

Bimodal Information Increases Spontaneous Interpersonal Synchronization of Goal Directed Upper Limb Movements

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When interacting with each other, people often synchronize spontaneously their movements, e.g. during pendulum swinging, chair rocking [5], walking [4][7], and when executing periodic forearm movements [3]. Although the spatiotemporal information that establishes the coupling, leading to synchronization, might be provided by several perceptual systems, the systematic study of different sensory modalities contribution is widely neglected. Considering a) differences in the sensory dominance on the spatial and temporal dimension [5], b) different cue combination and integration strategies [1][2], and c) that sensory information might provide different aspects of the same event, synchronization should be moderated by the type of sensory modality. Here, 9 naïve participants placed a bottle periodically between two target zones, 40 times, in 12 conditions while sitting in front of a confederate executing the same task. The participant could a) see and hear, b) see, c) hear the confederate, d) or audiovisual information about the movements of the confederate was absent. The couple started in 3 different relative positions (i.e., in-phase, anti-phase, out of phase). A retro-reflective marker was attached to the top of the bottles. Bottle displacement was captured by a motion capture system. We analyzed the variability of the continuous relative phase reflecting the degree of synchronization. Results indicate the emergence of spontaneous synchronization, an increase with bimodal information, and an influence of the initial phase relation on the particular synchronization pattern. Results have theoretical implication for studying cue combination in interpersonal coordination and are consistent with coupled oscillator models.

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