

OTHER BASIC EMOTIONS?



This should in no way insinuate that S. M. is not a good friend. In fact, she will do almost anything to help a friend in need. She once helped care for an older adult lady (Miss B.) who lived all by herself and needed some extra help due to her obesity and severe diabetic neuropathy. Every week S. M. would walk several miles to take Miss B. her groceries, help her out around the house, and keep her company. It was obvious that S. M. received great joy knowing that someone else needed her. One evening, as

BED NUCLEUS OF THE STRIA TERMINALIS

Major output pathway of the amygdala

Also related to anxiety from threat monitoring

But *time* related

brief stress response doesn't activate BNST

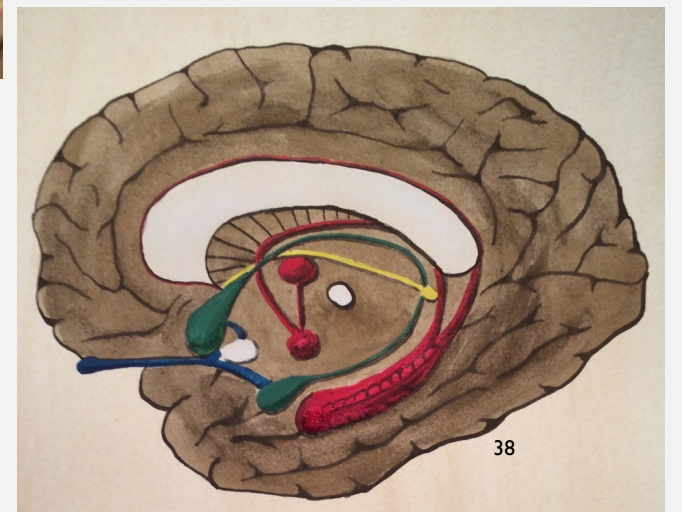
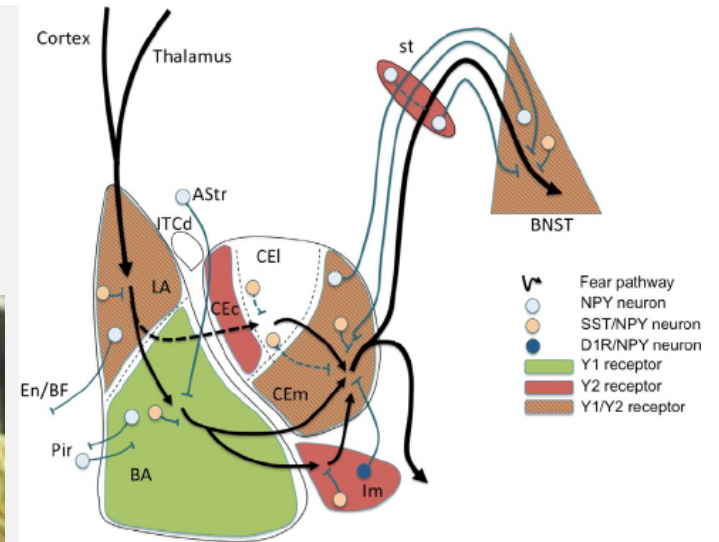
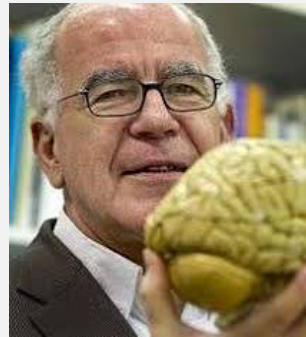
chronic exposure: *over* ten minutes long!

Sex differences (BNST central, somatostatin-expressing neurons):

twice as large in men as in women (Dick Swaab)

male-to-female treated trans women... female-typical number of cells

female-to-male trans man a male-typical number



CORTICAL CONTROL?

Emotion-based memory

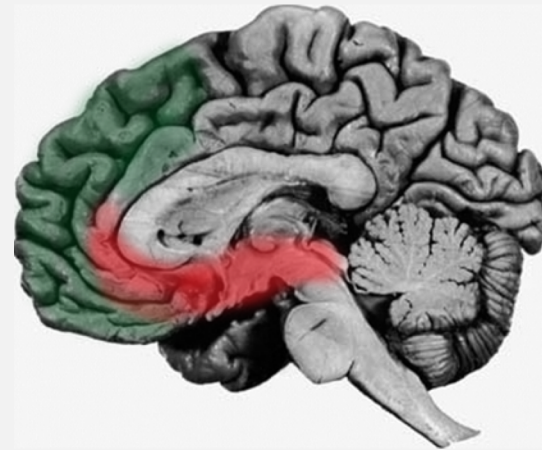
Emotion and executive resources

Through medial frontal lobes

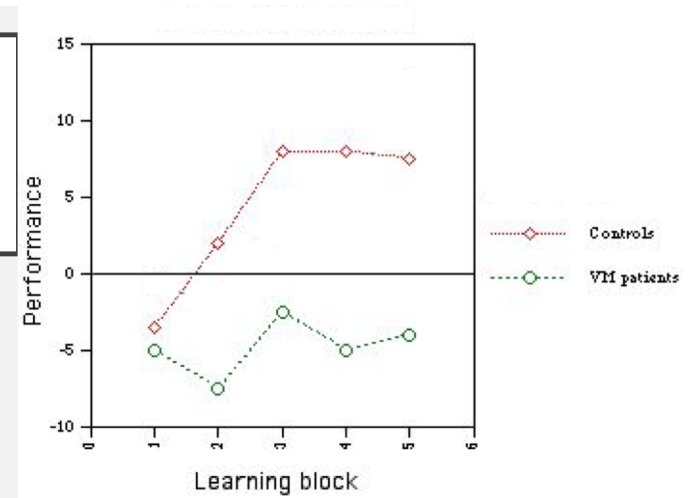
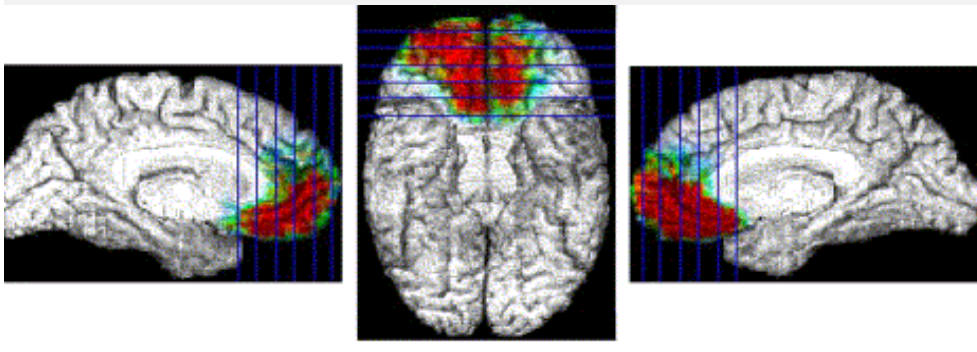
To dorso-lateral frontal lobes

