

SenseCam & memory rehabilitation

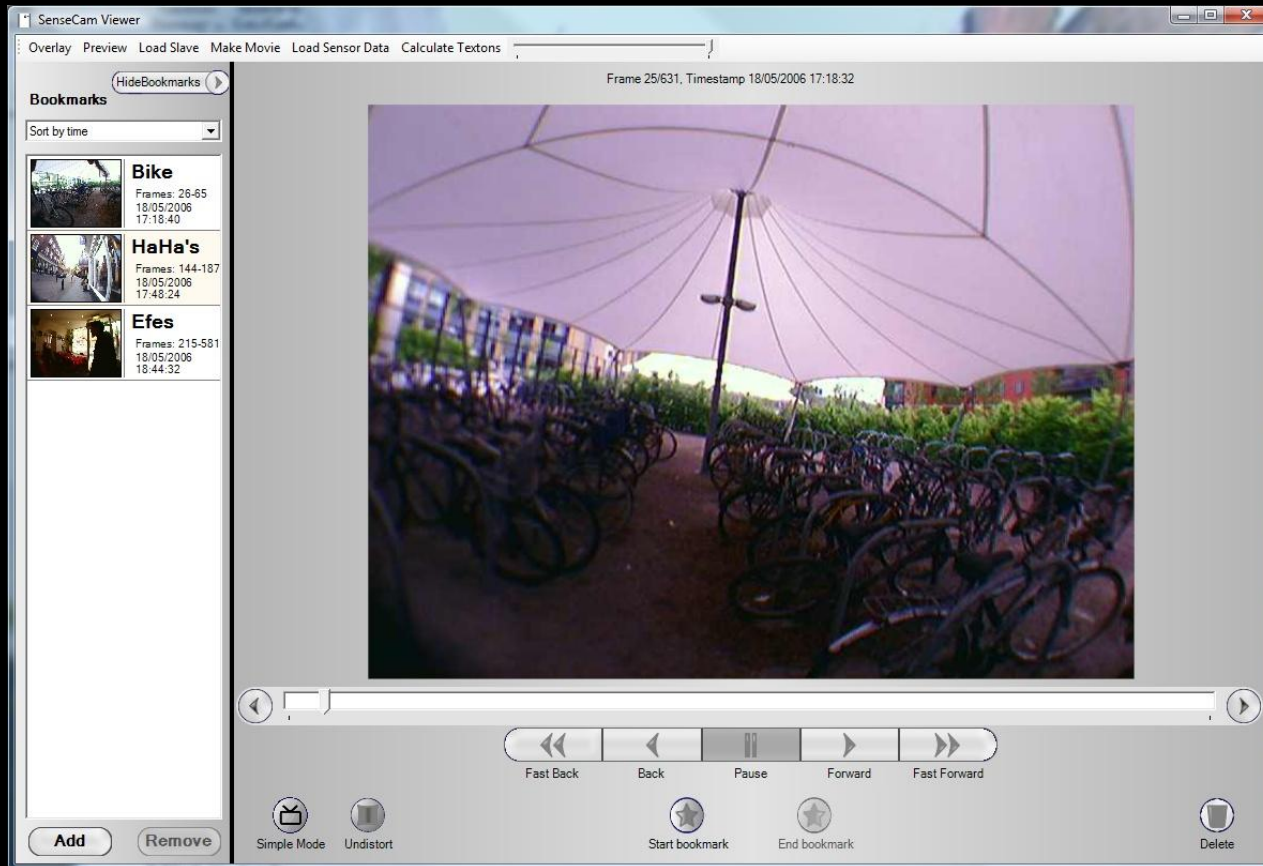
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SenseCam

- A new concept for digital cameras
 - wearable, wide-angle lens
 - automatic capture
 - range of sensors
- New media type
 - between digital stills & video
 - ‘digital experience’ capture



SenseCam



SenseCam movie (copyright Phil Barnard)

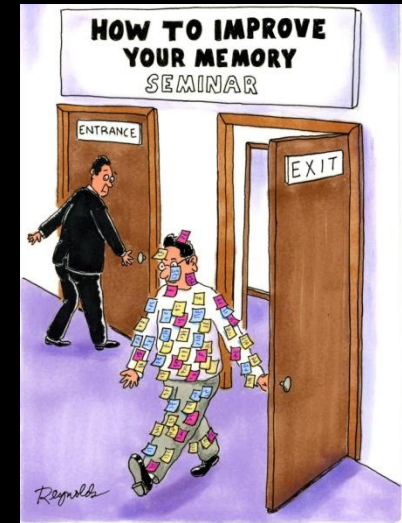


SenseCam & memory

- Cambridge Memory Aids Clinic
 - Memory aids for current and future events
 - Lack of aids for past events
 - Episodic memory important for psychological well-being

- SenseCam as memory aid for past events
 - Pictorial diary from user's visual perspective
 - Non-intrusive
 - Easy to use
 - Easy to view

- Hypothesis: SenseCam will help cue recall and promote consolidation of episodic memories



Clinical studies

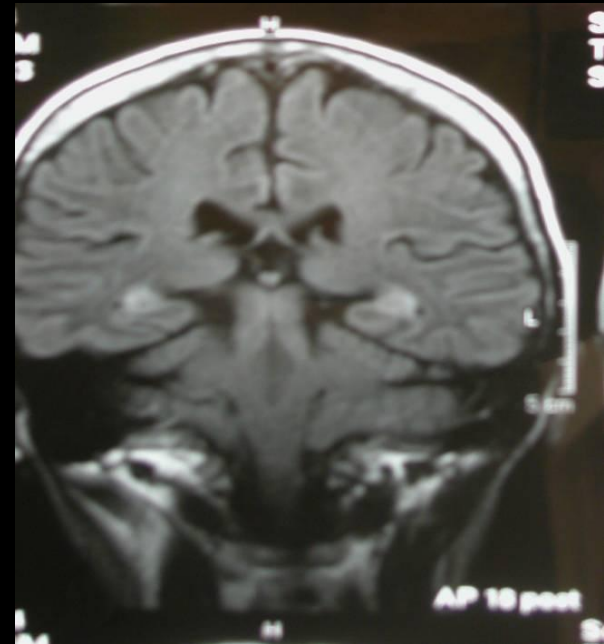
- Study conditions
 - Experimental
 - SenseCam used to record significant events
 - Control
 - Written diary used to record significant events
 - Baseline
 - No memory aid used
- Procedure
 - Significant event
 - Information reviewed every 2 days for 2 weeks
 - Memory of the event tested before each review

