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BACKGROUND

Contextual reinstatement has been shown to facilitate memory retrieval¹ and increase medial temporal lobe involvement in retrieval².

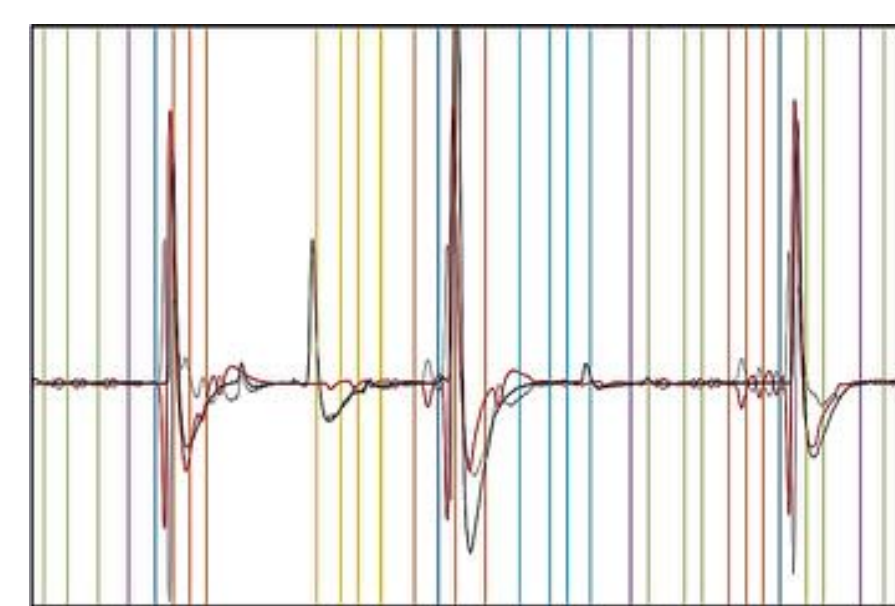
In this study, we used **fMRI** to test whether context reinstatement would influence retrieval of *item-emotion associations* (neutral objects + aversive or neutral sounds). Item-emotion associations may be supported by memory processes that are separable from the hippocampus³, which is important for representing episodic context.

We hypothesized that retrieval of negative item-emotion associations would be related to activity in the **amygdala** and **perirhinal cortex**, and that the **hippocampus** would be recruited during emotion retrieval when context was also reinstated.

BEHAVIORAL RESULTS

SKIN CONDUCTANCE RESPONSE TO WHITE NOISE BURSTS

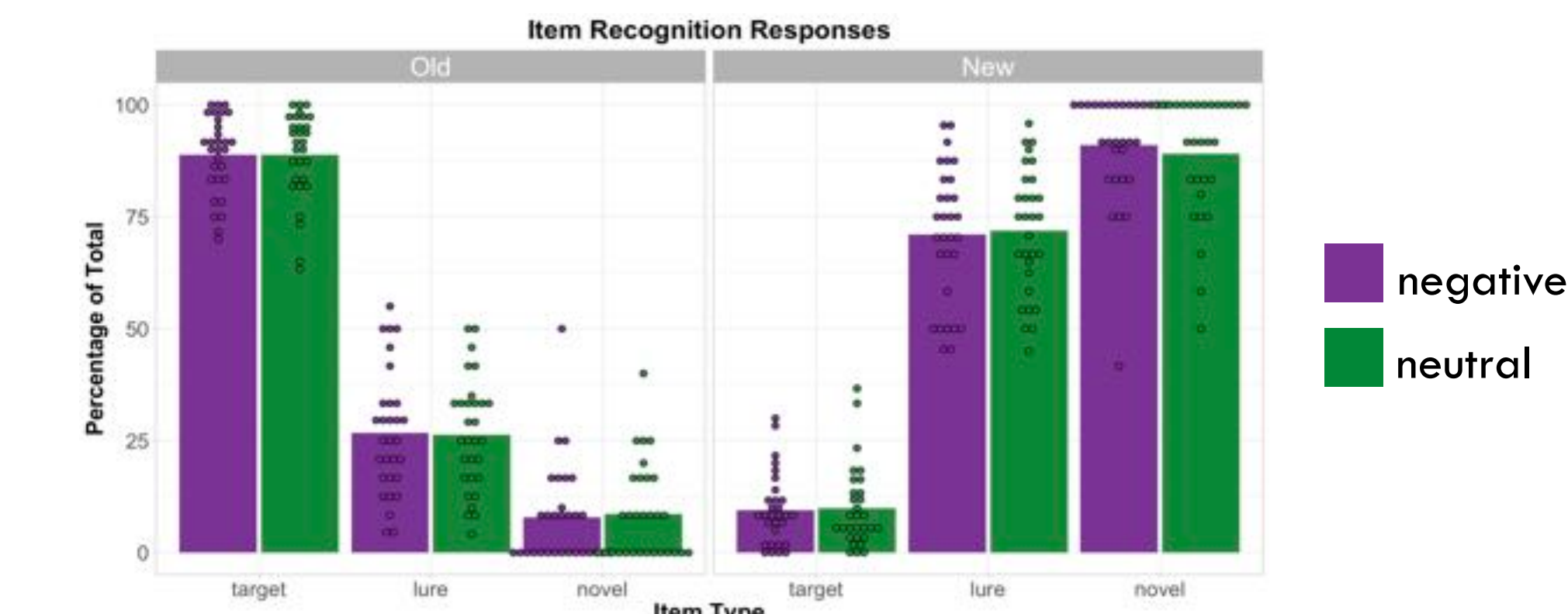
SCR from example subject
8 encoding miniblocks



