

The accessibility and availability of experience segments in memories for real-world events

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Everyday events

Real-world events are complex:

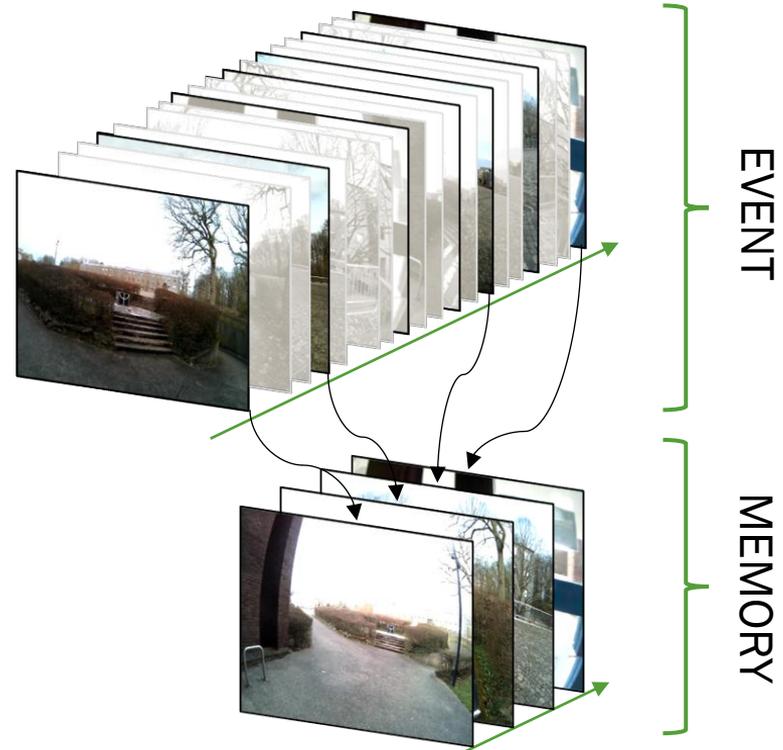
- Personal:
 - Interactive
 - Meaningful
- Spatial:
 - Composite
 - Dynamic
- Temporal
 - Continuous
 - Extended



What is the temporal structure of event memories

Event memories are summaries

- Remembering an event does not produce a continuous “mental movie”
- Our memories are summaries of past experiences with key moments.
- There are gaps in memories: some segment are not recalled.

