Accessibility and availability of actions and spatial displacements in memory for real-world events

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Introduction

Event recall produces temporal gaps: some segments of prior experience are omitted.
→ Moments of action are more frequently recalled than moments of navigation (Jeunehomme et al., 2018)
→ Does this asymmetry reflect differences in accessibility or availability of different kinds of memory segments ?

→ To what extent does **interaction with the environment** affect the temporal structure and compression of episodic memories?

EVENT / MEMORY
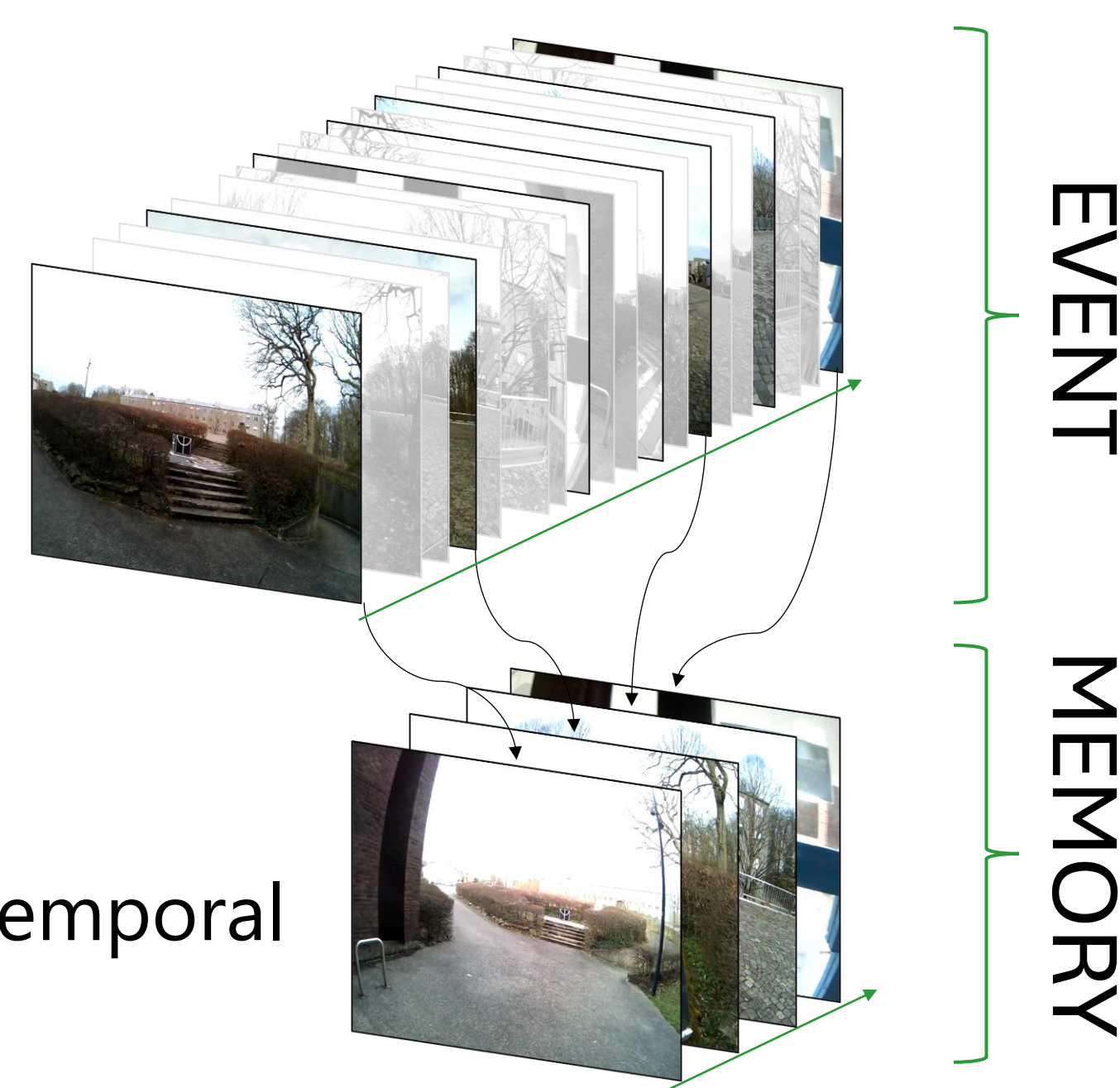
Hypotheses:

Lower recall of some navigation segments could be due to:

• **Reduced availability**: If navigation moments are not encoded, recognition performance should be near chance.

