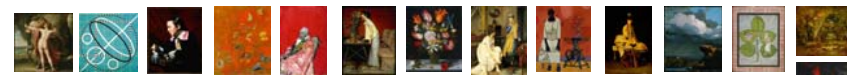


This is Your Brain on Art



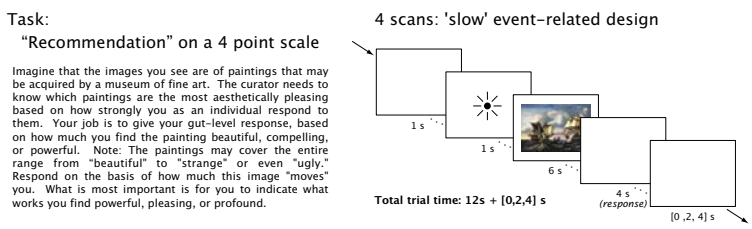
Edward A. Vessel¹, Nava Rubin¹ & G. Gabrielle Starr²
¹Neural Science & ²English Department, New York University

What happens in your brain when you have a pleasurable aesthetic experience?

What is an "aesthetic" experience?

- Simple "preference" vs. aesthetic reaction: Can a distinction be made?
- What is the role of subcortical reward circuits?
- What is the role of emotional systems?
- To what extent is an aesthetic reaction mediated by specific emotional responses?

Experimental Design

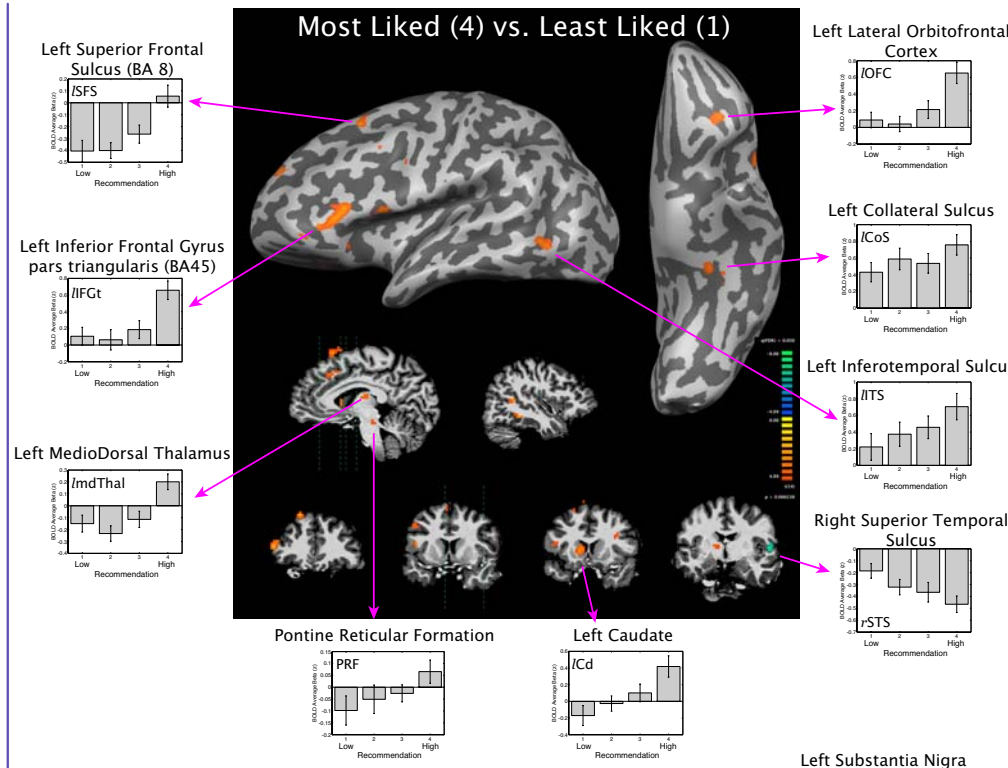


- Stimuli
- 109 paintings from CAMIO database (Catalog Of Art Museum Images Online)
 - Did not use images by famous artists or which are commonly reproduced
 - Size scaling:
 - Max dimension scaled to fit in 20"
 - Area scaled to not exceed 75% of a 20" box
 - Variety of cultures & historical periods
 - American, European, Indian, Japanese
 - 15th century to recent past
 - 6 (rough) categories:
 - Female figures (33), male figures (23), mixed group (20), still life (11), landscape (14), abstract (8)

