We are tied to others via synchronic imitation of gestures and emotional expressions. Recent brain imaging studies have shown that the Mirror Neurons previously located in area F5 are part of a much wider network of shared activation between observation and execution pathways in the brain, to the extent that both primary motor and sensory cortices are activated, altogether with numerous other structures. Such results suggest that motor representations shared by two individuals may have the chronometry of an intra-individual perception-action coupling. Within this framework, I will report studies exploring the role of synchrony between agents in ‘Mind to Mind Communication’. The agents are infants, ordinary children, children with autism and adults.

Synchronic imitation of gestures provides strong support to the stance that ‘language derives from non-language’. Preverbal infants show an extensive use of synchronic imitation for communicative purpose. They take advantage of the fact that imitation offers two roles, the role of model and the role of imitator. Via a coordinated alternation of imitating and being imitated, infants can sustain long social exchanges and share intentions here and now. It is a powerful communicative system that appears around twelve months, evolves in complex and coded combinations of imitating and being imitated throughout the two following years, and disappears when language is mastered. Such a developmental curve suggests that bodily resonance to others’ actions prepares language. Non-verbal children with autism are sensitive to the imitative communication of another human or of a robot. Turn-taking, topic-sharing, understanding the other's intentions, negotiating shared goals through codes and routines, all these features of language are prepared by the use of synchronic imitation. Yet, any means of communication is supported by interpersonal synchronization, as shown by dual EEG recordings and interactive fMRI.

Via emotional resonance, we reflect automatically the facial expressions of others. This synchronic mirroring provides to the partner a crucial index of the other's social involvement allowing communication to take place. I report a study comparing the facial responses of children and adults to emotional patterns displayed by a robotic head and a human actor, thus questioning how far social interaction between humans may rely on intuitive biological signals such as emotional resonance to expressive non human patterns.

Books

Chapters

Papers
Curriculum Vitae

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**Other activities**
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Associate Editor for Interaction studies: an Interdisciplinary Journal, Benjamins Ed.
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**European contracts**
European VIth program Information Society Technologies -Network of excellence 507422
European VIth program- IST-4-STREP: Observational learning in Cognitive Agents. End: Feb 2009
European VIth program – IST- 6- STREP: Feelix (Feel, Interact, Express: a global approach to development with interdisciplinary grounding) –Dec. 2006-May 2010

**Some recent publications:**