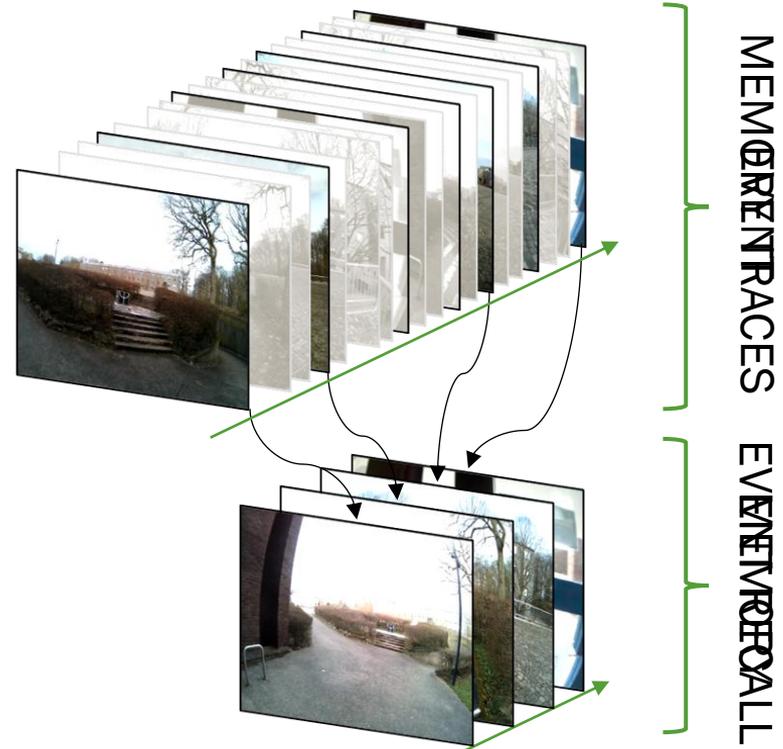


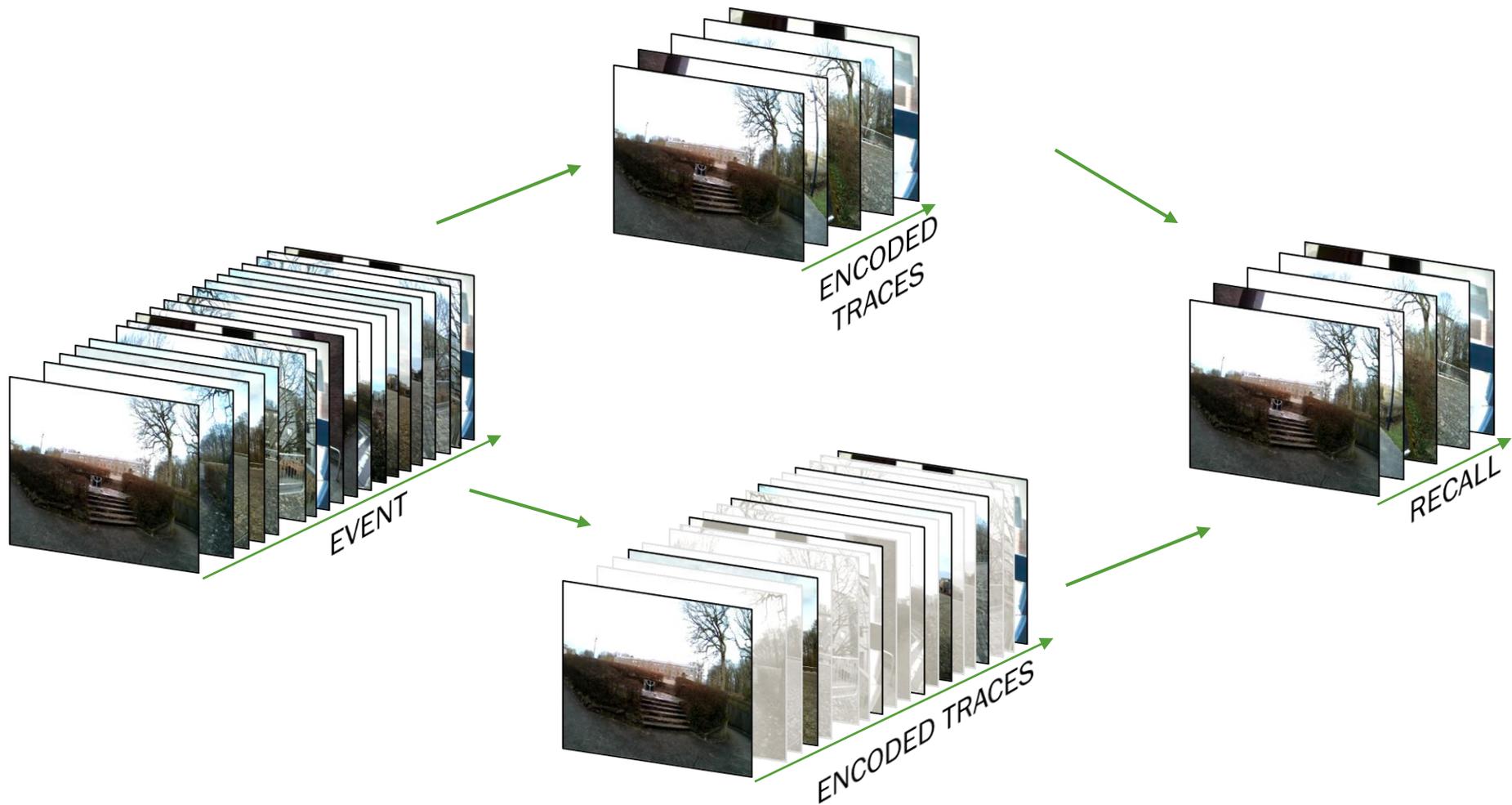
D'Argembeau et al., 2022 ; Jeunehomme & D'Argembeau, 2020 ; Jeunehomme et al., 2018.

