



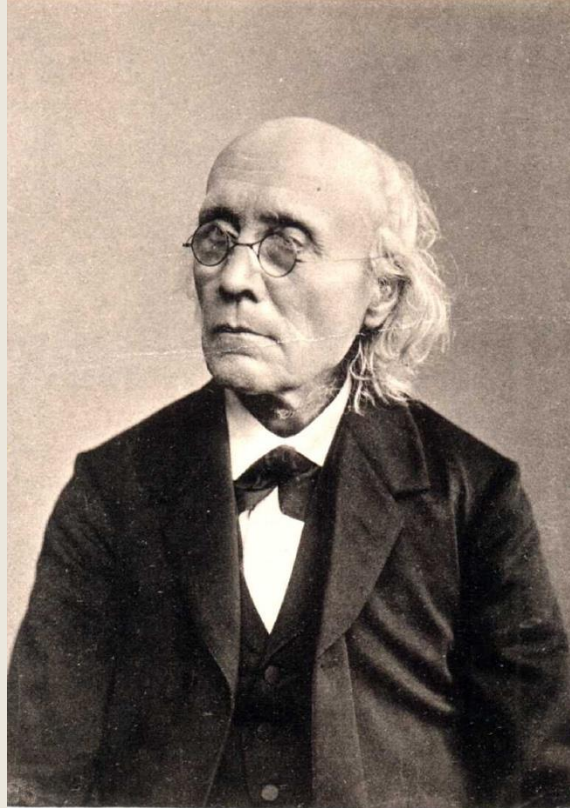
BRAIN AND ART: THE NEUROSCIENCE OF AESTHETIC APPRECIATION

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University of Toronto

Outline

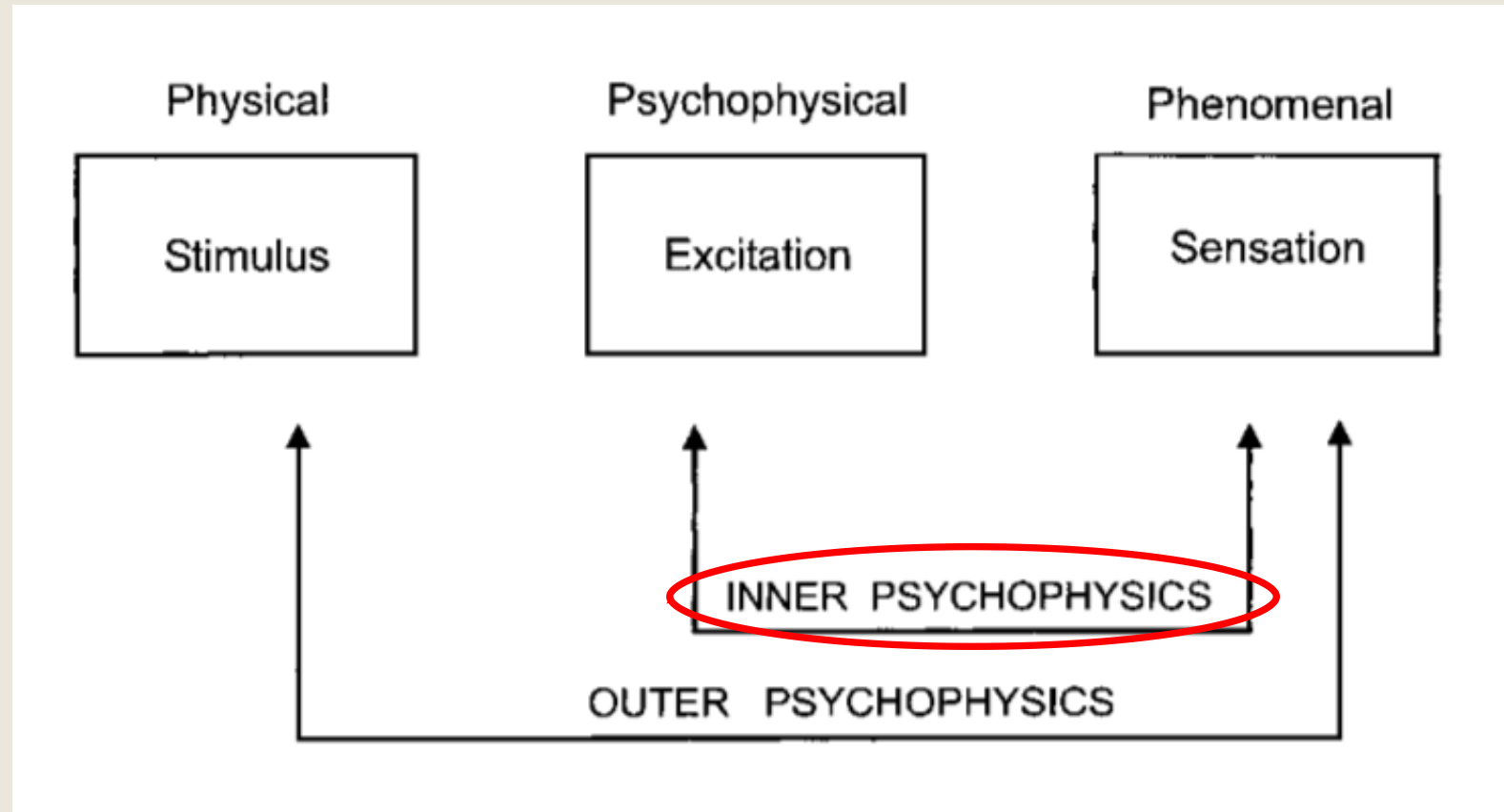
- Origins of empirical aesthetics,
 - *Neuroaesthetics.*
- The aesthetic triad:
 - *Rewards and emotions,*
 - *Sensation and perception,*
 - *Culture and experience.*
- Individual differences,
- Main conclusions.

Origins of empirical aesthetics

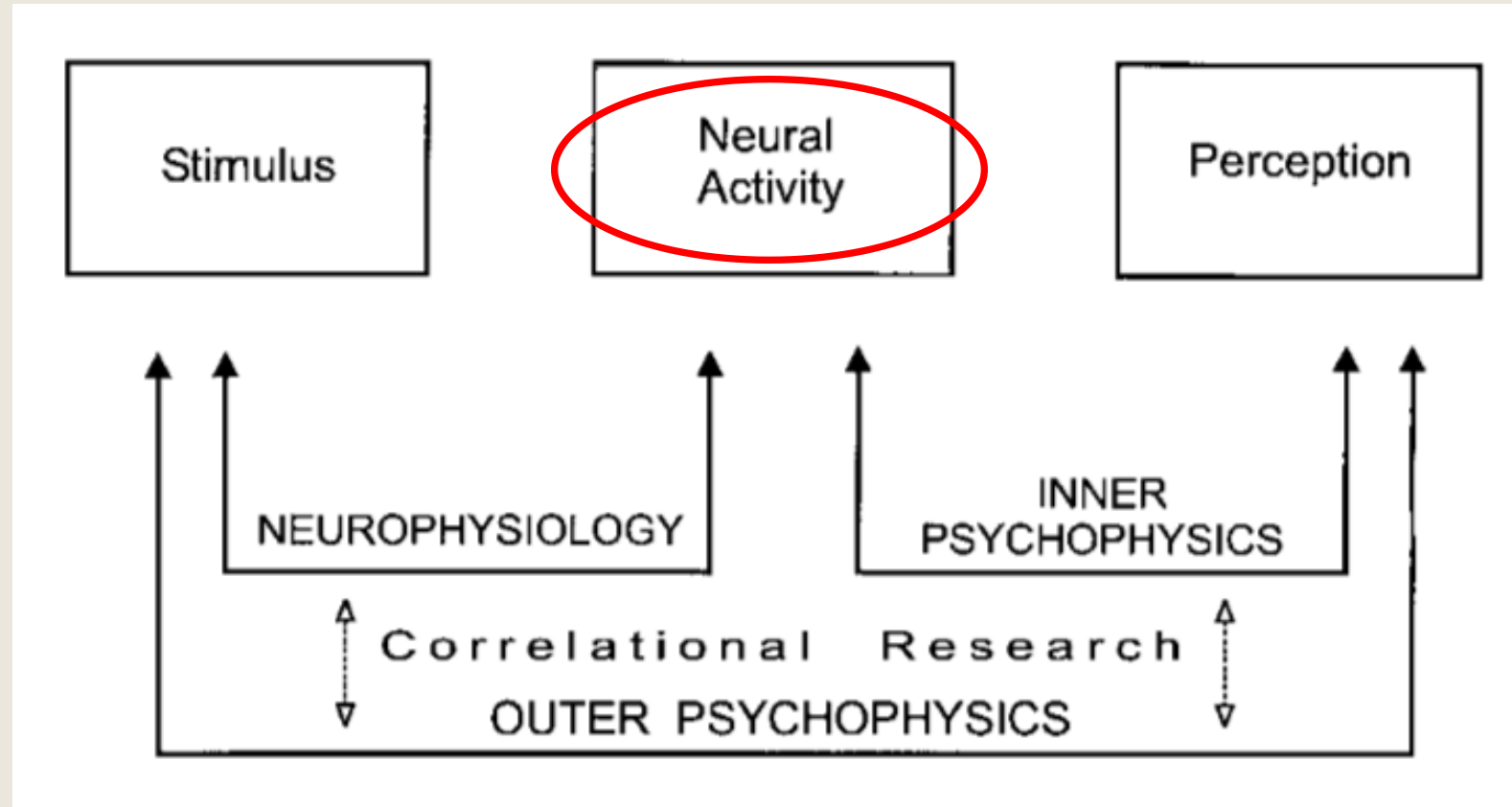


Gustav Theodor Fechner (1801-1887)

Fechner's psychophysics



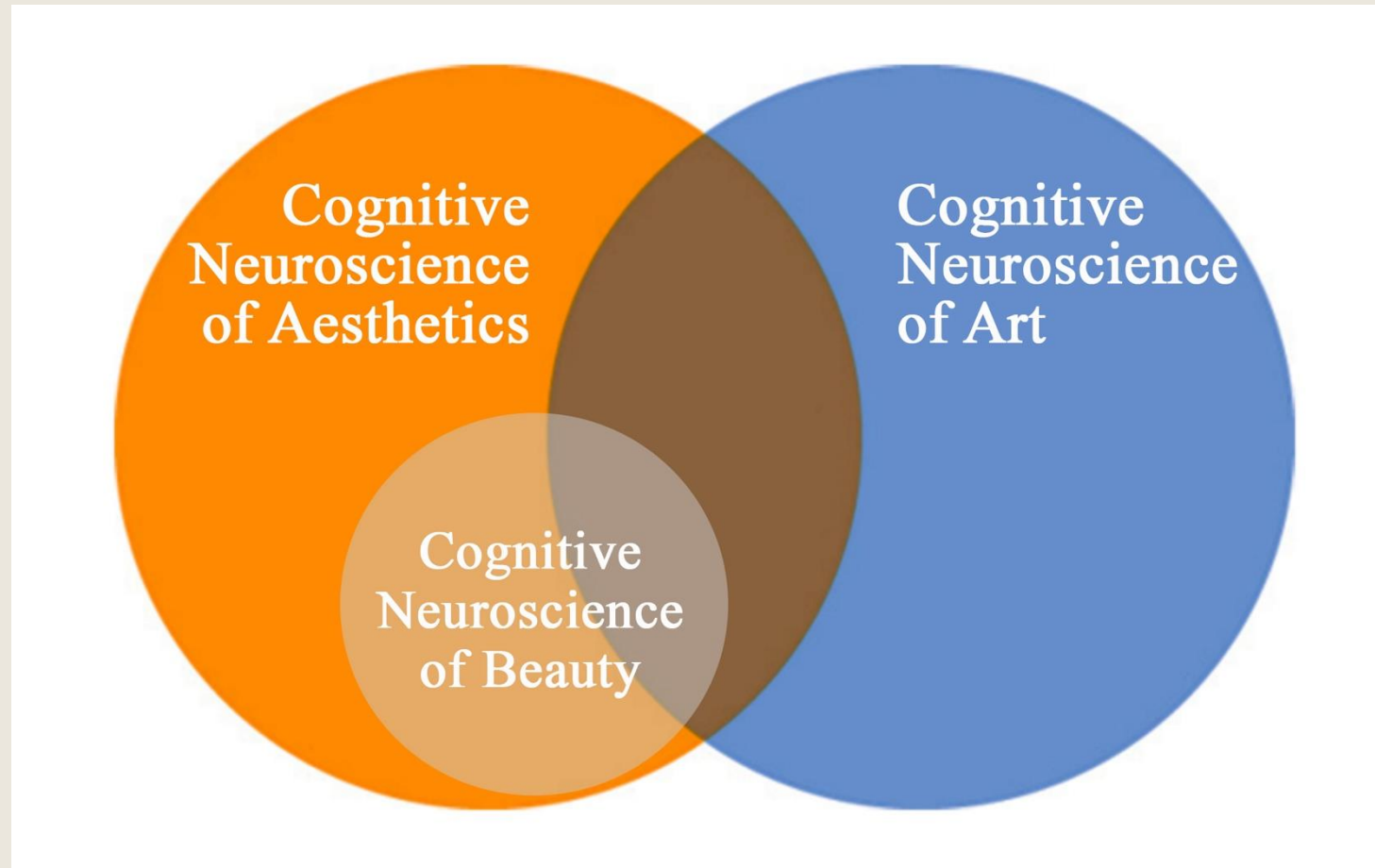
Fechner's psychophysics



What is neuroaesthetics?