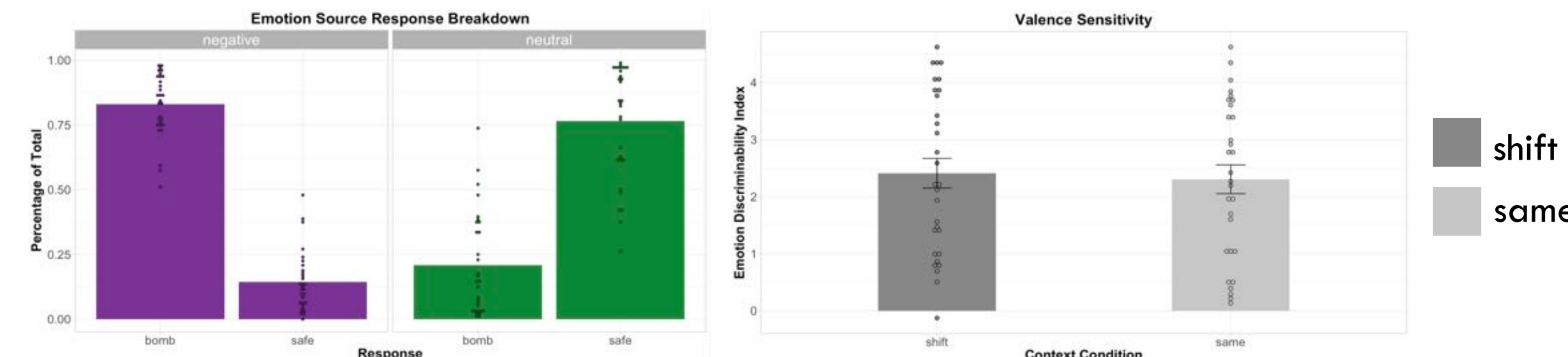
— Observed
— Predicted
... Residual
— Negative trials with noise burst
— Other negative trials
— Neutral trials with tone
— Other neutral trials

Across participants: Significantly increased SCR to negative noise burst trials, $p < .001$