Emotion in learning

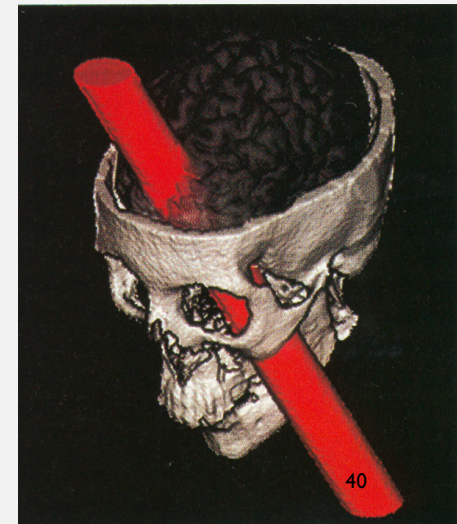
... and in planning actions (Bechara, Damasio, 1994)



VENTRO-MESIAL FRONTAL LOBES



No avoidance of bad-outcome choices
Consistently lose money
Correlates with problems in everyday life...
Phineas Gage (Harlow, 1848)



Motivated forgetting?

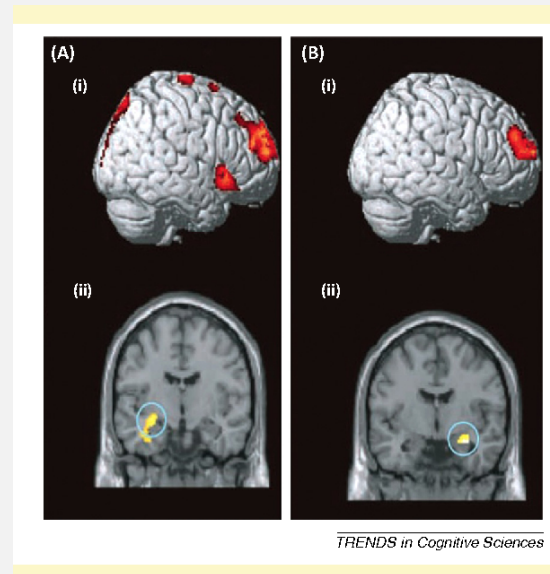
Neuroimaging studies: *several* brain regions

Prefrontal cortex
Hippocampus

No complimentary work using focal lesions

But patients may be *more* informative (Bub, 2000; Karnath, 2002)

Emotional *magnitude* of the 'repressed' material?
real life is more powerful than experimental materials (ethics...)



Anderson et al, 2014

Return of the repressed: Impaired cognitive control over unwanted memories after brain injury

Shanker, Roberts, Bracewell, Anderson and Turnbull

Happy childhood

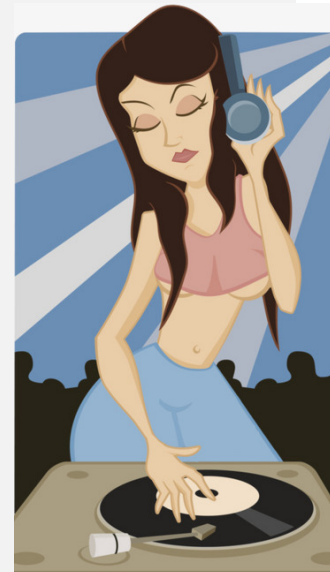
Age 18 forced to leave the family home

Described her twenties as 'turbulent'

Mid-forties, suffered an intracranial bleed
territory of the anterior left middle cerebral artery

Heightened sense of emotional reactivity
a failure of emotional regulation - reappraisal
common after left frontal lobe lesions (Salas et al)?

Return of memories of significant events in her earlier life



PRESERVATION OF EMOTIONAL MEMORIES?

Spared, but no recall having learned them

Remote (episodic) memory

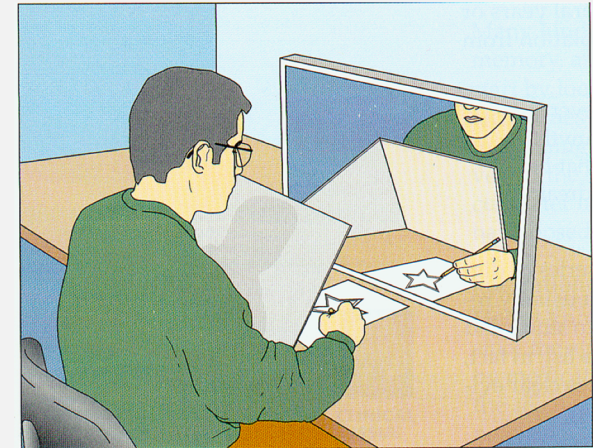
Immediate memory

Semantic memory

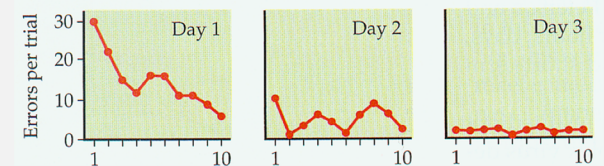
Procedural learning

Emotion-based learning

good/bad experiences



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



Emotion based memory:

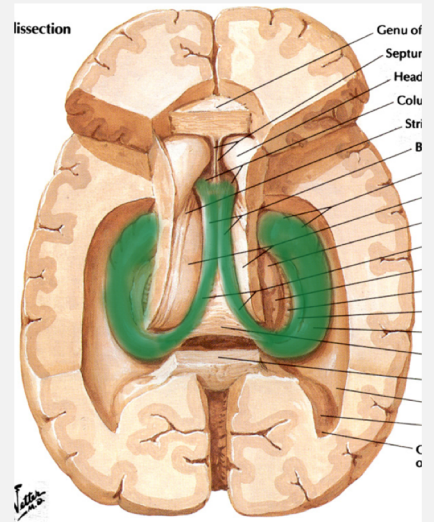
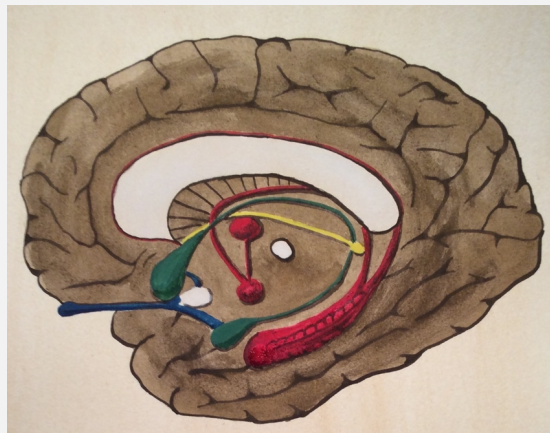
What is spared and impaired?

