

# Neural patterns formation via expectancy violations during learning from intentional threat

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## Introduction

- Intended and unintended actions are evaluated differently. An accidental harm is forgiven, whereas a failed-attempt is condemned (1).
- Pain received from an intentional vs. an unintentional agent is perceived to be more painful (2). Anger towards an agent delivering an aversive stimulus is greater if the agent is known to be intentional in her actions (3).
- We form judgements about others and their actions during social actions, which lead to expectations about that individual in future encounters.

## Question

- Can intentionality of a harmful action enhance expectancy violations during learning about the action and the agent?
- How is expectancy violation during social interactions represented in the brain?**

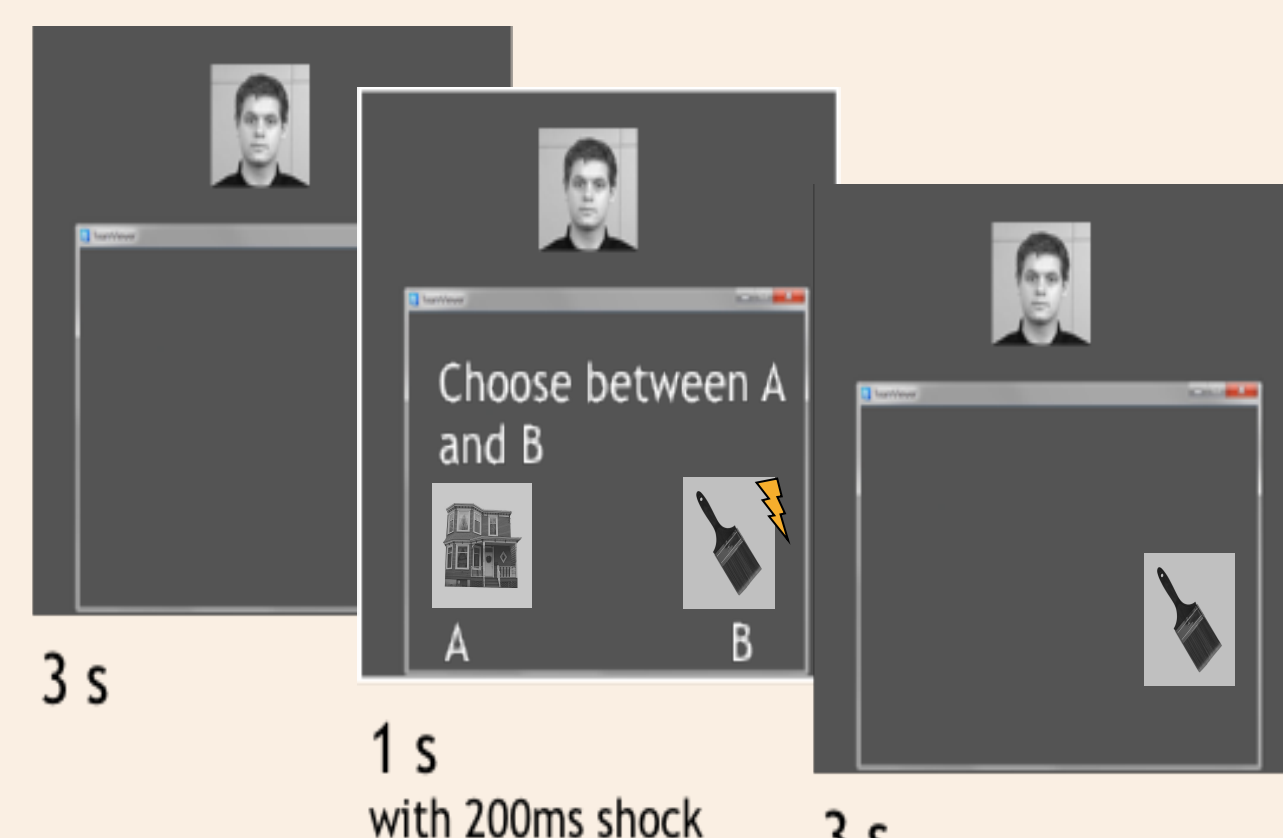
## Methods

- Forty healthy adults were recruited. Seven were excluded due to excessive motion for neuroimaging analyses, and nine due to technical difficulties for pupil dilation analysis.
- Data collected:  
fMRI, SCR, eye-tracking, self-reported measures, AQ, SA

