EuroMov Digital Health in Motion

Spontaneous vs. Intentional Interpersonal Coordination: Recovery and Leader-Follower Dynamics

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1 INTRODUCTION

Spontaneous vs. Intentional

Coordinating movement with a partner can happen without effort, or through deliberate synchronization. These two modes rely on different mechanisms and differ in stability.

Leader vs. Follower roles

Beyond rhythm, joint action also involves an implicit asymmetry: one partner often ends up leading, the other following. How quickly a follower can catch up after losing sync may reveal how flexibly this role is held.

HYPOTHESES

H1

Intentional coordination will produce stronger and more stable interpersonal coupling than spontaneous coordination.

H2

Following a brief perturbation, synchrony will be restored faster during intentional than spontaneous coordination.

Part of the ANR-funded MOVER project, which aims to develop an adaptive human–machine interface for improving intentional coordination in schizophrenia.

2 MATERIALS & METHODS

TASK

Dyads perform a **continuous rhythmic tracking task**. Each participant controls a cursor through oscillatory hand movements and receives visual feedback about their partner's movement. Participants move along a target trajectory at a self-selected frequency. At a random point in each trial, the system briefly slows one partner's cursor, creating a momentary follower/leader asymmetry (counterbalanced across trials).

CONDITIONS

Participants perform the task without any instruction to coordinate.

Spontaneous

Participants are explicitly instructed to synchronize their movements.

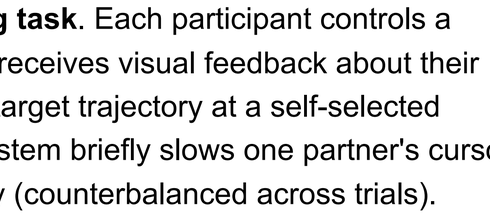
Intentional

perturbation

MEASURES

Coordination measures:

Relative phase
Phase variability
Synchronization index



Perturbation-recovery measures:

Relaxation time (time to return to stable relative phase after the slowdown)
Post-perturbation phase variability

Measures will be computed from the partners' cursor trajectories.

3 EXPECTED OUTCOMES

1 COORDINATION MODE

Intentional coordination is expected to produce stronger and more stable coupling than spontaneous coordination.

2 RECOVERY FROM PERTURBATION

Resynchronization after the induced lag is expected to be faster in the intentional condition. In the spontaneous condition, the slowed partner is expected to remain in a follower position for longer before coordination is restored.

PERSPECTIVES FOR MOVER

- Establish a healthy reference for spontaneous and intentional coordination.
- Identify how flexibly individuals shift between leader/follower roles
- Identify parameters for adapting the MOVER human–machine interface to each user.
- Prepare future comparisons with individuals with schizophrenia, whose intentional coordination may be selectively impaired.

References

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