Distracted by affective pictures: Neural mechanisms revealed by multivariate pattern analysis

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Introduction

- Pictures containing affective scenes are highly potent distractors. When such emotional distractors appear alongside the stimuli from a primary visual task, the performance of the primary task is adversely affected.

- In this study we sought to examine the neural basis underlying the distracting influence of affective pictures. Simultaneous EEG-fMRI were recorded while participants detected instances of coherent motion in a random dot kinematogram (RDK) overlayed on IAPS pictures in three categories: pleasant pictures=erotic couples, neutral pictures=workplace people, and unpleasant pictures=bodily mutilations. We hypothesized that stronger neural representations of distractors in ventral visual cortex (VVC) and MT cortex would lead to worse task performance.
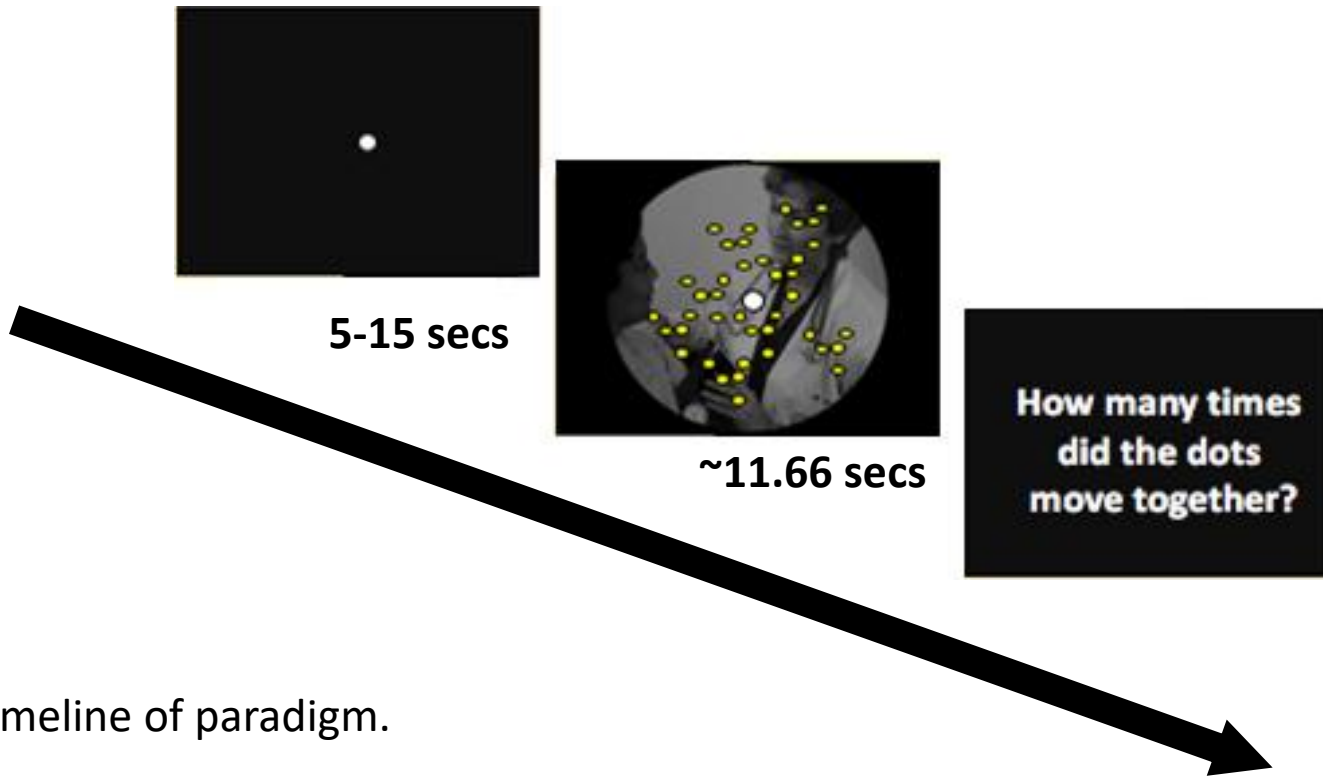
Method

5-15 secs

~11.66 secs

How many times
did the dots
move together?