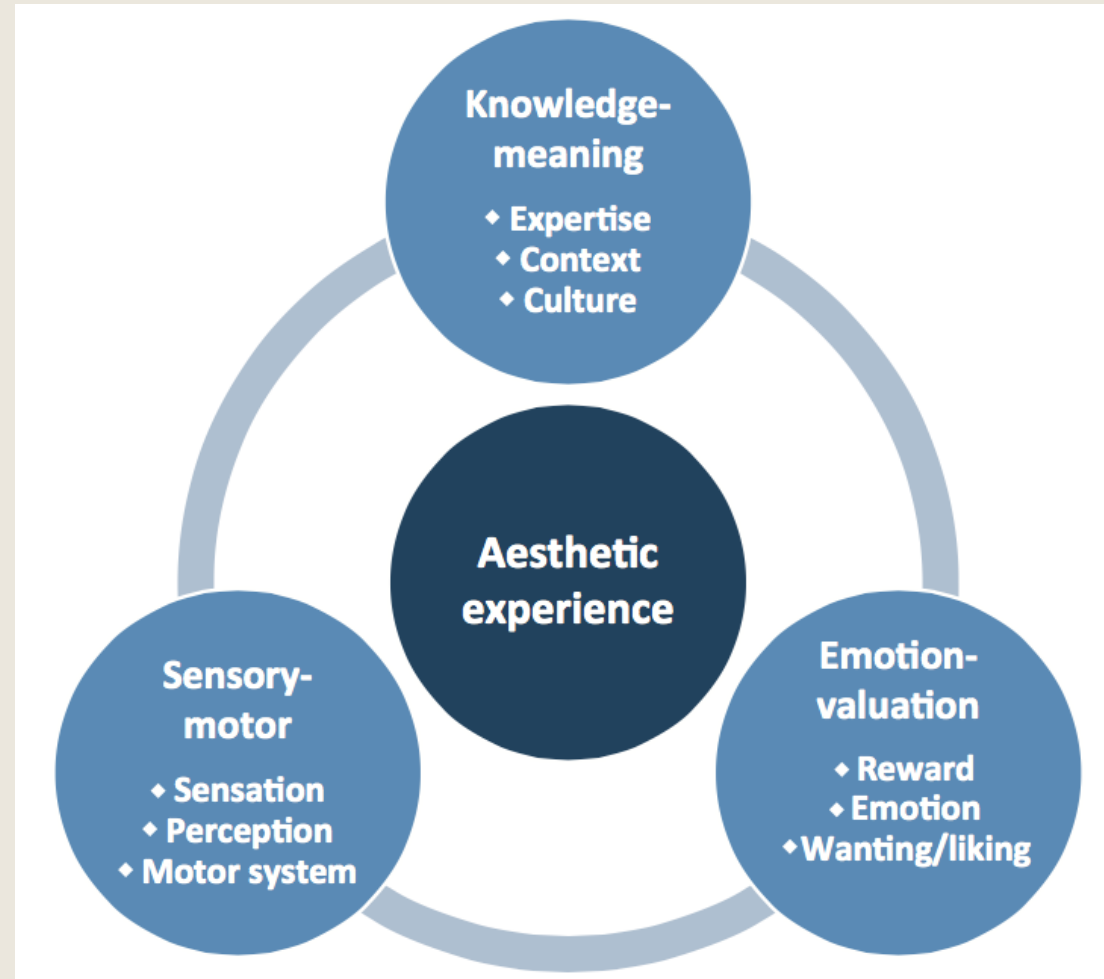
- **Neuroaesthetics** is a subfield of cognitive neuroscience concerned with understanding the neural bases of aesthetic experiences.
- **Aesthetic experiences** arise when we make *evaluative appraisals of objects*, including an implicit or explicit assessment of an object along an *Evaluation* dimension (i.e., good-bad).
- When you ask people what they associate with the term “aesthetics,” 90% respond with “**beauty**” (Jacobsen et al., 2004).

What is neuroaesthetics?



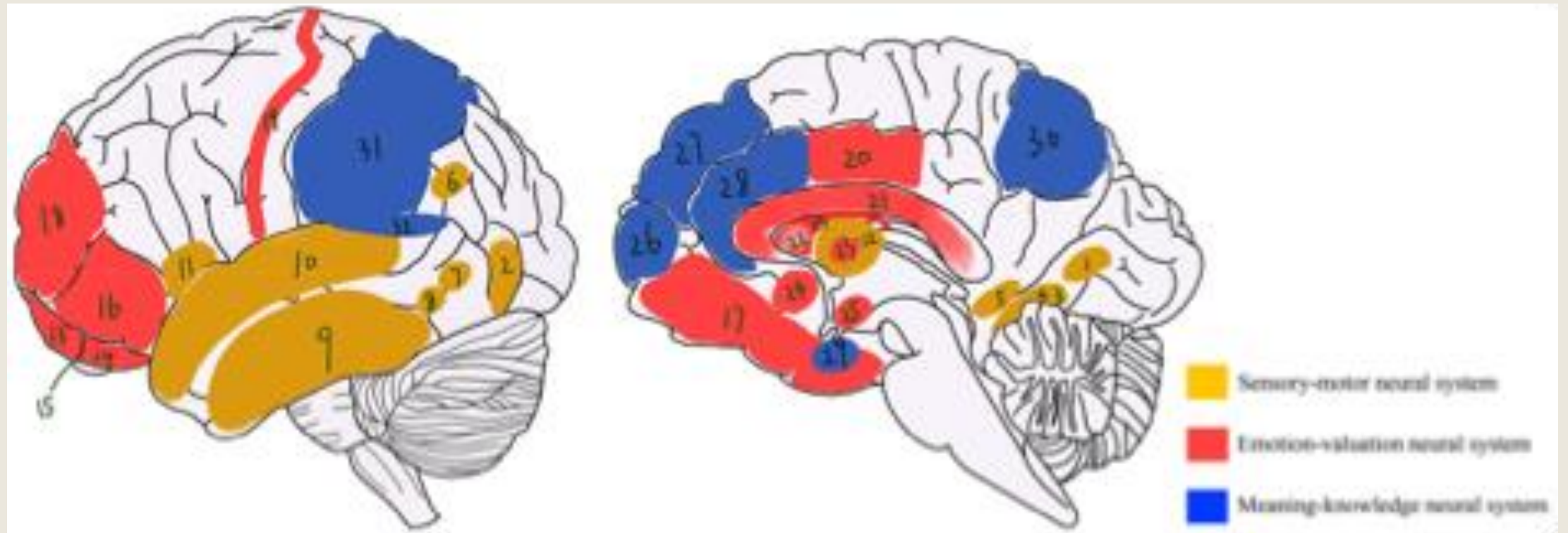
Pearce et al. (2016)

Aesthetic triad



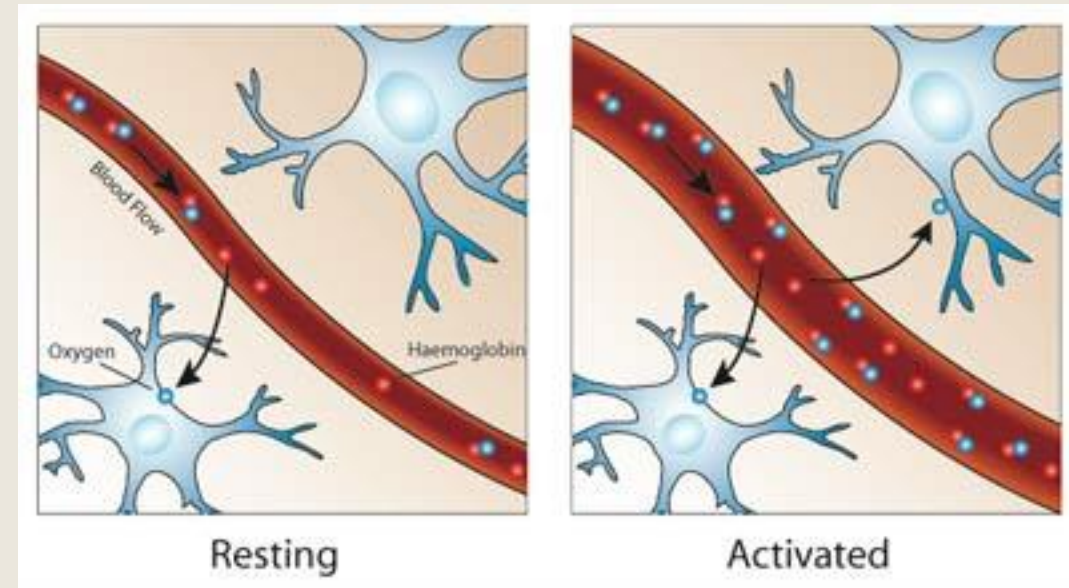
Chatterjee and Vartanian (2014)

Aesthetic triad



Li and Zhang (2020)

How does fMRI work?