What magnitude?

Just minor *residual* ability
or *normal* performance?

Precision *between* emotions

Predictors of preserved performance



HOW CLOSE TO NORMAL LEVELS?

SL: 85 years old, posterior cerebral artery stroke

Normal executive function performance

Early sessions

polite, but uncertain of identity/purpose...

repeated questioning...

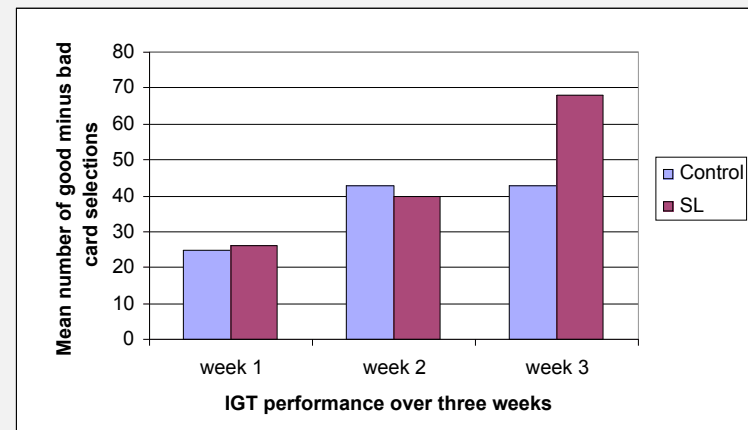
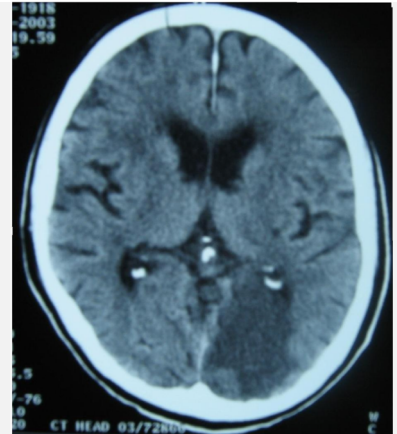
no idea about previous tasks

Later sessions

greeted warmly

far fewer questions

still no awareness of previous tasks



Turnbull & Evans (2006). Preserved complex emotion-based learning in amnesia. [Neuropsychologia](#)

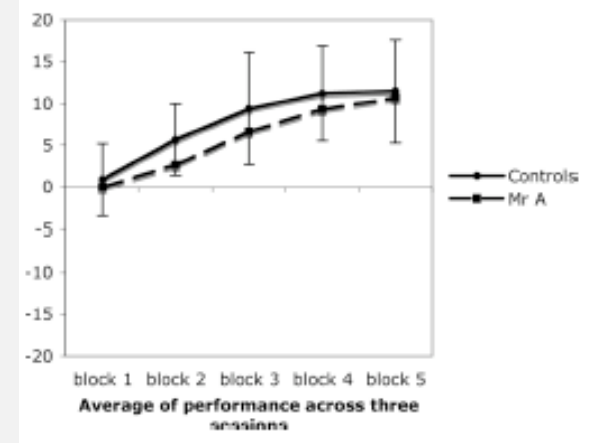
Turnbull, Zois, Kaplan-Solms & Solms (2006). The developing transference in amnesia. [Neuropsychologia](#)

REMEMBERING RELATIONSHIPS: PRESERVED EMOTION-BASED LEARNING IN ALZHEIMER'S DISEASE

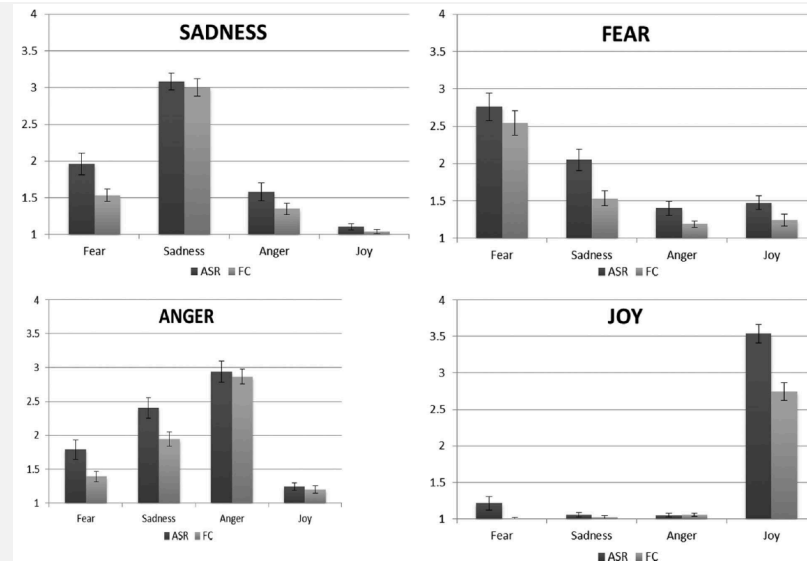
Cathryn E. Y. Evans-Roberts
Oliver H. Turnbull



example, Mrs. A commented that her husband had formed a close friendship with three people who also had a diagnosis of AD. Although he could not recognize these friends, or recall previous conversations, once reintroduced they consistently got on well. Interestingly, the relationship appeared to develop over time and they now often discussed the emotional impact of their diagnosis and provided support for each other. Interestingly, not all of Mr. A's recent inter-



Evans-Roberts & Turnbull (2011). Remembering relationships: Preserved emotion-based learning in Alzheimer's disease. Experimental Aging Research



Eliciting emotions

Previous literature?

Mostly negative vs positive

Possible to distinguish *amongst* negative emotions?

Salas, Radovic & Turnbull (2011). Inside-out: Comparing internally generated and externally generated basic emotions. Emotion, 9: 1-11.