 - Long-term recall tested

Clinical studies: case study 1

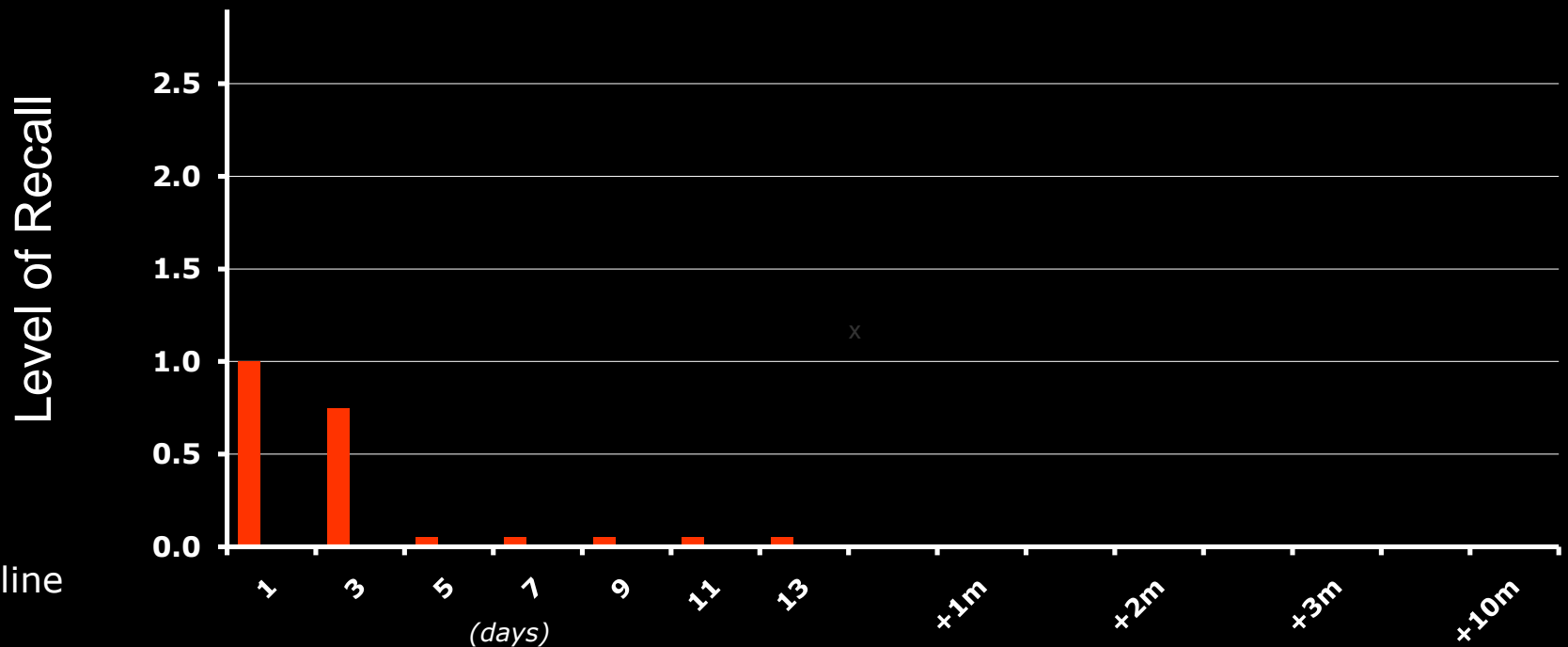
Mrs B – limbic encephalitis (Berry et al, in press)

- Cambridge Memory Clinic
- 63 year old, well educated woman
- Limbic encephalitis 2002
- Severe episodic memory impairment
 - No recall of an event within 3 to 5 days