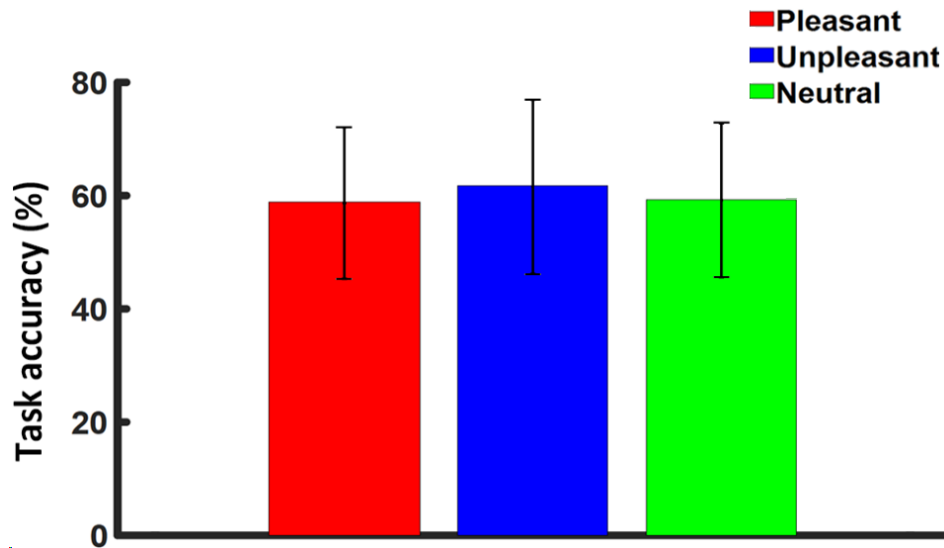Figure 1. Timeline of paradigm.

Result

Figure 2. Behavioral performance. No significance difference was found between groups.
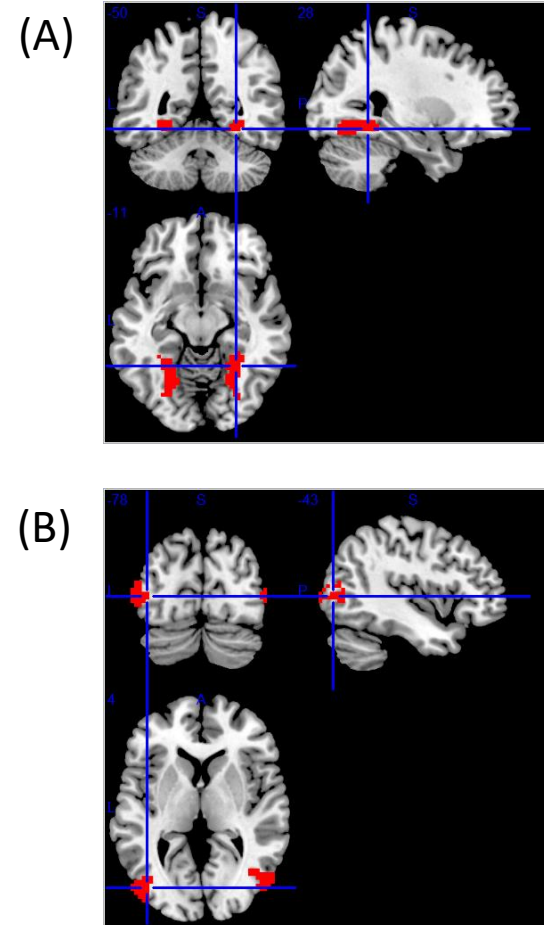
(A)

(B)