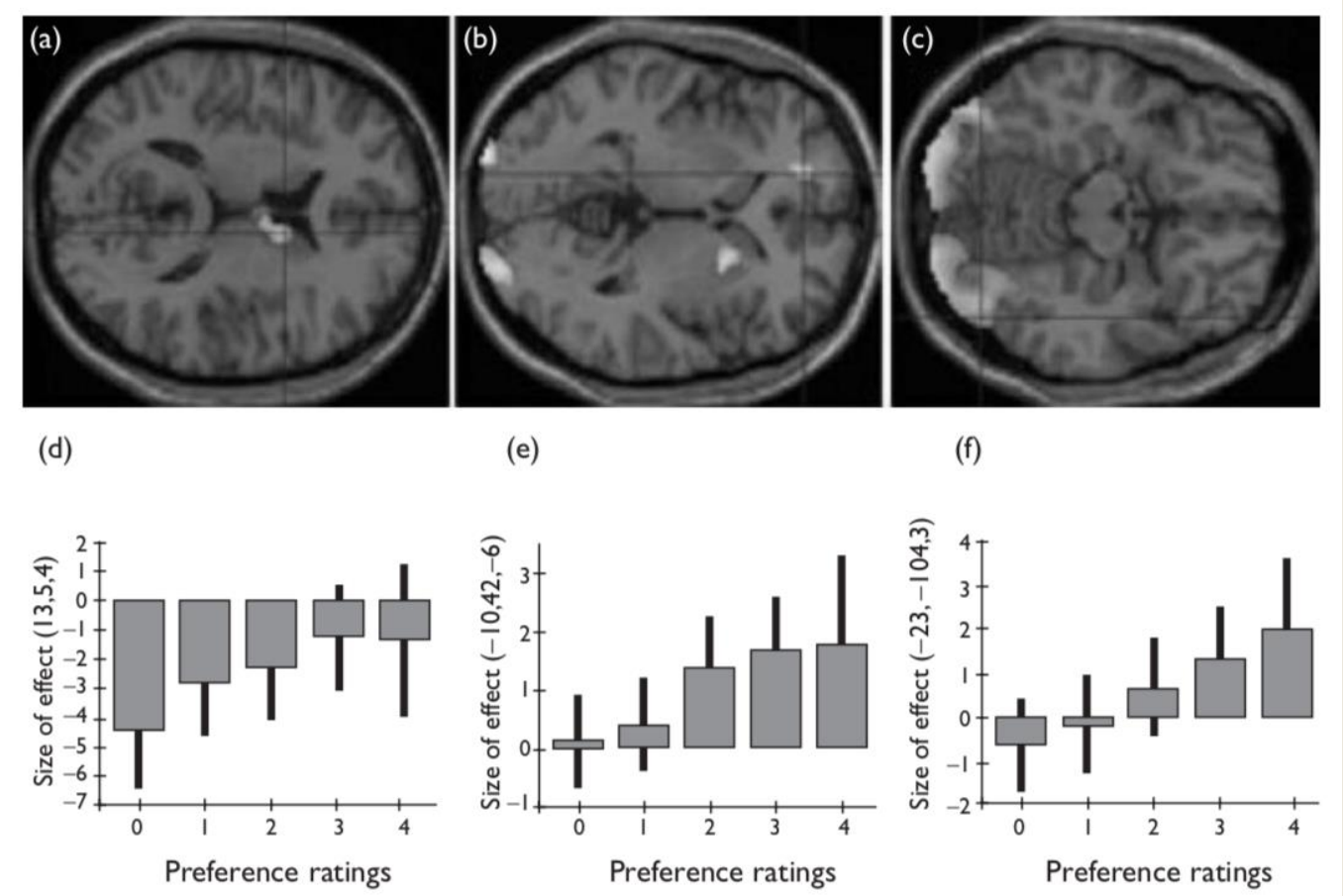


Emotion-Valuation System

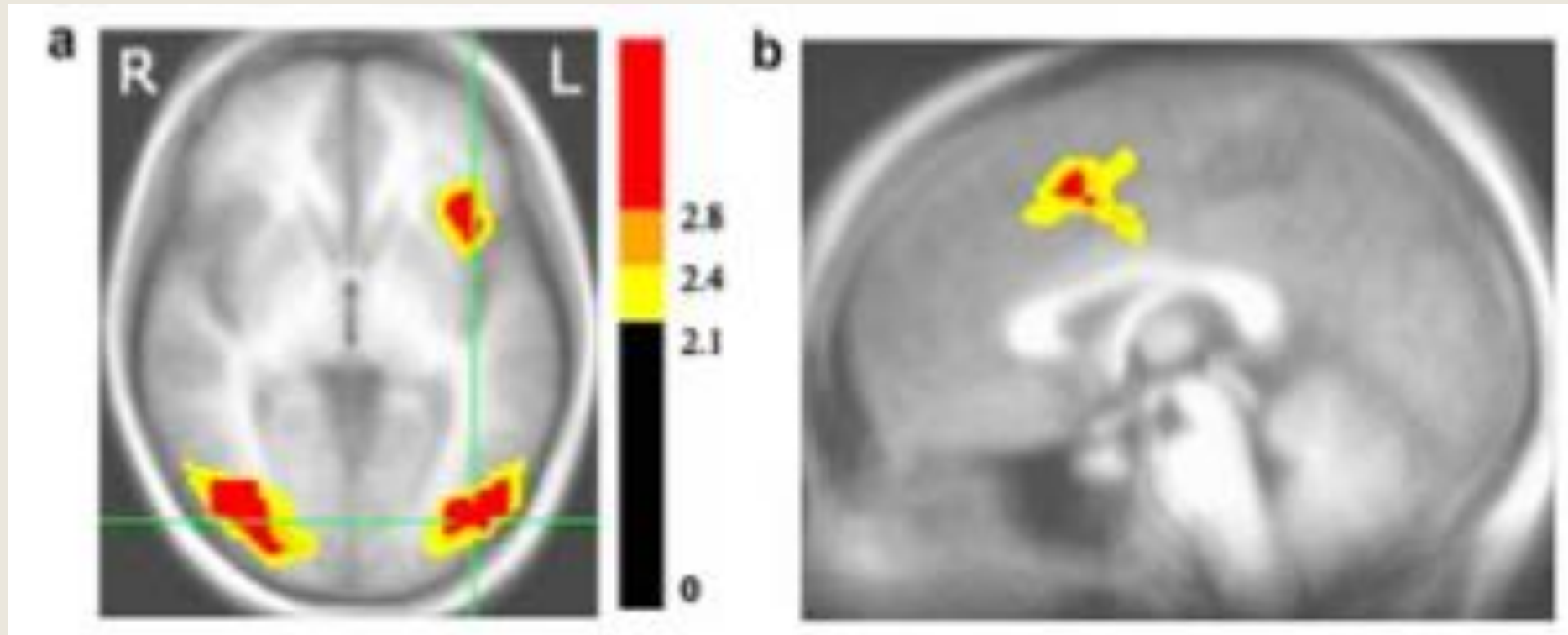
Aesthetic preference for visual art



Aesthetic preference for visual art



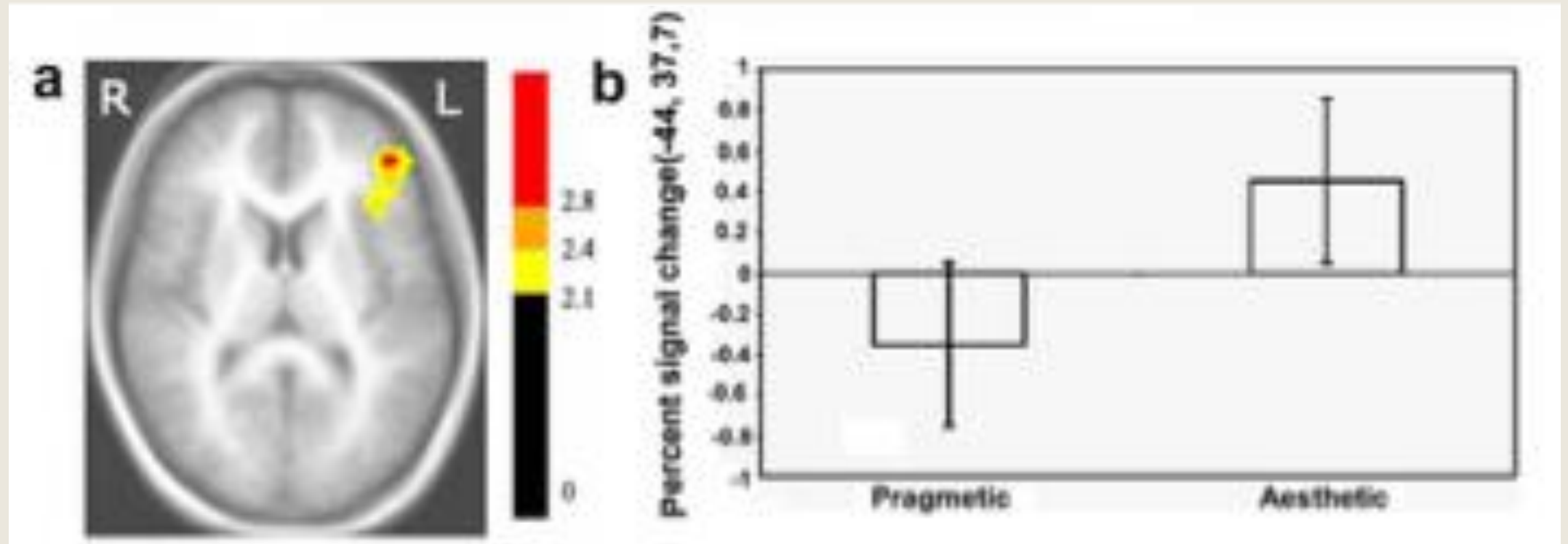
Aesthetic vs. pragmatic orientation



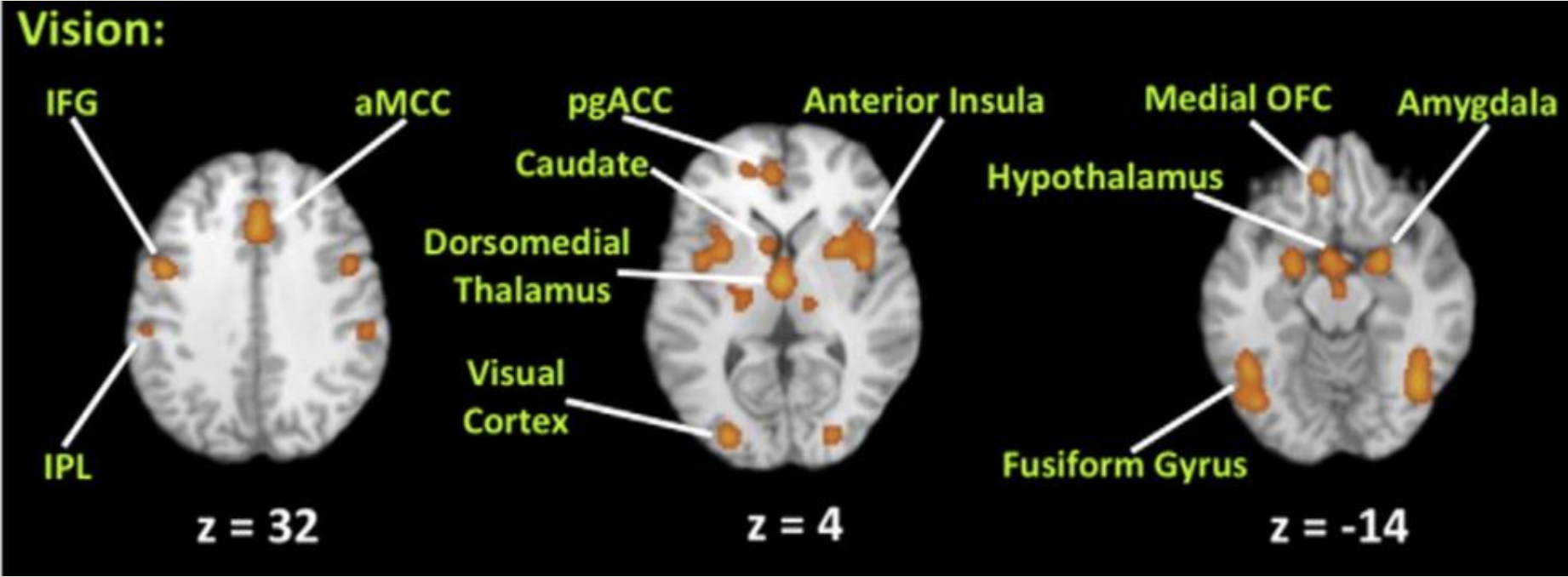
Aesthetic

Pragmatic

Aesthetic vs. pragmatic orientation