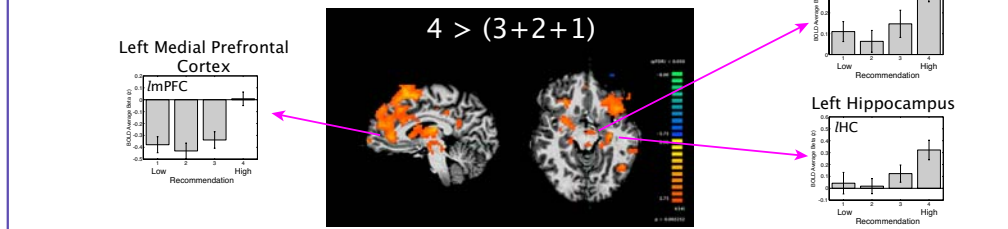
Post-fMRI Ratings (outside magnet):

- Subjects were shown images again in the lab and rated each image for the degree to which it brought about the following emotions:
- | Emotion | Rating Scale (1-4) |
|-----------|--------------------|
| Pleasure | 1 2 3 4 |
| Fear | 1 2 3 4 |
| Disgust | 1 2 3 4 |
| Sadness | 1 2 3 4 |
| Confusion | 1 2 3 4 |
| Awe | 1 2 3 4 |
| Joy | 1 2 3 4 |
| Sublime | 1 2 3 4 |
| Beauty | 1 2 3 4 |

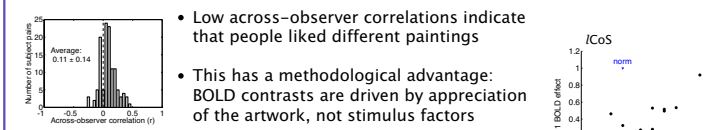
- Subjects
- 16 healthy adults (11 male, 13 rh, 27.6 ± 7.7 yrs)
 - Paid for participation
 - Mood: assessed before session using PANAS (Clark & Tellegen, 1988)
 - Art Expertise: assessed after session using a written questionnaire



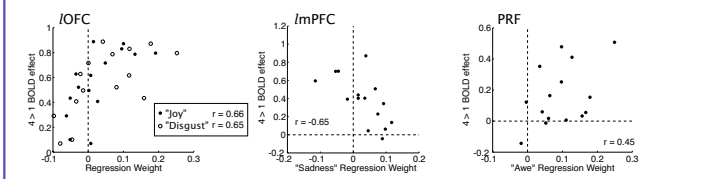
Is a recommendation of "4" categorically different?



Behavioral Results



Do specific brain regions reflect the influence of emotional factors on observers' aesthetic reactions?



Conclusions

- Activation in prefrontal and subcortical reward circuitry correlates with the strength of an aesthetic experience.
- The lmpFC (part of the default-mode network), as well as the lSFS and lmdThal, appear to be specifically activated by the most liked artworks, remaining below baseline for less liked art stimuli. This is different from what is seen in other regions correlated with aesthetic experience, where activity is graded or increases above baseline.
- Activation of the orbital and medial prefrontal cortices reflects the integration of emotional experience into an aesthetic reaction.
- Aesthetic evaluation recruits neural systems beyond those involved in simple preference decisions.
 - mPFC, ventral striatum, and post. hippocampus reflect preferences for abstract images (Vessel & Rubin, in prep)
 - OFC and nucleus accumbens reflect preferences for faces (Kim et al., 2007)
- Activation in high-level sensory association areas may also contribute to aesthetic reactions.

References

- Kim, H., Adolphs, R., O'Doherty, J.P., and Shimojo, S. (2007). Temporal isolation of neural processes underlying face preference decisions. *Proc. Natl. Acad. Sci. U. S. A.* 104, 18253-18258.
- Vessel, Edward A. & Rubin, Nava. (in prep) Preferences for novel abstract images are reflected in the activation of human reward networks.
- Watson, D., Clark, L.A., and Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: the PANAS scales. *Journal of Personality and Social Psychology* 54, 1063-1070.

