to injury
- most pronounced for events *just* prior to onset
- a temporal gradient (Ribot's law)
- remote events (childhood) easier to recall

Why? Structures for *retrieving* information
also critical for *encoding* memory...

MULTIPLE MEMORY SYSTEMS

Procedural memory

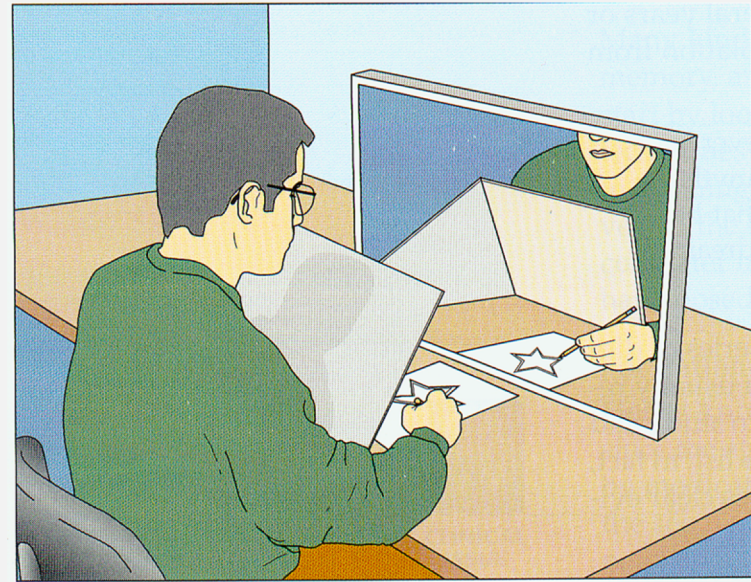
riding a bicycle, playing piano...



PROCEDURAL MEMORY

Complex motor skills
riding a bicycle
playing piano...

Mirror-tracing
in profound episodic amnesia



(b) Performance of H.M. on mirror-tracing task