Salas, Radovic, Castro & Turnbull (2015). Internally and externally generated emotions in people with acquired brain injury. Frontiers in Psychology, 6: 1-9

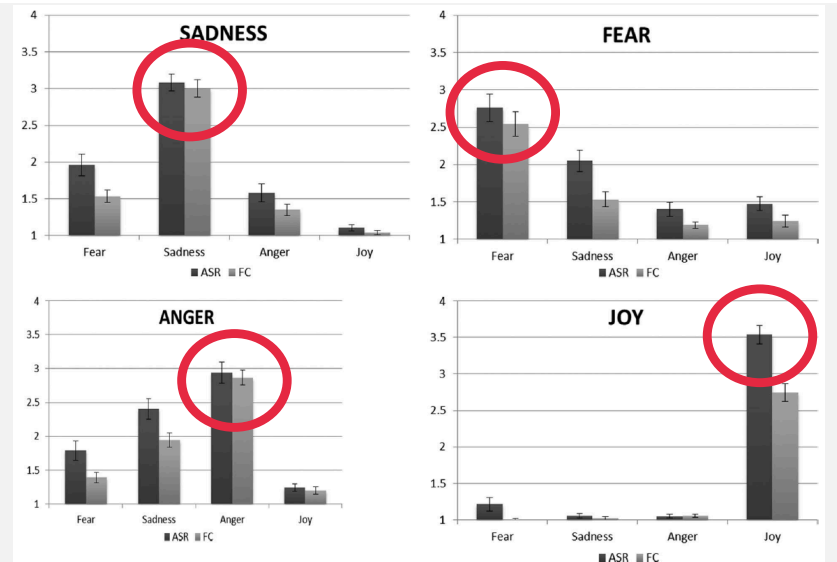
'PRECISION' OF EMOTIONS?

Eliciting emotions

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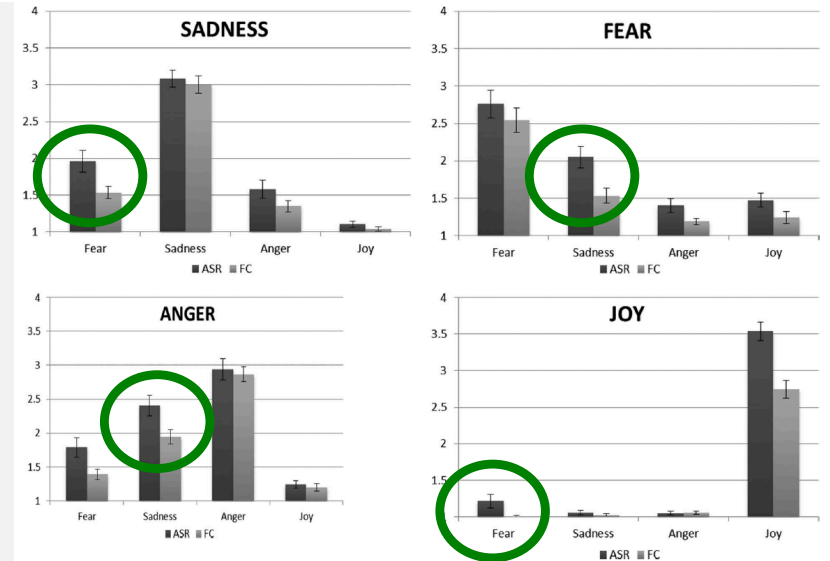
Salas, Radovic & Turnbull (2011). Inside-out: Comparing internally generated and externally generated basic emotions. Emotion

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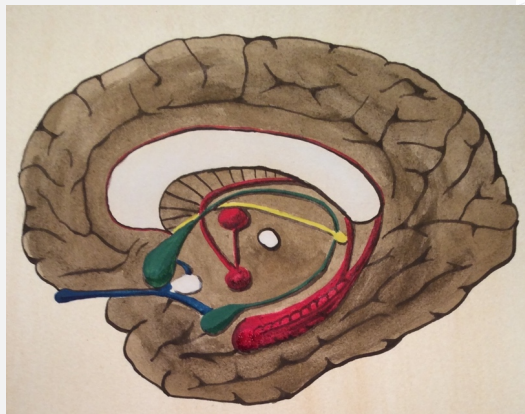


'PRECISION' OF EMOTIONS?

Non-target negative emotions *lower*
but *still* elicited



EMOTIONAL MEMORY AFTER AMNESIA



Journal of Neuropsychology (2018)
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Preserved re-experience of discrete emotions: Amnesia and executive function

Marian Andrei Stanciu*, Robert D. Rafal and Oliver H. Turnbull
School of Psychology, Bangor, Gwynedd, UK

SADNESS STORY

You are in a park.

A dog is running around, looking sick.

The dog falls at your feet and dies.

A teenager... was running after the dog.

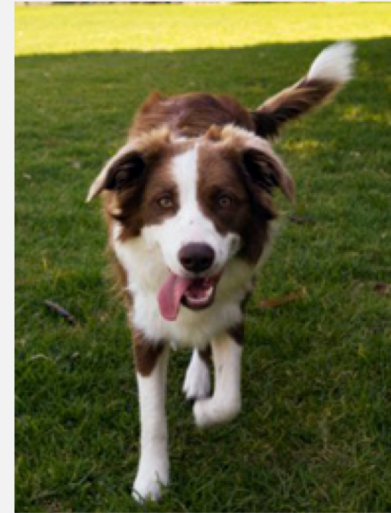
He is the dog's owner.

The teenager picks up the dead dog and strokes it.

The teenager has been looking after the dog ever since his parents died

The boy shows you a picture with his dog and with his brother from when they were on a trip in the mountains.

His brother fell off a cliff and could not be saved.

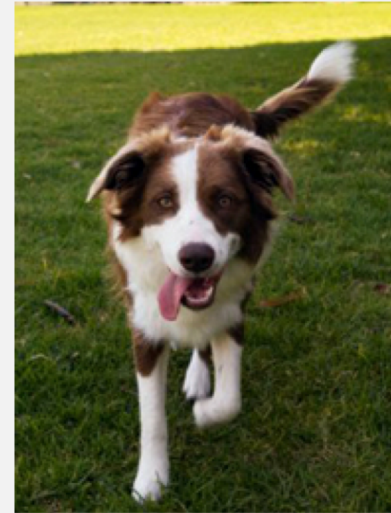


SADNESS STORY, 30 MINUTES

Control participant #10: I was *sat* in a park. There was a dog. It fell at my feet dead, because it was sick. There was a young boy chasing it, who wore a green top and *grey trousers*. The boy had a picture with the dog and his brother from when they were on a trip in the mountains, and his brother fell off the mountain and that's how he passed away. (18)

Korsakoff patient #02: The dog came running over and dropped down dead *at the owner of the dog*. He was a teenager, a boy, wearing a green *jacket*, grey trousers. And the dog was the only friend he had in the world, *because his dad fell off a cliff*. (9)

Korsakoff patient #04: The dog died. (2)