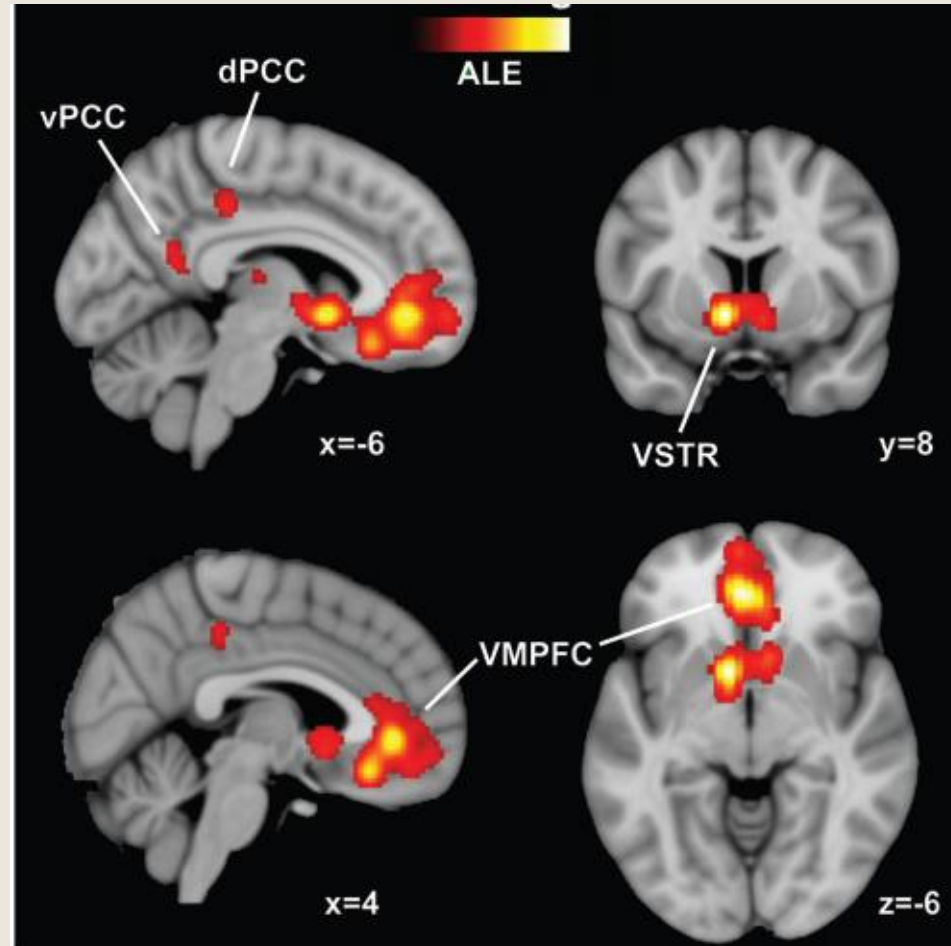


Aesthetic evaluation in the visual domain



Brain's reward system

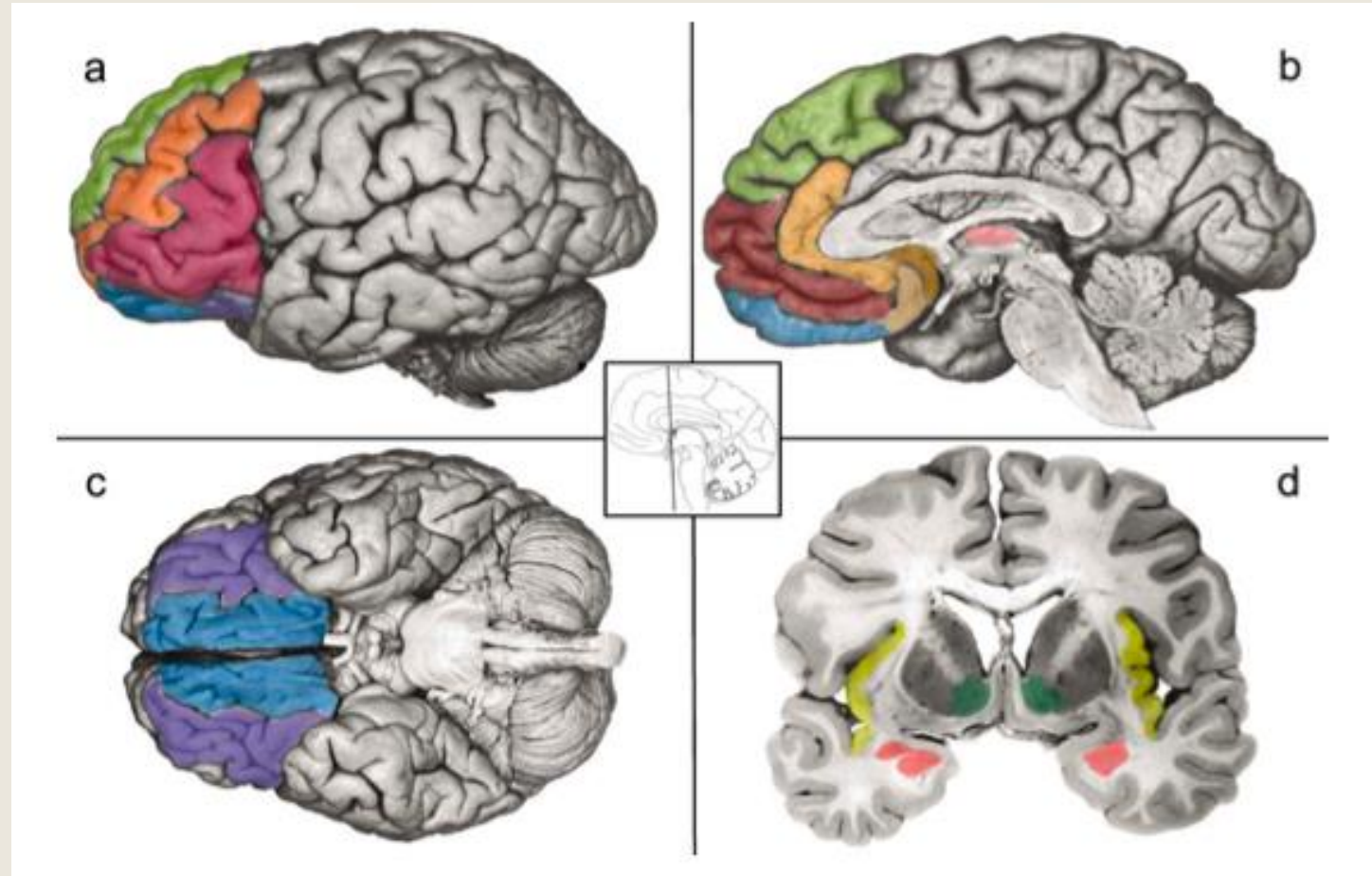
“Common
currency”
hypothesis



Clithero & Rangel (2014)

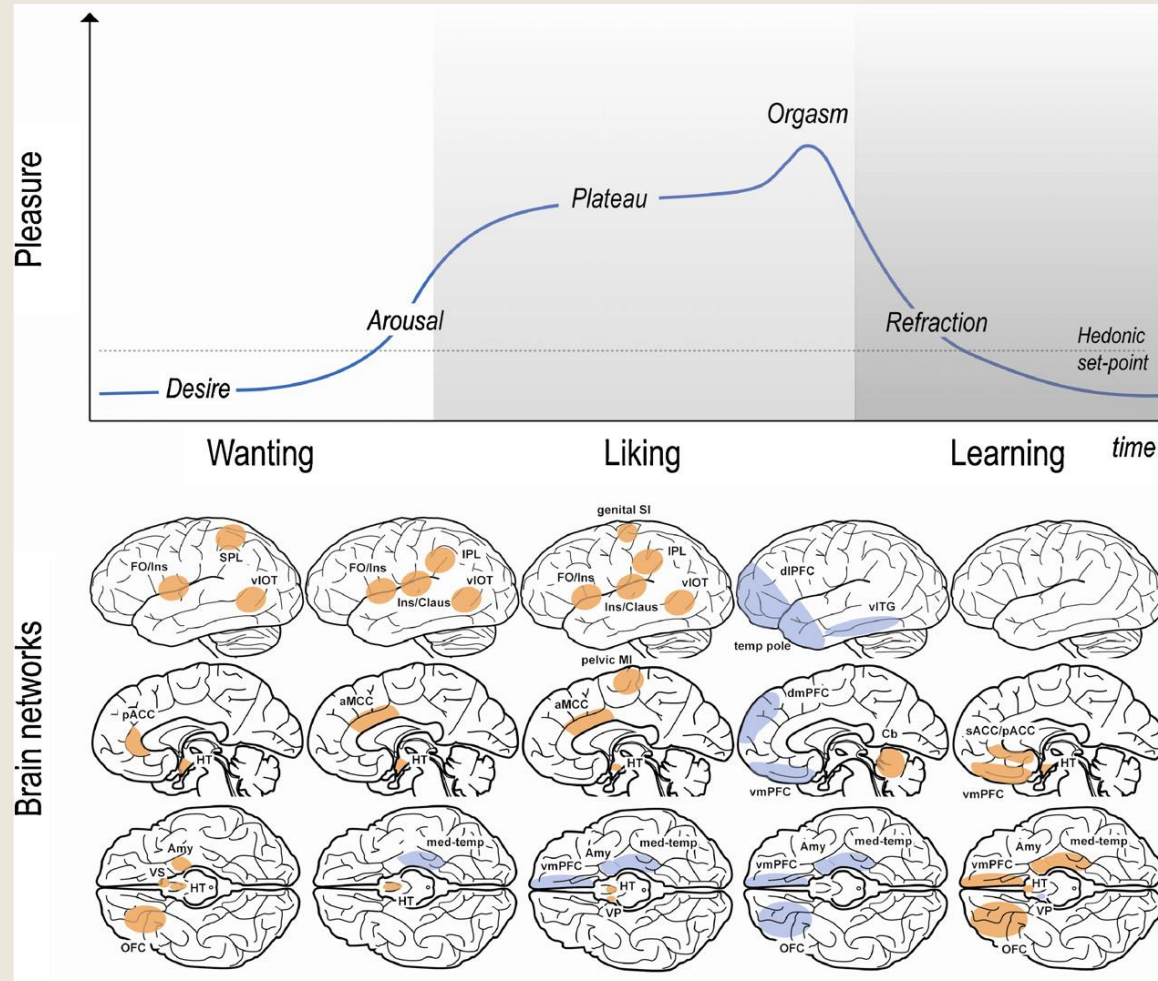
Brain's emotion system

“Core affect”



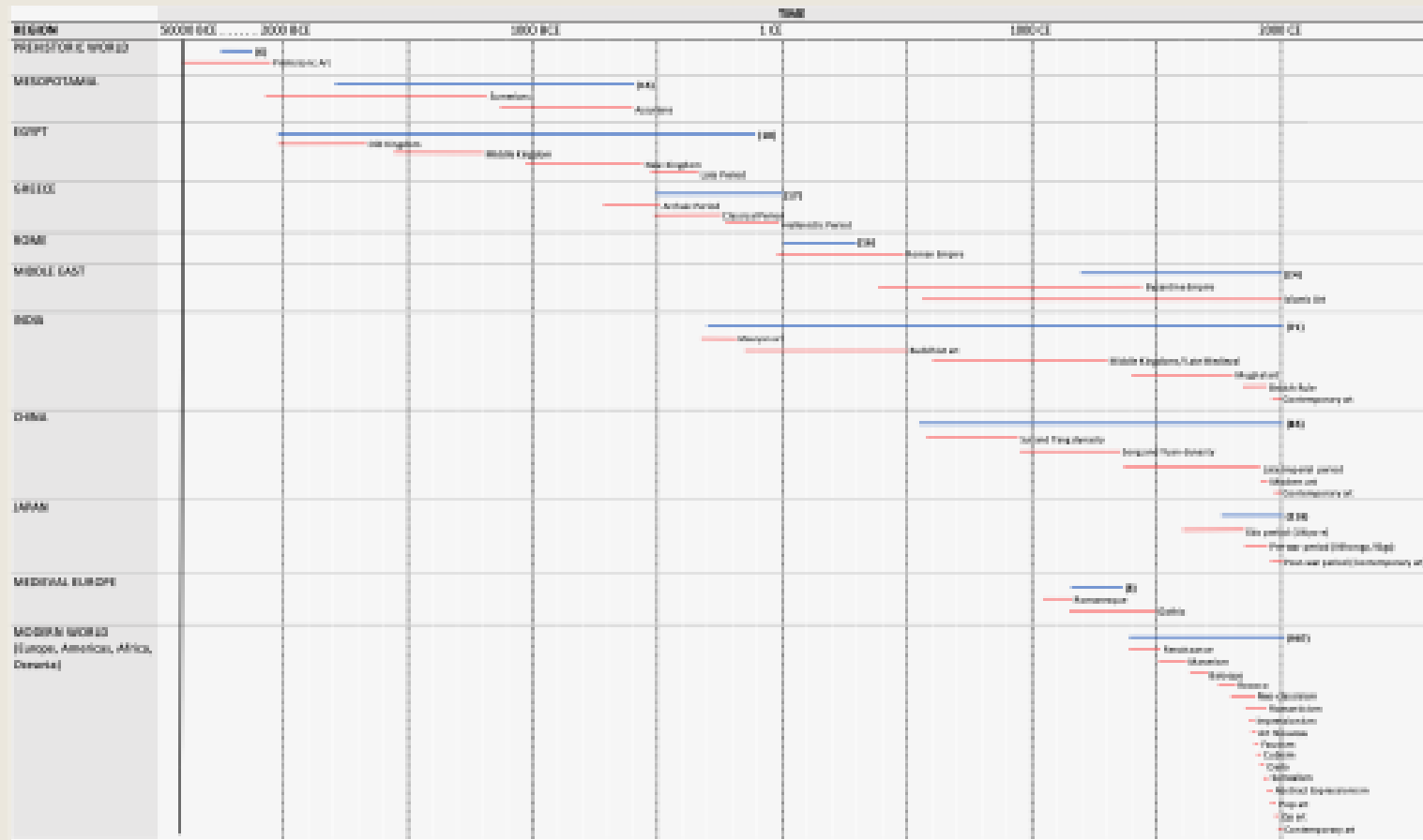
Barrett et al. (2007)

Brain's pleasure cycle



see Skov (2019)