• **Reduced accessibility**: If navigation moments are encoded but omitted during retrieval, recognition should be good despite low recall
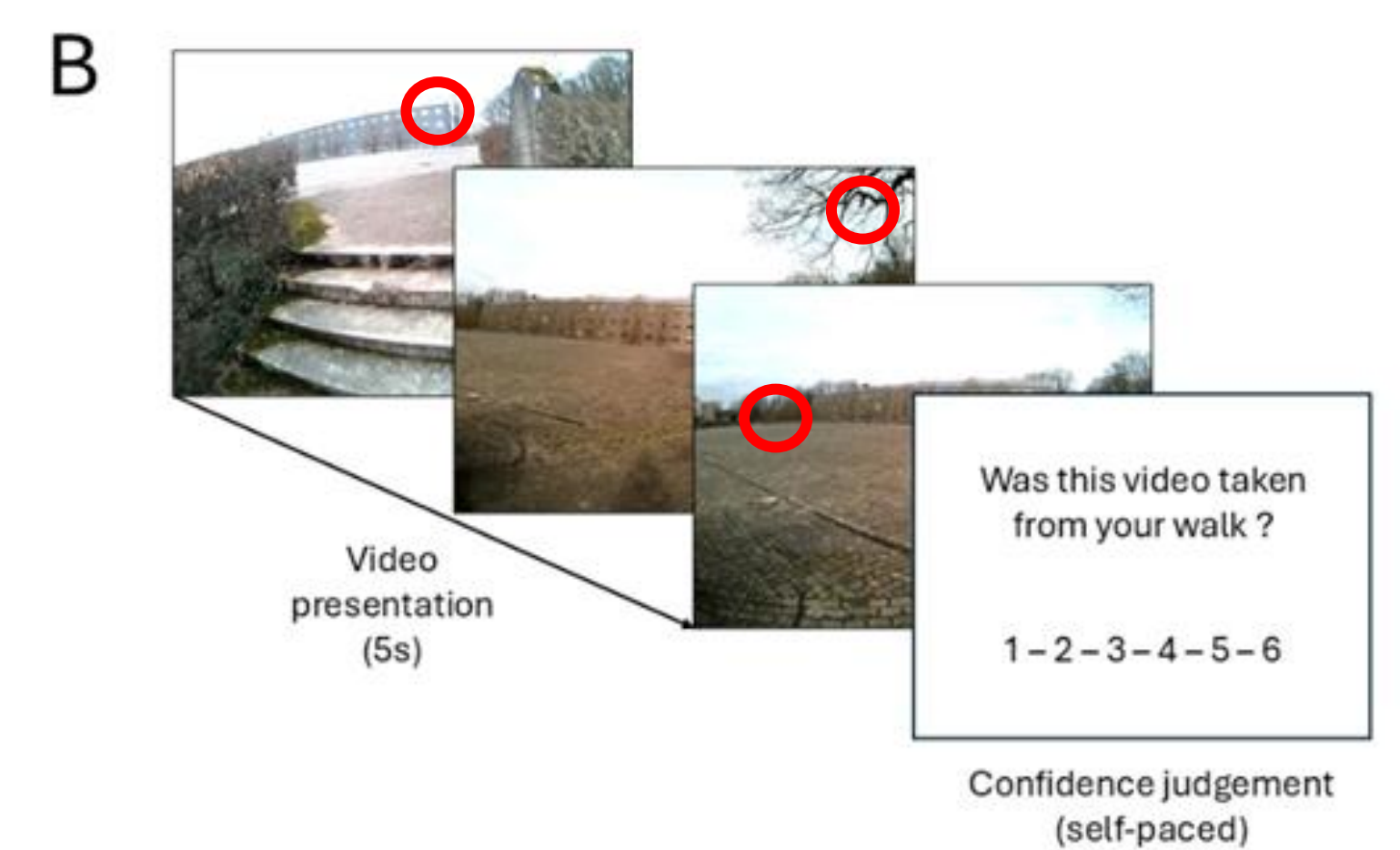
Method

Day 1 - Event

A ~**12 minutes walk** around the campus, with **3 actions** to execute in between **walking segments**.
Eyeglasses with front cameras eye-tracking capacities (Baumann & Dierkes, 2023).

