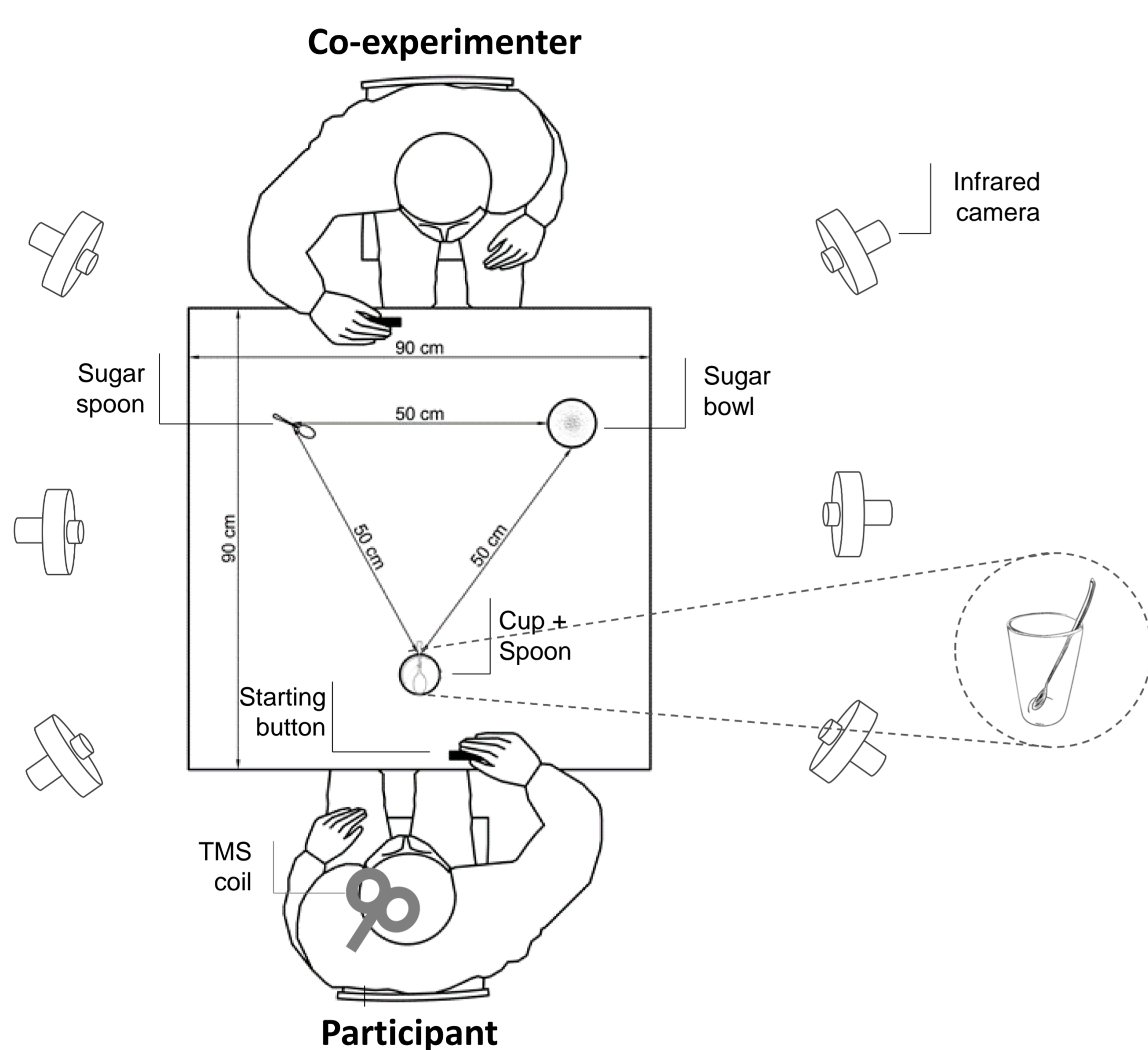


INTRODUCTION

Recent evidence suggests that motor inhibitory mechanisms may play a key role in interindividual motor coordination [1]. This study highlights, with a multimodal approach, the inhibitory processes taking place in dyadic motor interactions.