Complex emotions in relation to art

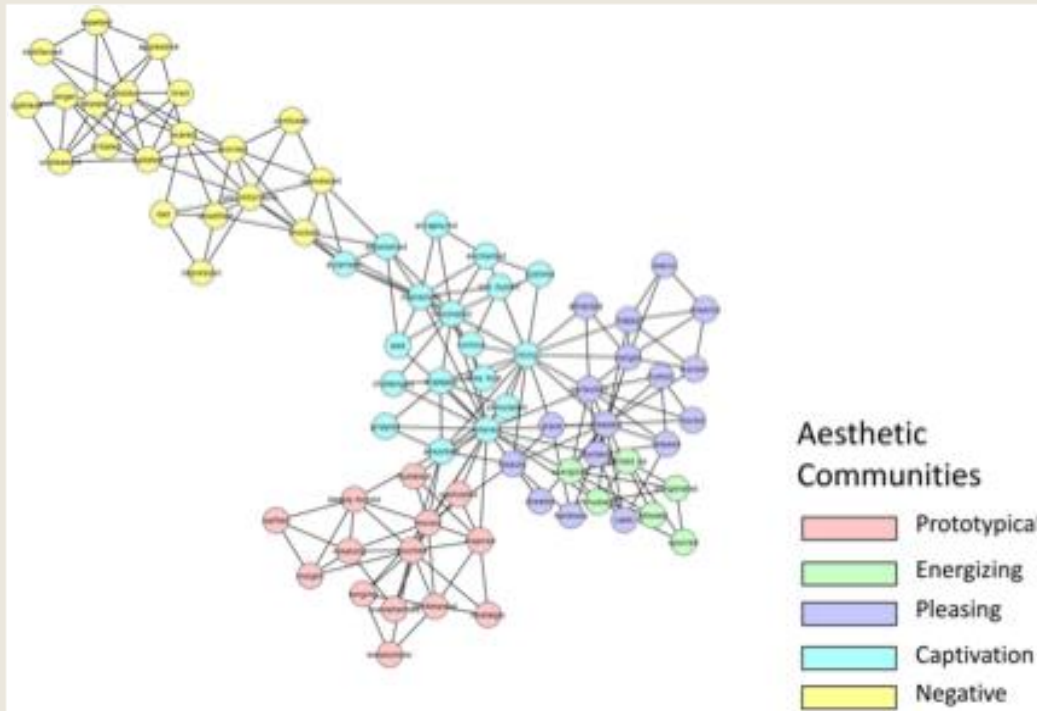


Complex emotions in relation to art

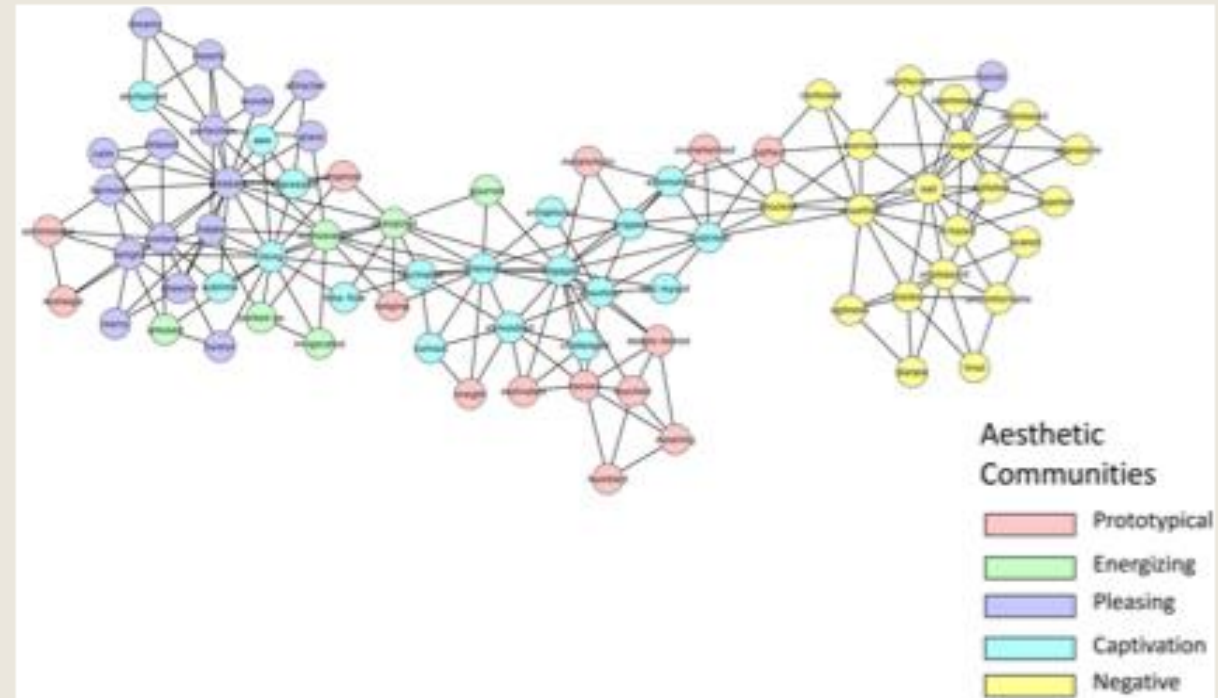


Stamkou et al. (2024)

Emotions in aesthetic vs. non-aesthetic contexts



Aesthetic



Non-Aesthetic

Kenett et al. (2023)

Sensory-motor System

Sensations and perceptions in art



Concetto Spaziale (Lucio Fontana)



Sensations and perceptions in art



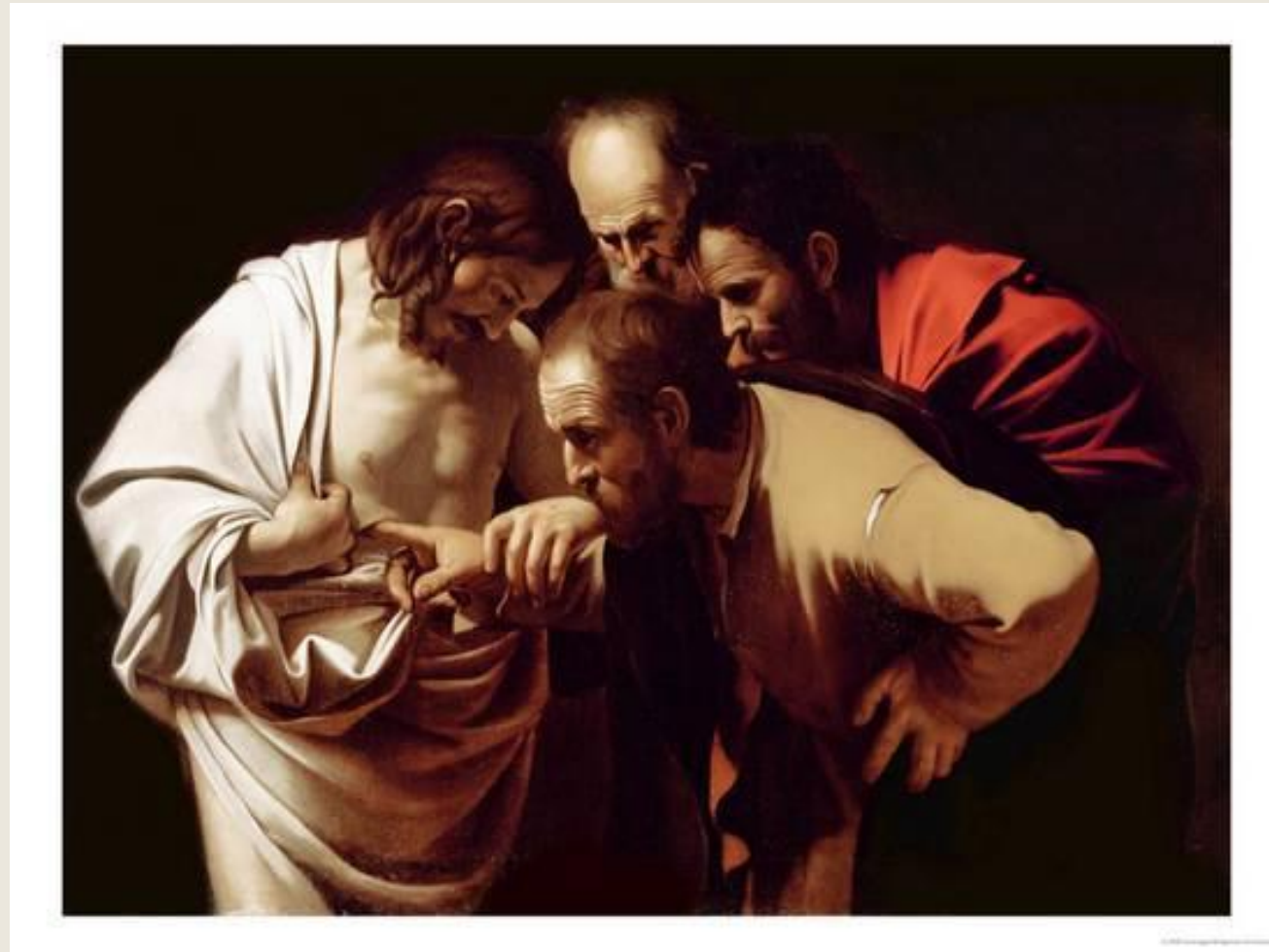
Starry night over the Rhone (Vincent Van Gogh)

Sensations and perceptions in art



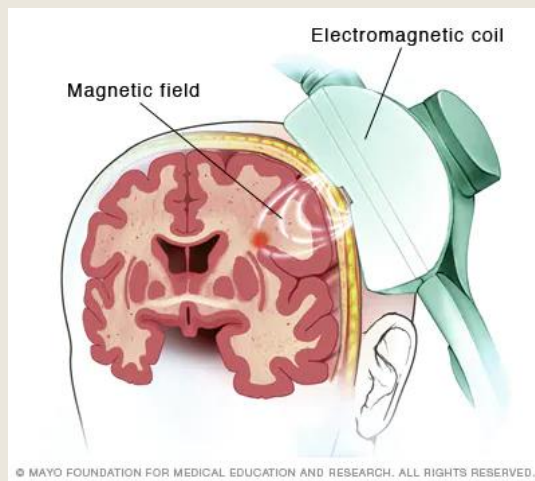
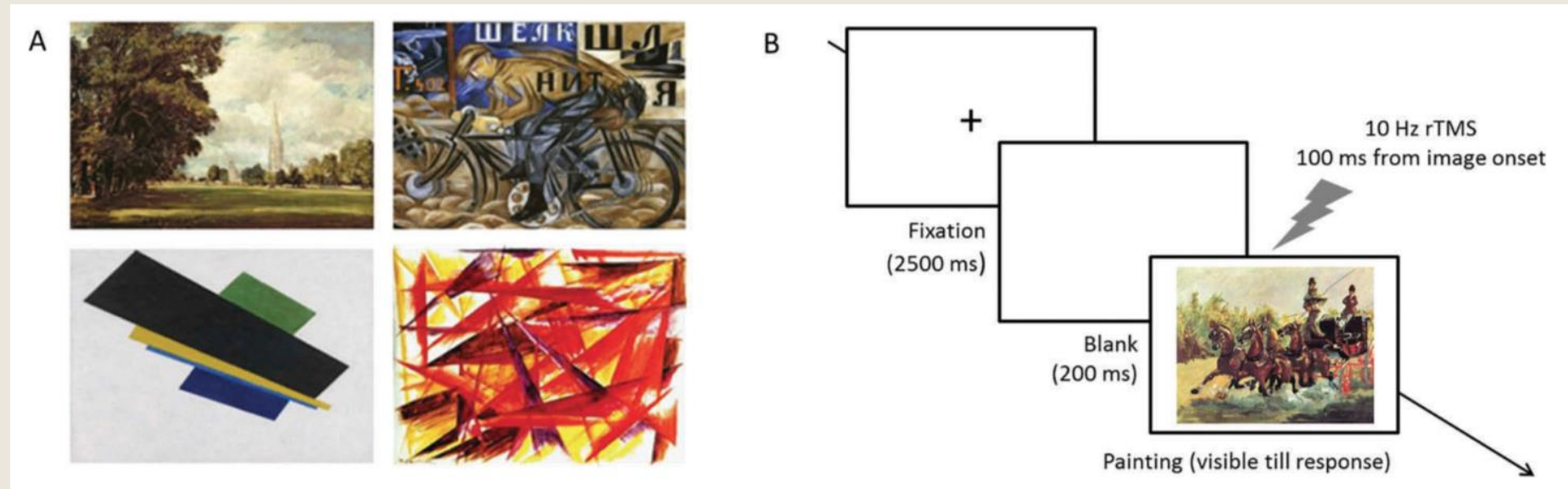
A Sunday afternoon on the island of La Grande Jatte (Georges Seurat)

