COGCOM
PhD in Cognition and Communication

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SCAN-Unit
Faculty of Psychology

Social Pain and Emotional Egocentricity in high-functioning Autism-Spectrum-Disorder: Behavioral and Neurophysiological Evidence

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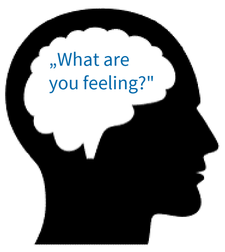
1. Introduction



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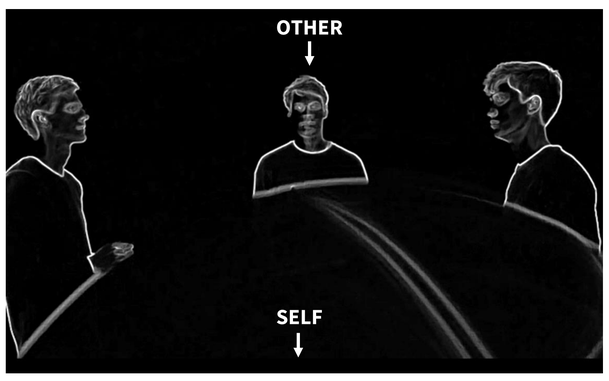
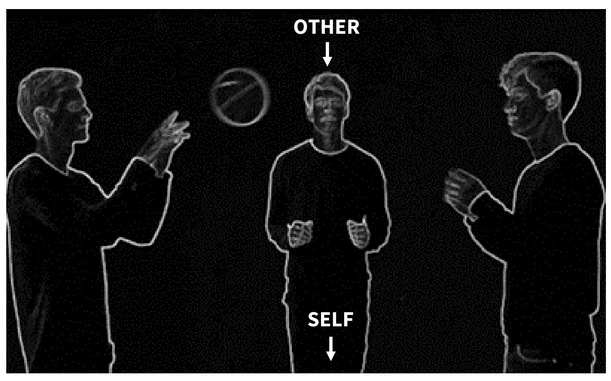
- **Empathy**, the ability to feel with another person, is closely related to **Theory of Mind** (ToM), understanding another person's mental states[1-3]
- However, self-projection mechanisms can lead to empathic judgements that are biased towards one's own perspective – resulting in an **Emotional Egocentricity Bias** (EEB)[4,5]
- In this context, the ability for **Self-Other Distinction** (SOD) plays an essential role, mainly because it avoids confusion between one's own and others' emotions[6]
- Here we tested the hypothesis that greater difficulties in SOD, resulting in a higher EEB in comparison to neurotypical controls, are at the **core of the empathy deficits** often associated with **Autism-Spectrum-Disorder** (ASD)

2. Method

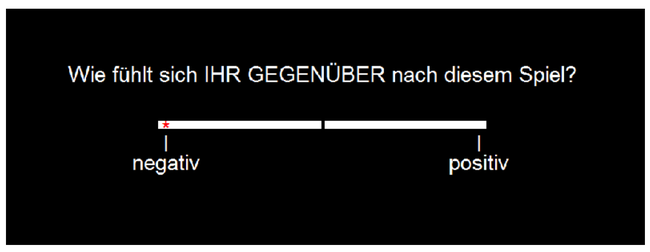
- Modified version of the virtual ball-tossing game **Cyberball**[7,8] to elicit **simultaneous** feelings of exclusion or inclusion for the participant ("SELF") and another player ("OTHER") that are either matching or not





- **Two conditions** (16 blocks each) manipulating the emotional involvement of the participant: **(1)** ACTIVE playing and **(2)** PASSIVE observation

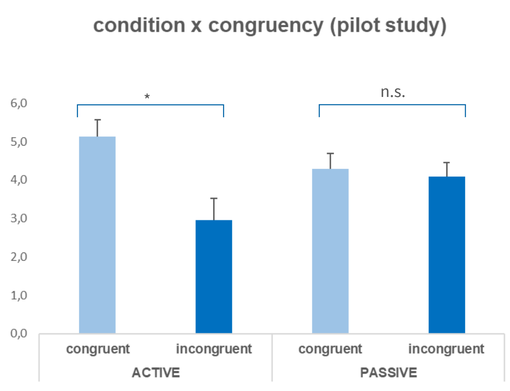
- **Behavioral judgment** of the OTHER's emotional state on a VAS from negative to positive