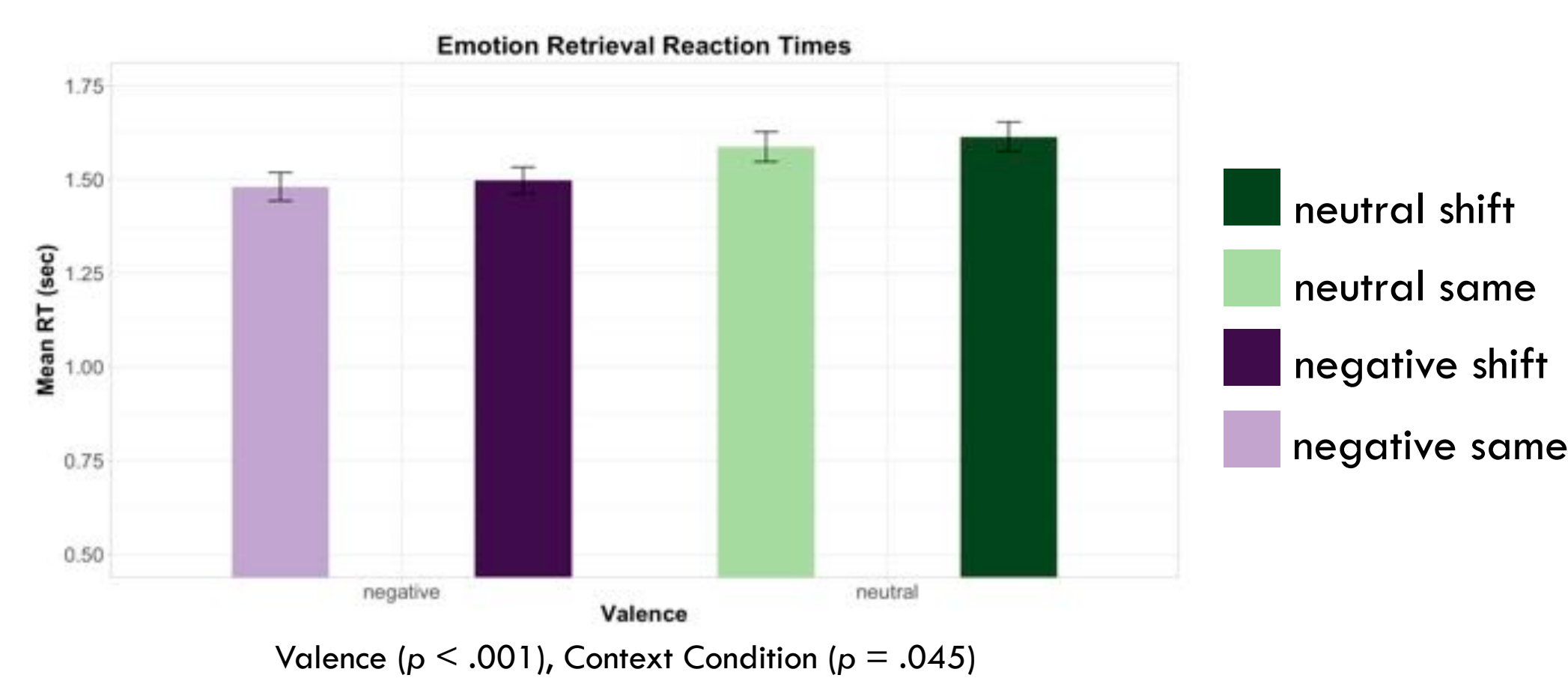
ITEM RECOGNITION ACROSS VALENCE



SIMILAR EMOTION RETRIEVAL ACCURACY ACROSS CONTEXT CONDITIONS

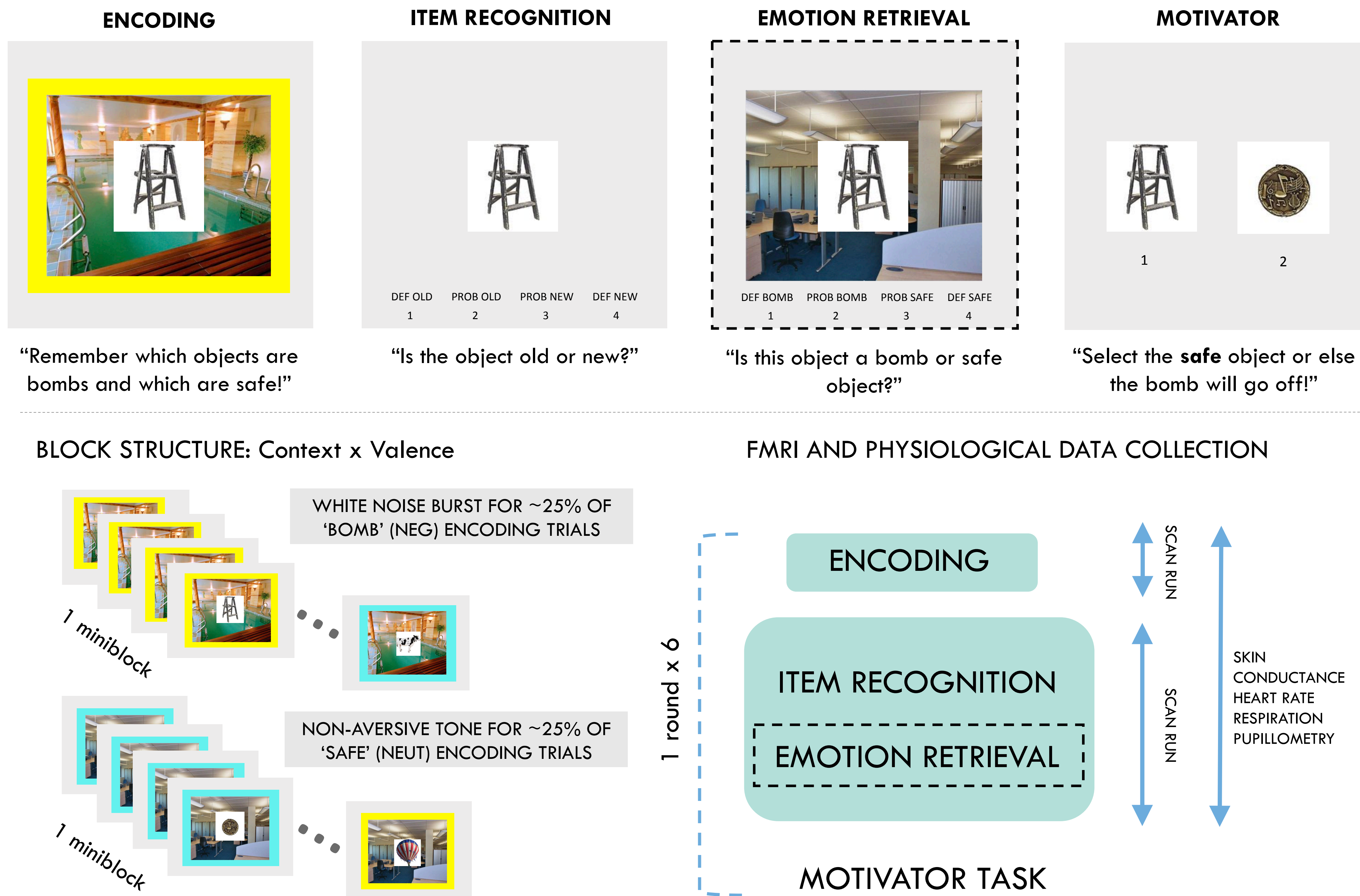


NEGATIVE VALENCE AND CONTEXT REINSTATEMENT INCREASE SPEED OF EMOTION RETRIEVAL



Valence ($p < .001$), Context Condition ($p = .045$)

STUDY DESIGN



FMRI METHODS

PARTICIPANTS

N=27 healthy young adults
(additional 3 excluded due to excessive motion)

FMRI DATA ACQUISITION & PREPROCESSING

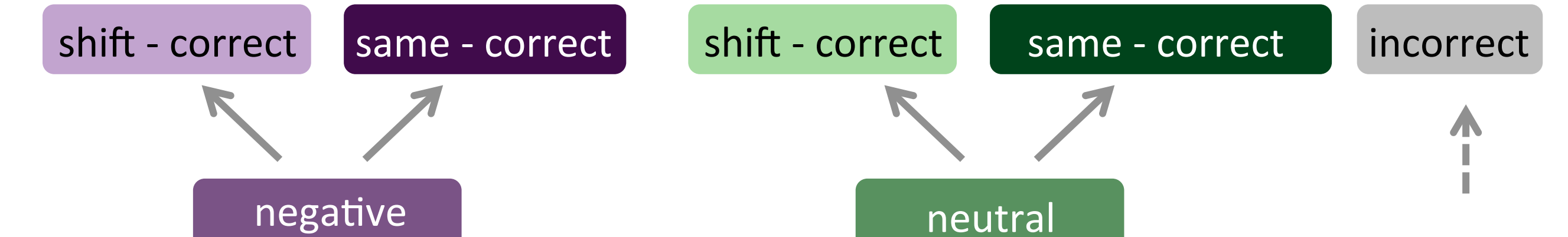
Siemens Prisma 3T scanner with 32-channel head coil
Multi-band EPI functional images
1.5 sec TRs, 2x2x2 mm voxels (whole-brain)
Jittered ITI mean \approx 4 sec
Coregistered with T1 anatomical images
Warped to MNI space
5mm Gaussian smoothing
Standard 6 motion regressors
Spike regressors for suspect time points (ArtRepair)

PHYSIOLOGICAL DATA ACQUISITION

EyeLink 1000 (data not shown)
Biopac with Acqknowledge software
Respiration, heart rate (data not shown)
Skin conductance response
- High Pass and Low Pass filtering
- Pspm modeling of negative & neutral trials

