The impact of context familiarity on visual and temporal compression in memory

Kevin Nguy[1] & Christel Devue[1]
1: Department of Psychology, University of Liège

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1. Introduction

Specific detailed **episodic memories** are compressed into **gist representations** and integrated into **schemas** over time and with experience (Robin & Moscovitch, 2017). However, the influence of schemas and **familiarity** on memory compression remains unclear. Familiarity can provide foundations to guide the encoding of new episodic details (Sekeres et al., 2024); but it can also interfere with their retrieval (Bellana et al., 2021) and cause more memory lapses leading to more **temporal compression** in memory (Jeunehomme & D'Argembeau, 2023).

Our pilot experiment investigates the retroactive effect of contextual familiarity on memory accuracy for episodic content and temporal compression in memory within the ecological setting of a campus tour. We hypothesise that contextual schemas act as building blocks to **facilitate compression** and recovery of the gist of a scene but **hinders the encoding of the specificities** inherent to a particular episode.

2. Methods

The day after

<u>Session 1</u>: incidental encoding of a tour on campus

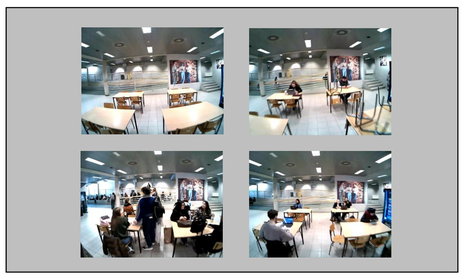
- Recorded with weareable camera
- Through 6 buildings supposed to vary in familiarity for first-year students

Replay phase

1. Mentally replay your walk in the building as precisely as possible.
2. Describe the content of your replay.

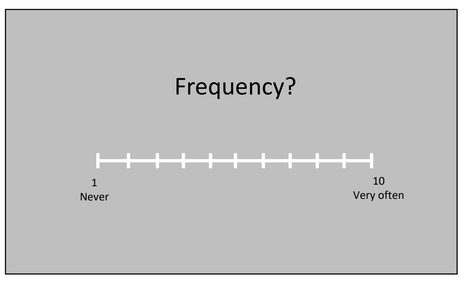
<u>Session 2</u>: Memory tasks

Recognition phase



Pick the photo originating from your walk.

Evaluation phase



Rate your overall pre-experimental familiarity and visit frequency for the places you encountered in the buildings.

3. Results: replay task

N=9

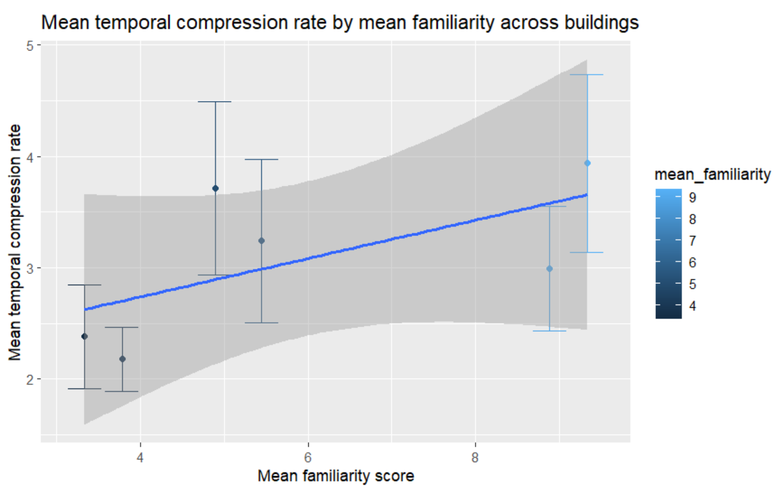
- Exclusion of 2 participants that totally forgot at least one building

