Toward a two-body perspective in the interdisciplinary study of non verbal communication

Jacqueline Nadel, CNRS, Centre Emotion, La Salpetriere, Paris, France

Social embeddedness has gained growing interest in cognitive sciences and is of central importance for HMI, Social Computing and related models. However more knowledge is needed to establish valid parameters of human-machine interaction. Such effort may help define the adequate social environments adapted to the heterogeneous peculiarities shown by people with social handicaps like autism. Indeed, the solipsistic view leading to study solitary subjects in the absence of a meaningful social context still predominates in brain, psychological and psychopathological studies. This view has assumed during decades a single-loop model of functioning that has conceptualized perception as an input function and action as an output function. The stance highlighting the intrabrain symmetry between perception and action via the Mirror Neuron System, although modulating the thesis of the single loop, still remains a one-body view exploring intrabrain correlates of perception and action. Instead, we need a radical move toward a two-body perspective exploring the cross-coupling between the perception of one partner and the action of the other, and how they relate in the two brains. For instance, novel imitation data in hyperneuroscience show that individuals entrain with each other at the levels of action, perception and cognition simultaneously, while interbrain synchronization of rhythms takes place. Such data highlight the interactive dynamics emerging from the system constituted by two partners.

How can this perspective influence the conception of HIM and Social Computing models? The response is certainly to be found in a bottom-up approach of non-verbal communication. The first two-body capacities emerging after birth are imitation and emotion. The early emergence of those social capacities is probably related to the fact that anatomic-functional similarities among human brains enhances dynamical similarities between brains. Imitation and emotion both generate resonance in the other via synchrony, turn-taking and topic-sharing, the three bedrocks of social communication. In an attempt to explore the developing functions of emotion and imitation and how far they meet social peculiarities in autism, I will bring behavioural, EEG, H-EEG and fMRI data obtained with typical newborns and infants, typical adults, and children and adolescents with autism.

At this point, we should not forget the contribution of new technologies to brain knowledge. We will give examples of how the use of robots can been seen as a potential scaffold for social neurosciences.