1094: Temporal Divisions: Segmenting Space through Time

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1. Introduction

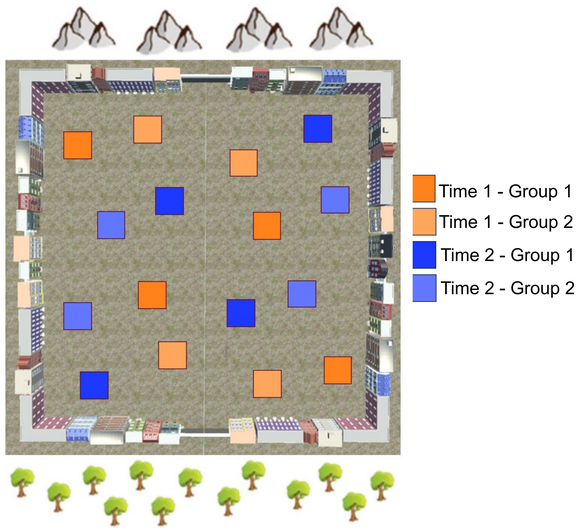
- Event segmentation, dividing time into contiguous blocks, is a key driver of episodic memory and helps with better recall.[1]
- In general, spatial and temporal distance are highly correlated, making it difficult to determine whether temporal segmentation influences spatial memory segmentation.
- Faster recognition noted when locations are both spatially and temporally proximal.[2]

Does spatial memory show temporal segmentation?

2. Method

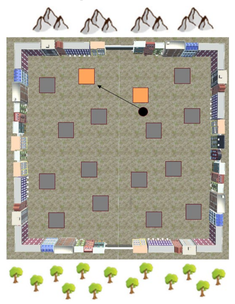
- **Sample**: 76 healthy participants (54 female, mean = 19.7, SD = 1.5). 21 additional participants started but couldn't complete the experiment (3 due to motion sickness, 2 declined, 1 excluded)
- **Pre-registered**

Experiment Environment



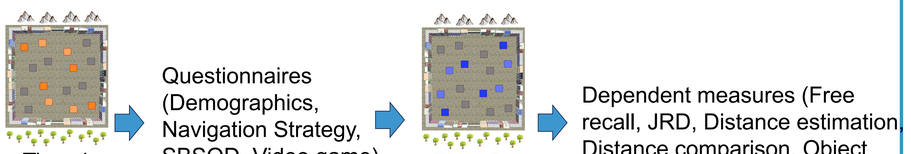
Navigation example

Top-down



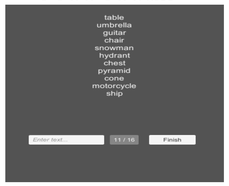
First-person

Experimental sequence

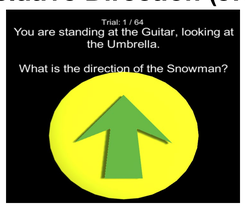


3. Dependent Measures

Free recall



Judgment of Relative Direction (JRD)



Distance Estimation

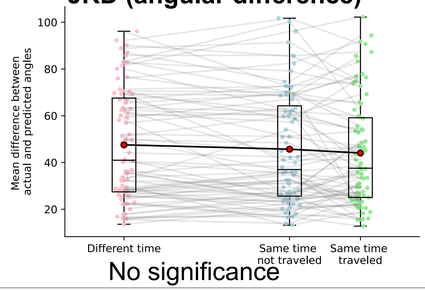
Distance Comparison

Object viewing

4. Results

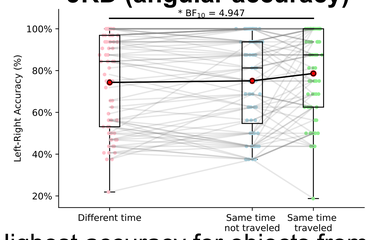
Angular measures

JRD (angular difference)



No significance

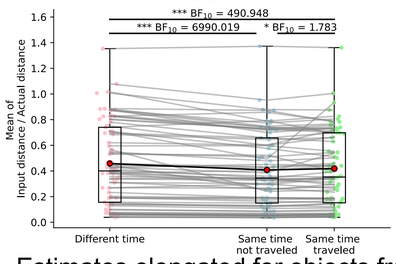
JRD (angular accuracy) *



Highest accuracy for objects from same time and traveled between

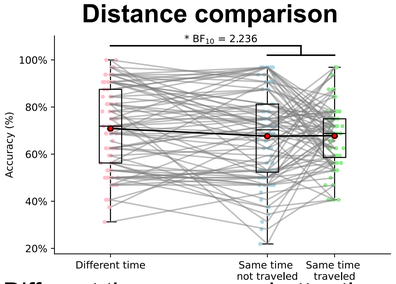
Distance measures

Distance estimation **



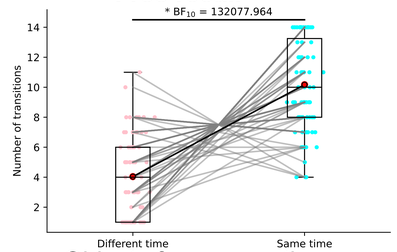
Estimates elongated for objects from different time

Distance comparison



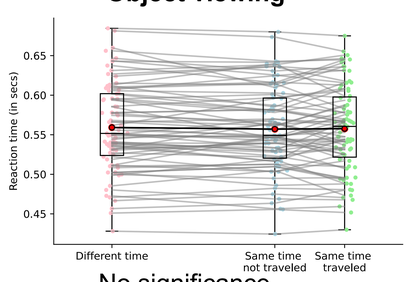
Different time accuracy better than same time accuracy

Free recall



Objects from same time are remembered together

Object viewing **



No significance

Significance and BF_{10} as per two-tailed Wilcoxon signed-rank test. * - not pre-registered, ** - outlier/s removed for visualization

5. Conclusions

Spatial memory shows temporal segmentation via elongation, accuracy difference (distance and angular), and recall.

- Better accuracy in distance comparison for objects from different time possibly due to elongation shown in distance estimation.
- Free recall shows strong preference for temporal over spatial proximity.
- Future work will identify neural correlates underlying spatial and temporal segmentation
  - Medial temporal lobe, especially hippocampus integral for both episodic and spatial memory.[3,4]

6. References

1. Zacks et al., (2006) *Psychol. Aging*
2. Clayton & Habibi, (1991) *J. Exp. Psychol. Learn. Mem. Cogn.*
3. Ezzyat & Davachi, (2014) *Neuron*
4. Peer & Epstein, (2021) *Curr. Biol.*

7. Acknowledgements

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