METHODS

28 participants sat at a table in front of a co-experimenter, they had to first **observe** the co-experimenter's action and then wait for the go-signal (TMS pulse) to **perform** their action (block design).



INTERACTIVE CONDITION: The co-experimenter grasps a sugar spoon and **stretches out her arm towards an out-of-reach cup near the observer.**

NON-INTERACTIVE CONDITION: The co-experimenter grasps a sugar spoon and **returns to the initial position.**

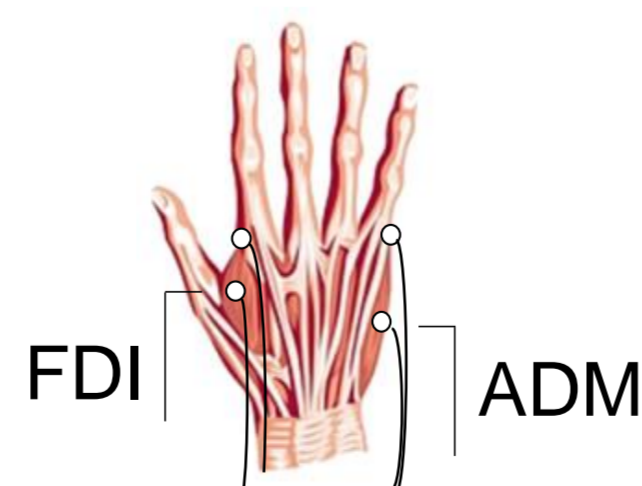
After having observed the co-experimenter's action, the participant had to perform either:

A **whole-hand grasp (WHG)** to lift a cup full of coffee

A **precision grip (PG)** to stir the coffee

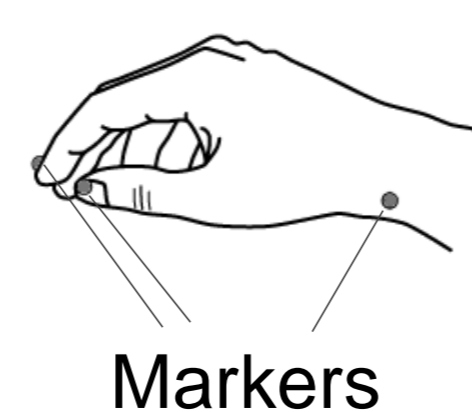
TMS and EMG recordings

Single-pulse TMS was administered over the left M1. Motor-Evoked Potentials (MEPs) and EMG activity from the first dorsal interosseus (FDI) and the abductor digiti minimi (ADM) muscles of the right hand were recorded.



