# Assessing the role of cortical plasticity in motor adaptation using motor evoked potentials: A pilot study

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To test the feasibility of using changes in cortical plasticity as a neural proxy for motor adaptation and motor learning.

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

# Summary

## ID

NL-OMON42640

**Source** ToetsingOnline

## Brief title

The role of cortical plasticity in motor adaptation: A pilot study

## Condition

• Other condition

Synonym not applicable

#### **Health condition**

fundamental research on healthy volunteers

#### **Research involving**

Human

## **Sponsors and support**

**Primary sponsor:** Donders Institute for Brain, Cognition and Behaviour **Source(s) of monetary or material Support:** Ministerie van OC&W

## Intervention

Keyword: adaptation, plasticity, Transcranial magnetic stimulation

## **Outcome measures**

#### **Primary outcome**

Motor evoked potentials peak to peak amplitudes are measured at specific time

points throughout the adaptation task.

#### Secondary outcome

not applicable

# **Study description**

#### **Background summary**

Research on adaptation of reaching movements has provided strong behavioral evidence of two processes underlying adaptation. A fast process, which responds fast to movement errors (fast adaptation), but forgets fast. On the other hand, there is a slow process, which adapts slow (slow adaptation) but also forgets slowly. Both processes combined represent the net behavioral adaptation patterns we see in adaptation tasks. A crucial question in this regard is, which brain areas are involved in these processes.

In the current pilot study, we will investigate, whether we can identify one of these processes in the primary motor cortex using single pulse transcranial magnetic stimulation (TMS). In this study, TMS will be applied to assess cortical excitability changes observed via motor evoked potentials (MEPs) at set intervals during the adaptation task.

#### **Study objective**

To test the feasibility of using changes in cortical plasticity as a neural proxy for motor adaptation and motor learning.

#### Study design

A within subject design. TMS will be applied over the left primary motor cortex (M1) to assess MEP peak to peak amplitudes. Subjects will perform a reach adaptation task. At various points throughout this task, MEPs are obtained to track task induced excitability changes in left M1.

### Study burden and risks

The currently proposed TMS paradigm is safe and does not carry any significant risks. Safety guidelines will be followed to ascertain participants' safety. Potential side-effects of TMS are tingling sensations under the electrodes, muscle tension and headache. These are generally mild discomforts that respond promptly to paracetamol (500mg). Volunteers can withdraw from the study at any given time and there are no direct benefits for the participants. The risk that the current application of the techniques as described in this protocol result in an insult is negligible (Nietsche et al. Brain Stimulation 2008 1 206-223; Rossi et al. Clin Neurophysiol. 2009 120 2008-39).

# Contacts

#### Public

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# **Trial sites**

## **Listed location countries**

Netherlands

# **Eligibility criteria**

3 - Assessing the role of cortical plasticity in motor adaptation using motor evoked ... 15-05-2025

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

## **Inclusion criteria**

18-35 years of age, right-handed

## **Exclusion criteria**

Skin disease, metal in cranium, use of psychotropic drugs, including cannabis, XTC, amphetamines and cocaine, epilepsy or family history of epilepsy, history of closed-head injury, history of neurological or psychiatric disorders, medication use (i.e. benzodiazepines, antidepressants and neuroleptica), cardiac pacemaker, electronic hearing devices, pregnancy.

# Study design

# Design

Study type: Observational non	invasive
Masking:	Open (masking not used)
Control:	Uncontrolled
Primary purpose:	Other

# Recruitment

NI

Recruitment status:	Recruitment stopped
Start date (anticipated):	12-01-2016
Enrollment:	20
Туре:	Actual

# **Ethics review**

Approved WMO Date:

19-11-2015

4 - Assessing the role of cortical plasticity in motor adaptation using motor evoked ... 15-05-2025

Application type:
Review commission:

# **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
 NL55270.091.15