

# Neural representation of social craving following isolation in the human brain

Tomova, L.<sup>(1)</sup>, Wang, K.<sup>(1)</sup>, Thompson, T.<sup>(1)</sup>, Matthews, G.<sup>(2)</sup>, Takahashi, A.<sup>(3)</sup>, Tye, K.<sup>(2)</sup>, Saxe, R.<sup>(1)(3)(4)</sup>

1) Department of Brain and Cognitive Sciences, Massachusetts Institute of Technology

2) Salk Institute for Biological Studies

3) McGovern Institute for Brain Research, Massachusetts Institute of Technology

4) Center for Brains, Minds and Machines, Massachusetts Institute of Technology

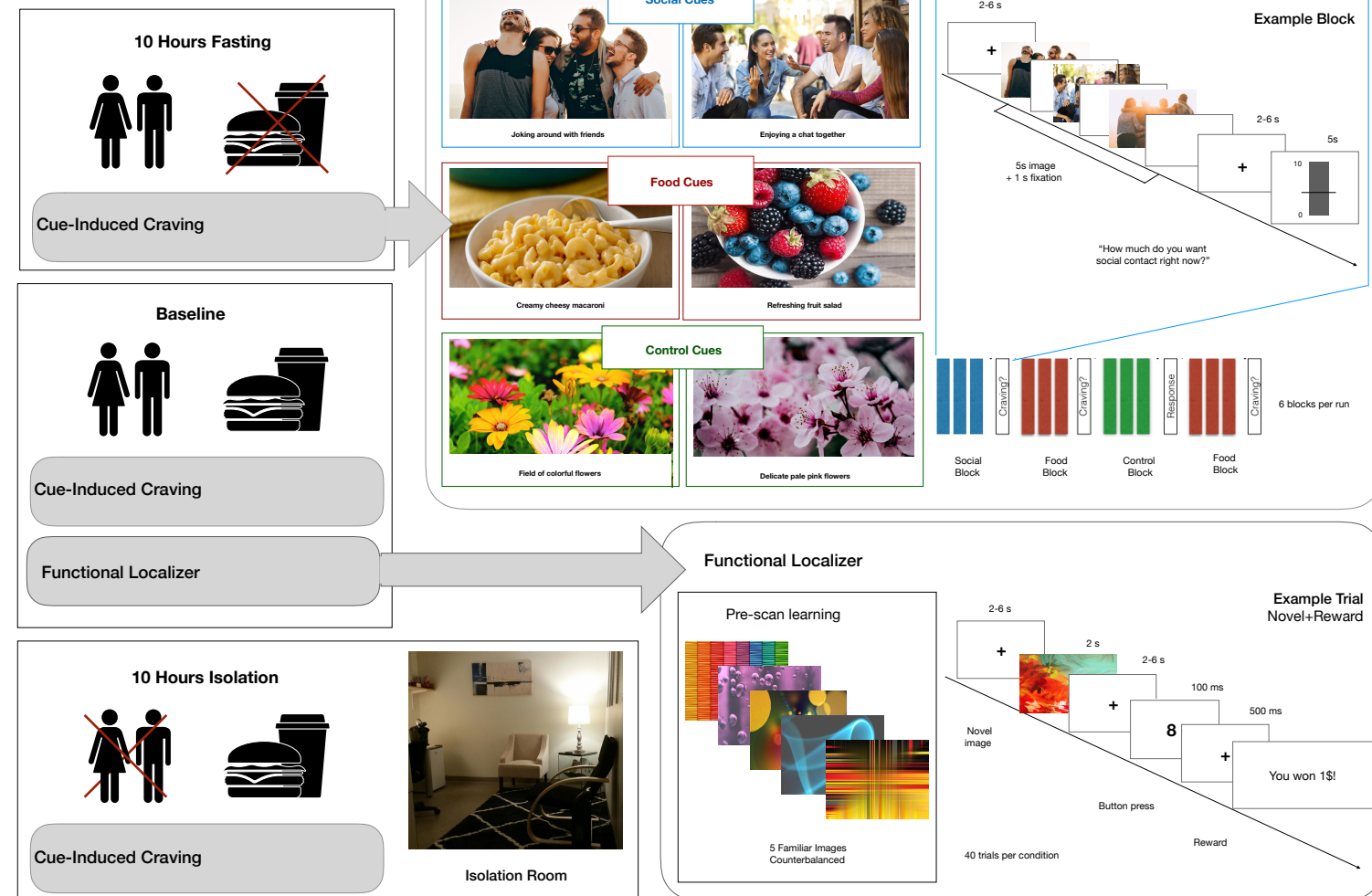


**Research Question:** After acute social isolation, do people crave social interaction like a hungry person craves food? Does social craving evoke activity in the same midbrain dopaminergic regions as food craving?

