**Imaging**

**Neural dynamics of two players when using nonverbal cues to gauge intentions to cooperate during the Prisoner's Dilemma Game**

mutual cooperation were largely areas known for reward processing, such as the **caudate nucleus of the striatum and the anterior cingulate cortex (ACC), suggesting that cooperation may be driven by the rewarding effects it produces**.

found greater activity in the theta (4–7 Hz) and alpha (8–13 Hz) bands of the orbitofrontal region during defection, but relatively **little cortical activity during cooperation**.

reflect the fact that the **cooperation strategy** examined may have occurred **relatively automatically** and independently of the partner's behavior, and **thus not requiring significant higher-level socio-cognitive processing**

EEG hyperscanning approach identified temporal dynamics and inter-brain synchronization across the cortex—most notably in the **right temporal parietal region**—providing evidence for involvement of these regions in the processing of **face-to-face cues to read each other's intent to cooperate**

The presence *of* ***face-to-face interaction led players to cooperate more often***, providing behavioral evidence for the use of these nonverbal cues in their social decision-making. The current study highlights the significance of power in the alpha band and inter-brain phase synchronizations in high-level socio-cognitive processing. It is also notable that the **neural substrates uncovered here are deeply associated with brain regions of autism spectrum disorder (ASD)**

**Inter-brain synchrony and cooperation context in interactive decision making**

Imaging results revealed that **theta/alpha-band inter-brain synchrony** was significantly higher in the **H-H** condition than in the **H-M** condition

previous studies have also proposed that theta/alpha activities are involved in **working memory** (Kawasaki, Kitajo,Yamaguchi, 2010; Sauseng et al., 2009). It is possible that social decision making in the Prisoner’s Dilemma game requires a working memory of the choices or outcomes from previous trials.

In the present study, there was higher frontal theta-band interbrain synchrony in the context with HCI vs. LCI. It is possible that the members of the dyad think more about their partner’s behavior in the HCI context, that is, **they “mentalize” in order to achieve a higher rate of cooperation.**

Early studies proposed that individuals’ rational choices supported behavioral decision making in the Prisoner’s Dilemma game (Axelrod, 1980; Schacter et al., 2011); specifically, human decision-makers would **balance the tension** between individual rationality (i.e., **choose defection for personal interest**) and group rationality (i.e., **choose cooperation in the interest of the group**) (Axelrod, 1980).