Results

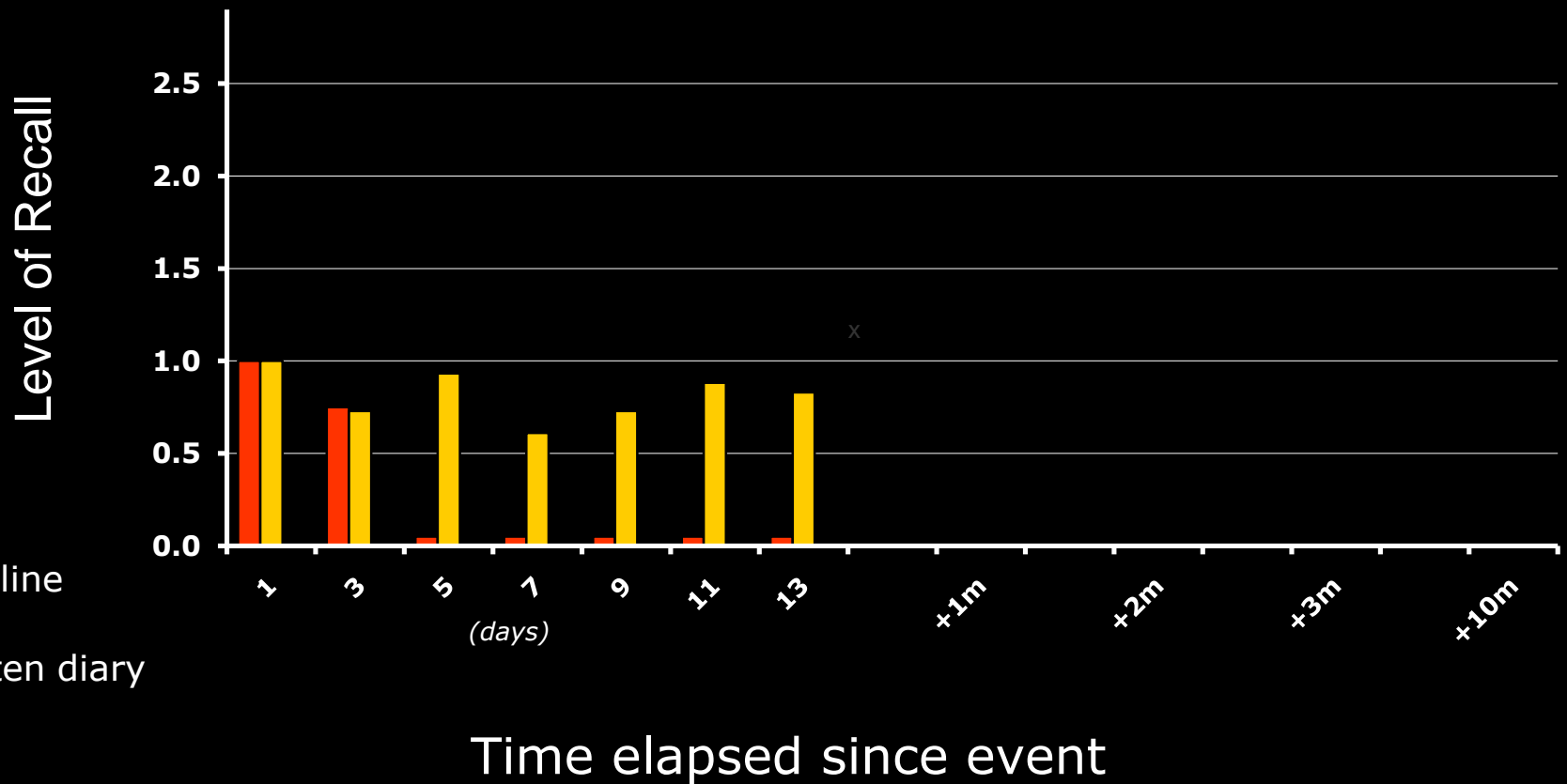
Memory of an event over time



Time elapsed since event

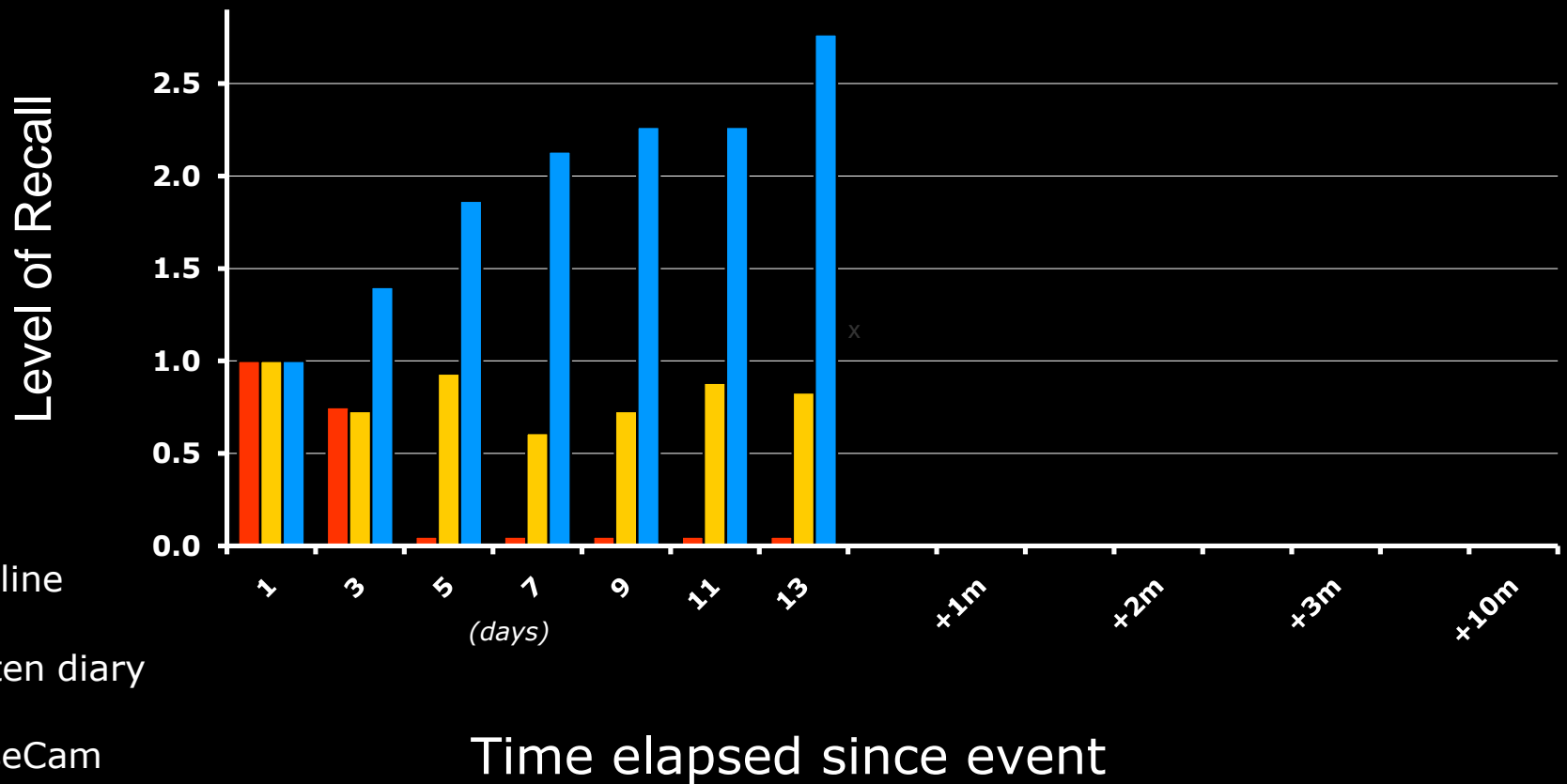
Results

Memory of an event over time



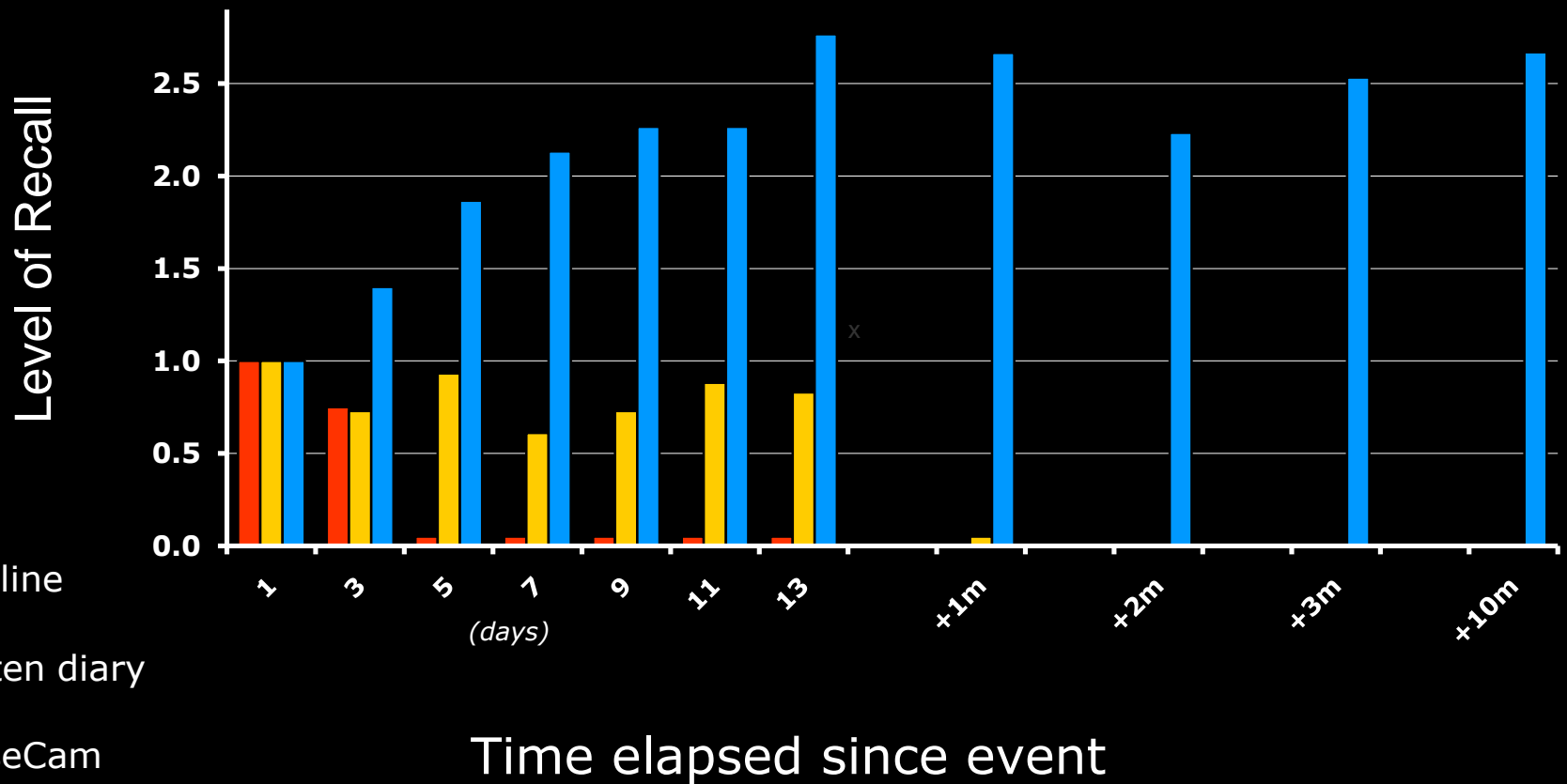
Results

Memory of an event over time



Results