## Design and Methods

### Session

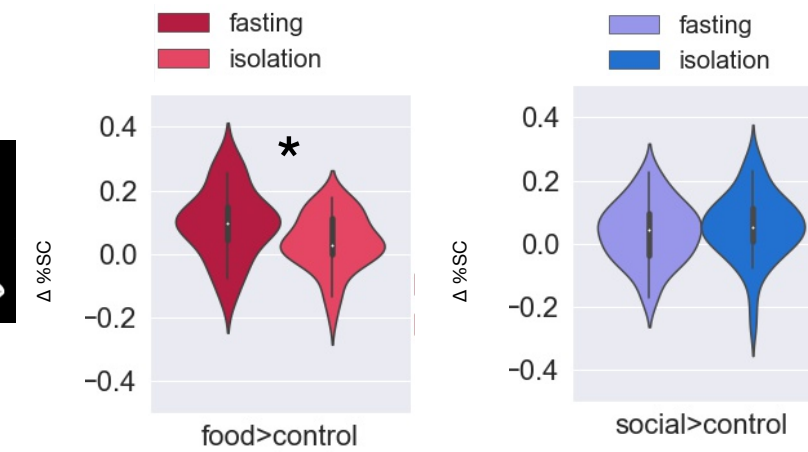
Within-Subject (N=40)  
Counterbalanced Order



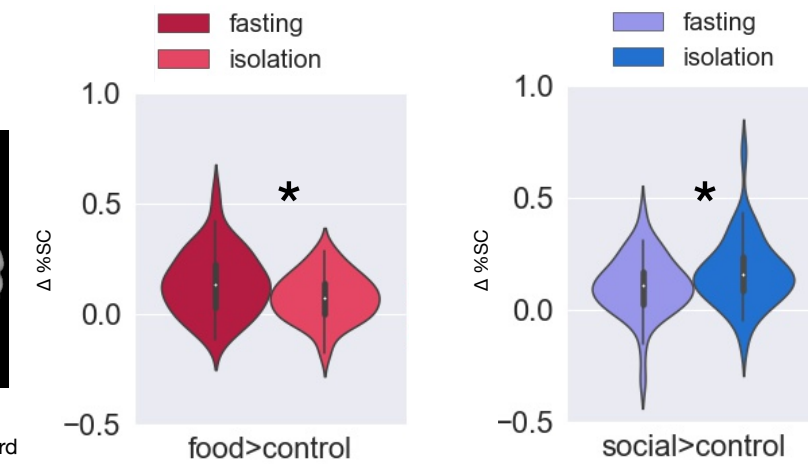
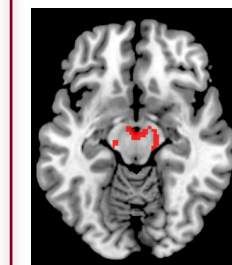
## Neuroimaging Results

Primary Hypothesis: Substantia Nigra/Ventral Tegmental Area

### Anatomical SN/VTA

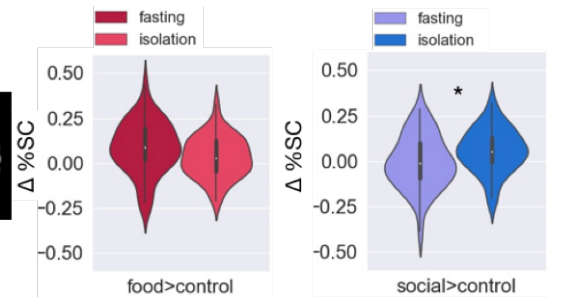
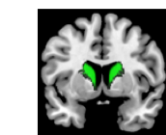


### Functional ROI

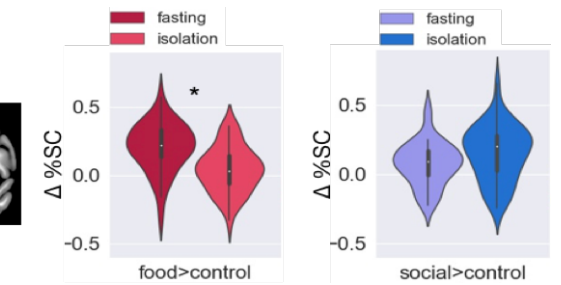
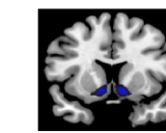