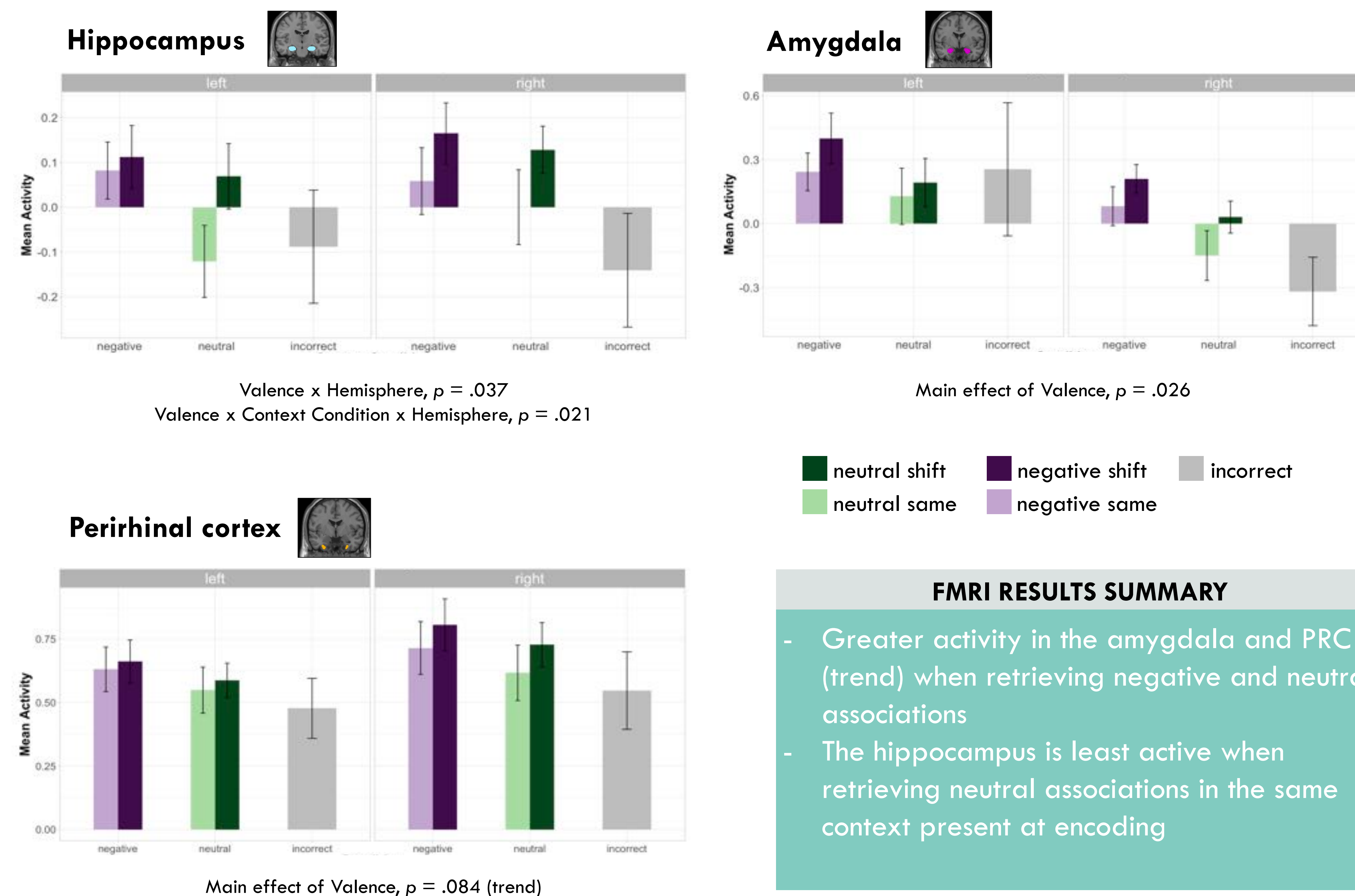
FMRI DATA ANALYSIS

GLM with regressors defined below
Activity estimates extracted from anatomical ROIs (see left), then entered into Valence x Context condition x Hemisphere rmANOVAs



FMRI RESULTS

Medial temporal lobe activity during emotion retrieval



FMRI RESULTS SUMMARY

- Greater activity in the amygdala and PRC (trend) when retrieving negative and neutral associations
- The hippocampus is least active when retrieving neutral associations in the same context present at encoding

SUMMARY

Context reinstatement facilitates retrieval of emotional associations (faster RTs).

The amygdala was more active when participants correctly retrieved negative vs. neutral item-emotion associations⁴. The PRC showed a trend toward this effect.

Surprisingly, there was less activity in the left hippocampus when context was reinstated during emotion retrieval, but only for items with a neutral association.

- This may reflect a weaker novelty or contextual salience signal in the hippocampus when an object has been learned to be safe in a particular context.

Ongoing & future directions

- Investigate the neural bases of incidental emotional and contextual reactivation during *item recognition*
- Relate incidental reactivation to the strength of contextual reinstatement effects during emotional retrieval