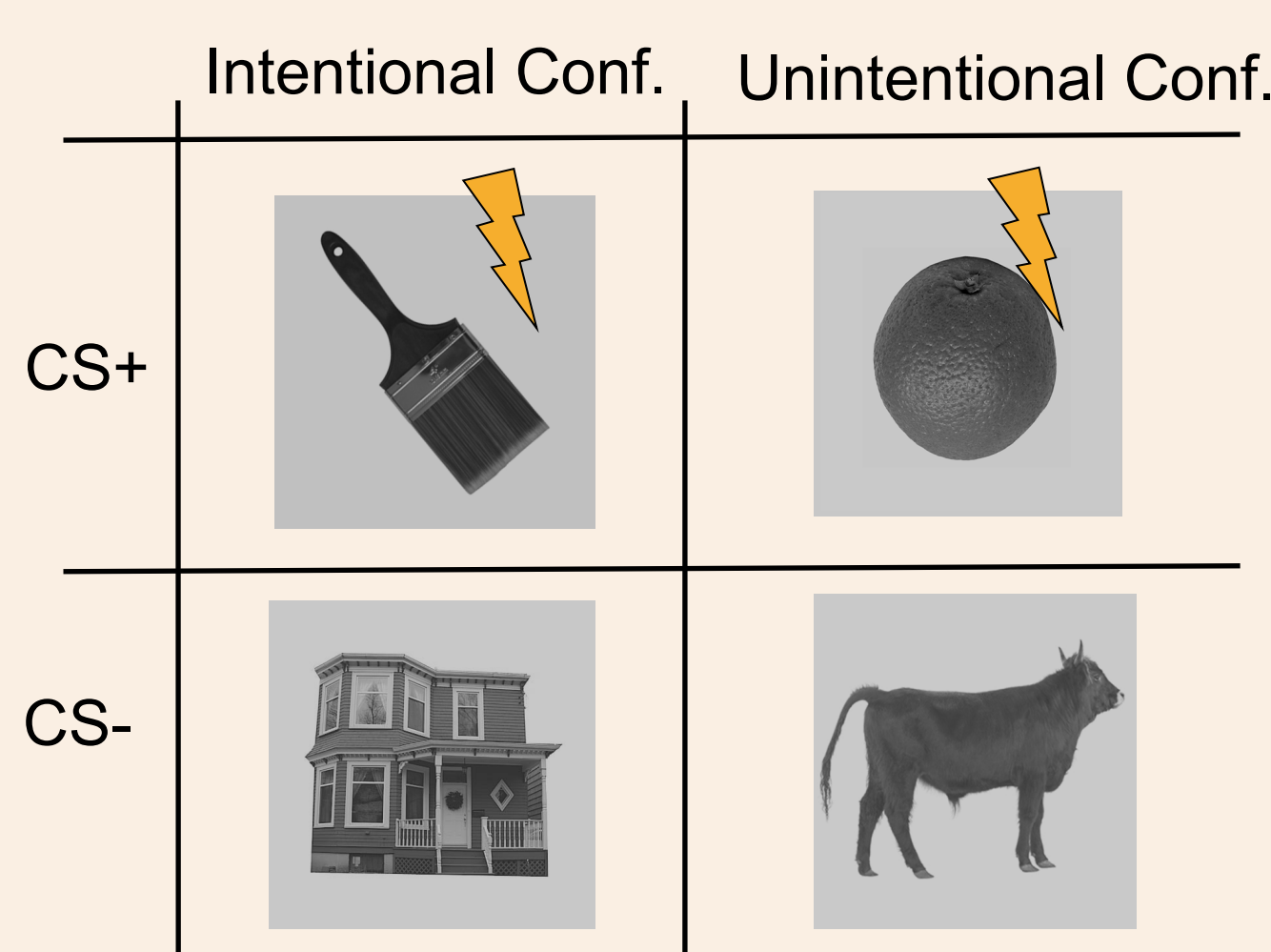
