

Action verbs understanding are slowdown by sensorimotor restriction

Introduction

On the one hand: several experiments have shown a link between the sensorimotor system and action words processing (Fischer & Zwaan 2008).

→ Language and action could be related because of the evocation of common sensorimotor representations (Bidet-Ildei, Sparrow, & Coello, 2011).

On the other hand: sensorimotor representations are affected by short-term limb immobilization (Toussaint & Meugnot, 2013).

Aim: show that a brief period of sensorimotor restriction would disrupt action words processing.

Method

32 participants (mean age = 20 years):
- 16 control
- 16 immobilized

Procedure

Semantic decision task



Immobilized

Semantic decision task



Control

Pre-test

Post-test

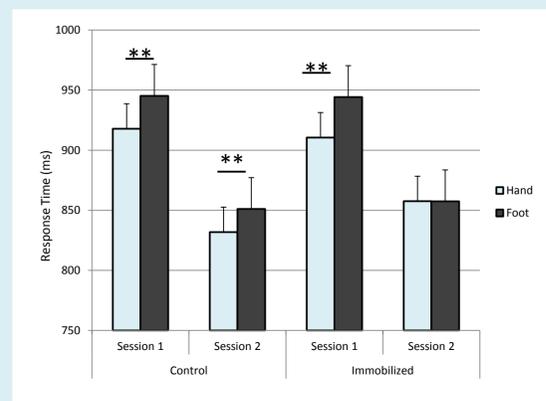
Day 1 → Day 2 →

Semantic decision task:

Judge whether a verb mainly involves the hand (write, clap...) or the foot (run, jump...)

Reaction time and accuracy were recorded

Results



Response time (ms)

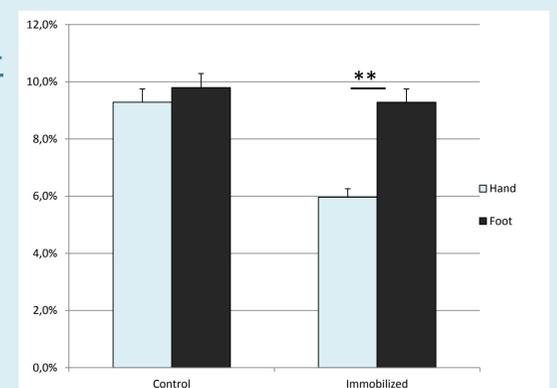
Control group:
Pre-test : **hand < foot**
Post-test : **hand < foot**

Immobilized group:
Pre-test : **hand < foot**
Post-test : **hand = foot**

IPI: Improvement from pre-test to post-test (%)

Control group:
Hand = Foot

Immobilized group:
Hand < Foot



Conclusion

-Sensorimotor restriction disturbs action verbs processing, confirming the embodied view of cognition (Barsalou, 1999)

→ Sensorimotor representations are directly involved during action words processing

-Upper limb immobilization specifically affects the processing of hand-action

→ Processing action words activates somatotopic representations in the sensorimotor cortex

References:

- Barsalou, L.W. (1999). Perceptual symbol systems. *Behavioral and Brain Sciences*, 22, 577-660.
- Bidet-Ildei, C., Sparrow, L., & Coello, Y. (2011). Reading action word affects the visual perception of biological motion. *Acta Psychologica (Amst)*, 137(3), 330-4. <http://doi.org/10.1016/j.actpsy.2011.04.001>
- Fischer, M. H., & Zwaan, R. A. (2008). Embodied language: a review of the role of the motor system in language comprehension. *Quarterly Journal of Experimental Psychology (Colchester)*, 61(6), 825-50.
- Toussaint, L., & Meugnot, A. (2013). Short-term limb immobilization affects cognitive motor processes. *Journal of Experimental Psychology: Learning Memory & Cognition*, 39(2), 623-32. <http://doi.org/10.1037/a0028942>