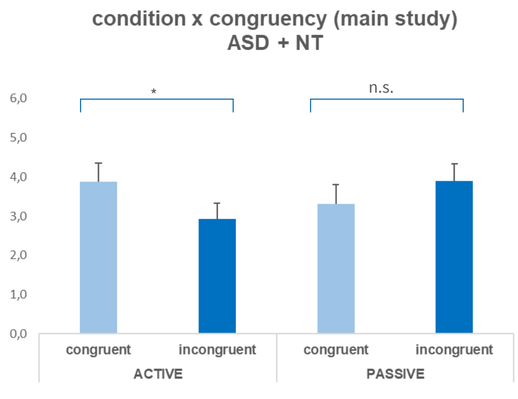


- **Participant samples**
  - Pilot study: $n = 53$ ($M_{age} = 25$, $SD = 5.8$)
  - Main Study: $n_{ASD} = 20$ ($M_{age} = 37.1$, $SD = 10$) $n_{NT} = 19$ ($M_{age} = 37.2$, $SD = 10$)
  - Groups were matched for age, gender, handedness and intelligence

Full-factorial, mixed design
- group (ASD, NT)
- condition (active, passive)
- congruency (congruent, incongruent)
- valence (inclusion, exclusion)

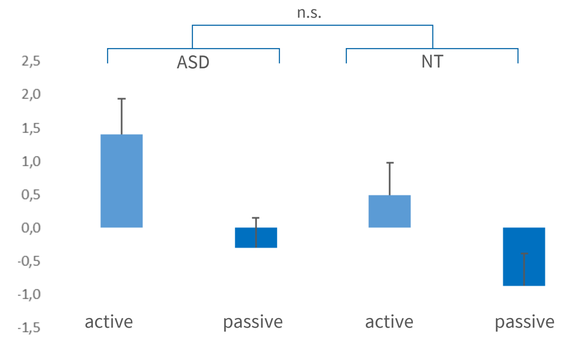
3. Behavioral Results





Pilot Study: Significant **condition x congruency** interaction ($F_{(1,48)} = 15.897$, $p < .001$, $\eta_p^2 = .249$)

Main Study: Significant **condition x congruency** interaction ($F_{(1,37)} = 12.077$, $p = .001$, $\eta_p^2 = .246$) but **no group differences** (condition x congruency x group: $F_{(1,37)} = 0.143$, $p = .707$, $\eta_p^2 = .004$)

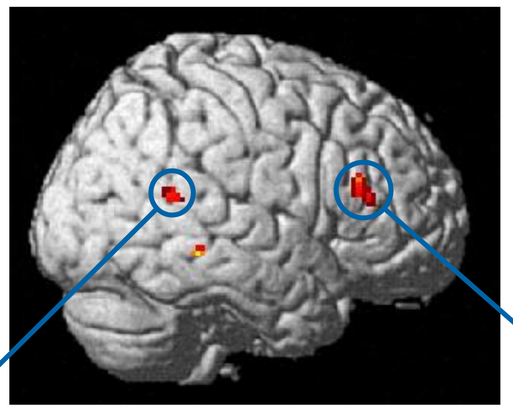


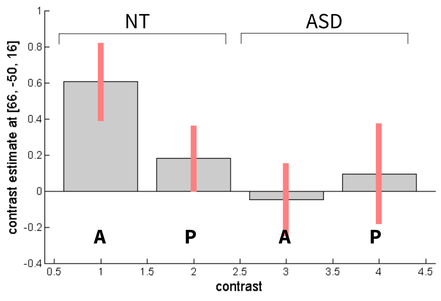
Overall Emotional Egocentricity Bias (EEB) = How much the rating of the other person's affective state is biased towards one's own state (incongruent – congruent trials)

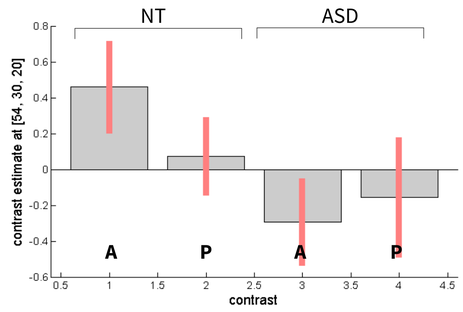
4. Imaging Results

right temporo-parietal junction (rTPJ) [x: 66, y: -50, z: 16]

right dorso-lateral prefrontal cortex (rDLPFC) [x: 54, y: 30, z: 20]







Brain areas of statistical difference between 17 NT and 17 ASD for INCONGRUENT vs. CONGRUENT trials during the ACTIVE condition, masked on [INC vs. CON] > [ACT vs. PASS] in controls ($p < 0.001$, uncorrected)

5. Conclusion

- **Similar behavioral EEB** in the NT and ASD populations
- Brain differences in the rTPJ and rDLPFC, two key areas involved in ToM and SOD
- The present findings **replicate** previous results on the EEB and **expand** them to the domain of social pain
- Furthermore, they suggest **neurophysiological differences** between neurotypical and autistic individuals, possibly underpinning differences in SOD during empathic judgments
- This has **crucial implications** for the directions of further research of empathic abilities in ASD

„I know how you feel!"

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