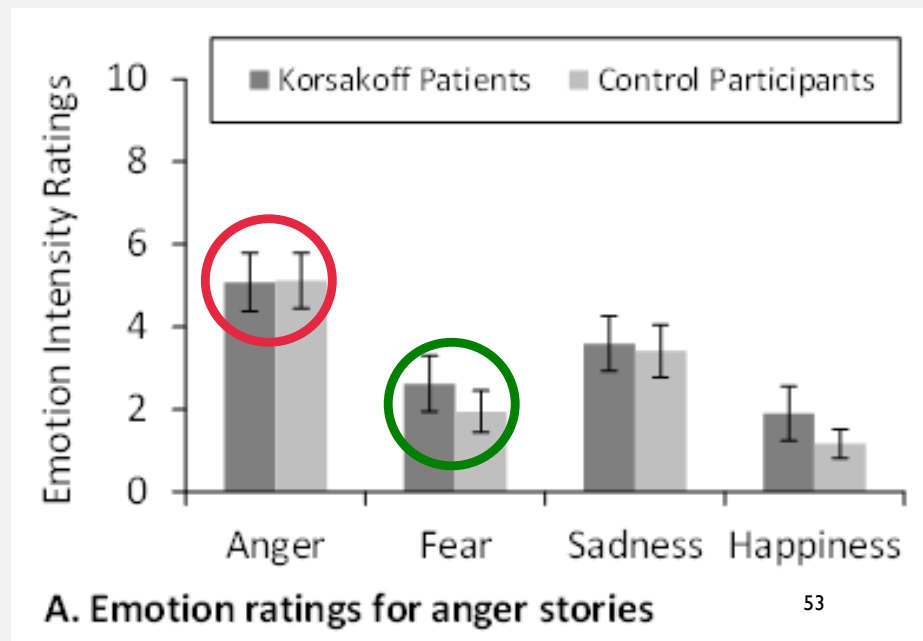
IDENTIFYING *SPECIFIC* NEGATIVE EMOTIONS

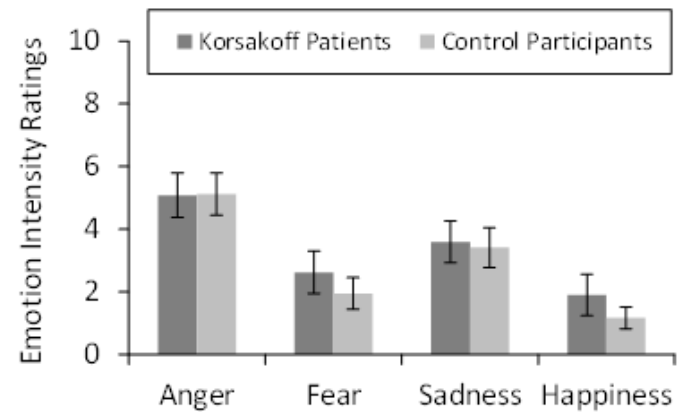
Powerful emotional experience

Selective identification

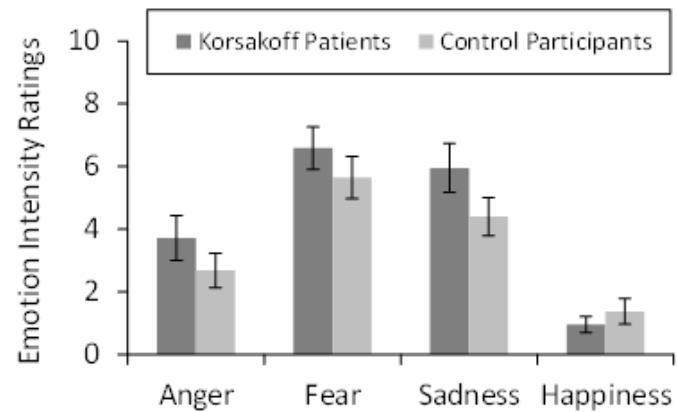
even *within* negative emotions

No patient vs control differences

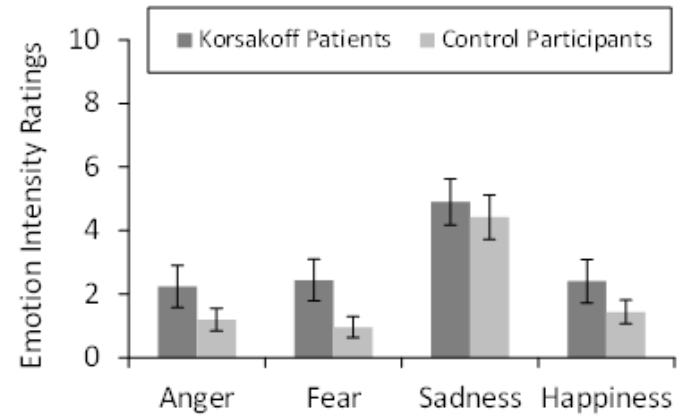




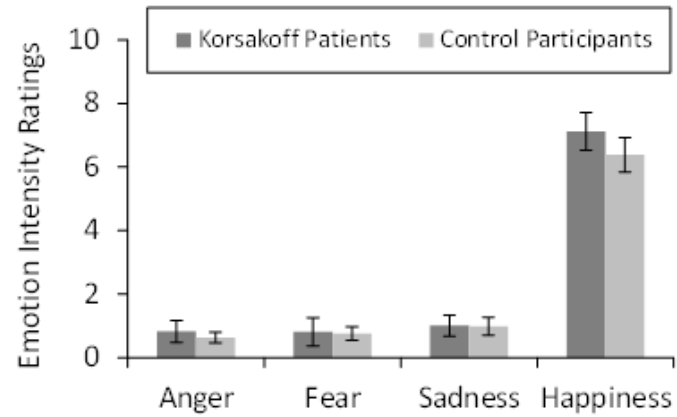
A. Emotion ratings for anger stories



B. Emotion ratings for fear stories



C. Emotion ratings for sadness stories



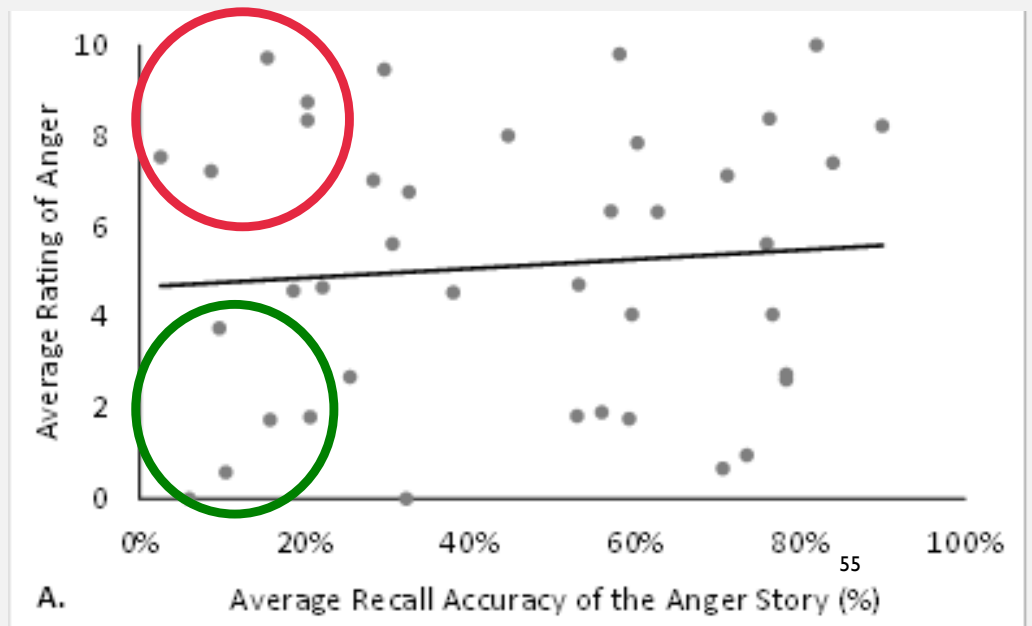
D. Emotion ratings for happiness stories

IS *EMOTIONAL INTENSITY* A PREDICTOR?