<u>Spearman correlation test</u>

r = 0.22, p= 0.07

<u>Linear mixed model</u>

LMM frequency: β = 0.106, σ_β=0.061, p-value=0,095

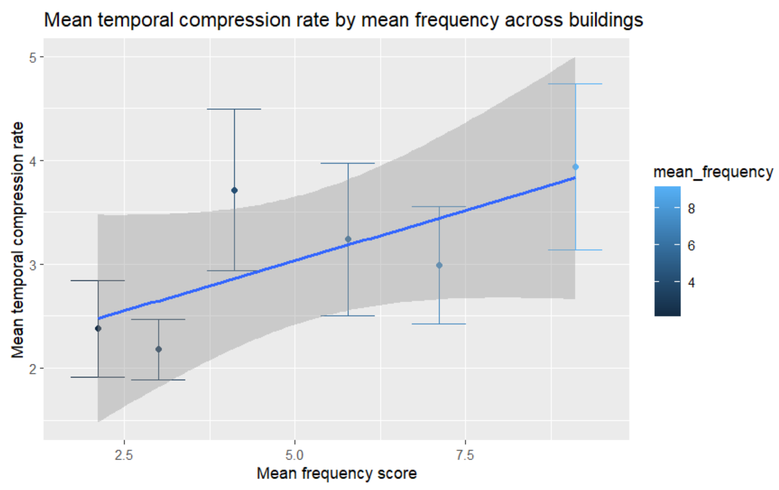


<u>Spearman correlation test</u>

r = 0.36, **p= 0.007**

<u>Linear mixed model</u>

LMM frequency: β = 0.147, σ_β=0.060, **p-value=0025**

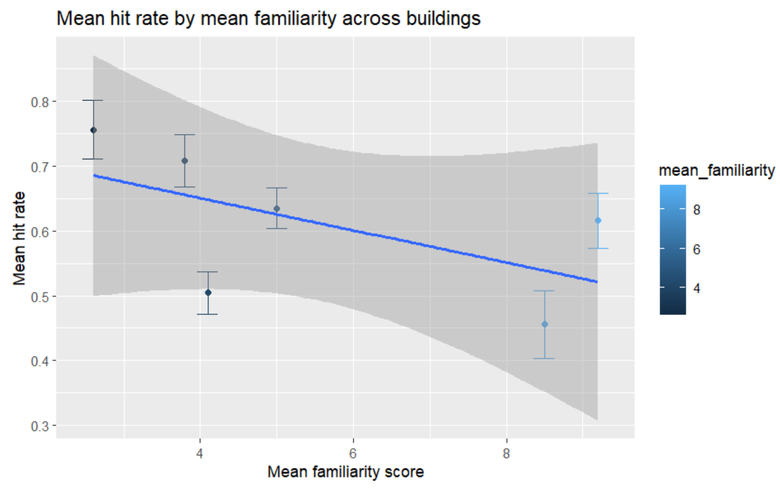


4. Results: recognition task

N=10

- Very similar results with familiarity or frequency.

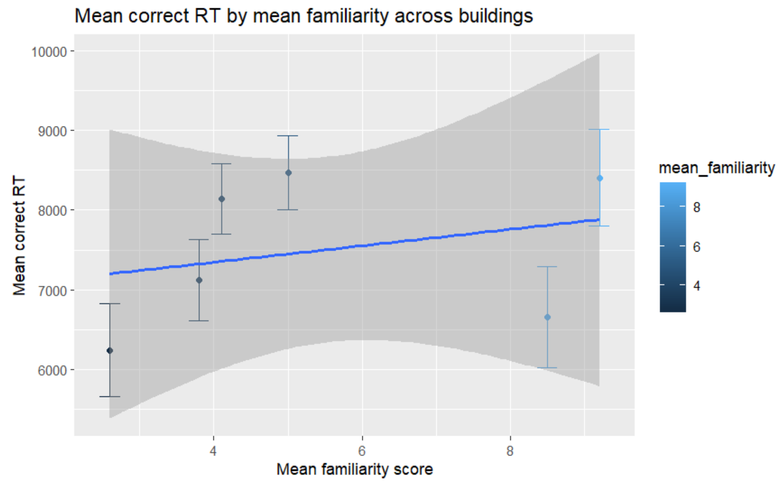
Exclusion of 1 participant due to camera malfunctioning



<u>Linear mixed model</u>

LMM familiarity: β = -0.010, σ_β=0.006, p-value=0,091

LMM frequency: β = -0.131, σ_β=0.006, p-value=0,063



<u>Linear mixed model</u>

LMM familiarity: β =34.695, σ_β=67.876, p-value=0,61

LMM frequency: β = 82.159, σ_β=71.719, p-value=0.258

5. Discussion

- Overall, our findings suggest that walks in familiar places were temporally and visuo-spatially more compressed in memory than walks in unfamiliar places: contextual schemas seem to provide a base upon which faster replay can be achieved but this comes at the cost of encoding episodic details.
- These results are in line with neurobiological data showing reduced activity of the hippocampus when remembering familiar events (Sekeres et al., 2018).
- However, these results have to be taken cautiously, since it is only a pilot study.
- This pilot will be used to recalculate statistical power by simulation and adjust methodology to reduce the risk of missing data.

6. References

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