Contribution ID: **437** Type: **Poster**

The effectiveness of functional Near-Infrared Spectroscopy (fNIRS) for investigating sensorimotor processing in numerical cognition throughout the lifespan.

Wednesday, September 25, 2024 2:10 PM (20 minutes)

Numerical skills are crucial in various daily life activities, such as activities involving money, understanding numbers and mathematical concepts, comparing magnitudes, and performing calculations. The established link between number processing and sensorimotor mechanisms related to hand actions is well-documented in behavioral research. Embodied cognition theories propose that sensorimotor processes form the foundation for mental representations of numbers. According to action-based theories of cognition, number abilities develop dynamically through interaction with the environment, such as representing numbers, counting, or using fingers for calculations. How can we predict numerical abilities by observing sensorimotor activity across the lifespan?
In this regard, Functional Near-Infrared Spectroscopy (fNIRS) serves as an excellent investigative method for exploring the link between numbers and sensorimotor action across all age groups. The fNIRS is a non-invasive neuroimaging technique that enables monitoring of brain activity by measuring changes in the concentration of oxyhaemoglobin and deoxyhemoglobin in the blood. It provides an effective compromise between spatial (approximately 1 cm) and temporal (approximately 10 Hz) resolution, and demonstrates relative tolerance to movement artifacts. It is non-invasive, and allows testing without physical constraints, offering a promising opportunity to study the neural correlates of sensorimotor and cognitive processing. fNIRS is commonly employed in studies involving children and neonates. Additionally, it is a straightforward technique for testing elderly populations.In this presentation I will shed light on the potential of fNIRS in elucidating the intricate relationship between sensorimotor activity and numerical abilities across the lifespan.

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Session Classification: Lunch & Poster 3