Wide range of accuracy and emotion scores

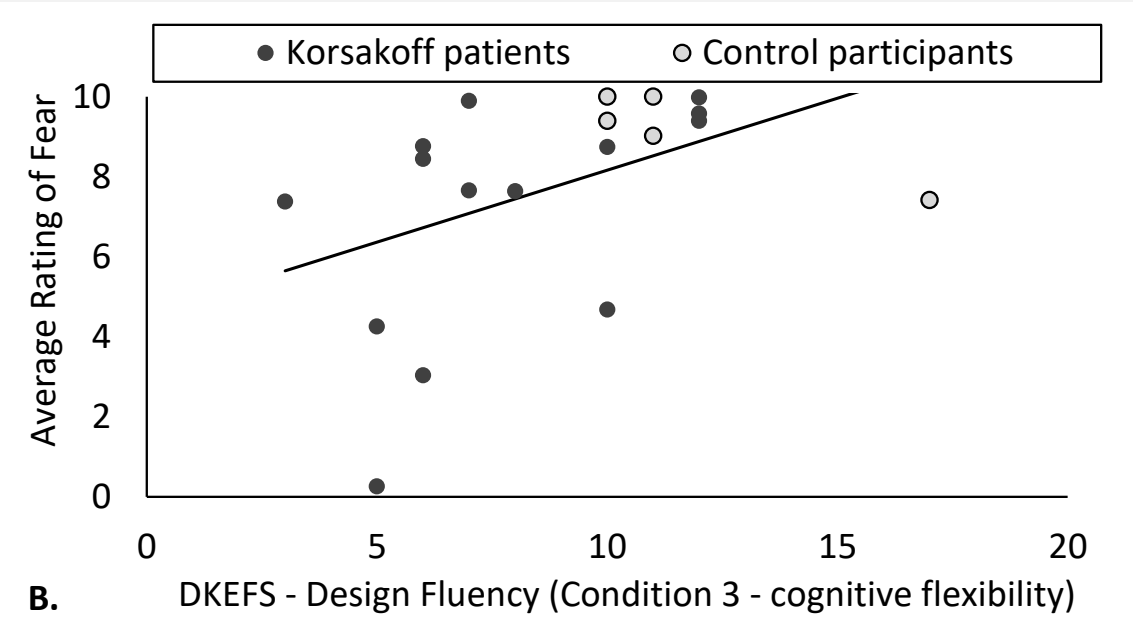
No relationship between them

For patients and controls



IS EXECUTIVE FUNCTION A PREDICTOR?

$r=0.49$
 $p=.054$



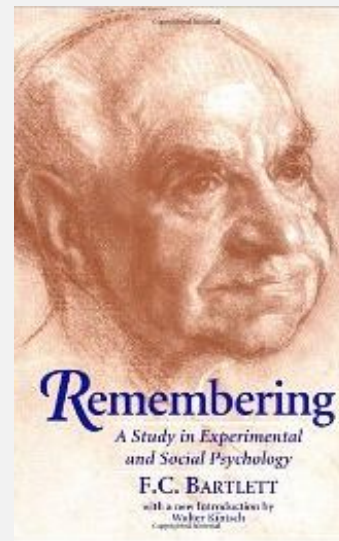
MEMORY, OR REMEMBERING?

Doesn't depend on magnitude of original emotion

Correlates with executive ability

The ability to reconstruct?

Not 'memory'... but *remembering*
(Bartlett, 1932)

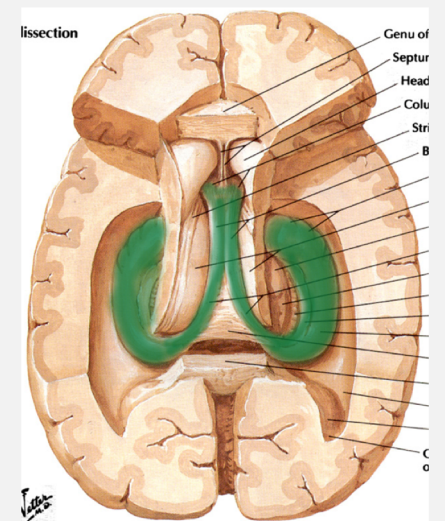
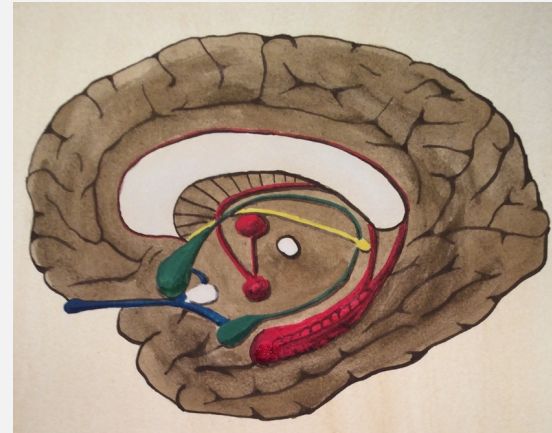


How much specificity?

