Perception of weight through mental simulation

Published: 13-07-2012
Last updated: 30-04-2024

Investigate how is the motor cortex affected by the observation of a hand lifting a box of different weights.

Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Other condition
Study type	Observational invasive

Summary

ID

NL-OMON37468

Source
ToetsingOnline

Brief title
Perception of weight through mental simulation

Condition

- Other condition

Synonym
This study is not aimed at a certain disorder. It is a study with healthy subjects.

Health condition

gezonde proefpersonen

Research involving
Human

Sponsors and support

Primary sponsor: Universitair Medisch Centrum Groningen
Source(s) of monetary or material Support: NWO 451-09-006 + SFRH / BD / 47576 /

2008

Intervention

Keyword: MEPs, weight perception

Outcome measures

Primary outcome

Motor evoked potentials measured during the observation of objects being

lifted.

Secondary outcome

n.v.t.

Study description

Background summary

The present project aims at finalizing and extending the findings from a study conducted by Nikola Valchev and Alessio Avenanti (Valchev et al., submitted) at the Center for Cognitive Neurosciences at Cesena, University of Bologna during the month of March 2009. In that experiment we explored the role of somatosensory cortex (brain area SI) on the perception of weight. Subjects were presented with videos of a hand lifting a box and were asked to judge the weight of the box either after a TMS (transcranial magnetic stimulation) perturbation of SI, primary motor cortex (M1) or sham (i.e. no stimulation). Results show that a TMS disruption of SI but not of M1 weakened the precision with which subjects could estimate the weight of the lifted box. These results therefore show that the primary somatosensory cortex plays a role in our perception of weight of an object we see lifted by somebody else. In addition, Pobric et al (2006) found that a disruption of the premotor cortex leads to a similar degree of impairment of the above mentioned task. Alaerts et al (2010) found that the amplitude of the motor evoked potential (MEP), elicited by single pulse TMS on M1, is modulated by the observation of an object being lifted. With the present study we therefore wish to investigate whether the modulation found by Alaerts et al is caused by the flow of information running from SI to M1 and/or from the premotor cortex. In order to investigate if this question we need first to replicate the findings of Alaerts et al (2010) recording MEPs from the right hand muscles when participants view videos of a right hand lifting an object of different weights. However we plan to use

videos in which the object is not visible (hidden behind a screen) and record MEPs from muscles that are visible (ECR) and occluded (FDI, ADM) but clearly involved in the action. If modulation of the MEPs is found for the non-visible muscles and is proportional to the weight of the box, that would be an indication that weight estimation could be done by mentally simulating not only the kinematics of the action but also the effort of the action (somatosensory simulation).

Study objective

Investigate how is the motor cortex affected by the observation of a hand lifting a box of different weights.

Study design

We will measure the magnitude of the MEPs, elicited by single pulse TMS while subjects watch videos of a hand lifting a box of different weights. The box will be hidden behind a screen, providing us with the possibility to measure from visible and occluded muscles of the hand of the observer.

Study burden and risks

Single pulse TMS is a non-invasive technique, so there is no need of special preparation of the subject.
The safety of the single pulse TMS has been demonstrated extensively (Gates, 1992; Pascual-Leone et al., 1993; Wassermann et al., 1996; Wassermann, 1998). No harmful side effects have been reported when the international safety guidelines are followed (Wassermann, 1998).

The strong magnetic field used by TMS can dislocate ferromagnetic particles inside the brain and the eyes. In order to exclude subjects with metal particles inside their brain, subjects will be required to complete a questionnaire and only if none of the exclusion criteria is met the subject will be allowed to participate in our experiment.

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adults (18-64 years)
Elderly (65 years and older)

Inclusion criteria

1. Healthy males and females 2. 18 years old or older 3. Normal vision and hearing 4. Right-handedness (through questionnaire: Edinburgh Handedness Inventory,

Exclusion criteria

1.left-handedness or ambidexterity 2.drug or alcohol abuse 3.(history of) significant medical, psychiatric or neurological conditions 4.history of head injury with loss of consciousness 5.metal in cranium 6.epilepsy or family history of epilepsy 7.cardiac pacemaker 8.infarcations 9.implanted medical pump 10.intracardiac lines 11.history of psychiatric illness (Axis 1, DSM-IV) 12.(suspected) pregnancy

Study design

Design

Study type: Observational invasive
Masking: Open (masking not used)

Control:	Uncontrolled
Primary purpose:	Other

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	19-12-2011
Enrollment:	26
Type:	Actual

Ethics review

Approved WMO

Date:	13-07-2012
Application type:	First submission
Review commission:	METC Universitair Medisch Centrum Groningen (Groningen)

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
CCMO	NL40314.042.12