Memory of an event over time



Clinical studies: case study 2

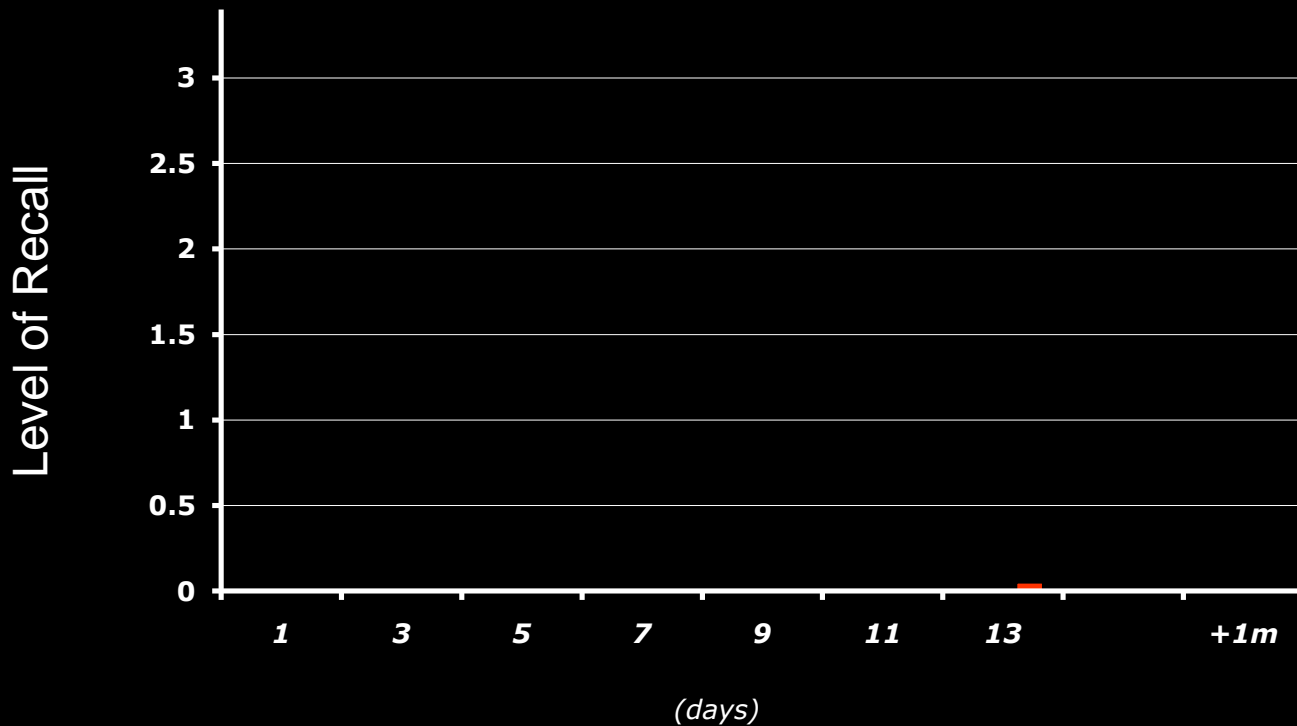
Mrs F – Alzheimer's disease

- Cambridge Memory Clinic
- 67 year old woman, living alone
- Alzheimer's disease diagnosed in 2000
- Now in 'moderate' stages of disease
- Marked memory impairment

