

Central and peripheral components of the placebo effect on motor performance

Thursday, September 11, 2025 2:10 PM (20 minutes)

Introduction: The effect of placebos on task-related physical fatigue and brain activity remains underexplored yet relevant to dissect. This study investigates the neurophysiological mechanisms underlying motor placebo effects and their impact on fatigue at both central and peripheral levels, using Readiness Potential (RP) as an electrophysiological (EEG) central measure and Median Frequency (MDF) as an electromyographical (EMG) peripheral one.

Methods: Participants (n=48) were randomly assigned to three groups: Natural History, Learning, and Expectation Groups. The motor task involved the repetitive lifting of a load across three sessions: Baseline, Reinforced Expectation, and Test. Placebo groups were deceptively informed that an electrical stimulation applied to their wrist would reduce fatigue. The Learning Group received the sham treatment during the Reinforced Expectation Session, along with a hidden reduction of the lifted load. In the Expectation Group, the same load reduction was applied, but the sham treatment was administered only during the Test Session.

Results: Placebo groups subjectively reported significantly lower fatigue than the Natural History Group. EEG results showed that the Natural History Group exhibited an increase in RP, whereas the Learning Group showed a reduction in RP, indicating a decrease in central fatigue. No significant changes were observed in the RP for the Expectation Group. EMG analysis revealed an increase in MDF only in the Learning Group, suggesting reduced peripheral fatigue, an effect absent in the Expectation Group.

Conclusion: These findings suggest that placebo effects influence both central and peripheral fatigue, but conditioning procedures are necessary to modulate peripheral mechanisms.

If you're submitting a symposium talk, what's the symposium title?

If you're submitting a symposium, or a talk that is part of a symposium, is this a junior symposium?

No

Primary author: CECCONATO, Giorgia (Dipartimento di Neuroscienze "Rita Levi Montalcini", Università di Torino, Torino, Italia)

Co-authors: VOLPINO, Valeria (Dipartimento di Neuroscienze "Rita Levi Montalcini", Università di Torino, Torino, Italia); PIEDIMONTE, Alessandro (Dipartimento di Neuroscienze "Rita Levi Montalcini", Università di Torino, Torino, Italia); CARLINO, Elisa (Dipartimento di Neuroscienze "Rita Levi Montalcini", Università di Torino, Torino, Italia)

Presenter: CECCONATO, Giorgia (Dipartimento di Neuroscienze "Rita Levi Montalcini", Università di Torino, Torino, Italia)

Session Classification: Lunch and poster 1

Track Classification: Action and movement