# The role of scene context in object perception: A transcranial magnetic stimulation study

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| **Ethical review** | Approved WMO |
| **Status** | Recruiting |
| **Health condition type** | Other condition |
| **Study type** | Interventional |

## Summary

### ID

NL-OMON50049

**Source**
ToetsingOnline

**Brief title**
Context in object perception

### Condition

- Other condition

**Synonym**
Niet van toepassing

**Health condition**

Niet van toepassing - Onderzoek bij gezonde vrijwilligers

**Research involving**
Human

## Sponsors and support

**Primary sponsor:** Radboud Universiteit Nijmegen
**Source(s) of monetary or material Support:** ERC consildator grant

## Intervention

**Keyword:** Object categorization, Transcranial magnetic stimulation, Visual cortex

## Outcome measures

### Primary outcome

In the object recognition task (experiment 2a) percentage correctly categorized objects is the main dependent variable. In the template matching task the difference between size judgement error in distant and near object conditions will be the main dependent variable.

### Secondary outcome

none.

# Study description

### Background summary

The human visual cortex is able to rapidly categorize objects. In ambiguous situations contextual information from the surrounding scene can help this process. This implies that the early visual cortex, receiving visual information, object-selective visual cortex and scene-selective cortex have to interact. Indeed, neuroimaging studies have provided evidence for such interactions. However, causal evidence as well as the specific timing of when the visual information is processed remains elusive.

### Study objective

As an extension on a study that is currently running and has previously been approved by the METC (NL69407.091.19) the aim of this study is to identify the importance of scene context in the perception of objects by manipulating activity in object and scene-selective visual cortices using transcranial

magnetic stimulation (TMS).

### Study design

A two-part within-subjects design. In the first experimental session sensitivity to TMS over object- and scene-selective cortex will be determined by using the design of Dilks et al. (2013). Based on participants* behavioural response to TMS, they will perform one of three experiments in the second session. Participants sensitive to TMS over the lateral occipital cortex (LOC), an object-selective visual area, perform a study in which an object within a scene or an object without scene has to be recognized. It will be investigated how priming using the scene alone may speed up object recognition. To investigate this timing, TMS will be applied ~100, ~200, ~300, and ~400 ms after stimulus onset to the LOC. Participants sensitive to TMS over the occipital place area (OPA) or first visual cortex (V1), perform a study in which the size of an object has to be judged relative to a scene containing depth. An error in size judgement is expected to depend on the scene depth, and thus processing in OPA and V1. To investigate this timing, TMS will be applied ~100, ~200, ~300, and ~400 ms after stimulus onset.

### Intervention

TMS will be applied to interfere with ongoing brain activity. In experiment 1 five pulses separated by 100 ms will be given per trial (following the procedure of Dilks et al., 2013 and NL69407.091.19). In experiment 2 two pulses separated by 40 ms will be given per trial.

### Study burden and risks

The currently proposed TMS paradigms do not carry any significant risks. Safety guidelines as acknowledged by the International Federation of Clinical Neurophysiology will be followed strictly. Potential side-effects are fatigue and headache. These are generally mild discomforts that respond promptly to common analgesics. Volunteers can withdraw from the study at any given time and there are no direct benefits for the participants.

## 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

Between 18-35 years of age years; Right-handed; Non-smoking; Normal or corrected-to-normal vision; Willingness and ability to give written informed consent and willingness and ability to understand the nature and content, to participate and to comply with the study requirements.

## Exclusion criteria

1) Average use of more than 3 alcoholic beverages daily; 2) Use of psychotropic medication or recreational drugs; 3) Epilepsy or history of an epileptic insult; 4) A nuclear family member with epilepsy; 5) Pregnancy; 6) Serious head trauma or brain surgery; 7) Neurological or psychiatric disorders; 8) Large or ferromagnetic metal parts in the head (except for a dental wire); 9) Implanted cardiac pacemaker or neurostimulator; 10) Participation in a NBS study in the past 28 days; 11) Previous participation in 10 or more NBS studies.

# Study design

## Design

**Study type:** Interventional

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| Masking: | Double blinded (masking used) |
| Control: | Uncontrolled |
| Primary purpose: | Other |

## Recruitment

NL

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| Recruitment status: | Recruiting |
| Start date (anticipated): | 18-05-2022 |
| Enrollment: | 72 |
| Type: | Actual |

# Ethics review

Approved WMO

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| Date: | 18-03-2020 |
| 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 | ID |
|---|---|
| CCMO | NL72752.091.20 |