Normal magnitude

Retained *precision between* emotions

Predicted by executive function
but not episodic memory

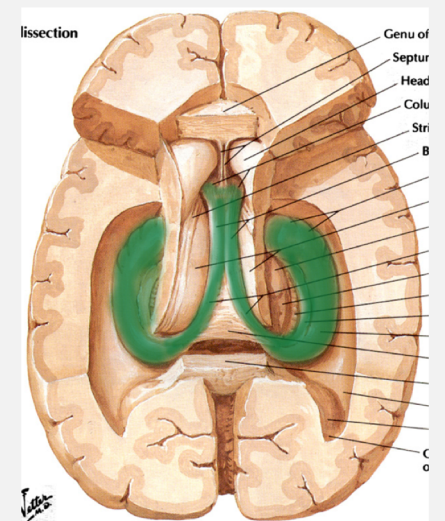
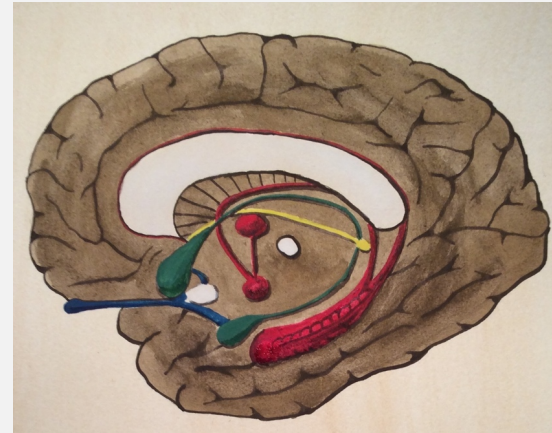


5. Links to various disorders / phenomena

Infantile amnesia

PTSD

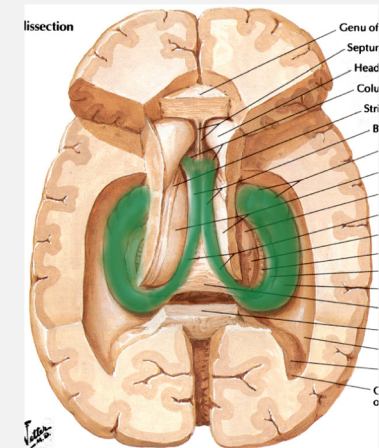
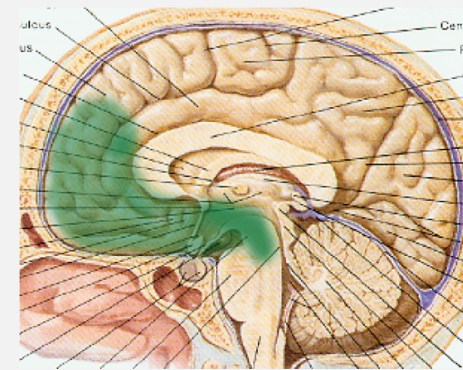
Transference



INFANTILE AMNESIA?

Hippocampus (episodic)
late development (2-3 years)
a cause of infantile amnesia?

Emotional memory?
attachment findings...
much earlier development
certainly from 6 months
perhaps from birth?



PTSD?

‘Unexplained’ sudden anxiety?

Hippocampus (episodic)
disrupted by cortisol
Yoram Yovell (2003)

TABLE 1. MEMORY PHENOMENA IN THE DSM-IV DEFINITION OF PTSD

Criterion	Description	Type of Memory	Direction of Change in Memory
B1	Recurrent and distressing recollections of the event, including images, thoughts, or perceptions	Declarative, episodic	Increased
B2	Recurrent distressing dreams of the event	Declarative, episodic	Increased
B3	Acting or feeling as if the traumatic event were recurring	Declarative, episodic and Nondeclarative, learned motor behaviors	Increased
B4	Intense psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event	Nondeclarative, emotional (fear conditioning)	Increased
B5	Physiologic reactivity on exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event	Nondeclarative, emotional (fear conditioning)	Increased
C3	Inability to recall an important aspect of the trauma	Declarative, episodic	Decreased
D4	Hypervigilance	Nondeclarative, nonassociative (sensitization)	Increased
D5	Exaggerated startle response	Nondeclarative, nonassociative (sensitization)	Increased

DSM-IV Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition; PTSD=posttraumatic stress disorder.
Yovell Y, Barrett V, Shalev AY. CNS Spectr. Vol 8, No 9, 2003.

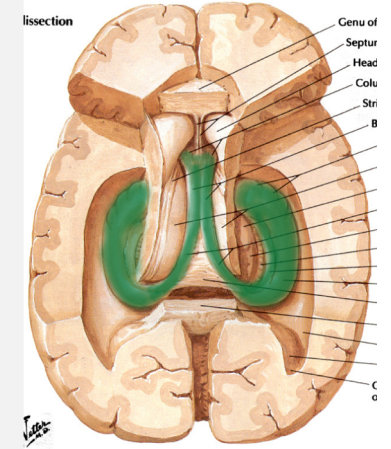
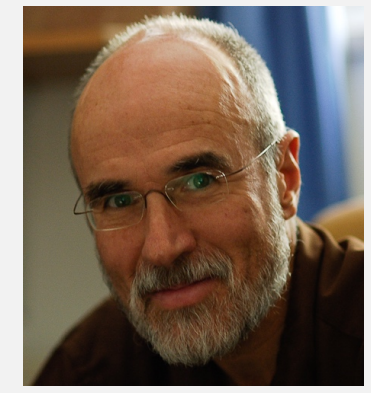
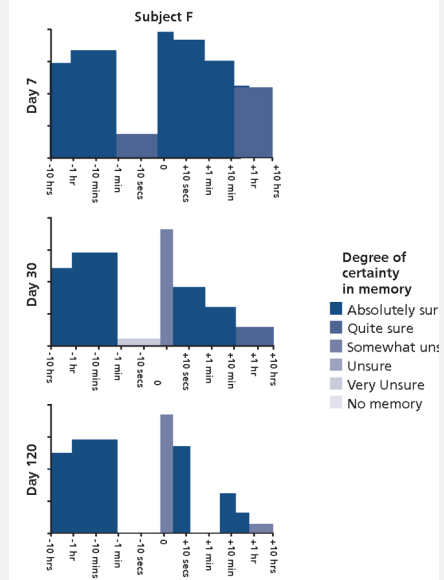


TABLE 2. SUBJECT DEMOGRAPHICS AND TEST RESULTS

Subject	Age (Years)	Gender	Education	Past Psychiatric History	Intrusion Symptoms Frequency	Intrusion Symptoms Intensity	Avoidance Symptoms Frequency
A	23	Male	High school	Adjustment disorder	0	0	0
B	26	Male	High school	Adjustment disorder	0	0	0
C	24	Male	Some college	None	0	0	3
D	24	Male	Some college	Major depression	1	2	2
E	19	Male	Some college	None	0	0	2
F	19	Male	Some college	None	8	8	12

Only Subjects A and F met the CAPS threshold criteria for the diagnosis of PTSD. These two subjects were the only ones who demonstrated longer and expanding memory gaps in their successive narratives. All subjects had brief, fixed memory gaps that did not fill up on cued recall and remained stable throughout the study period.



