

## **Temperamental influences on social cognition under stress**

### **ABSTRACT:**

#### **Background**

Humans possess extraordinary skills at understanding the mental processes of others. Yet, significant interindividual variability exists in the development of socio-cognitive skills. Findings suggest that anxious-reactive temperament is related to slower development of understanding the mental states of others, but the mechanisms underlying this effect are poorly understood. As social interactions are an important source of life stress, the ability to regulate stress responses may be linked to acute social cognition in difficult situations, ultimately determining socio-cognitive development.

#### **Aims**

This project aimed at investigating the link between physiological stress regulation, and behavioural and neural markers of social cognition under stress. As measures of physiological regulation, we used heart rate variability (HRV) and frequency of physical exercise, a well-known influence on physiological regulation.

#### **Method**

Participants engaged in a reaction-time task designed to measure spontaneous social perspective taking. This was combined with a mental arithmetic stress induction and, for study 2, functional magnetic resonance imaging. Participants also rated their predicted anger response to hypothetical frustrating situations, and underwent measurement of HRV and self-reported exercise.

#### **Results**

Compared to participants in the low exercise group, participants in the high exercise group showed stronger social perspective taking under stress, and scored lower on predicted anger. Across participants, stress induction reduced reactivity of brain areas associated with social cognition to the perspective taking task.

#### **Conclusions**

At the neural level, there is a clear suppression of social cognition under stress, supporting the notion that difficult social situations may have a negative impact on our ability to understand the other person. Physical exercise emerged as the strongest predictor of social cognition under stress, suggesting that high physical fitness supports regulation in stressful social situations.

#### **Keywords**

Social cognition, Stress, Temperament, Emotional reactivity

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