Why are segments omitted?

- Availability:
 - The segments are not stored in memory
 - Selection during **encoding**
- Accessibility:
 - The memory traces are skipped
 - Selection during **recall**

→ **Comparing free recall and recognition memory**





Day 1: Encoding phase



- A real-world event with actions to perform in different locations (~12 minutes)
- Recorded from the participant's point of view (with eye-tracking)
- They did not know their memory would be tested

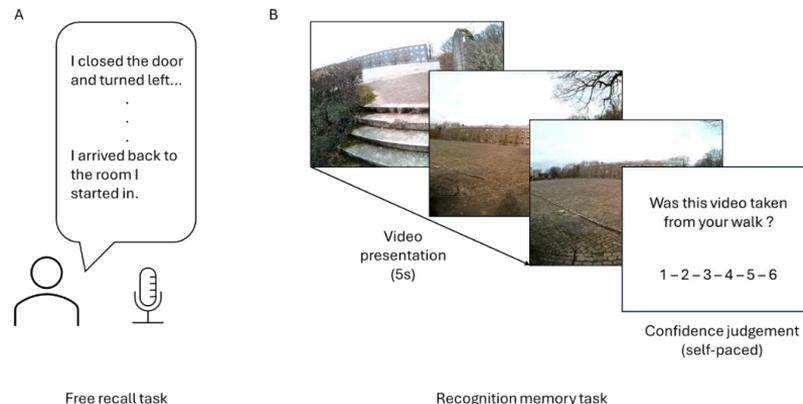
Day 2: Retrieval phase

1. Free recall

- Re-experience the event in as much detail as possible
- Mention any moment you can remember, even the unimportant

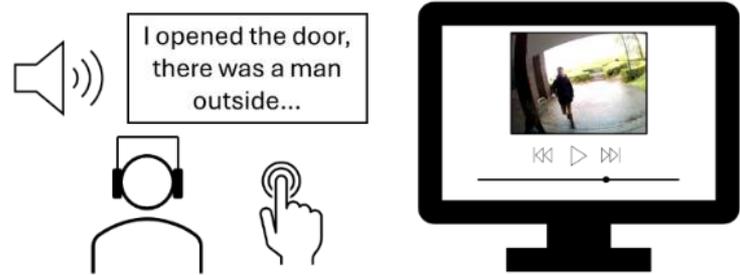
2. Recognition memory

- 5s videoclips, extracted from their footage (targets) or someone else's (lures)
- Old/new with a 6-points confidence scale



Identifying recalled moments

- Participants listened to their recall
- They flagged moments of the video that corresponded to moments they had recalled
- Trials containing a flagged moments were marked “recalled”, and the rest “unrecalled”



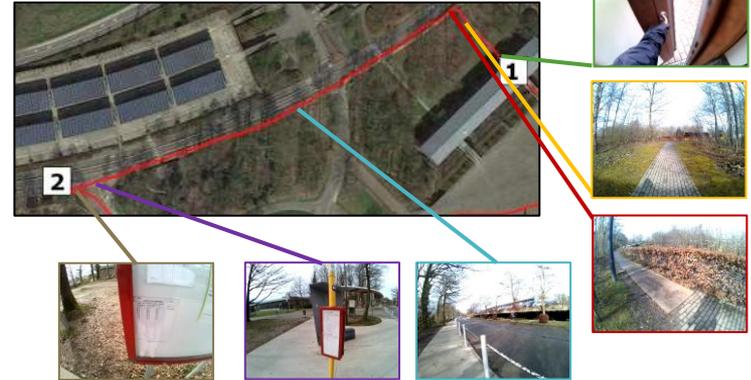
Lure trials were marked as “recalled” when they depicted the same moment as a recalled target trial

=> Recognition performance for unrecalled trials will indicate their availability in memory