Day 2 – Memory tests

A
I closed the door and turned left…
I arrived back to the room I started in.
Free recall task

B
Video presentation (5s)
Was this video taken from your walk ?
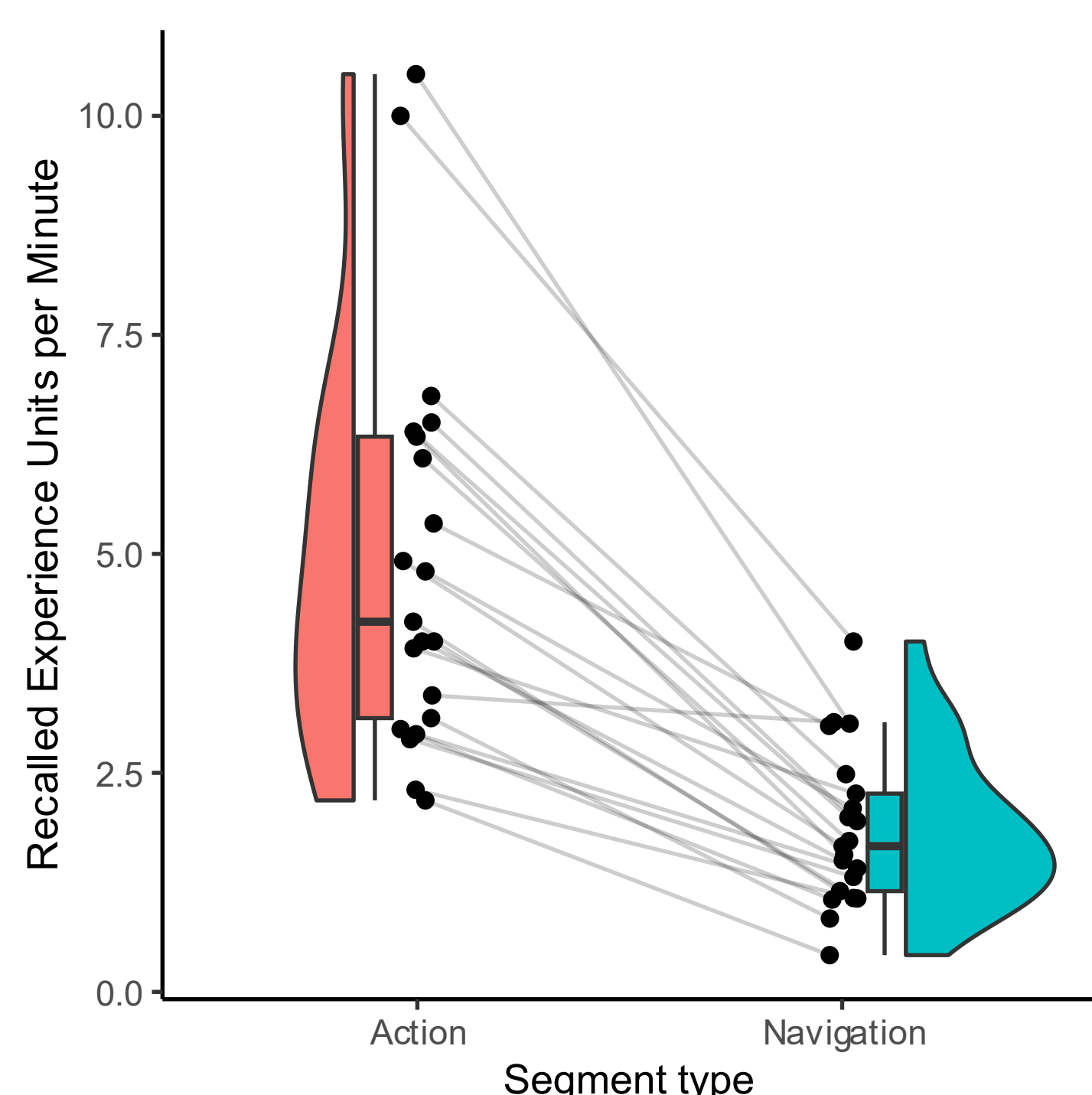1 – 2 – 3 – 4 – 5 – 6
Confidence judgement (self-paced)
Recognition memory task