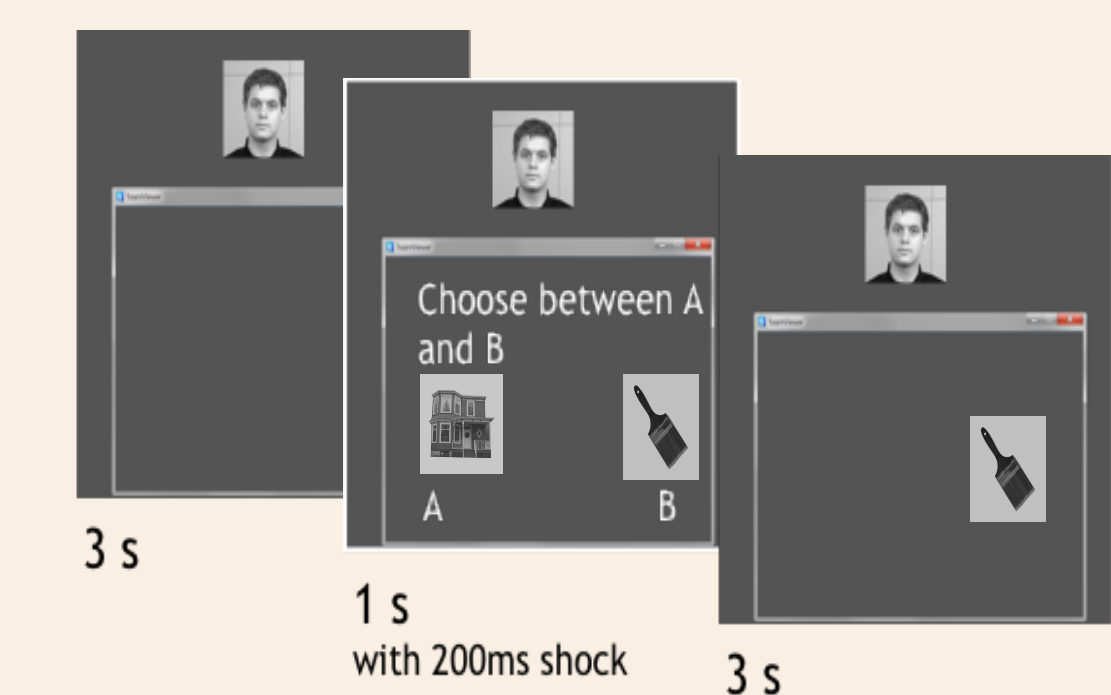
F. Loc. RS Acquisition RS Extinction