Results: Mrs F Alzheimer's disease

Results

Memory of an event over time



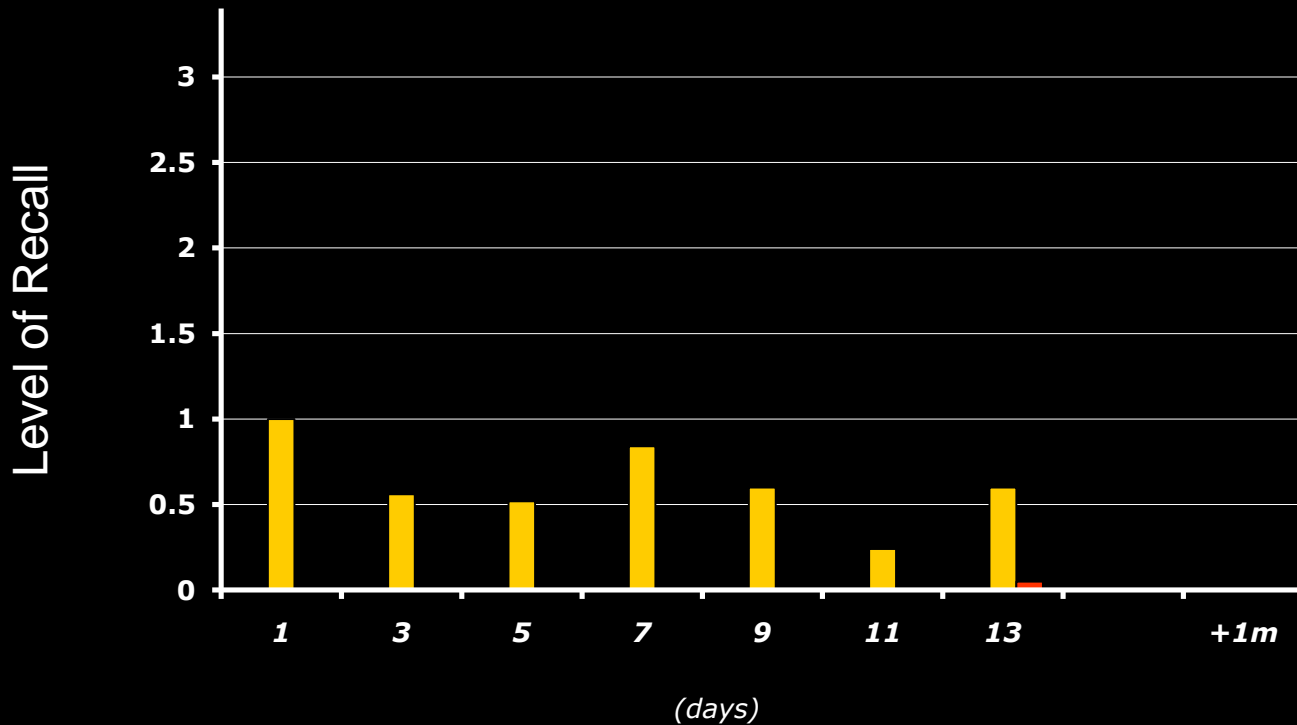
■ Baseline

Time elapsed since event

Results: Mrs F Alzheimer's disease

Results

Memory of an event over time



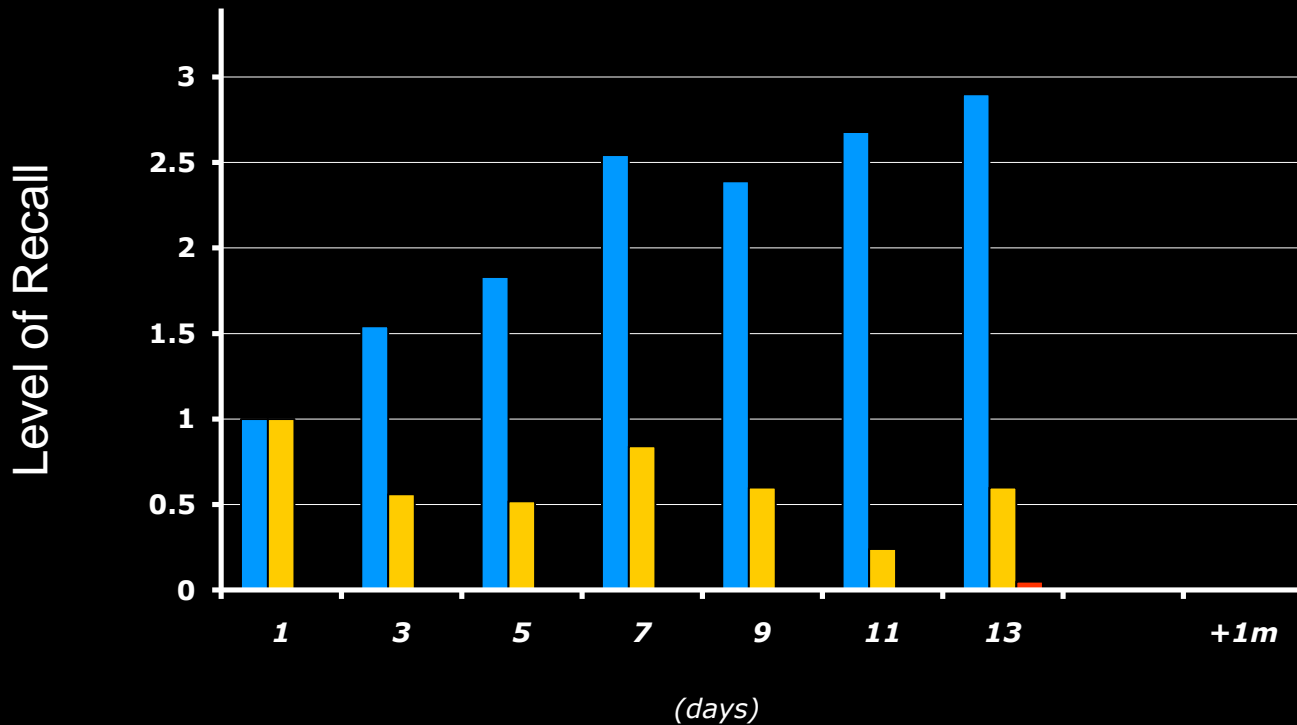
Baseline

Written diary

Time elapsed since event

Results

Memory of an event over time

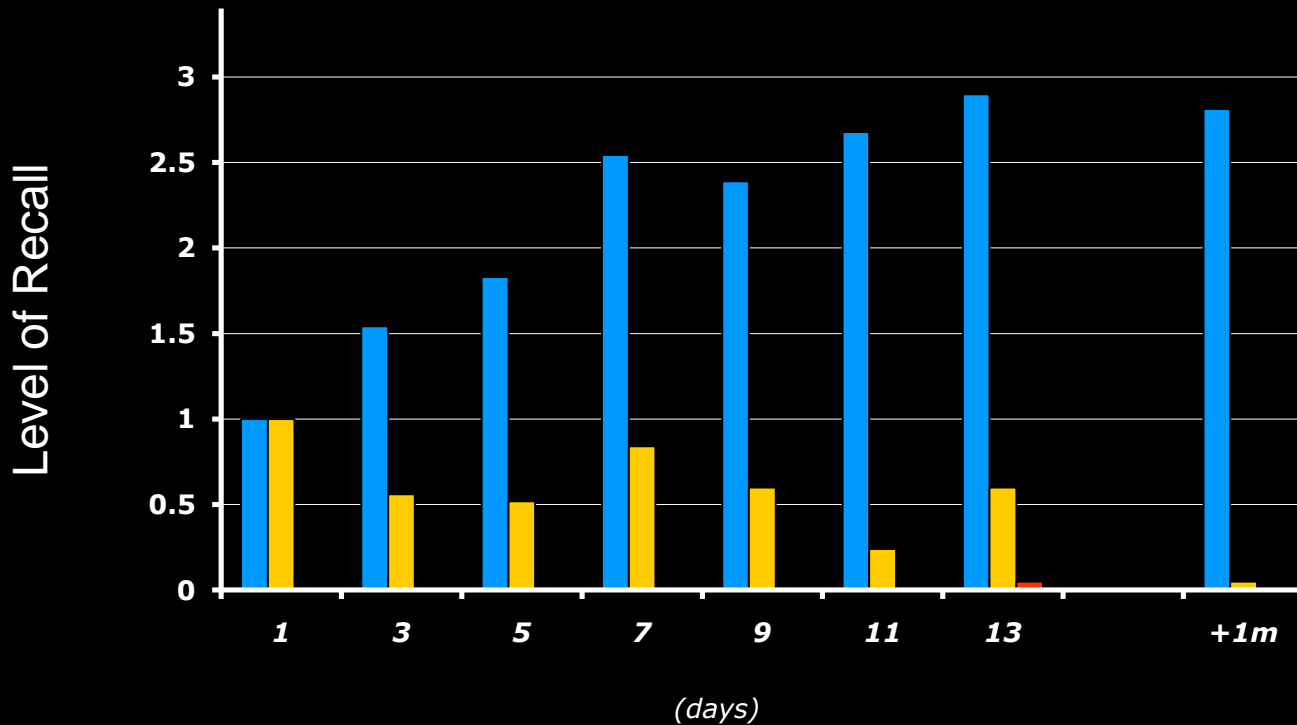


- Baseline
- Written diary
