

The clockworks of human-robot collaboration

Human collaboration is a complex behavior comprising multiple cognitive, motor and emotional elements. In order to design 'socially intelligent' robots it is important to understand the underpinnings of these processes. These include the ability to read the actions, intentions and emotions of another agent. To unravel how robot design can address these crucial requirements we have performed a series of studies that examine these mechanisms in both human-human and human-robot interactions. We found that although humans naturally tend to anthropomorphize inanimate objects, they will empathize more with a robot whose appearance is more human-like than with a non-human looking robot, because the human perceives the robot as more similar to self.

Interestingly, we have shown that even without modifying appearances, perceived similarity between humans can be increased if preceded by brief interpersonal synchronization of movement. Thus, even a non-human looking robot may appear more similar to the human if it synchronizes its motions with the human's motions. Moreover, our work has demonstrated that such synchronization enhances general human-human collaboration, and could therefore facilitate also human-robot interaction. In addition we have found that humans are selectively responsive to specific types of robot gesturing and signaling. Relatedly, we have shown that human-human synchronization leads participants to produce more salient gestures that enable increased joint performance of collaborative tasks. Therefore, timing and synchronization, which significantly augment human-human interactions, may serve as a powerful approach for boosting human-robot communication and collaboration.

Tal-Chen is a postdoctoral fellow at the Institute for Learning & Brain Sciences at the University of Washington. Her research examines the roles of music and synchrony in social interactions. She obtained her PhD at the Centre for Music and Science, University of Cambridge, UK, where she investigated the relationship between music and empathy, demonstrating that regular participation of school children in musical group interaction sessions can potentially increase their capacity for emotional empathy. Her postdoctoral work has revealed extensive links between interpersonal synchronous interaction and a range of social-cognitive-emotional behaviors. Tal-Chen's work is funded by a Fulbright Postdoctoral Fellowship, a GRAMMY Foundation Grant and a grant from the John Templeton Foundation.