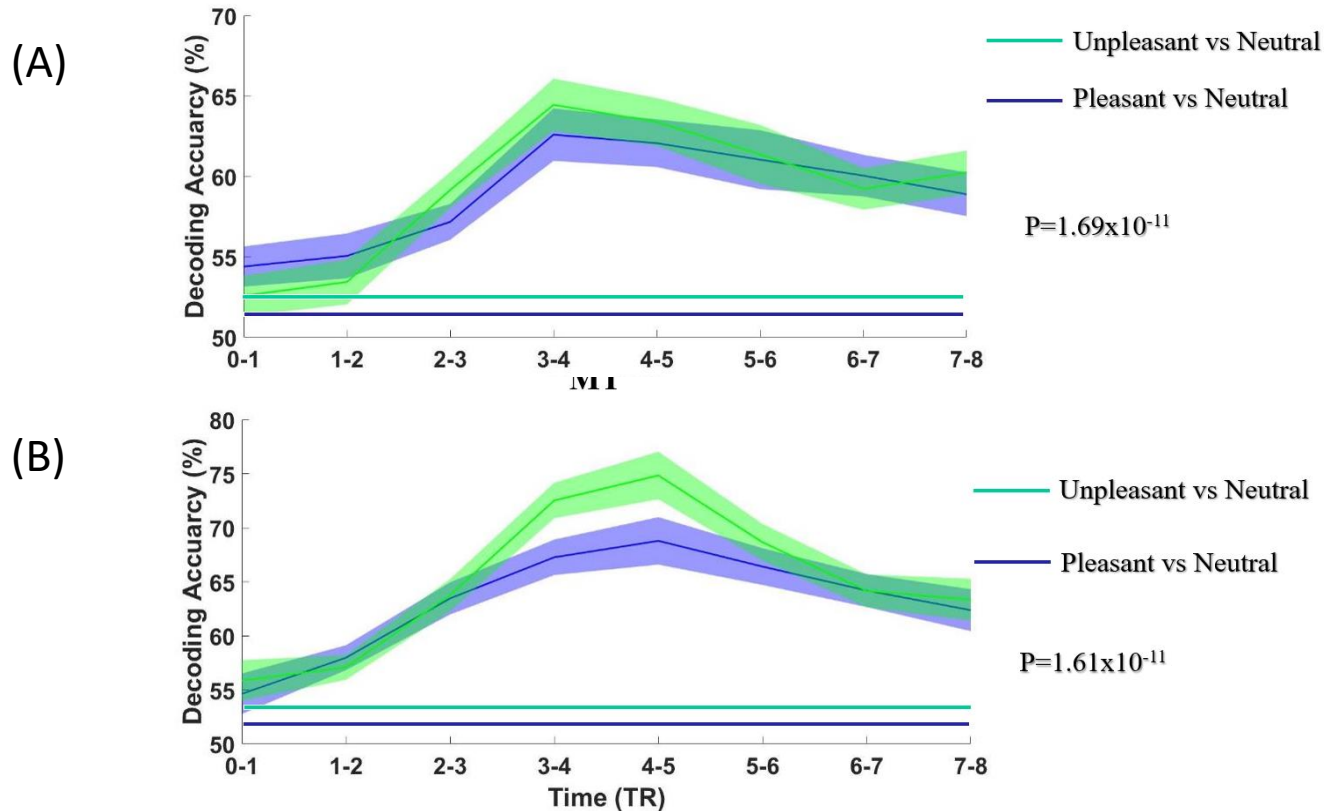Figure 3. ROI of ventral visual cortex (A) and MT (B).