- SenseCam

Time elapsed since event

Results

Memory of an event over time



- Baseline
- Written diary
- SenseCam

Time elapsed since event

Clinical studies: case study 3

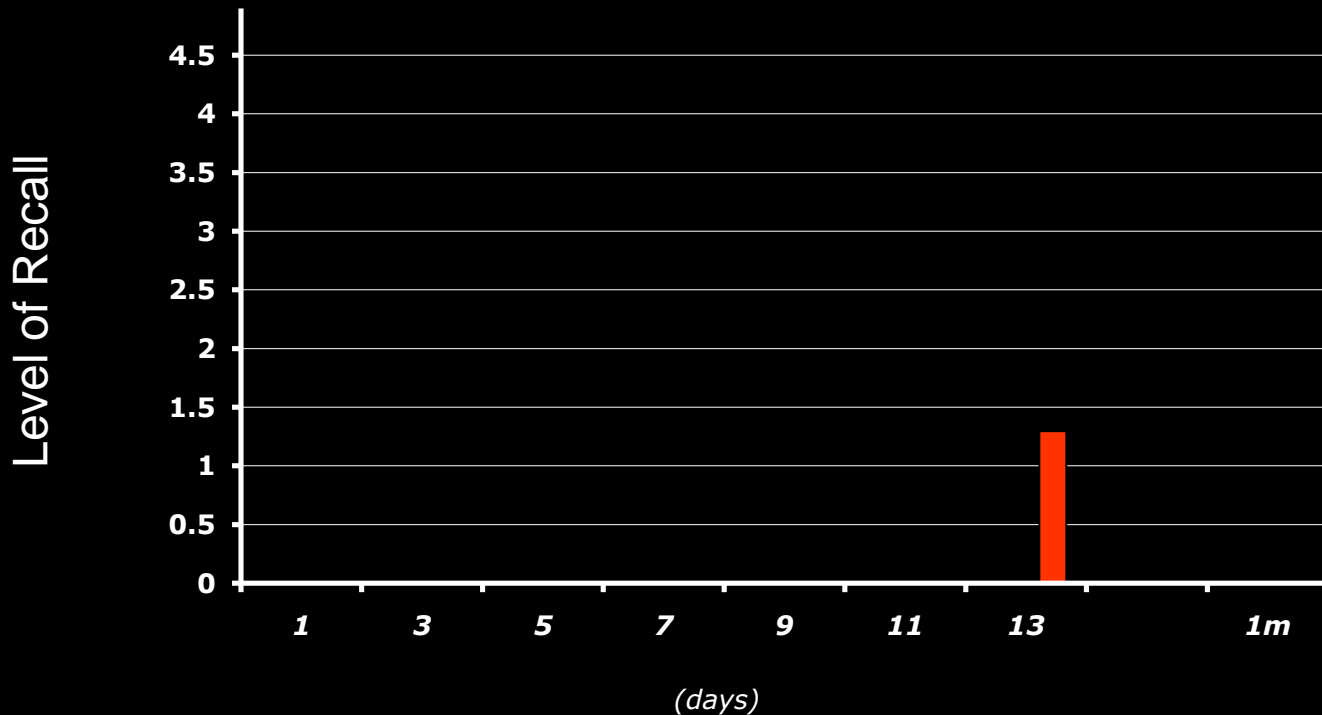
Mr D – Alzheimer's disease

- Cambridge Memory Clinic
- 75 year old, married man
- Alzheimer's disease diagnosed in 2006
- Now has marked memory impairment
- Relatively intact other cognitive functioning