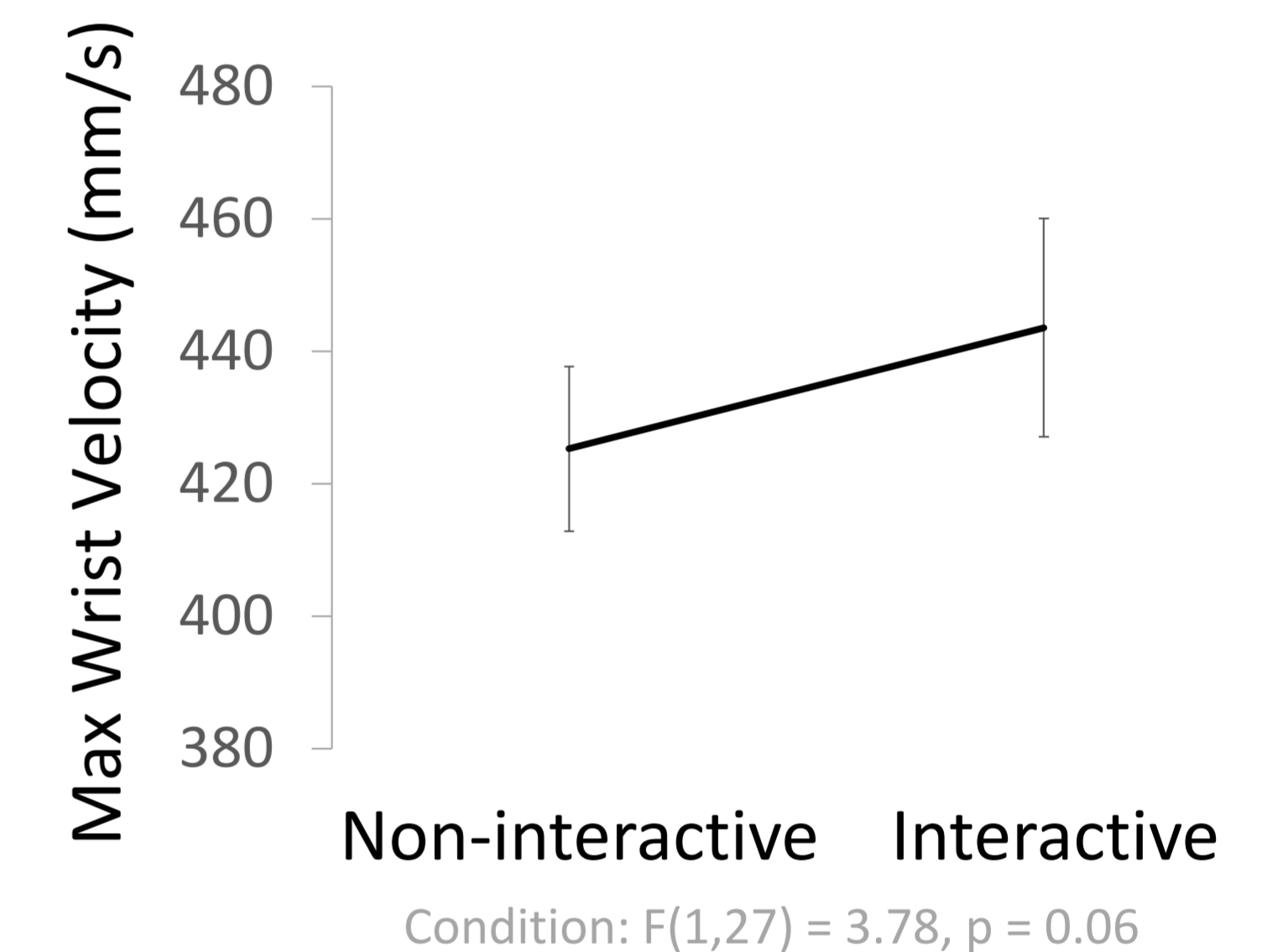
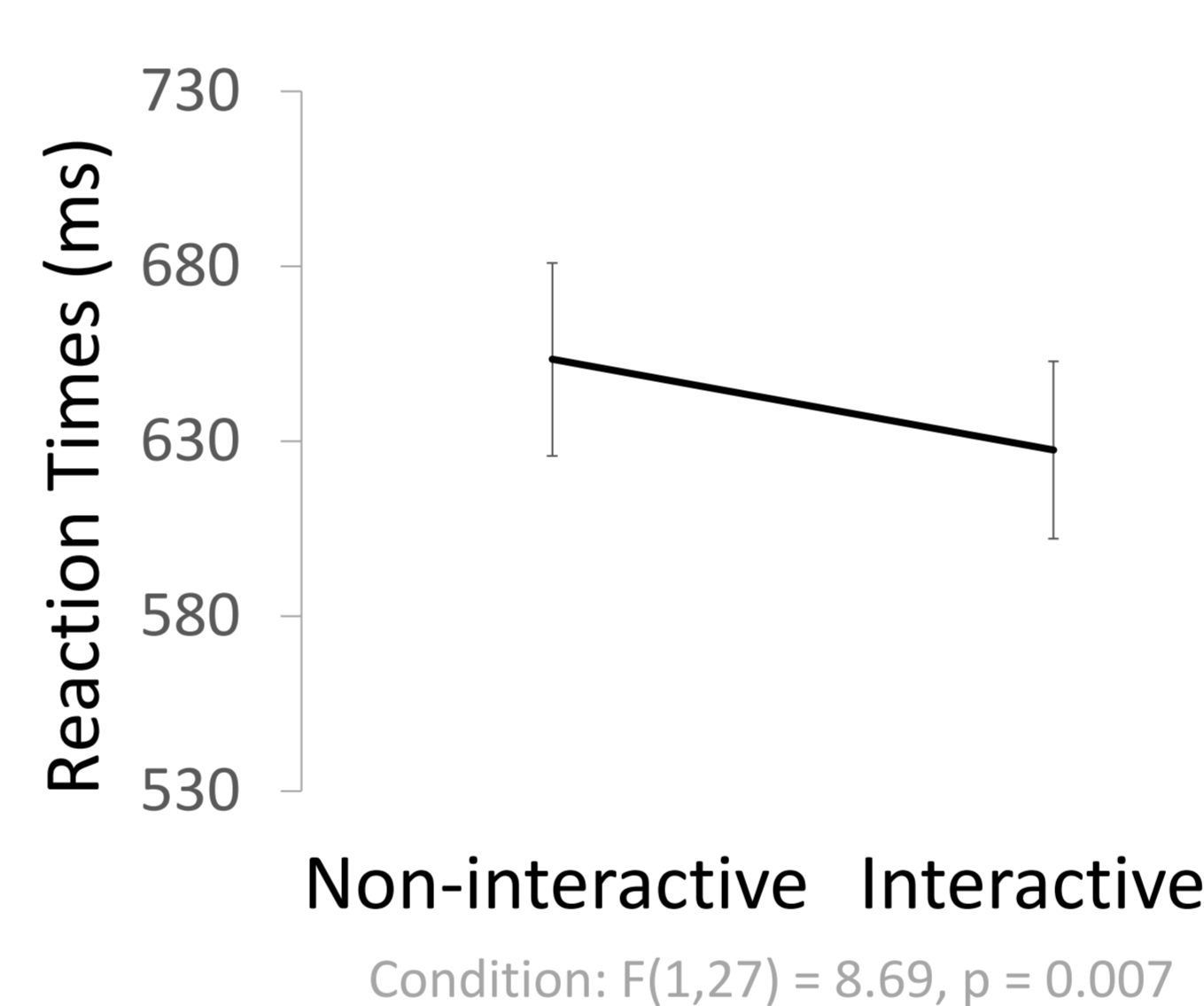
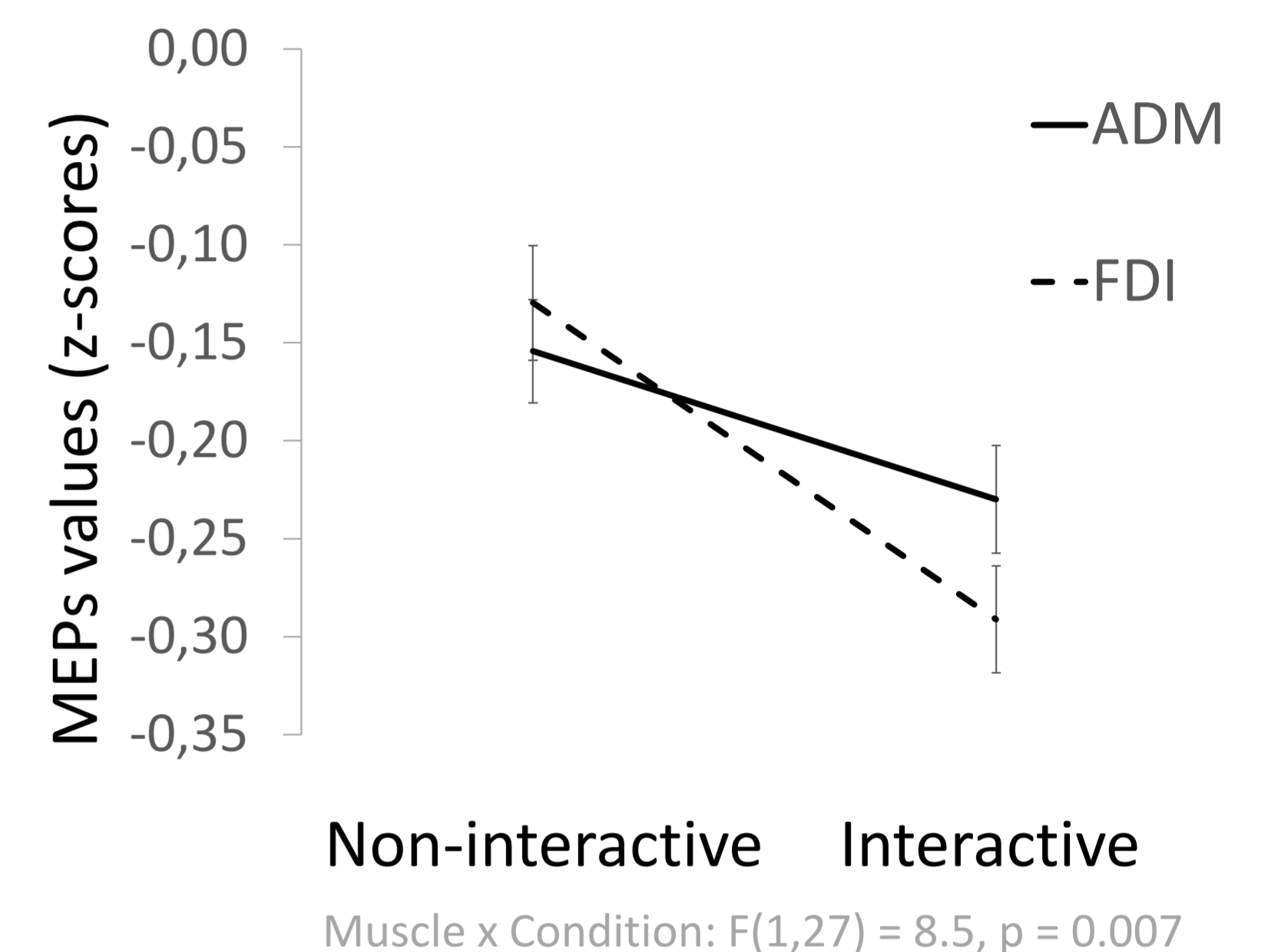
Kinematics recordings

A 3D-Optoelectronic SMART-D system was used to track the kinematics of the participant's right hand.



RESULTS

When observing an interactive gesture, a strong corticospinal inhibition (see MEP amplitude) precedes a speeded response (see RT and Max Wrist Velocity).



CONCLUSIONS

Observing an interactive gesture while aiming to socially interact leads to a preparatory inhibition. This effect is then associated with a more efficient action execution.

This phenomenon may be involved in avoiding untimely overt reactions, but also in facilitating rapid reactions [2].

Overall, our results provide a contribution to the understanding of the functional connection between motor preparation and execution of social interactions, highlighting how tightly timed suppression of muscle activity is essential for skilled interactive movements.

References

- [1] Cardellicchio et al. (2020). Parallel fast and slow motor inhibition processes in Joint Action coordination. *Cortex* 133, 346-57.
[2] Hannah R et al. (2018). Selective suppression of local interneuron circuits in human motor cortex contributes to movement preparation. *J Neurosci* 38, 1264-76.