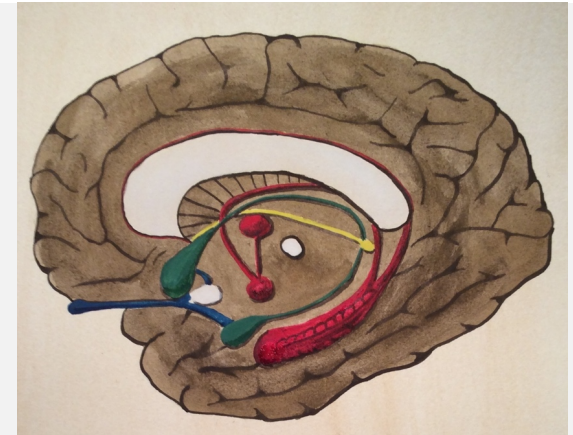
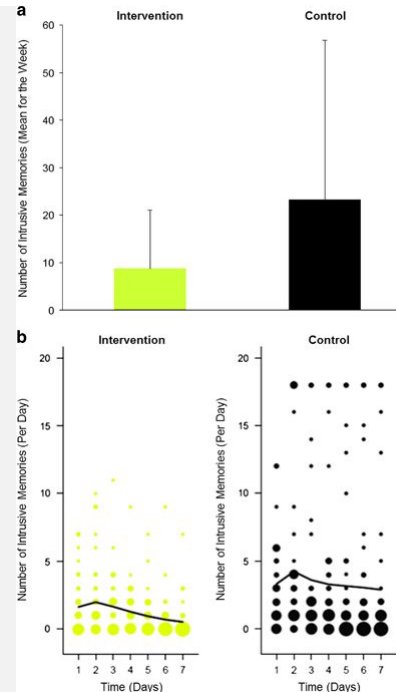
Locations of Subjects A and F Who Developed PTSD

Amygdala?

enhanced by cortisol
trigger of emotional memories?

Emily Holmes' work on distraction
Tetris: visuo-spatial load...

One woman in her 20s described having repeated intrusive memories of her motor vehicle accident trauma: 'the picture of falling on the street with my head kept popping up in my head' and 'seeing blood dripping'. She engaged well with playing Tetris in the emergency department and found it fun. 'I think it helped a lot to distract my mind after [the] accident by playing Tetris'.



PSYCHOTHERAPY IN AMNESIA?

Which cognitive abilities does one need for effective psychotherapy?

Emotion-based systems?

Working alliance intact?

Therapeutic change despite amnesia?



frontiers
in Psychology

ORIGINAL RESEARCH
published: 25 August 2017
doi: 10.3389/fpsyg.2017.01418



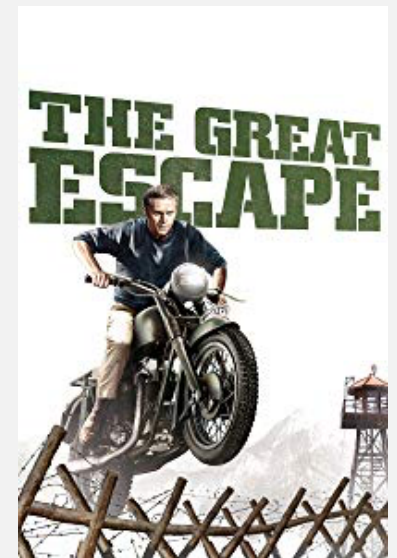
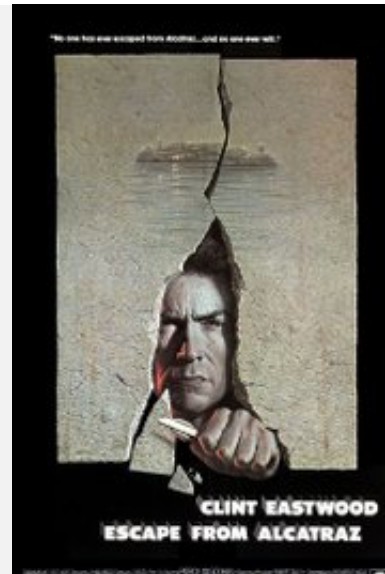
Observations on Working Psychoanalytically with a Profoundly Amnesic Patient

Paul A. Moore^{1,2*}, Christian E. Salas^{3,4}, Suvi Dockree⁵ and Oliver H. Turnbull⁴

¹ Department of Psychiatry, School of Medicine, Trinity College, Dublin, Dublin, Ireland, ² Friary Court Medical Centre, Kilkenny, Ireland, ³ Laboratory of Cognitive and Social Neuroscience, Faculty of Psychology, Diego Portales University, Santiago, Chile, ⁴ School of Psychology, Bangor University, Bangor, United Kingdom, ⁵ National Rehabilitation Hospital, Dublin, Ireland

JL, 38 years old, in sheltered housing
Master's, architectural design
anoxic brain injury (diabetic ketoacidosis),
profound anterograde amnesia (no retrograde)

72 sessions of psychoanalytic psychotherapy
favourite films: *Escape From Alcatraz*, *The Great Escape*



THE LIFFEY BRIDGE INCIDENT...



Early in the therapy process (session 5)

First real difference of opinion

JL's experience of a nearby bridge

James Joyce Bridge, Dublin

radically different from therapist's knowledge

Transformation across a six week period

BRIDGE PHASE I

Near the end of Session 5:

JL: Here do you know what they call that pedestrian bridge that crosses the Liffey down there?

P: The Ha'penny Bridge?

JL: No, no, no, not the Ha'penny Bridge... It's a new pedestrian bridge.

P: That, that's not a pedestrian bridge,
... traffic *can* go across that bridge.

JL: No, no, its not big enough for cars.



BRIDGE PHASE I

JL: It's just a little pedestrian, it's only about from here to the wall apart wide. I'm telling you, no cars can cross it.

P: I drove over that bridge

JL: No, well there's no way you saw cars on this bridge... anyway I can tell you that much, there's no way you drove over it either... it's just a little pedestrian bridge.

JL: Come in next week and tell me you drove across it, and I'll give you a thousand euros, ten thousand euros, a million euros! (both laugh). You wouldn't even get your car up on to it. Something Mr. Bean would try now, to cross over it in his car, wouldn't work.



Session 11:

JL: So I went down to look at that bridge

P: Did you, yeah?

JL: Yeah. Okay I'm wrong!

But you can see over from both sides of it though!

P: So, it stayed on your mind?

JL: You know, I didn't realise that the footbridge was sort of part of the bridge itself.

P: It's very important to you, the bridge, and how the bridge was remembered, and how it was brought in here. It's probably one of the few things we had a strong disagreement about...

..It was very important for you to try and figure it out, when I had one opinion and...

JL: ...I had another.



CONCLUSIONS

Multiple memory systems

- distinct anatomies
- selectively damaged
- a lot to discover about their interaction

A lot known about episodic memory

- feels like our 'personal' memory

Much less known about emotion-based memory

- scientifically important
- potentially very important for the psychotherapies

