The relationship between visual hallucinations, visual perception and attention in patients with schizophrenia

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The primary objective is to investigate if there is a difference in the performance on tasks measuring visual perception and attention between visual hallucinating schizophrenic patients, schizophrenic patients who do not hallucinate and healthy...

Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Schizophrenia and other psychotic disorders
Study type	Observational invasive

Summary

ID

NL-OMON45154

Source
ToetsingOnline

Brief title
INZICHT

Condition

- Schizophrenia and other psychotic disorders

Synonym
non-affective psychotic disorder, psychosis

Research involving
Human

Sponsors and support

Primary sponsor: Universitair Medisch Centrum Groningen
Source(s) of monetary or material Support: d.m.v. financiering onderzoekstijd hoofdonderzoeker in kader van aanstelling UMCG

Intervention

Keyword: fMRI, Schizophrenia, Visual hallucinations, Visual perception

Outcome measures

Primary outcome

The primary parameter of the first party of the study is object and space perception, assessed by the Visual Object and Space Perception (VOSP) battery. Object perception is also assessed by Image Recognition Movies (IRM). The VOSP consists of four tests assessing object perception and four tests assessing space perception. It minimizes the involvement of other cognitive systems. They have to do the test in writing. The IRM compromises 4 movies in which objects dynamically appear out of random noise, mimicking suboptimal visual situations. Subjects have to verbally name the image when recognized. The speed and content of conscious perception will be assessed.

The primary parameter of the second part of the study is the fMRI-scan-output while the IRM test is performed.
The primary endpoint of the retinotopic mapping fMRI-scans is cortical activation, reflected by the Blood-Oxygen-Level-Dependent (BOLD)-level. During this retinotopic mapping, participants are presented with a bar and wedges with a checkerboard pattern which moves across the screen,
The primary endpoint of the resting-state fMRI-scans with pushing buttons for VH is also cortical activation, reflected by the Blood-Oxygen-Level-Dependent (BOLD)-level.

Secondary outcome

The secondary objective is attention. The Test Battery of Attentional Performance (TAP) was applied for this objective. Participants have to focus their visual attention for 10 minutes on a computer screen for this test and have to push a button if they recognize irregularities in movement patterns. It measures the number of omitted irregularities for sustained visual attention.
An other type of attention, working memory, is assessed by the Wechsler Adult Intelligence Scale II Word Learning and Recalling Task. Participants are presented with 15 words on a computer screen, then they have to try recall those 15 words. This is repeated twice. The total correct remembered words are measured, as are the number of wrong answers and number of words named twice (or more times). After 20 minutes, they are asked to recall the 15 words (delayed recall). Also, they are presented with 30 words, which include the 15 presented words as well as 15 words which were not presented. They are asked whether they have been presented with the particular words. The number of correct hits and correct rejections are measured.
An other secondary objective is auditory perception. .A speech discrimination test has been applied for this objective (22).Subjects are seated in front of a computer screen, wearing a headphone. On each trial a target word is presented at 60-65 dB, superimposed on white background noise at 72 dB. The target words are audible but hardly discernable. Stimuli consists of verbs and nouns. After a 2-seconds* delay a probe stimulus, consisting of a spoken word, is presented, free of noise, and thus clearly audible. During this phase the screen showed

only a fixation cross. The question *have you heard the word *X* in the noise?*is then presented on the screen, with *X* referring to the probe stimulus. Subjects indicate their answer on a five-point scale, ranging from *certainly not* to *certainly*. The experiment consists of 50 trials. On half of the trials, the target word and the probe word are the same.

Secondary output of the second part of the study is from the resting-state fMRI-scans, which is the Blood-Oxygen-Level-Dependent (BOLD)-signal, which is thought to reflect neuronal activity. Another secondary parameter is the motor response during the visual task, as participants have to push a button when they recognize the image, and when the central fixation square changes color.

The secondary output of the retinotopic brain mapping fMRI-scan are motor responses, as during this test too, a central fixation square changes color with random intervals. Participants are asked to push a button on a response box, to keep attention constant.
The secondary output of the resting-state fMRI-scans with pushing buttons for VH are also motor responses, as during this scan patients push a button when they start experiencing VH, and push an other button when the VH stops.