The structure of event recall

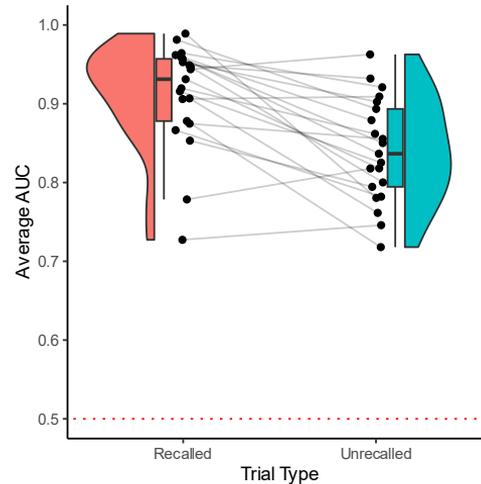
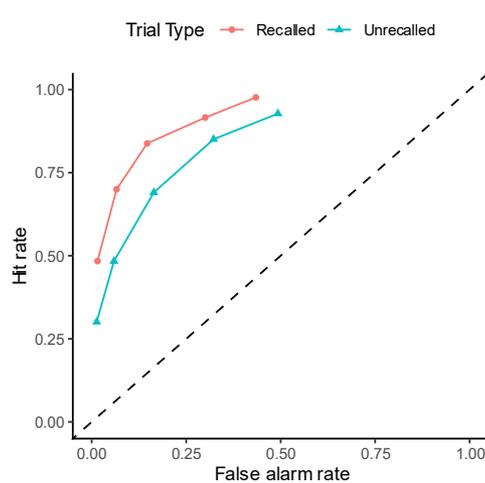
- Recall took the form of a series of moments separated by gaps

[...] I got out of the building and I saw a bus driving by, I turned left alongside the road, I remember I looked at a bike passing by on the right... Then I arrived at the bus stop but at first I looked at the wrong schedule, then I checked the correct schedule [...]



- On average, about 27 identified moments per participant (~2.3 per minute)

The availability of unrecalled moments



Average AUCs:

.91

.84

$t(20)=5.05, p < .001, d = 1.10$

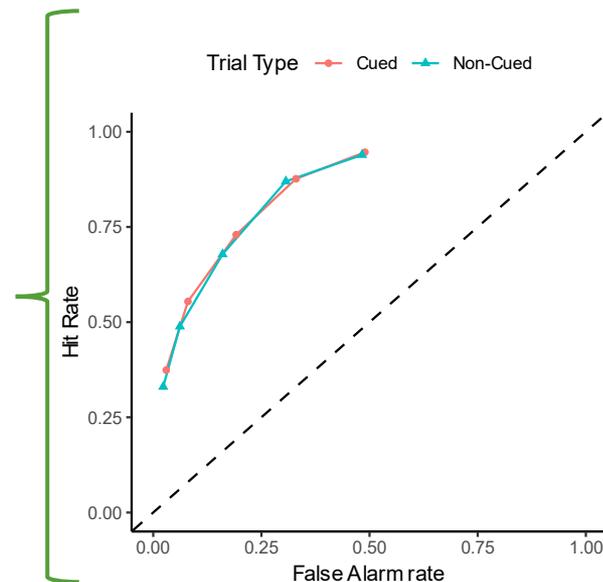
- Unrecalled segments
 - Recognized **less often** than recalled moments
 - Still a **very good** recognition performance

Experiment 2: cueing with gaze patterns

- Can additional cueing help participants distinguish between trials ?



