

Brain-to-brain synchrony early in life: What can we learn from different hyperscanning techniques?

Organizers:

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Hyperscanning techniques allow the simultaneous recording of brain activity of different subjects. With the advent of sophisticated new tools and techniques over the past decades, it is now possible to study the inter-brain correlations between cerebral activity of a group of interacting subjects as a unique system. Ecologic experimental designs can be adopted to create an interaction between subjects similar to real life social situations, thus, hyperscanning represents a potentially revolutionary new approach, opening new perspectives for understanding the evolution and development of typical and atypical human social interactions. Given these new opportunities, it appears timely and important to reflect and discuss open questions and current challenges and limitations of different hyperscanning techniques. These include (1) review of experimental tasks suited for hyperscanning across different age groups (from infancy to adulthood) and neuroimaging techniques (EEG, NIRS, fMRI); (2) methodological approaches (such as frequency-based connectivity estimators in EEG hyperscanning, and calculation of temporal correlation and Granger-based causality used on hemodynamic data, i.e., obtained with fMRI and NIRS), (3) impact of subjects' characteristics (such as age and gender) on neural synchrony measures; (4) behavioral correlates of brain-to-brain synchrony. This symposium intends to provide a forum to stimulate the discussion of these and other issues. Clinical implications will be highlighted, particularly with respect to the relevance of early social interaction for mental health across the life-span. In a nutshell, the symposium aims at providing up-to-date knowledge on hyperscanning techniques of social interactions during human development. Each presenter brings long-standing unique and complementary expertise to the table, making the sum greater than the parts.

Symposia Schedule:

8:00-8:15

Hyperscanning techniques and social cognitive neuroscience: where are we now?

Laura Astolfi, Department of Computer, Control, and Management Engineering, Rome, Italy

8:15-8:30

Neural underpinnings of mutual gaze and joint attention using hyperscanning functional MRI

Hiroki Tanabe, Department of Cerebral Research, Okazaki, Aichi, Japan

8:30-8:45

Exploring the neural evidence of mother-infant entrainment: Inter-brain synchronized hemodynamic activity

Yasuyo Minagawa, Department of Humanities and Social Sciences, Tokyo, Japan

8:45-9:00

Is brain-to-brain synchrony of parent-child dyads related to the child's ability to regulate affect?

Vanessa Reindl, RWTH, Aachen, Germany

9:00-9:15

Questions and Answers