

EXERCISE, PHYSIOLOGICAL REGULATION, AND SOCIAL COGNITION UNDER STRESS

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Background: While humans have extraordinary skills of understanding the mental states of others, significant individual differences in social cognition exist. Previous work and theoretical frameworks suggest a link between low-reactive, low-anxious temperamental traits and better development of social cognition. However, evidence for this link in humans is scarce to date.

Aims: This project aimed at assessing the link between emotional reactivity and social cognition in human participants, particularly focusing on the impact of stress on social perspective taking.

Method: Participants completed a reaction-time task designed to measure automatic perspective taking, combined with a mental arithmetic stress task, and a non-stressful control task. One group of participants additionally underwent functional magnetic resonance imaging to measure brain activity, while completing the tasks. As measure of emotional regulation, we measured heart-rate variability (HRV) at rest. Current levels of physical exercise were also measured, as known moderator of stress regulation.

Results: In the main behavioural study, participants engaging in regular physical exercise showed higher perspective taking under stress, compared to participants low in physical exercise. We also observed a negative relationship between resting HRV and the impact of stress on perspective taking. Contrarily, in the brain imaging environment, no perspective taking was observed, behaviourally or at the neural level.

Conclusions: The findings regarding HRV suggest that good physiological regulation can support perspective taking under stress. Regular physical exercise emerged as an important variable in participants' ability to maintain social perspective taking in situations of high stress. Potentially, improved physiological regulation due to exercise improves social cognition in challenging situations. Yet, perspective taking as measured with this task seems easily interrupted by highly demanding environments such as being in the MRI scanner, or by the dual-task nature for the MRI study setup.

Keywords: Social cognition, Exercise, Stress, Perspective taking, Emotion regulation

Publications:

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