

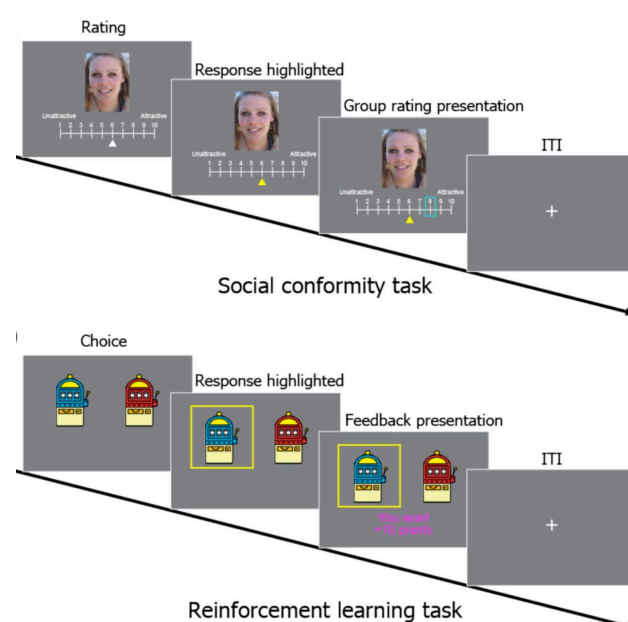
Testing the reinforcement learning hypothesis of social conformity

Marie Levorsen, Ayahito Ito, Shinsuke Suzuki & Keise Izuma

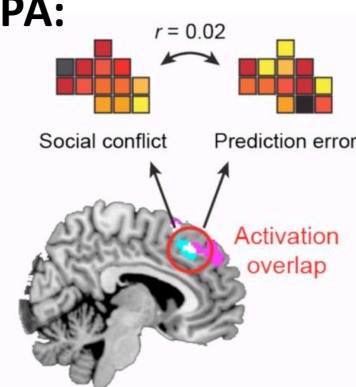
Introduction

- Social influence affects everyday life decisions, it is important to understand how and why that is
- Previous neuroimaging studies have found that the posterior medial frontal cortex (pmFC), anterior insula and ventral striatum are involved in both social conformity and reinforcement learning
- Klucharev et al., (2009) suggest a common neural mechanism for social conformity and reinforcement learning signalled by a reward prediction error
- The two processes have never been directly compared; no previous study has examined these two processes within the same participants
- Activation overlaps based on univariate fMRI analysis cannot be considered strong evidence of a common neural mechanism (Woo et al., 2014)

Task:



Correlation-based MVPA:



Aim

- To test the reinforcement learning hypothesis of social conformity by having the same sample of participants perform both a social conformity task and reinforcement learning tasks whilst in an fMRI scanner
- Use multi-voxel pattern analysis (MVPA) to more directly test this hypothesis

Method

Participants: Twenty-five neurological healthy, British females (mean age = 22.1 years)

Stimuli: 100 digital colour photographs of Caucasian females (the images were taken from the set used in the study by Klucharev et al., 2009).

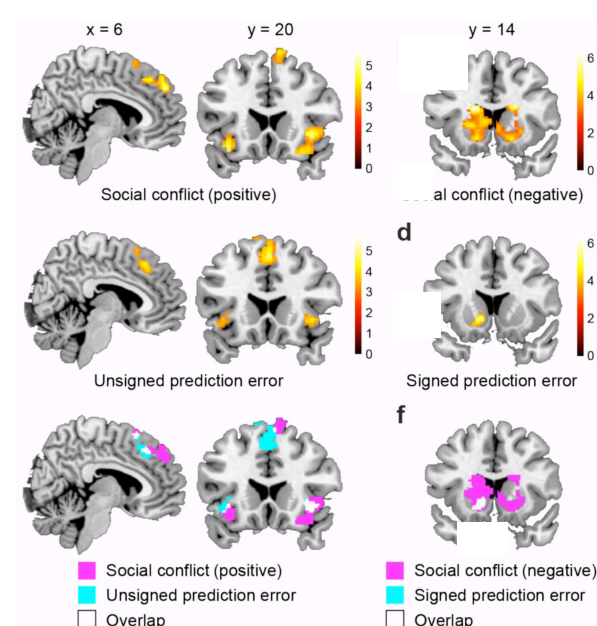
Procedure:

fMRI scan session: reinforcement learning task and social conformity task

Behavioural testing session: unexpected second social conformity task, without group rating (the difference between the ratings in the first and second conformity task was used to measure the behavioural conformity effect)

Results

Univariate results:



Correlation-based MVPA:

Regions	ROI size (voxel)	Correlation-based MVPA	
		Average correlation	p-value (uncorrected)
<i>Overlap between areas positively related to social conflict and areas positively related to unsigned prediction error</i>			
dmPFC	27	-0.02	0.62
pre-SMA	26	-0.02	0.61
Right insula	65	-0.03	0.70
Left insula	18	-0.01	0.60
<i>Overlap between areas negatively related to social conflict and areas positively related to signed prediction error</i>			
Right putamen	66	-0.02	0.72
Left putamen	74	0.01	0.41
Left NAcc	157	-0.02	0.72

* $p < 0.05$ (Bonferroni correction). Significant results of the correlation-based MVPA mean that activation patterns are similar between social conflict and prediction error (i.e., evidence supporting the hypothesis).

Conclusion

No clear evidence of a common neural mechanism for social conformity and reinforcement learning