

Memory for famous faces: Role of stimulus clutter

Sui C. Lau & Yuhong V. Jiang

Department of Psychology, University of Minnesota

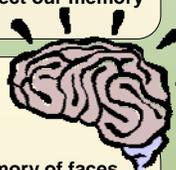


UNIVERSITY OF MINNESOTA

Problem

How does viewing multiple faces simultaneously affect our memory for these faces?

Background



Previous research on human perception and memory of faces has focused primarily on presenting a single face in isolation, a situation rarely found in the real world.

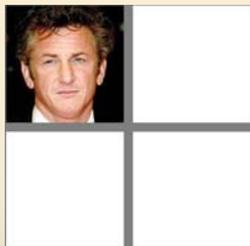
Recent research has shown that the human brain increases activity when viewing multiple *identical* faces, but decreases activity when viewing multiple *different* faces.

Present study: What is the corresponding behavioral response, particularly short-term and long-term memory, when people view multiple versus isolated faces?



Experiment

Condition 1: 1-single



A single face presented once in the experiment, for 2 sec.

Condition 2: 4-same



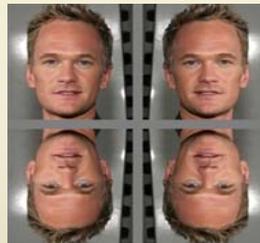
One identity is duplicated and presented simultaneously in four quadrants. The display is presented once for 2 sec.

Condition 3: 4-different



Four identities are presented simultaneously, on 4 occasions, for a total of 8 sec (2 sec per identity).

Condition 5: Symmetry

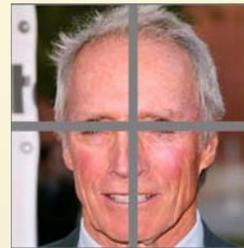


One identity is flipped and/or inverted. The display is presented once for 2 sec.

Task during memory encoding: Rate how much one likes the display.

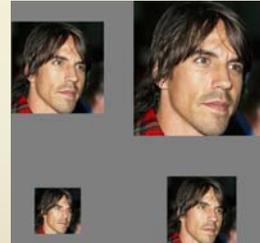
Task during memory testing: Which face (an old one and a new one) did you see before? Memory is tested immediately or after a one-week delay.

Condition 4: 1-big



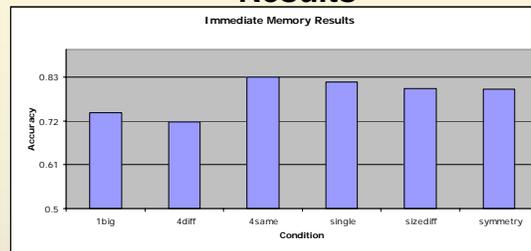
One large face is split into 4 quadrants. It is shown once for 2 sec.

Condition 6: Size-Diff



One identity is altered into four different sizes. The display is presented once for 2 sec.

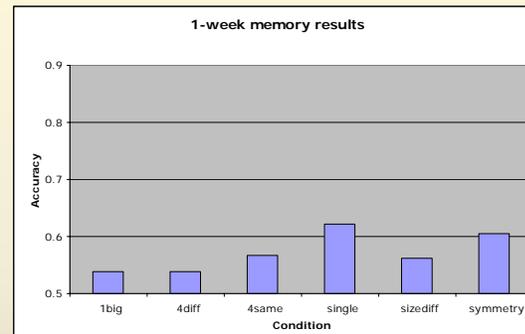
Results



Accuracy of immediate memory: 4-different < the other conditions.

→ Different faces compete for neural representation, degrading immediate memory performance

1-week memory results



Accuracy of long-term memory: 4-different is still lower than the other conditions, but the advantage in the 4-same condition (compared with single) is absent (or reversed).

Analysis and Conclusion

Immediate memory: Highest for 4 identical faces and lowest for 4 different faces, consistent with the brain imaging data. Presenting different faces lead to neural competition, reducing brain activity and impairing face memory.

Long-term memory: Highest for single faces and lowest for 4 different faces. More data are needed to confirm the statistical significance of these trends.

Take home message: To enhance visual perception and memory of objects (or faces), avoid presenting multiple different objects simultaneously.

Our brain is limited in its capacity in handling multiple different objects.



Acknowledgement and References

I would like to thank Yuhong Jiang for her attentive support and help, UROP for the opportunity to explore, Jiang Lab members for their assistance in the process of data gathering
 1 Shim, W.M., Jiang, Y. V., Kanwisher, N. (2008). Types and tokens in the ventral visual pathway: The neural representation of multiple visual objects. *Journal of Vision*, 8(6): 66, 66a.