

Effect of transcranial magnetic stimulation (TMS) on the planning and execution of imitative and complementary actions

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Ethical review	Approved WMO
Status	Pending
Health condition type	Other condition
Study type	Interventional

Summary

ID

NL-OMON30883

Source

ToetsingOnline

Brief title

Role of inferior frontal gyrus (IFG) in execution of complementary actions

Condition

- Other condition

Synonym

body movement, imitation and working with others

Health condition

imitatie en complementaire acties

Research involving

Human

Sponsors and support

Primary sponsor: Radboud Universiteit

Source(s) of monetary or material Support: Europese Unie

Intervention

Keyword: complementary action, IFG, imitation, TMS

Outcome measures

Primary outcome

We will measure a number of dependent variables including reaction time (RT), movement time (MT) and accuracy of the movement (was the correct grip used).

These results will be compared between the conditions in which participants receive rIFG, lIFG or OCC stimulation. Specifically, we will conduct a 2x2x3 ANOVA using Task (Imitate, Complement), Phase (preparation, execution) and Location (rIFG, lIFG, OCC) as independent variables.

Secondary outcome

not applicable

Study description

Background summary

In daily life humans often imitate the actions of other people. Imitation is important for a number of processes including language acquisition, learning of new motor plans and engaging in social situations [1]. For these reasons, imitation has received much attention from the scientific community. When two people have to carry out a cooperative task, imitation seems to be less important. In these cases, achieving the goal of the action often depends on the execution of a complementary action. For example, in order to take a mug from someone you must often perform a different grip than you observe (i.e. if someone hands it to you holding the ear, you must grip the body and vice

versa).

Study objective

We recently conducted a fMRI experiment in which we compared brain areas activated during the preparation of imitative and complementary actions [2]. The right inferior frontal gyrus (rIFG, pars opercularis) was significantly more active during preparation of the complementary as compared to the imitative actions. The goal of the present experiment is to directly test whether or not the inferior frontal gyrus is necessary for the planning and execution of complementary actions. In order to test this hypothesis we will use a combined fMRI/TMS approach.

Study design

The study will take place over two days. On the first day we will take a 3-D scan of the brain using fMRI. Participants will also perform the experimental task (same as used for the TMS experiment) while functional images are collected. The fMRI portion will take approximately 45 minutes. The results from the fMRI task will be used to determine more precisely the location within the IFG that will be later stimulated (see the attached project sheet for approval of the fMRI portion). Approximately two weeks after acquisition of the fMRI data, participants will take part in the TMS portion of the experiment.

For the TMS portion, we will use the same basic task as in the fMRI version. We will assess the effect of rTMS of IFG on imitation and complementary actions using four experimental conditions. First, we will establish the motor threshold. Based on these results we will establish the stimulation strength for that individual. Following this initial step, we will conduct the main TMS experiment. Participants will be given detailed instructions and allowed a brief practice period prior to the beginning of each of the experimental blocks.

Intervention

In order to disturb the activity of the three stimulation locations (rIFG, lIFG, OCC) rTMS (maximum of three pulses per trial) will be applied. During rTMS sessions three brain areas (locations) will be stimulated in a randomized order.

Study burden and risks

In this study rTMS method will be used, and the maximum number of pulses per trial will be three. The total number of magnetic pulses each subject will receive is 1440 (480 per location), which fits within the TMS guidelines. In the past, use of such parameters has never led to any side effects. There are no

known benefits to participating in this 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

right handed

age

Exclusion criteria

epilepsy

intracorporeal metal implants

cardiale pacemaker

Study design

Design

Study type: Interventional

Masking: Single blinded (masking used)

Control: Uncontrolled

Primary purpose: Other

Recruitment

NL

Recruitment status: Pending

Start date (anticipated): 01-12-2007

Enrollment: 16

Type: Anticipated

Ethics review

Approved WMO

Application type: First submission

Review commission: CMO regio Arnhem-Nijmegen (Nijmegen)

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

CCMO

ID

NL19672.091.07