Sensations and perceptions in art



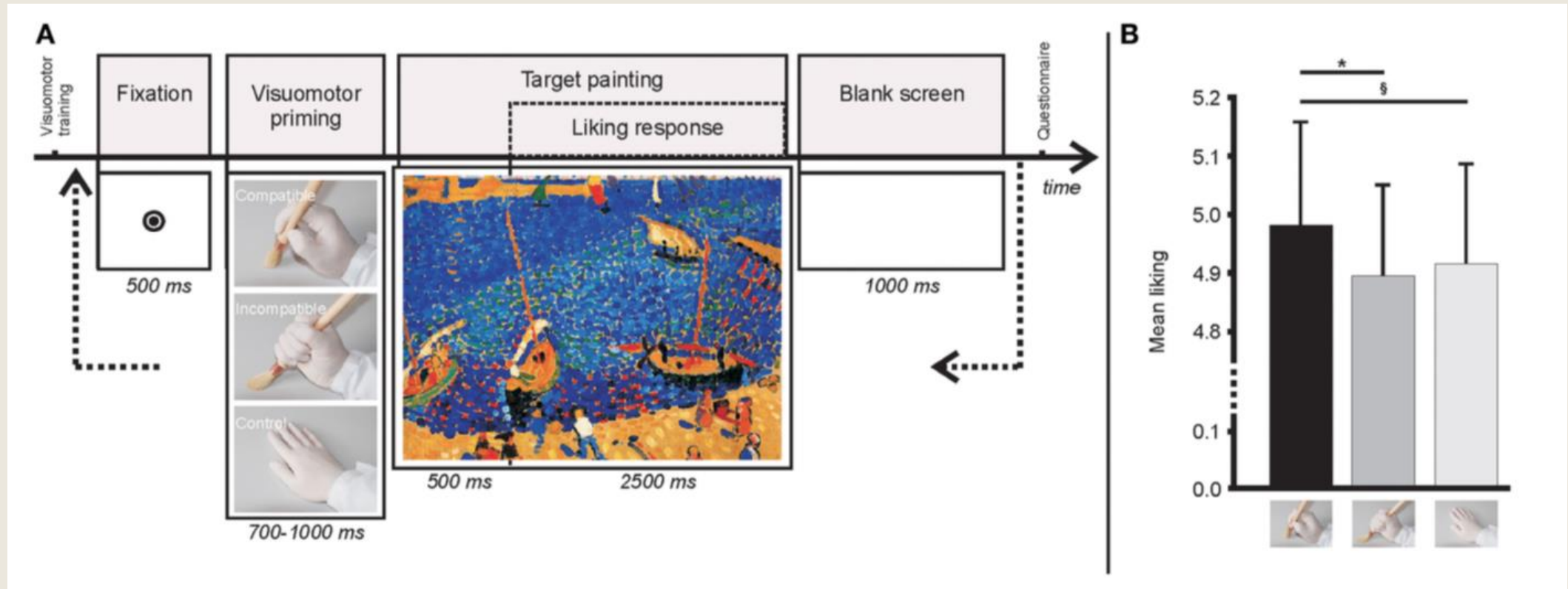
Incredulity of St. Thomas (Caravaggio)

Disrupting implied motion in art

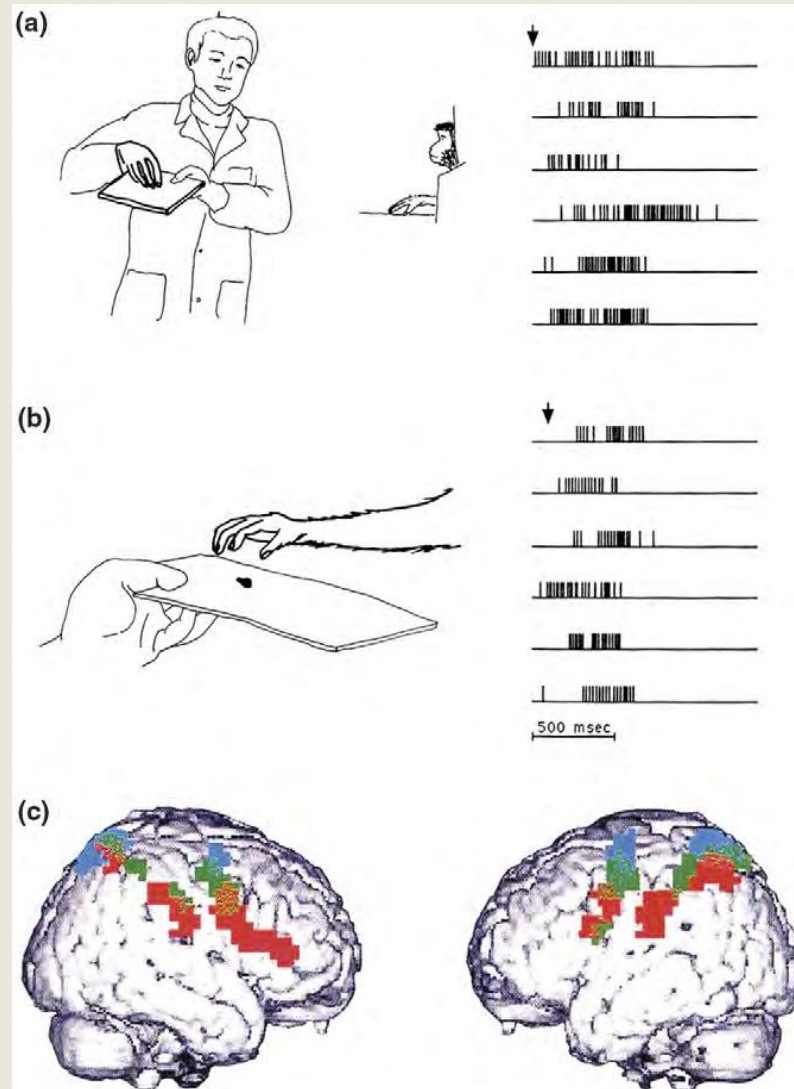


Cattaneo et al. (2017)

Priming actions in art



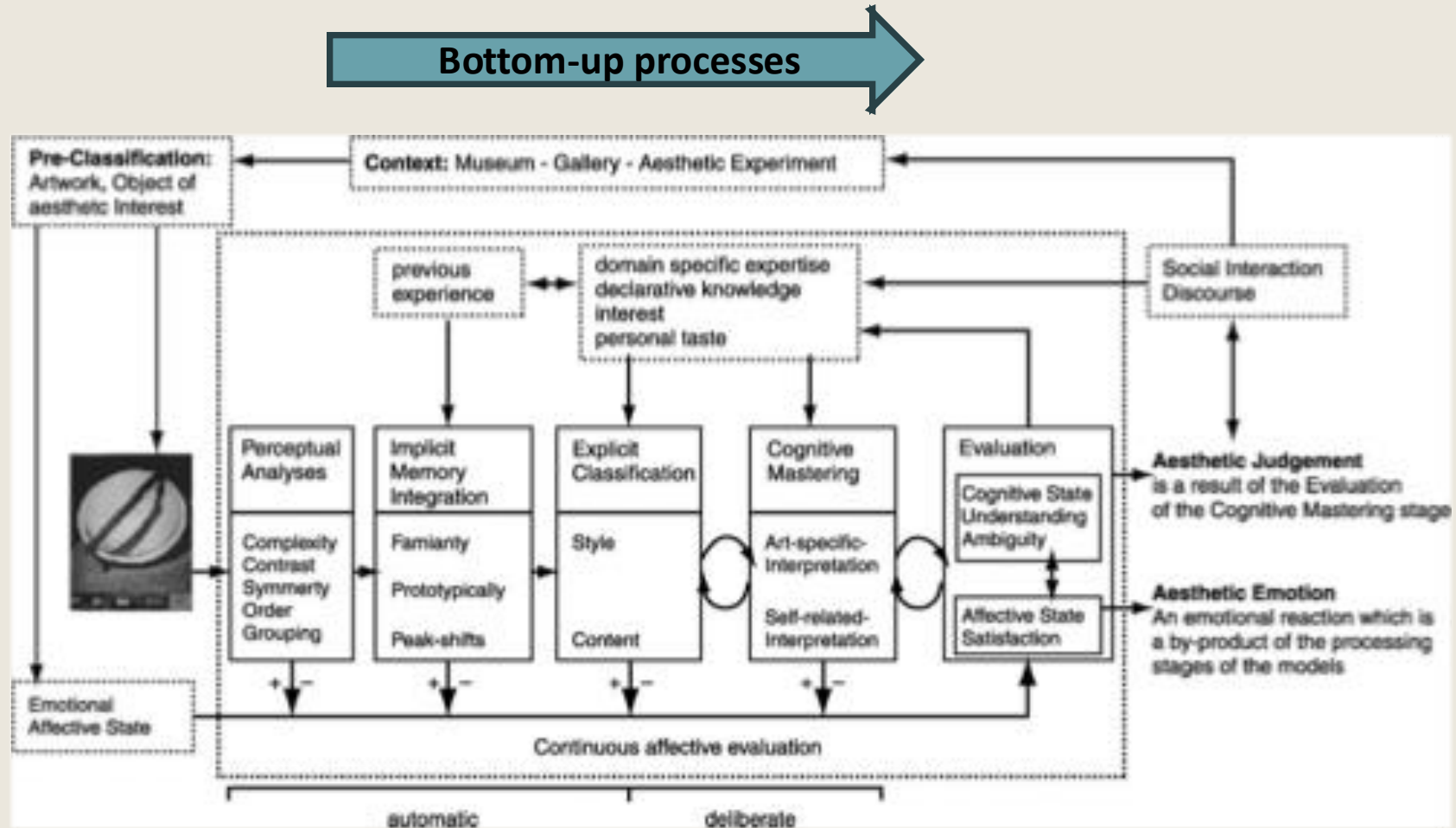
Mirror neurons and empathy in art



Freedberg & Gallese (2007)

