Image memorability modulates image recognition, but not image localization in space* and time

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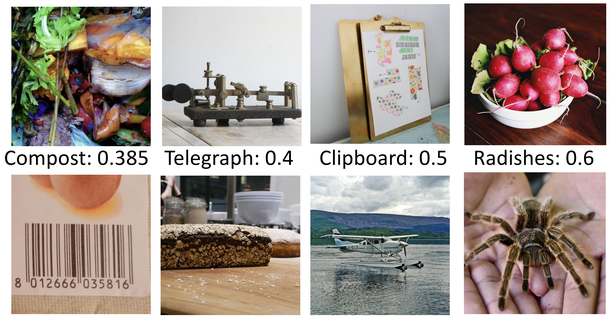
*After running a new, improved version of the experiment, we discovered that image memorability actually DOES modulate image localization in space. …as you will see below.

Background

- After seeing hundreds of images for 2-3 sec, observers can determine whether they have previously seen an image with over 80% accuracy (Brady et al., 2008).
- Some images are more easily remembered than others (Bainbridge, 2021).
- There is a smaller, but still massive memory for the locations of those items in space and time (Wolfe, 2023).

Are spatial and temporal massive memories influenced by image memorability?

Example Stimuli (with memorability scores)



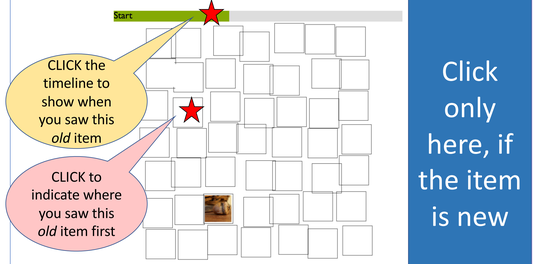
Compost: 0.385 | Telegraph: 0.4 | Clipboard: 0.5 | Radishes: 0.6

Barcode: 0.707 | Bread: 0.8 | Seaplane: 0.9 | Tarantula: 1.0

(Hebart et al., 2019 & Bainbridge et al., 2021)

Task

Participants had to remember the identity of an image, and the location and time at which it was presented.

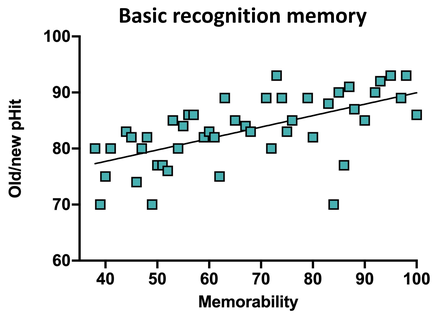


Click only here, if the item is new

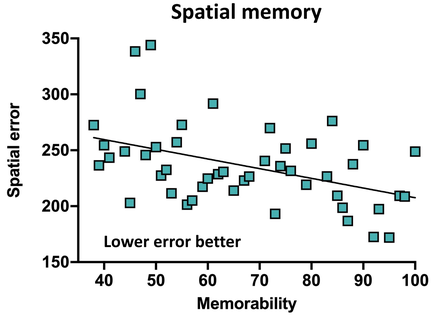
A: 150 images spanning the full range of memorability. (n=22)
B: 150 images restricted to high memorability scores. (n=24)
C: 150 images restricted to low memorability scores. (n=23)

Results

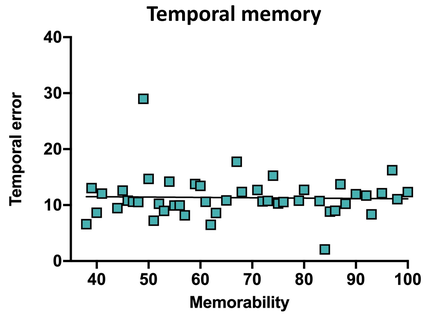
A. Full Range of memorability



Images with higher memorability scores are more memorable.

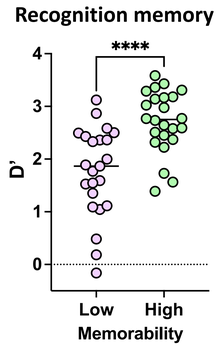


Memory for spatial location improves with increased image memorability.

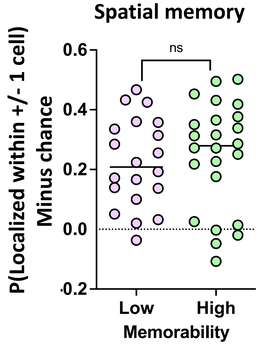


BUT…Memory for temporal location does not vary as a function of image memorability.

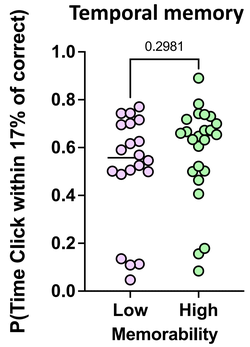
B. Only High memorability vs C. Only Low memorability



High memorability images are recognized better than low.



In this experiment, memorability did not improve spatial memory.



AND…memorability did not improve temporal memory.

Conclusions

- We replicate the basic memorability effect for image *recognition*.
- *Recall* of spatial location appears to be enhanced by higher image memorability but only in the Full Range version of the experiment (too many "bad" Os in B & C?).
- *Recall* of temporal position showed no effects of memorability.

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References

[1]Hebart MN, Dickter AH, Kidder A, Kwok WY, Corriveau A, Van Wicklin C, et al. (2019) THINGS: A database of 1,854 object concepts and more than 26,000 naturalistic object images. PLoS ONE 14(10): e0223792.

[2]Bainbridge, W. A. (2021). Memorability: Reconceptualizing Memory as a Visual Attribute. In T. F. Brady & W. Bainbridge (Eds.), *Visual Memory*: Routledge.

[3]Brady, T. F., Konkle, T., Alvarez, G. A., & Oliva, A. (2008). Visual long-term memory has a massive storage capacity for object details. *Proceedings of the National Academy of Sciences*, *105*(38), 14325–14329.

[4]Wolfe, J. M., Wick, F. A., Mishra, M., DeGutis, J., & Lyu, W. (2023). Spatial and temporal massive memory in humans. *Current Biology*, *33*(2), 405-410.e4.