Disrupting empathic accuracy for pain: a TMS and behavioural study

Published: 04-03-2020
Last updated: 14-12-2024

Understanding the functional relevance of brain networks supporting either emotion sharing or cognitive understanding of others using TMS.

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

Summary

ID

NL-OMON49979

Source
ToetsingOnline

Brief title
EmpaTMS

Condition

- Other condition

Synonym
Feelings, Theory of Mind

Health condition

The experiment is conducted on healthy participants. In the proposed project we test behaviour during social cognition (e.g., empathic accuracy)

Research involving
Human

Sponsors and support

Primary sponsor: Netherlands Institute for Neuroscience
Source(s) of monetary or material Support: NWO VIDI Grant

Intervention

Keyword: emotional empathy, empathic accuracy, mentalizing, TMS

Outcome measures

Primary outcome

Primary outcome of the study will be participant performance in our task.

(Behavioural Outcome)

Secondary outcome

N.A.

Study description

Background summary

We believe that cognitive and emotional empathy represent two paths to understanding others by either sharing their feelings or trying to build a propositional knowledge about them (Zaki et al., 2012b; Spunt and Lieberman, 2013; Zaki, 2014). They have a (at least partially) different neural substrate. Emotional empathy seems to be rooted in resonant activations coupling observation and first-hand emotional experience. Whereas cognitive empathy is more linked to activity within the so-called mentalizing network. Using TMS, we want to selectively modulate target regions within the two networks supporting these processes. At the same time, we will provide participants with stimuli in which we modulate the emotional content and the cognitive description of the same emotional content. We will ask participant to rate the emotional content of the shown videos and calculate their accuracy.

We expect the two networks to be particularly sensitive to specific information in social interaction (emotional content for the former and contextual cognitive information for the latter). We thus expect TMS to have a differential and specific effect on accuracy based on the specific target. Furthermore, we expect a differential effect in condition in which the

emotional content and the cognitive description are incongruents.

Study objective

Understanding the functional relevance of brain networks supporting either emotion sharing or cognitive understanding of others using TMS.

Study design

Participants will be tested in a single session. Two groups of participants will be recruited, in Group 1 active TMS will be applied over the anterior cingulate cortex (aCC) and in Group 2 active TMS will be applied over the temporo-parietal junction (TPJ).
They will be asked to watch videos involving another individual experiencing annoying stimulations to the hand of different intensities while they rate how much pain that person is feeling. Our paradigm stimuli include videos in which an actress is experiencing painful stimulation of different intensities. In half of the videos the actress is freely showing her facial expressions (*show pain*) in the other half the actress is suppressing (*suppress pain*) her facial expressions. Participants will be provided a description about which type of video they are watching (label: show, suppress)
A congruency manipulation will be added, creating conditions in which the label corresponds to the content of the video (congruent conditions, i.e. *show pain*/ show pain instruction) and situations in which the content of the video does not correspond to the label (incongruent conditions, i.e. *suppress pain*/show pain instruction).

Participants will receive repetitive TMS (6Hz stimulation, total of 12 pulses/clip) while watching the clips. They will watch each clip twice, once while receiving active rTMS and once in a placebo condition without rTMS (sham condition).

We will compare the participants* ratings of pain experienced by the actress to the auto-ratings reported by the same actress about her first-hand experience with the stimulations (empathic accuracy, EA), as well as the ratings between stimulation (real vs. sham), and congruency (congruent vs incongruent) conditions. This will allow us to understand the contribution of the brain regions associated to affective and cognitive empathy whenever the content (affective component) and context within an empathy-eliciting situation are not aligned.

Study burden and risks

No burden is associated with our study. Risks are minimized by the screening procedure. The main one being mild headache during stimulation and in the

minutes right after.

Contacts

Public
Netherlands Institute for Neuroscience

Meibergdreef 17
Amsterdam 1105 AZ
NL
Scientific
Netherlands Institute for Neuroscience

Meibergdreef 17
Amsterdam 1105 AZ
NL

Trial sites

Listed location countries

Netherlands

Eligibility criteria

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

Inclusion criteria

Healthy participants, age 18-35

Exclusion criteria

Participants without a good level of proficiency in English will be excluded from the study.

Participants will be screened using a questionnaire for any contraindication to the use of neuromodulation tools (in this case Transcranial Magnetic Stimulation - TMS). Main criterium is history of epilepsy or intense and recurring headache.EXAMPLE OF SAFETY SCREENING* Have you ever:
o Had an adverse reaction to TMS?
o Had a seizure?
o Had an EEG?
o Had a stroke?
o Had a head injury (include neurosurgery)?
* Do you have any metal in your head (outside of the mouth,) such as shrapnel, surgical clips, or fragments from welding or metalwork? (Metal can be moved or heated by TMS)
* Do you have any implanted devices such as cardiac pacemakers, medical pumps, or intracardiac lines? (TMS may interfere with electronics and those with heart conditions are at greater risk in event of seizure)
* Do you suffer from frequent or severe headaches?
* Have you ever had any other brain-related condition?
* Have you ever had any illness that caused brain injury?
* Are you taking any medications? (e.g. Tricyclic anti-depressants, neuroleptic agents, and other drugs that lower the seizure threshold)
* If you are a woman of childbearing age, are you sexually active, and if so, are you not using a reliable method of birth control?
* Does anyone in your family have epilepsy?
* Do you need further explanation of TMS and its associated risks?

Study design

Design

Study type:	Observational invasive
Intervention model:	Other
Allocation:	Non-randomized controlled trial
Masking:	Open (masking not used)
Control:	Placebo
Primary purpose:	Other

Recruitment

NL

Recruitment status:	Completed
Start date (anticipated):	08-03-2021

Enrollment:	80
Type:	Actual

Medical products/devices used

Generic name:	Magstim Rapid2
Registration:	Yes - CE intended use

Ethics review

Approved WMO Date:	04-03-2020
Application type:	First submission
Review commission:	METC Amsterdam UMC

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	NL68819.018.19