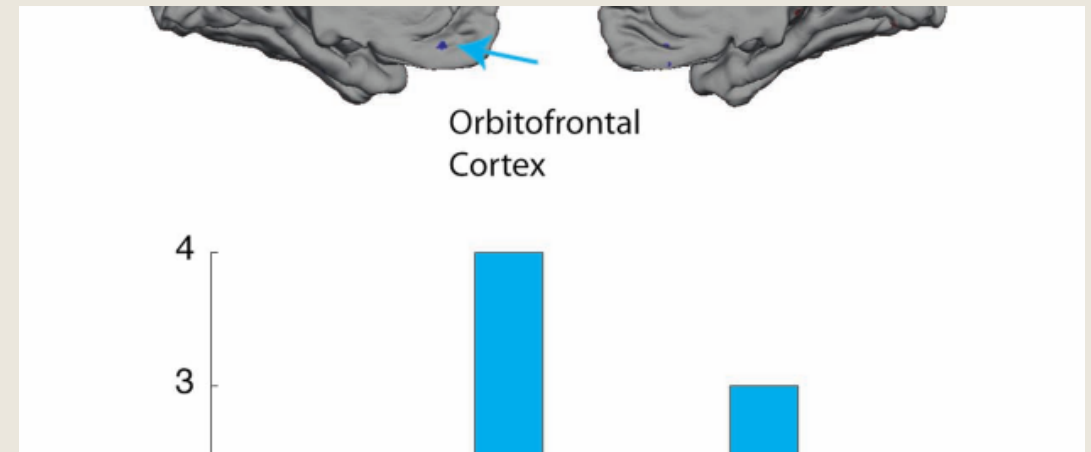
Knowledge-meaning System

Model of aesthetic experience



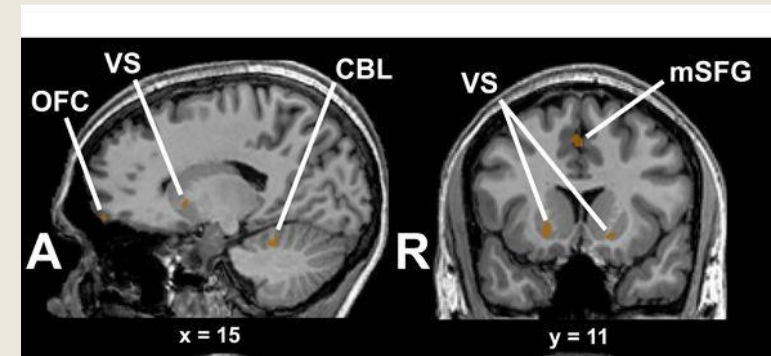
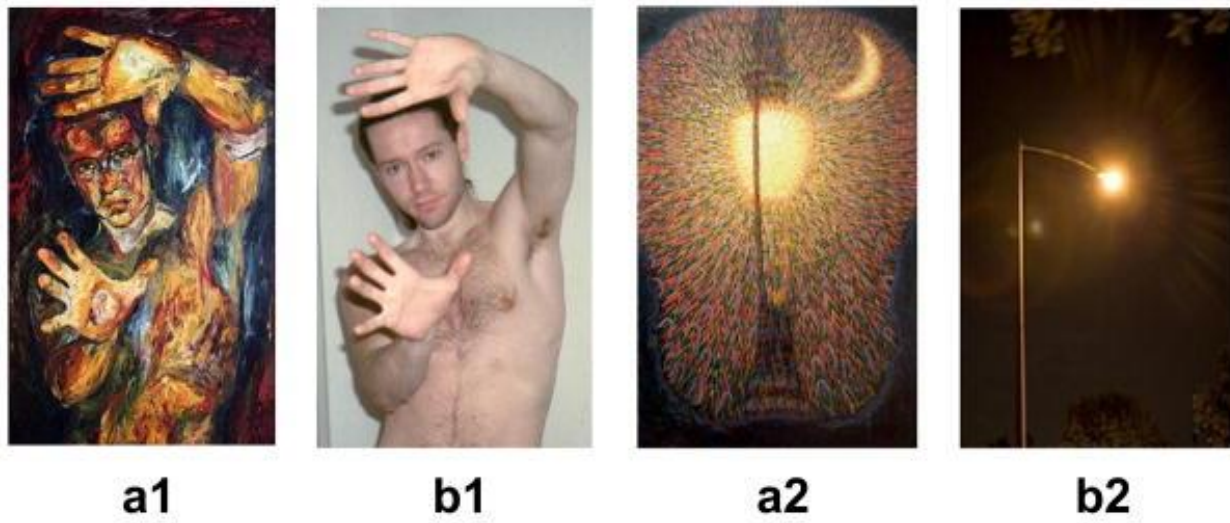
Leder et al. (2004)

Authenticity



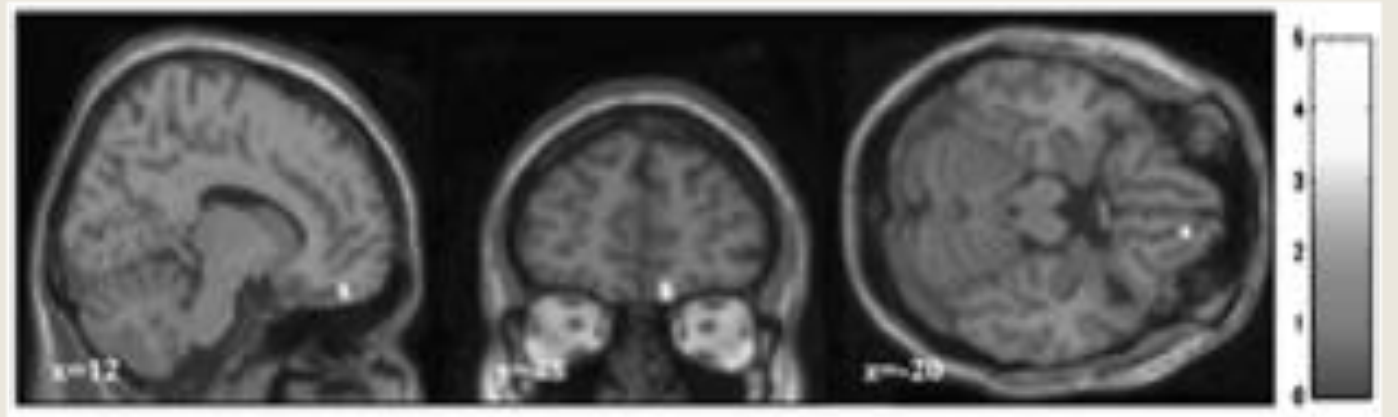
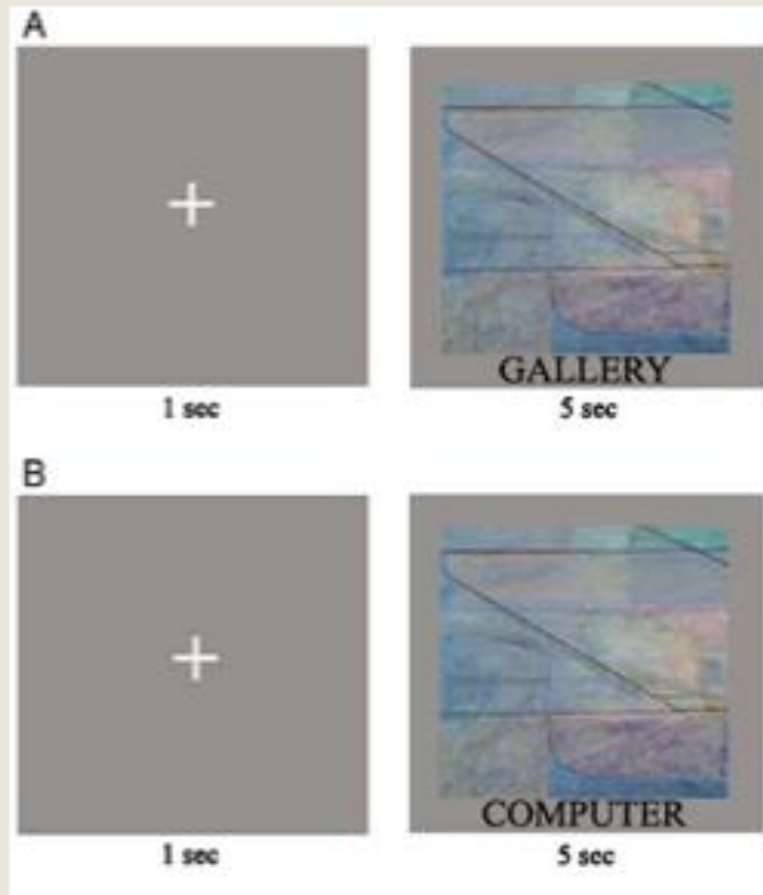
Huang et al. (2011)

Art vs. non-art



Lacey et al. (2011)

Artist- vs. computer-generated art



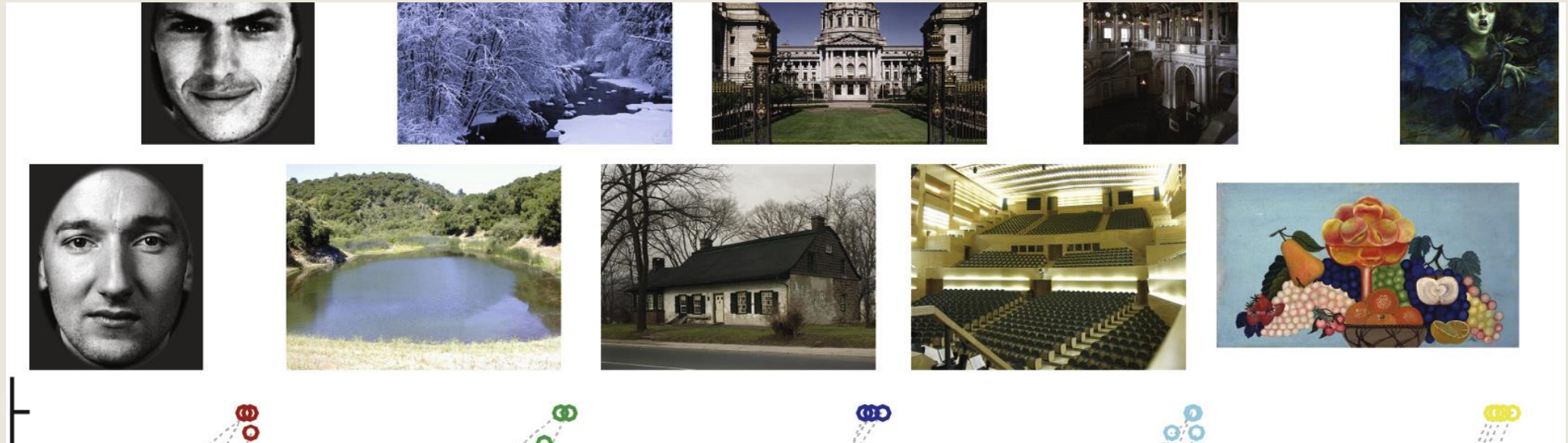
Kirk et al. (2009)