Half of the recognition trials had their original **gaze pattern visible**, in order to examine if it increases performance
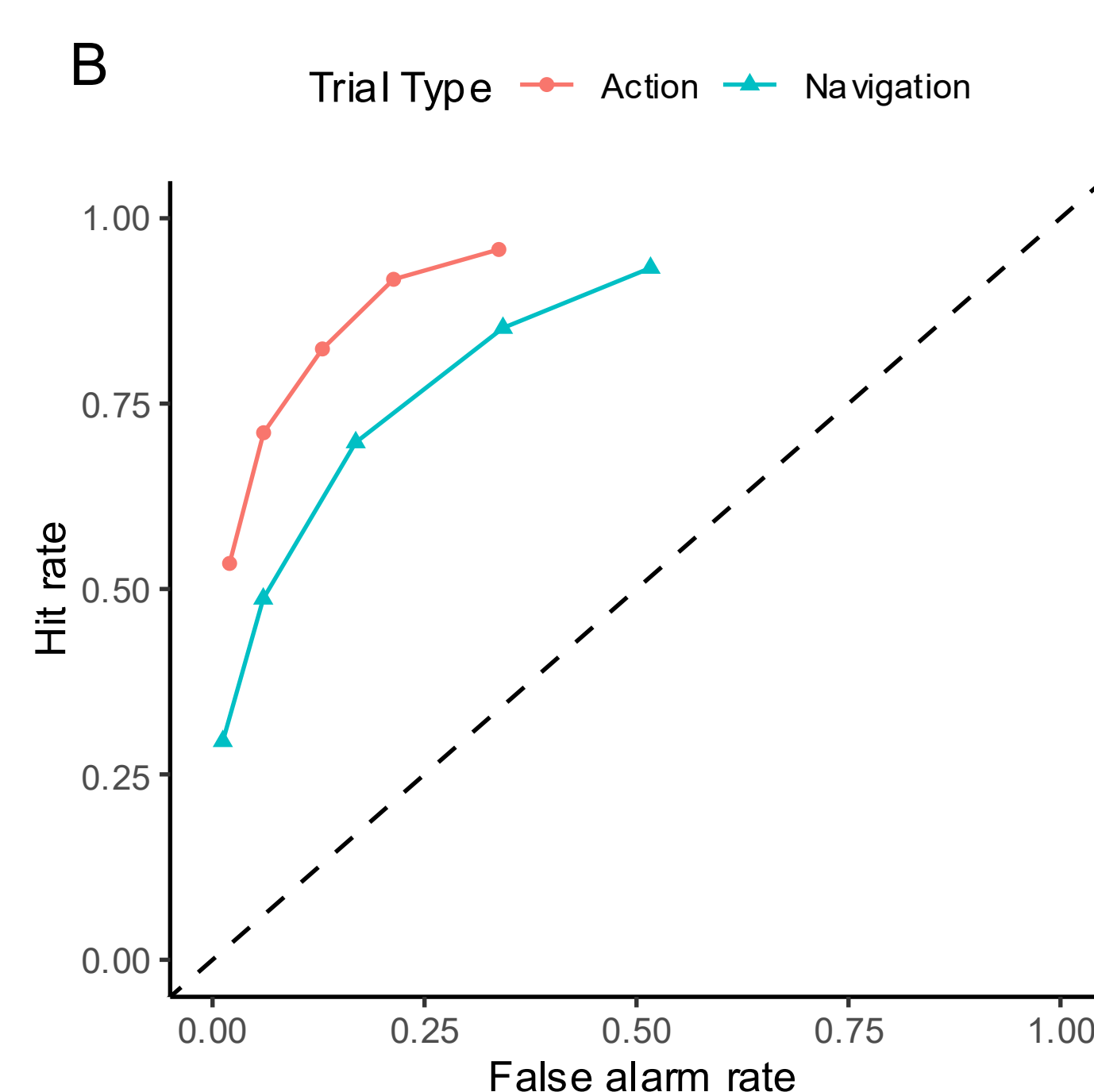
Results

Free recall

Recalled Experience Units per Minute — Action / Navigation — Segment type

	Action segments	Navigation segments
Moments per minute	4.94	1.58

- Action segments are much **more densely recalled** than navigation segments

Recognition memory

Trial Type — Action / Navigation
Hit rate vs False alarm rate

	Action segments	Navigation segments
AUC	0.93	0.84

- Navigation segments were **less accurately recognized** than action segments
- But they were recognized with **good accuracy** nonetheless
- No effect of gaze-cueing

Discussion

- **Key findings**:
  - Event recall mainly focuses on moments of interaction with the environment
  - Navigation segments are less often recalled and less accurately recognized than actions, suggesting that they are both **less accessible and less available in memory**
  - Recognition of navigation segments is still above chance, suggesting that some segments are **available in memory** but **skipped during recall**

→ Action segments may benefit from **higher attention, goal relevance, and event segmentation** (Baldwin & Kosie, 2021; Conway, 2009; Tversky et al., 2004)
→ Navigation may be compressed due to **redundancy and sparse segmentation**

References:
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