

## Temporal Co-creation between Multi-People

As evidenced in music ensemble, dance and sports, people cooperatively produce rhythm with other people. Such temporal co-creation between multi people includes many time delays: delays included in signal processing, multi-modal integration, sensory-motor coordination and cooperation with other people. Despite of such delays, people generate movement cooperatively with others in real time. To investigate the characteristics of temporal co-creation between people is important not only to understand human communication but also to achieve temporal co-creation between human and artifacts.

We conducted a psychological experiment. In the task, two mutually isolated followers simultaneously synchronized by finger tapping with a human leader or metronome producing constant tempo. The followers performed this task with or without tapping timing information of the other follower. The leaders were asked to tap their finger to keep constant tempo with or without the tapping time information of followers. Negative asynchronies (NAs) were observed under all leaders conditions. That is, the tap timings of the followers preceded those of the leaders. The amount of NA under human leader conditions was smaller than that under metronome condition. In addition, the followers predictively synchronized the human leaders while they synchronized the metronome to follow it up.

**Keywords:** Temporal co-creation, Multi-people communication, Cooperative rhythm production

### References

- 1) T. Ogata, T. Katayama, Y. Miyake and J. Ota, Cooperative Rhythm Production between Three People through Auditory Signals. In Proceedings of 23<sup>rd</sup> International Symposium on Micro-Nano Mechatronics and Human Science, pp. 456—459, Nagoya, Nov. 2012.

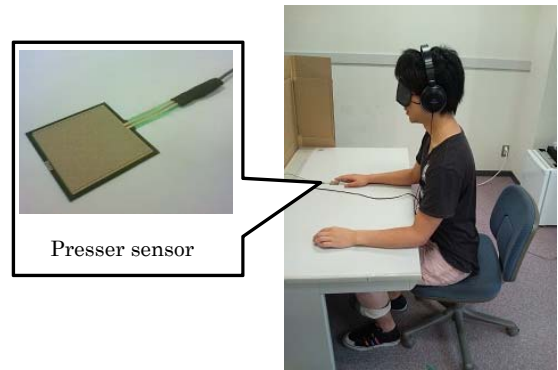


Fig. 1 The picture of a participant in the experiment and the presser sensor to measure the timing of the tapping

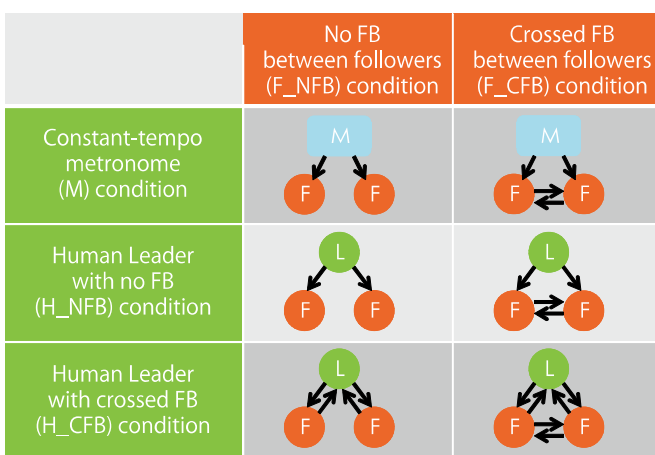


Fig. 2 The conditions of a leader who keeps the constant tempo and followers who cooperatively produce rhythm to synchronize with the leaders. The arrows indicate presentation of stimuli of metronome or other peoples' tapping timing. FB means feedback.

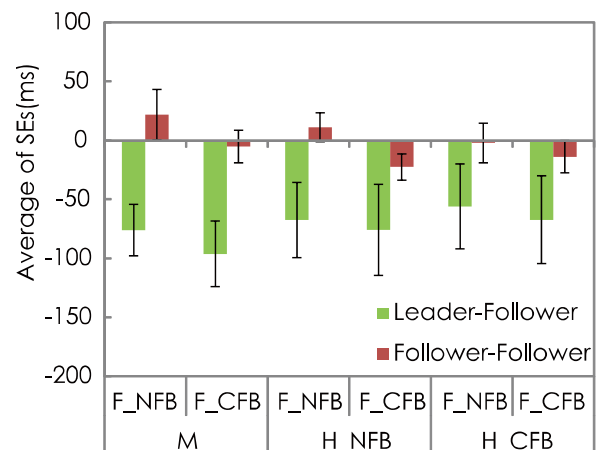


Fig. 3 Averaged synchronized errors (SEs). The followers tended to tap before the leaders.