Functional imaging of visual perception and attention

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The main objective of this study is to understand how the brain selects information using attention: what determines which information is selected and how does this selection occur? An important component of this project will be aimed at researching...

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

Summary

ID

NL-OMON41408

Source
ToetsingOnline

Brief title
Visual perception and attention

Condition

- Other condition

Synonym
no deficits

Health condition

niet van toepassing

Research involving
Human

Sponsors and support

Primary sponsor: Universiteit Utrecht
Source(s) of monetary or material Support: NWO VENI (NL)

Intervention

Keyword: attention, Functional imaging, MRI, visual perception

Outcome measures

Primary outcome

Activity of neural populations as measured using MRI.

Secondary outcome

Not applicable.

Study description

Background summary

People usually perceive what is in front of their eyes without any difficulty, and are able to act in response to that visual information without effort. This apparent ease belies the fact that visual information processing the brain is an extremely complex and incompletely understood process, with over half of the cerebral cortex dedicated to the purpose. Some situations bring the internal mechanisms of visual information processing to light. One example is the case of so-called 'ambiguous images', a kind of puzzle-figure that has not one but two possible perceptual interpretations. A well-known example is the 'duck-rabbit illusion': when looking at this image, which itself does not change, the observer perceives a duck at some moments and a rabbit at others, thus revealing the active and interpretative nature of visual processing in the brain. A different example is formed by the eye movements we make when entering a room or driving a car. In those situations there is an abundance of visual information to choose from, and our system selects just a specific part of this information using either eye position or attention, while we ignore the remaining information.

Study objective

The main objective of this study is to understand how the brain selects information using attention: what determines which information is selected and

how does this selection occur? An important component of this project will be aimed at researching how this directing of attention relates to the other example mentioned above: the changing perception of 'ambiguous images'. Existing studies indicate that these perceptual alternations between distinct interpretations arise from processes that have much in common with the processes behind switches in attention between parts of the visual input. This potential connection offers a fruitful new angle for studying visual perception and its dependence on attention.

Study design

Observers will be scanned in an MRI scanner while they view images projected onto a screen. These images can be ambiguous figures, such as the above-mentioned 'duck-rabbit' illusion and other images that can be perceived in two different ways. Observers will be able to indicate their perception at any given moment using response buttons. The projected displays can also consist of multiple objects, usually geometric shapes like squares and circles, in which case observers will be asked to move their attention between objects in the display. Our analysis of measured brain activity will primarily focus on the activity that occurs around the time of perceptual switches in the face of ambiguous visual information, and around the time of attention shifts in the case of multi-element displays.

Study burden and risks

relatedness (if applicable):
One scan session will last for about 60 minutes. Functional MRI is a non-invasive technique with no known rists. The data will primarily be used for research purposes. However, if we encounter important brain defects we will contact a radiologist for advise. If the radiologist deems it important to follow up on the observation, then the participant will be notified. There are no immediate benefits for the participants, apart from the monetary compensation. Participants will be made familiar with the visual displays and their task beforehand, outside the scanner.

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

Age between 18 and 65 years of age and normal vision

Exclusion criteria

- Ferrous objects in or around the body (e.g. braces, glasses, pacemaker, metal fragments) - Drug or alcohol abuse over a period of six months prior to the experiment
- History of closed- or open-head injury
- History of neurological illness or endocrinological dysfunction
- Claustrophobia
- Major medical history
- Chronic use of medication
- History of epilepsy
- History of epilepsy in first-degree relatives
- Incapability of giving an informed consent
- Pregnancy

Study design

Design

Study type: Observational non invasive

Masking:	Open (masking not used)
Control:	Uncontrolled
Primary purpose:	Other

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	01-04-2015
Enrollment:	100
Type:	Actual

Ethics review

Approved WMO

Date:	10-01-2014
Application type:	First submission
Review commission:	METC Universitair Medisch Centrum Utrecht (Utrecht)

Approved WMO

Date:	11-02-2015
Application type:	Amendment
Review commission:	METC Universitair Medisch Centrum Utrecht (Utrecht)

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	NL45398.041.13