

## **Oxytocin: On the psychophysiology of trust and cooperation**

### **ABSTRACT:**

#### **Background**

Trust is a mentalizing process which makes human relationships, social organizations and political and economical systems, possible. Oxytocin (OT) is a neuromodulator well known to facilitate maternal and pair bonding as we reviewed. Consistently, in humans, exogenous intranasal OT enhances mentalizing that facilitates trusting behaviours: from the affective-perceptual, e.g. facial emotion recognition, eye-to-eye gaze, to a higher-order cognitive-evaluative dimension, e.g., social learning, generosity, cooperation and particularly, trust. However, the underlying psychophysiology of OT's effects is unknown.

#### **Aims**

We aimed to understand how oxytocin affect the psychophysiology of cognitive processes behind trust, such as empathy, cooperation and social salience. This research is key to advance social psychology and neuroscience and to rationally improve our etiological models of psychiatric social symptoms.

#### **Method**

For this, we have conducted a series of studies involving placebo-controlled double-blind administration of intranasal oxytocin during tasks of social salience and social dilemma (with sexual objectification targets), with brain imaging, pupillometry, eye-gaze tracking and/or electroencephalography recording in humans.

#### **Results**

This project has allowed us to show that:

- 1) OT's effects on neural activity may exist irrespective of fear-related social- or reward-contexts;
- 2) Sexualization impairs cooperative behavior towards women opponents and that this pattern – as well as the associated P300 ERP latency - is counteracted by intranasal oxytocin;
- 3) Oxytocin's effect on central and autonomic neurocorrelates of salience attribution (as measured via pupillometry and eye-gaze) depend on both socialness and reward value of stimuli;
- 4) Oxytocin increases the spatio-temporal salience of social interactions measured via eye-gaze during free-viewing;
- 5) Oxytocin normalizes the synchronization of brain activity across individuals with psychotic disorders during emotional video watching;

#### **Conclusions**

We have thus furthered the: 1) characterization of both autonomous and central neurocorrelates of trust-relevant processes such as cognitive and emotional empathy and social salience

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attribution; 2) knowledge of OT's effects on resting state brain networks, and 3) OT's role in trust-dependent cooperation choices in social dilemmas, including in objectification contexts.

### **Keywords**

Empathy, Trust, Cooperation, Oxytocin, Salience, Social dilemmas, EEG, fMRI, Pupillometry, Eye-gaze.

### **Published Work:**

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