- 13 trials per CS type, 23 trials per confederate.
- 50% reinforcement: only 6 of the chosen CS+'s preceded with a shock.
- 2 phases:  
Phase 1 with 10 trials of each confederates face.  
Phase 2 with 10 trials of each CS.

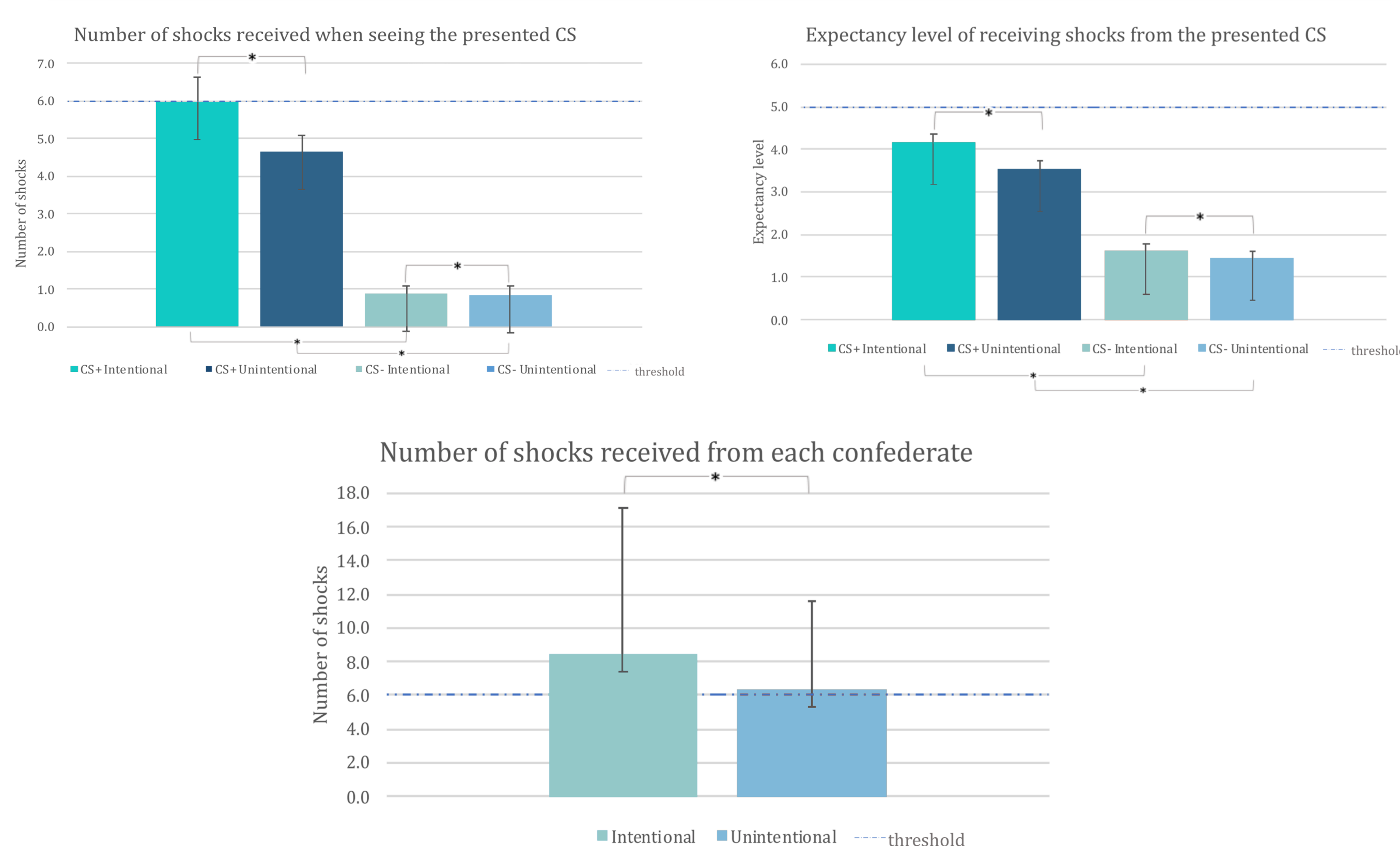