Result

Figure 4. Decoding accuracy between pleasant vs neutral and between unpleasant vs neutral as a function of TR in a trial. (A) Ventral visual cortex (B) MT
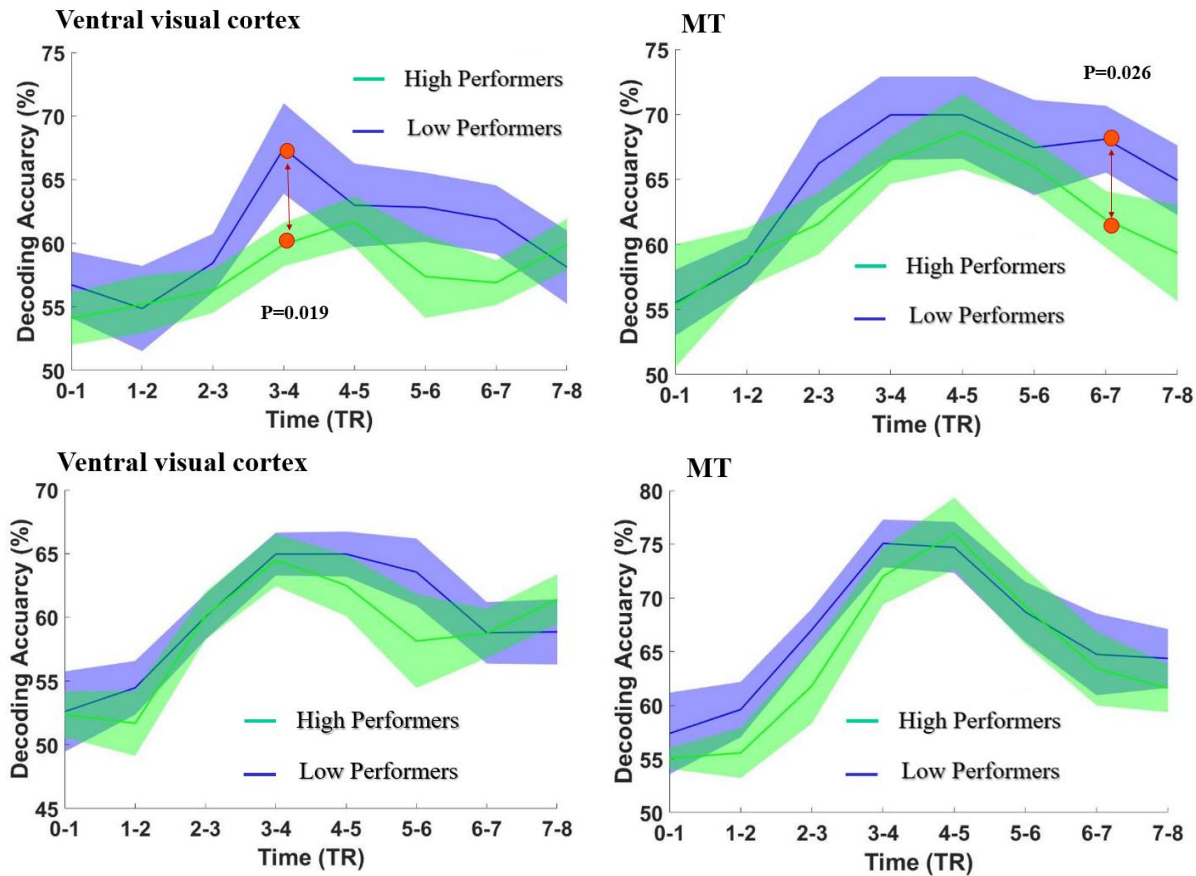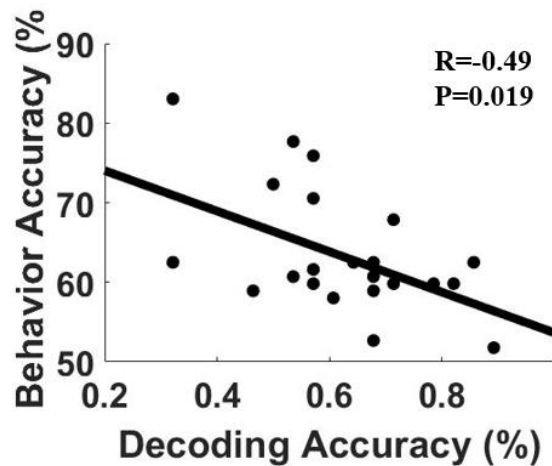
Result

Figure 5. Unpleasant vs neutral (A) and Pleasant vs neutral decoding time course for high and low performers.
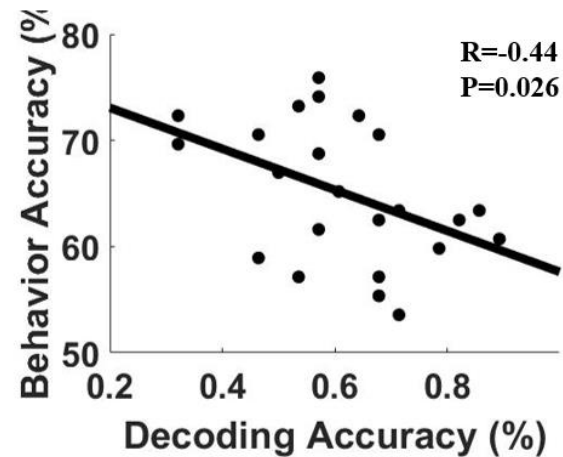
Result

Figure 6. Unpleasant vs neutral decoding accuracy and task performance.

Conclusion

- Behaviorally, task performance was similar whether the distracting pictures contained pleasant, neutral or unpleasant scenes.
- Pleasant and unpleasant pictures evoked distinct multivoxel responses in ventral visual cortex and MT relative to neutral pictures.
- When the distractors are unpleasant pictures, the more distinct their neural representations in ventral visual cortex and MT, the worse the task performance.
- These adverse impacts have different time courses in ventral visual cortex and MT.
- Neural representations of pleasant pictures in ventral visual cortex and MT did not correlate with task performance.

Thanks for listening