No effect of cueing
on videoclip
discriminability

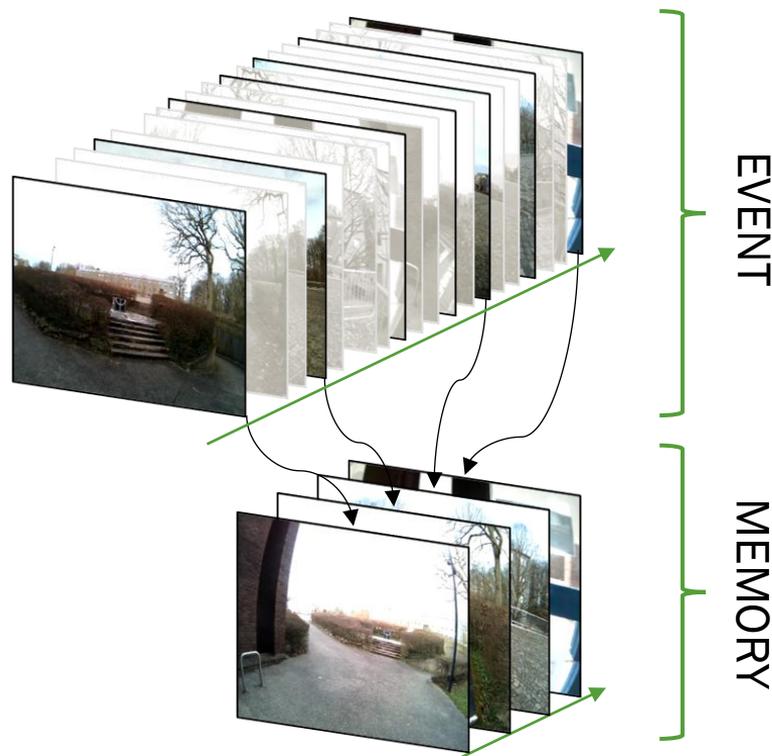


Gaps in recall: unavailable segments

- Selection at encoding
 - Fluctuation of attention
 - Moments of change
 - Beginning and end of events
 - Most informative moments

Baldwin & Kosie, 2021

→ Some segments are **not recalled nor recognized** because they are less well encoded.



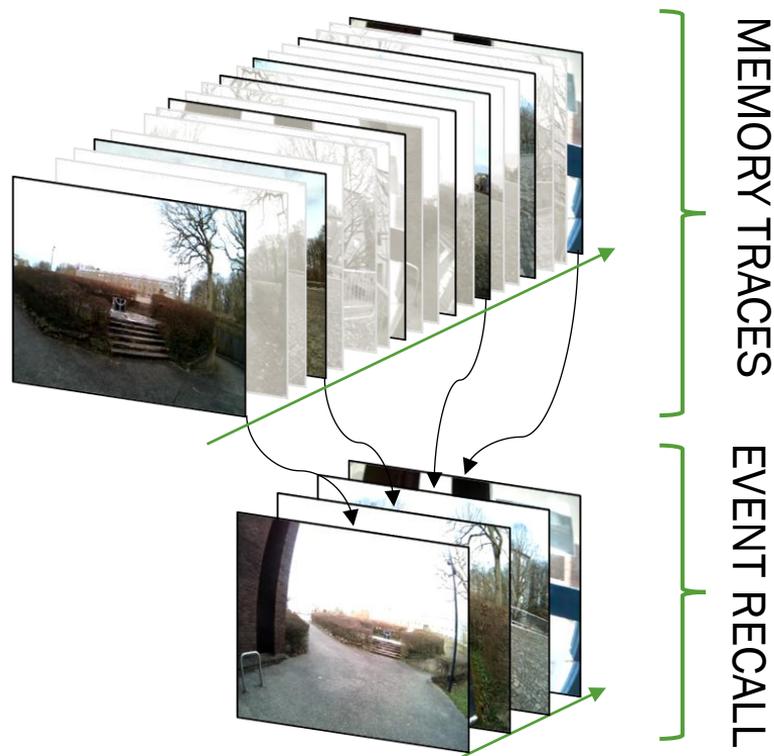
Gaps in recall: unaccessed segments

- **Selection at retrieval**

- Weaker or less integrated memory traces not accessed
- Less informative segments are not necessary to form a coherent event representation.

→ A lot of segments are **encoded**, but **skipped during event recall**.

Michelmann et al., 2023



To conclude

- Episodic memory does not reproduce the temporal structure of events.
- Event memories are a series of segments separated by gaps.
- We measured the recognition memory performance of unrecalled segments of experience.
- We saw that the gaps in recall can mostly be attributed to a selection of information during retrieval.
- There is a lossy selection process during encoding as well.
- Both processes shape the temporal structure of event memories.



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