### CS+ preceding with a shock



### CS+ not preceding with a shock

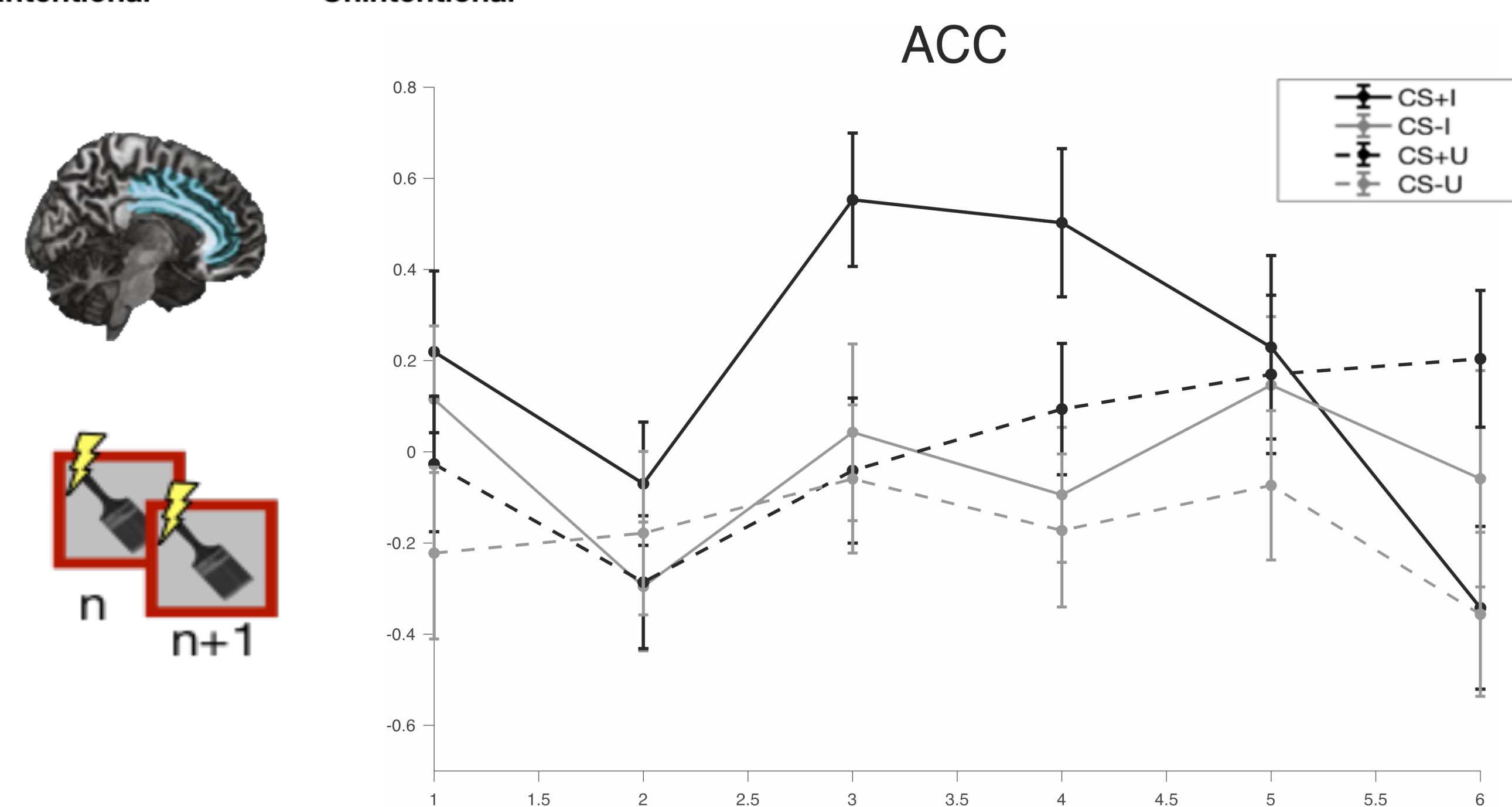
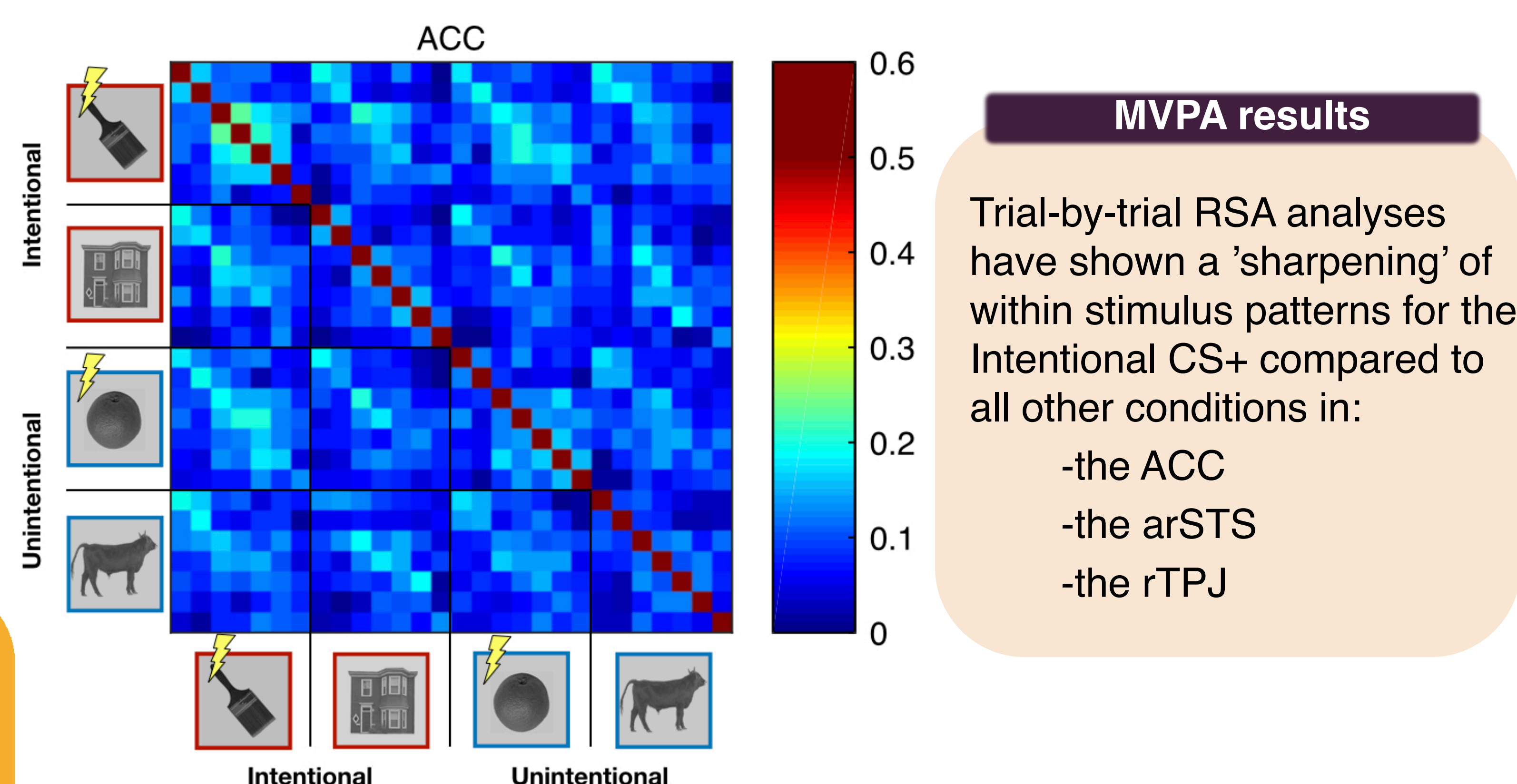