Results: Mrs F Alzheimer's disease

Results

Memory of an event over time

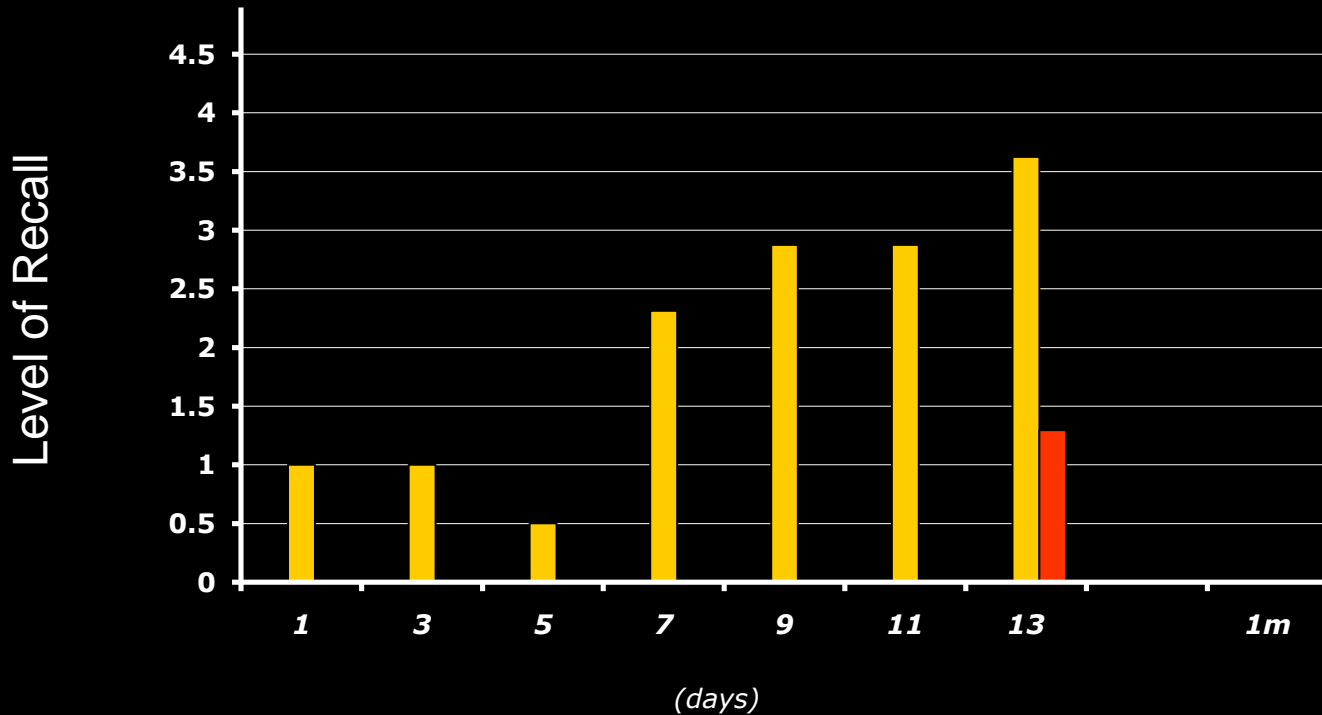


Time elapsed since event

Results: Mrs F Alzheimer's disease

Results

Memory of an event over time



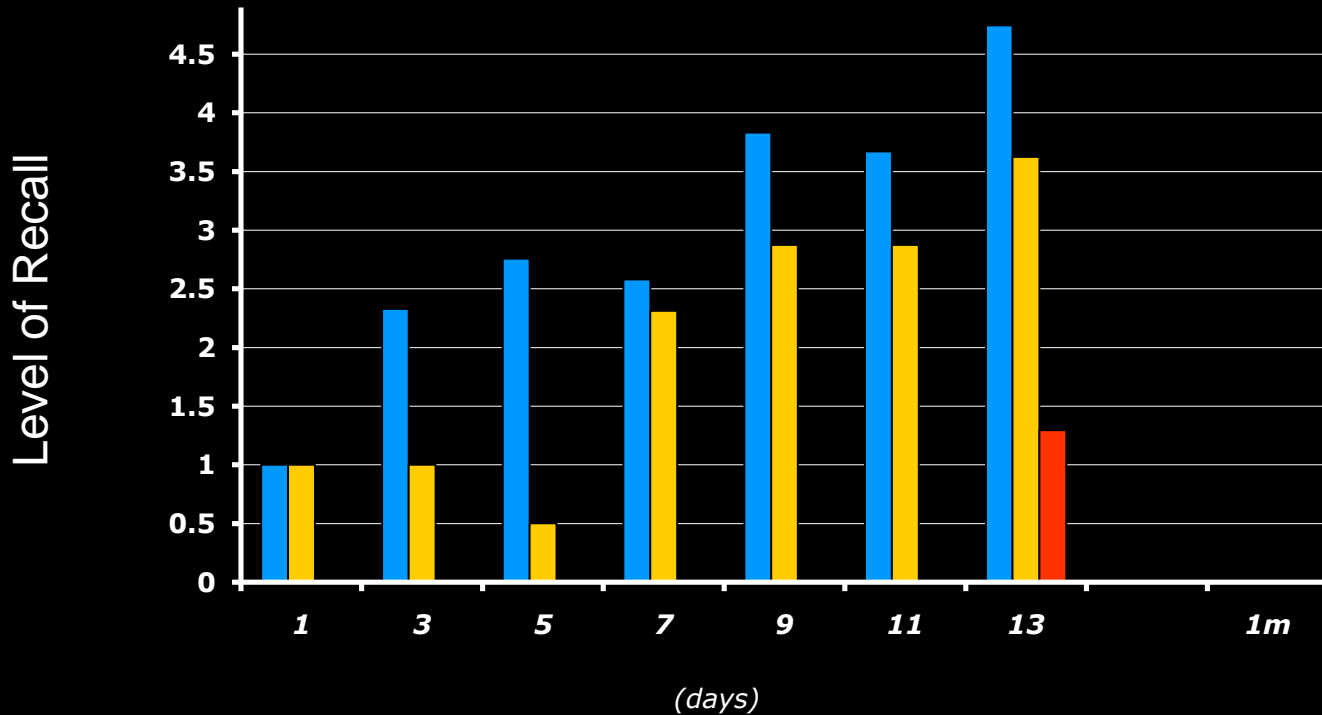
Baseline

Written diary

Time elapsed since event

Results

Memory of an event over time

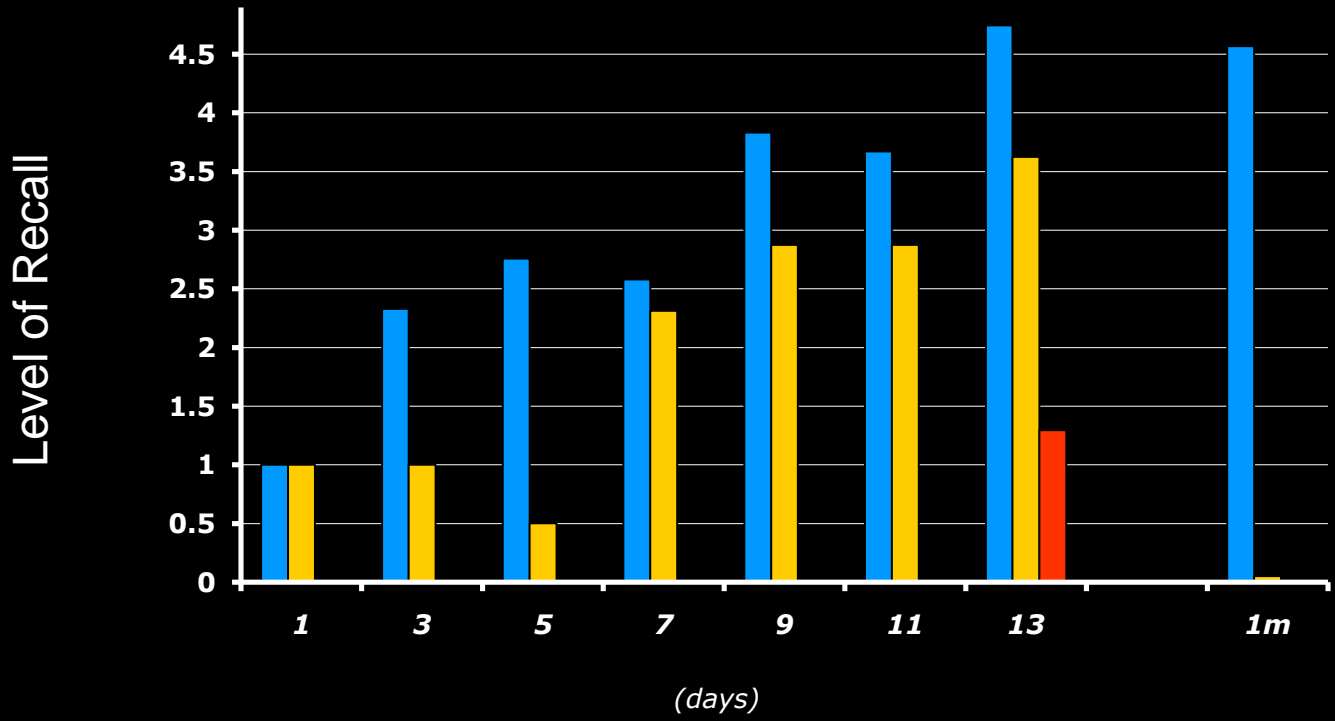


- Baseline
- Written diary
- SenseCam

Time elapsed since event

Results

Memory of an event over time



- Baseline
- Written diary
- SenseCam

Time elapsed since event

Results

- *'Looking at the images is definitely helpful... normally I would just forget these things'*
- Using the written diary *'I just have to take J's word for it'*
- Different to ordinary camera as *'you see exactly what you saw'*
- Sharing experiences again is a *'sheer pleasure'*
- *'SenseCam is a Godsend... everyone should have one!'*

Discussion

Why is SenseCam an effective memory aid?

1. SenseCam movies mimic episodic memory (Conway, 2006)
 - Visual
 - From egocentric viewpoint
 - Recollectively experienced
 - Summary records
 - Correspond to reality
2. Certain SenseCam images are particularly strong cues
 - Personally meaningful events
 - Unpredictable 'high impact' images (cf. Croucher, Calder, & Barnard, 2006)
3. SenseCam movies stimulate brain regions important for memory consolidation
 - Hippocampus and related memory structures
 - Neural networks not easily activated otherwise

Ongoing research

- MSRC
 - Alzheimer's disease
 - Other clinical groups
 - Neuroimaging studies
- Collaborations
 - fMRI in normal population (Conway & Cabeza)
 - Rehabilitation of dysexecutive functioning (Gracey)
 - Facilitated recollection in dementia (Barnard & Clare)
 - Multimedia biography reminiscence therapy (Baecker, Stern, & Black)
 - Assessment and rehabilitation of TEA (Zeman)
 - Objective memorability of SC images (Finlay, Brewer, & Benjamin)

Summing up

- SenseCam powerfully stimulated the recall and consolidation of autobiographical memories in patients with memory loss
- SenseCam images may be especially potent cues for triggering autobiographical memory recall
- SenseCam has many important clinical and theoretical applications