

superior parietal cortex and supplementary motor area. An 8-8-optode bundle, making 22 channels, targets this region of interest. Outcome measures are: (de)oxygenated hemoglobin concentration changes per task per channel. Results: In this ongoing research, the protocol was already feasible in 19 children ( $7.52 \pm 1.19$ ). Conclusion: Simultaneous registration of cortical MNS activity (fNIRS) and Kids-BESTest scores will help increase the understanding of the control mechanisms underlying the heterogeneous balance problems in DCD. Consequently, first steps are made to confirm whether DCD shows deviant or delayed development.

**Disclosure:** No significant relationships.

**Keywords:** Developmental Coordination Disorder; brain imaging; Pediatric; movement science

### W0034

#### Using fNIRS to study Mother-Child Brain-to-Brain Synchrony in Typical and Atypical Contexts

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A potential avenue of investigating the caregiver-infant relationship lies in caregiver-infant synchrony, which refers to the coordinated interplay of behavioural and physiological signals reflecting the bi-directional attunement of one individual to the other's psychophysiological, cognitive, emotional and behavioural state. Here, we aim to study how early naturalistic caregiver-infant interactions give rise to caregiver-infant attachment, which influences physiological and psychological processes by modulating brain sensitivity. Furthermore, we aim to study how caregiver-infant bond shapes neural pathways involved in socio-emotional regulation in typical and atypical contexts. We present new evidence from fNIRS hyperscanning studies, where we measured simultaneous caregiver (mothers,  $N=30$  and fathers  $N=38$ ) and child brain activity ( $N=70$ ). From the mother-child hyperscanning study (Azhari et al., 2019; 2020; 2021), we have found that higher levels of parenting stress are correlated to lower mother-child brain-to-brain synchrony, especially in the areas of the medial left prefrontal cortex. Additionally, maternal anxious attachment (Azhari et al., 2020a) also correlated in lower mother-child synchrony in the frontal and medial left prefrontal regions. These areas contain structures implicated in the inference of mental states and social cognition, highlighting the role of psychological factors such as parenting stress and attachment style in the influence of caregiver-infant bond formation during naturalistic interactions. From the combined mother- and father-child free play sessions (Azhari et al., 2020b), behavioural data revealed that parenting stress and caregivers' recall of their past bonding experiences their own parents interact with each other to influence the eventual quality of dyadic interaction with their child.

**Disclosure:** No significant relationships.

**Keywords:** Mother-child; fNIRS; Hyperscanning

### W0035

#### NIRS Hemodynamic Response to Methylphenidate in Children with Attention Deficit Hyperactivity Disorder: First Administration, Titration Phase and Associations with Clinical Severity.

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**Introduction:** Attention deficit hyperactivity disorder (ADHD) is a neurodevelopmental disorder characterized by lack of self-regulation and deficits in organizing behaviors in response to emotional stimuli. Methylphenidate (MPH) is one of the most effective psychostimulant drugs for ADHD, however, a possible predictive utility of brain hemodynamic data related to MPH administration and its relation to clinical symptomatology is still not clear. To address these questions, we used Near Infrared Spectroscopy (NIRS) technology, a non-invasive optical technique that allows to investigate the effect of psychopharmacological treatment on cortical hemodynamics.

**Methods:** Twenty children with ADHD underwent a three-waves study and 25 healthy controls were recruited at W1. At W2 children with ADHD received first MPH administration and at W3 they reached the titration phase. At each phase children performed - during NIRS recording - an emotional continuous performance task with visual stimuli of different emotional content. Clinical data were also collected at W1 and W3. We investigated the relationship among the difference between NIRS activation at W2 and W1 (Delta1) and W3 and W2 (Delta2), for each subject, task condition and brain region. Lastly, we investigated correlations between the Delta1 and clinical symptomatology indexes at W1 and between Delta2 and clinical data at W3.

**Conclusions:** Our study results suggest that hemodynamic changes in right prefrontal region probably induced by first MPH administration could predict hemodynamic changes related to MPH titration phase. These biological indexes could be associated to clinical evidences related not only to core ADHD symptoms but also to affective correlates.

**Disclosure:** No significant relationships.

**Keywords:** methylphenidate; adhd; Near Infrared Spectroscopy (NIRS)