Ai-Da robot artist

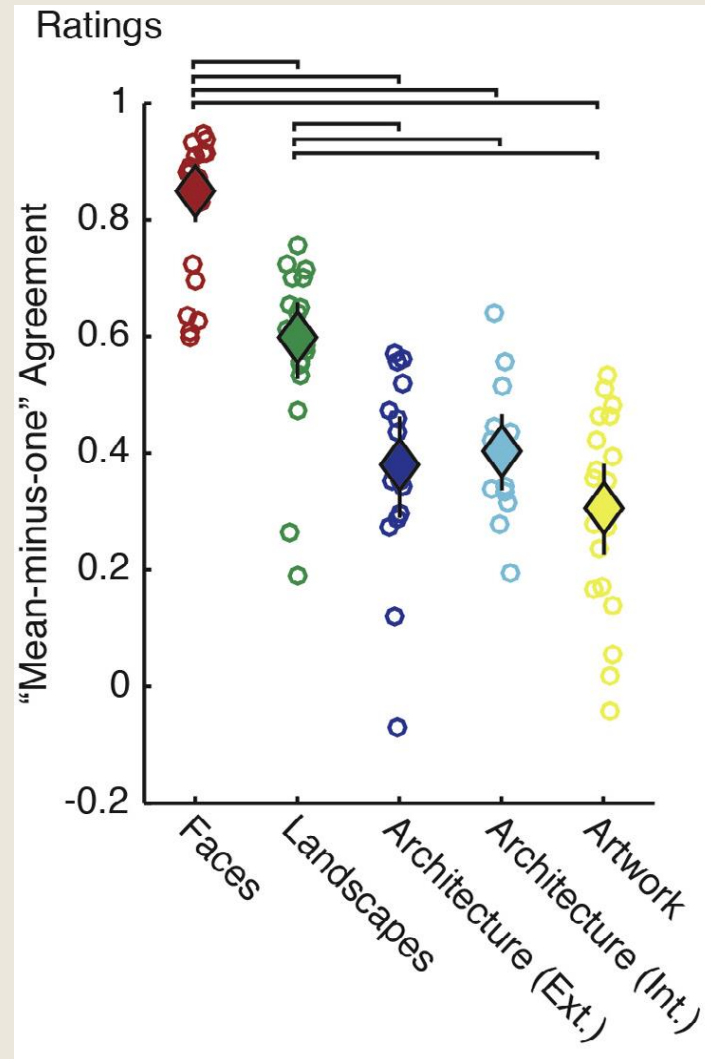


Individual differences

Individual differences



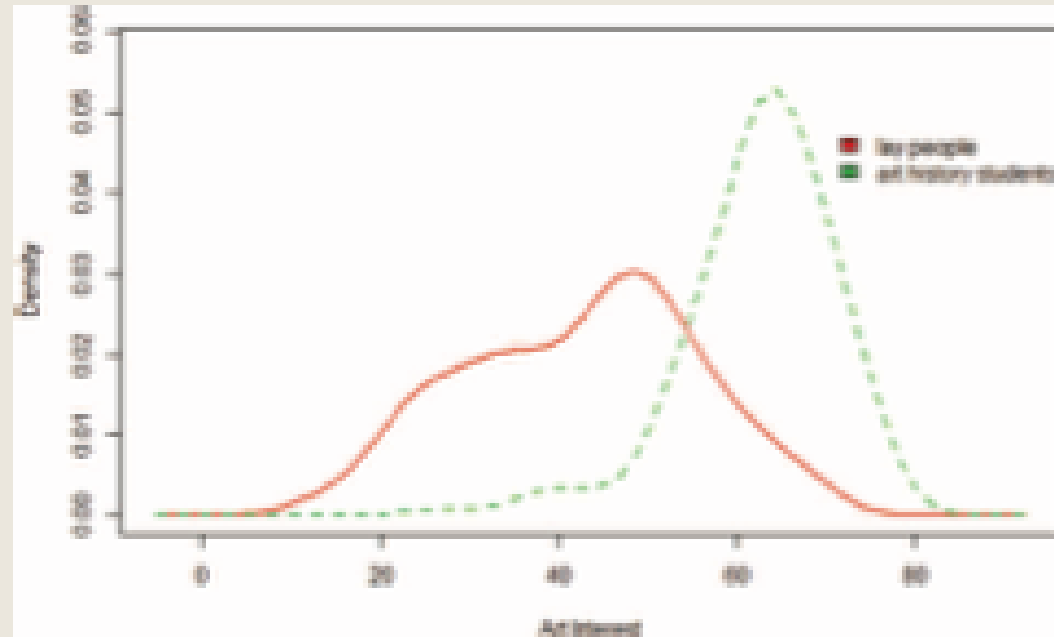
Individual differences



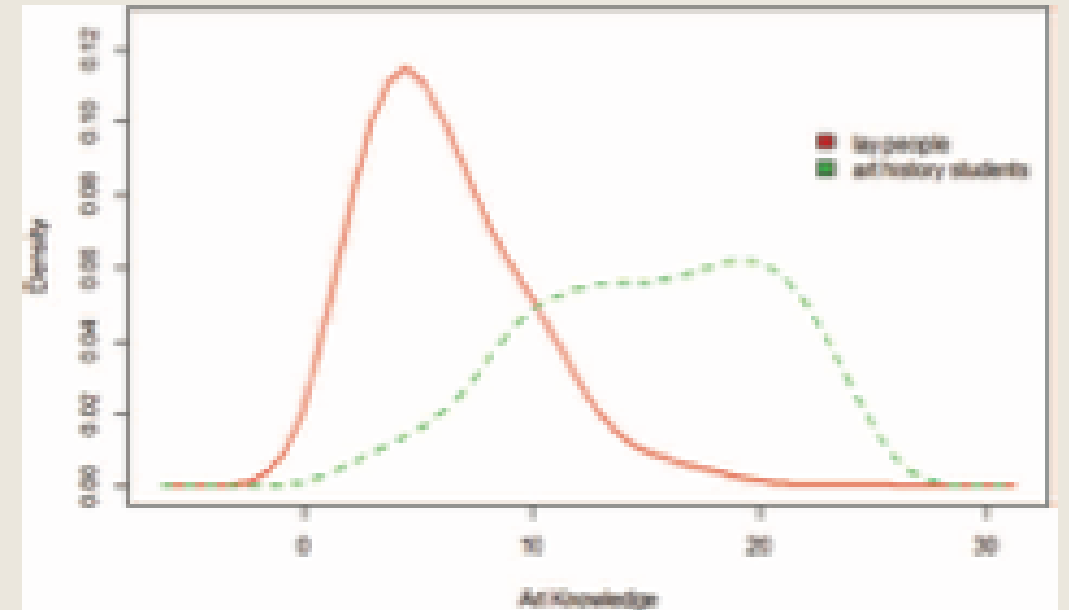
Vessel et al. (2018)

Art interest and art knowledge

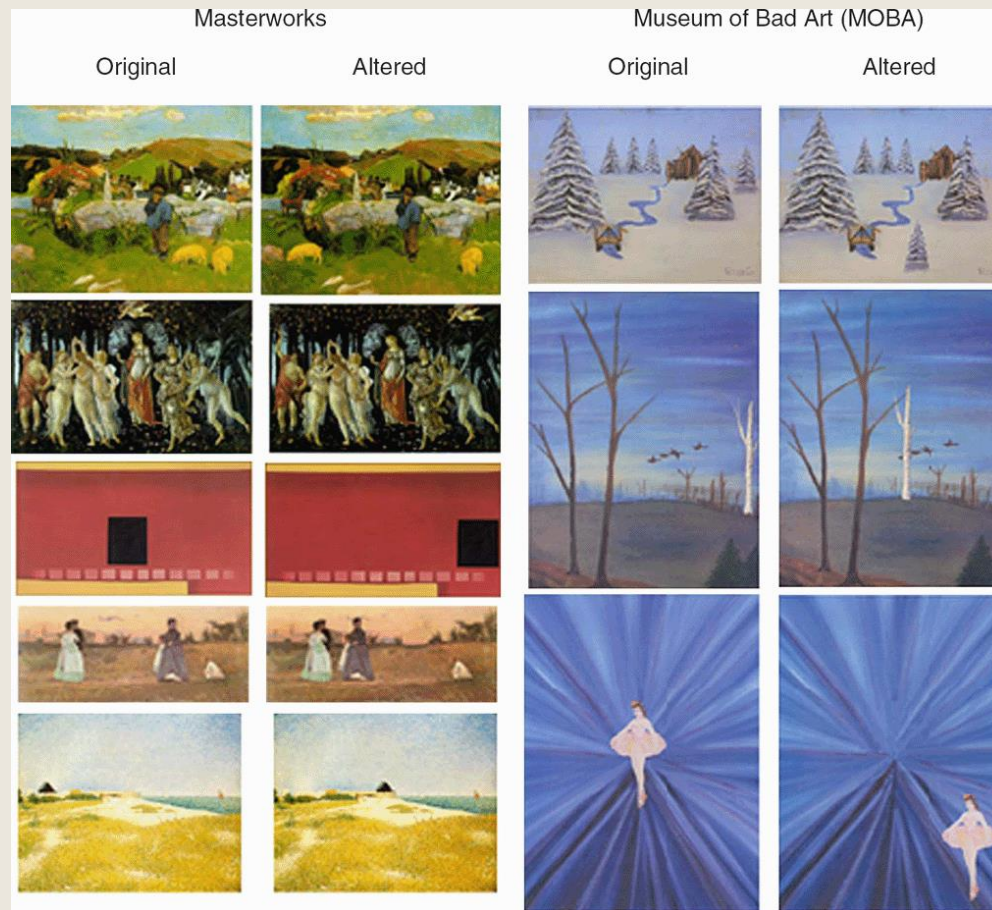
Art interest



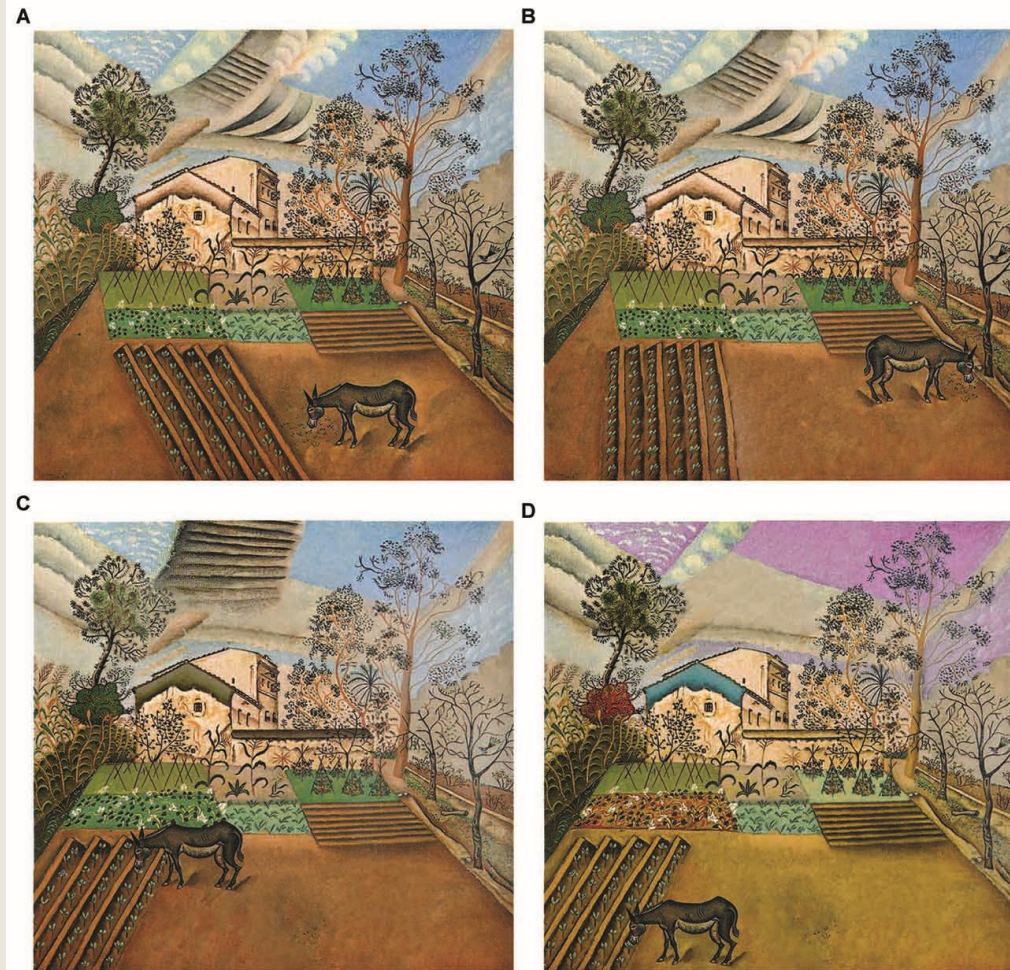
Art knowledge



Individual differences

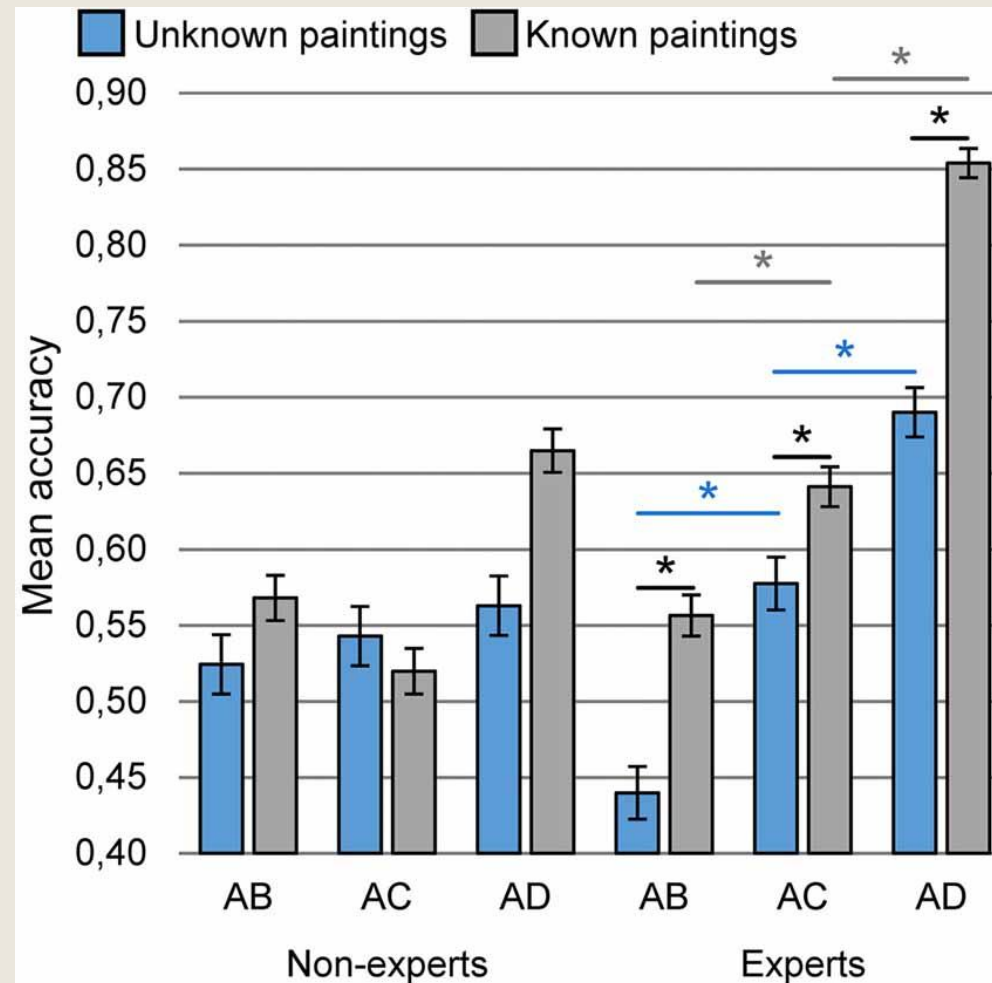


Individual differences



Francuz et al. (2018)

Individual differences



Main conclusions

- “Common currency” hypothesis,
- Top-down effects exceed bottom-up effects on aesthetic appreciation,
- Context plays a critical role in how we evaluate art,
- People differ greatly in their preferences for art,
- Search for meaning and understanding is a major motivation for interacting with art.

Thank you!