Additional Results: Striatum

### Caudate

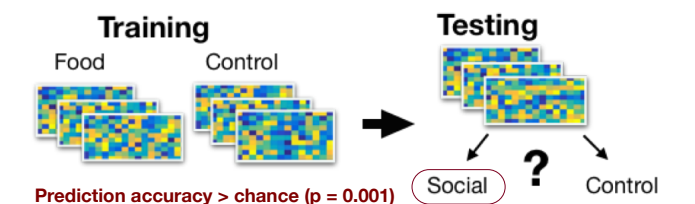


### NAcc

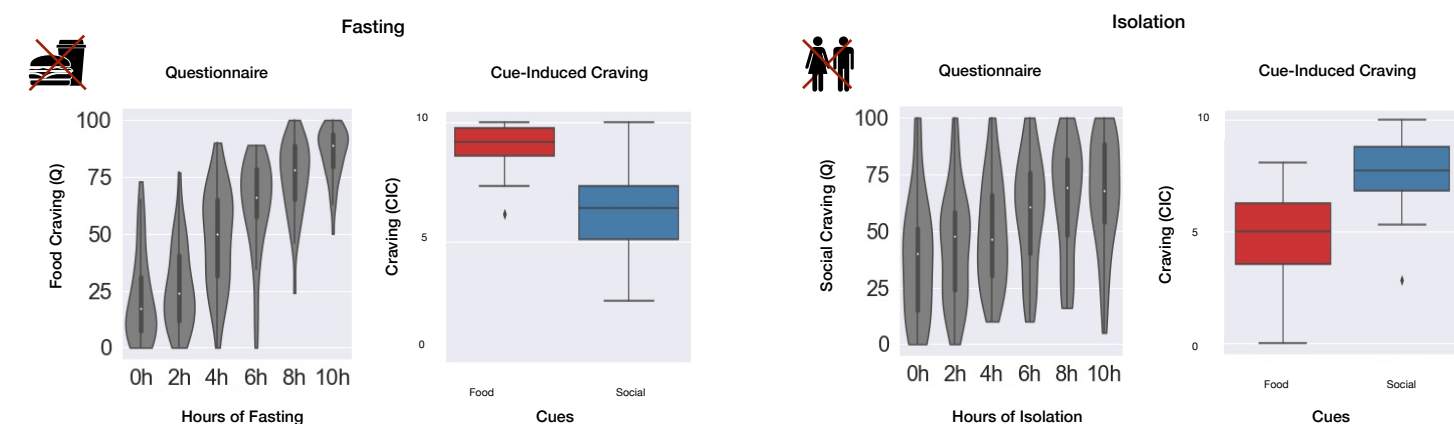


Additional Results: Pattern Analysis

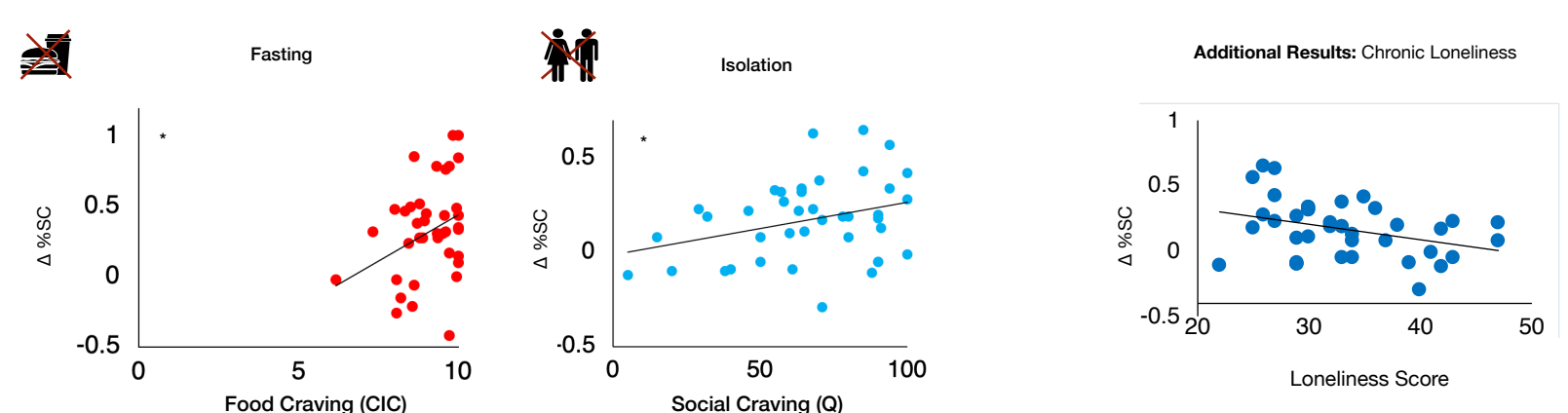
### Machine learning: pattern classification



## Behavioural Results



## Brain-Behaviour Correlations



**Conclusion:** 10 hours of social isolation can cause self-reported social craving in healthy well-connected adults and evokes a craving-like response in SN/VTA. Social and food craving evoke different responses in striatum.