## Behavioral results

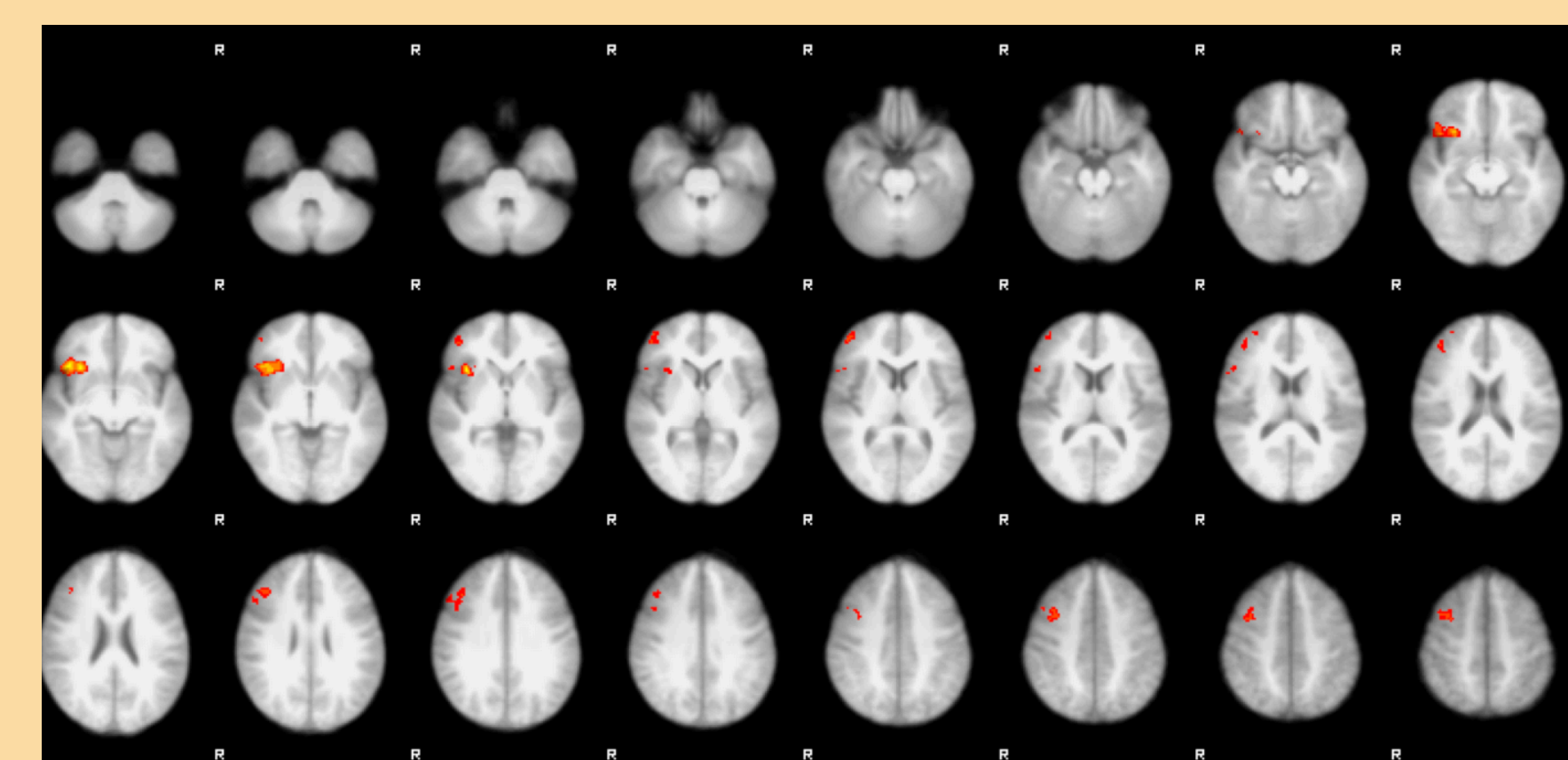


## References

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### Intentional CS+ > Unintentional CS+



### CS+>CS-

2.3 7.6

## Discussion

- We established an experimental paradigm to test the role of agency in learning and memory.
- Pupil responses confirmed that the conditioning procedure was successful, and that the participants had elevated responses to CS+'s.
- Neuroimaging results suggest that intentionality of an agent is represented differentially in ACC, seen by trial-by-trial pattern similarity increase.

Univariate analyses show activation in a diffused network resembling the DMN, when intentional CS+'s that did not deliver shocks are compared with unintentional ones.