Study description

Background summary

Schizophrenia is a psychiatric disorder, characterized by psychoses, which are chronic or recurrent. It is a clinical diagnosis established by clinical

interviews assessing signs, symptoms and history following standardized diagnostic criteria such as the DSM-IV. Hallucinations in schizophrenia are typically considered to be auditory, consisting of *hearing voices*, although hallucinations in other sensory domains also exist. Visual hallucinations are present among 14% to 69% of the patients. A challenging explanation for the occurrence of recurrent complex visual hallucinations (RCVH) in schizophrenia is offered by the Perception and Attention Deficit (PAD) model, which states that they only occur in the presence of a dual deficit in attention and perceptional processes. Several studies show that in schizophrenia there are combined deficits in attention and perception. However, until now no attempts have been made to establish direct evidence for this relationship by comparing visual hallucinating schizophrenic patients with non-visual hallucinating patients and healthy controls. Therefore, the first part of the study consists of four neuropsychological tests assessing attention and visual perception. A fifth test assessing auditory perception is included as well, because we would like to investigate whether a possible change in perception is modality-dependent or not.
The second part of the study consists of an object recognition task (visual perception) during fMRI, in order to search for a bottom-up of top-down disorder. Furthermore, connectivity between brain regions will be explored using resting-state fMRI. An fMRI-scan including retinotopic mapping will provide more detailed information about in particular bottom-up processing. The fourth way to explore the neuronal base of VH in psychotic disorders is by investigating direct neural correlates of VH, by analyzing resting-state fMRI-data of psychotic patients while they experienced VH (only patients with visual hallucinations will undergo this scan).

Study objective

The primary objective is to investigate if there is a difference in the performance on tasks measuring visual perception and attention between visual hallucinating schizophrenic patients, schizophrenic patients who do not hallucinate and healthy controls, within the framework of a recently proposed theory on the origination of visually hallucinations (Perception and Attention Deficit model). The objective of the second part of the study is to explore neuronal correlates of visual hallucinations in psychosis., The objective of the visual task is to search for changes in neuronal activity during visual recognition reflecting a bottum-up and/or top-down disorder. The objective of the resting-state fMRI-scans is to explore what brain mechanisms predispose patients with a psychotic disorder to generate visual hallucinations.
The objective of the retinotopic mapping fMRI-scan is to explore detailed differences in the visual system and in particular bottom-up processing in psychotic patients with visual hallucinations.
The objective of the resting-state fMRI-scans with pushing buttons for VH is to explore the direct neuronal correlates of VH in psychotic disorders.

Study design

The study is a case control study.

Study burden and risks

The first 2 visits of the study will cause very little burden because of the durations (1 x 90 minutes, 1 x 120 minutes) and nature (questionnaires and tests without invasive procedures). The second part of the study involves a fMRI study. The first fMRI scan takes about 1 hour and 15 minutes (the total visit takes about 2,5 hours), the check of the quality of vision 1 hour, the second fMRI scan about 1 hour (for patients with visual hallucinations: 1 hour and 10 minutes; the total visit takes about 2.5 hour). Patients will be selected carefully whether they are suitable for fMRI (checking for contra-indications like for instance a pacemaker or suffering from claustrophobia). Participants will be well informed about the fMRI-procedure. Pathology might show up with the fMRI. If this happens, we will inform the general practitioner. Participants will be informed about this and have to agree with it, otherwise they cannot be included.
This study is ethically justified, because its searches for insight in the pathophysiology of hallucinations in schizophrenia and will cause little burden to the patients. This study hopefully will provide more information about the relationship between visual perception, attention and visual hallucinations in schizophrenia, thereby possibly contributing to a better treatment in the future.

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

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

Inclusion criteria

For patients:
1) meeting DSM-IV criteria for schizophrenia, schizophreniform disorder, schizoaffective disorder or psychotic disorder NOS;
2) in case of psychiatric comorbidity, the schizophrenia spectrum disorder is predominating;
3) age between 18-55;
4) speaking Dutch fluently;
5) being able to give informed consent.;Healthy controls must fulfill the following criteria:
1) age between 18-55;
2) speaking Dutch fluently;
3) being able to give informed consent.

Exclusion criteria

1) other psychiatric disorders than above mentioned schizophrenia spectrum disorders; that presumably affect our data;
2) the presence of accompanying neurological disorders that supposedly influence our data;
3) visually acuity less than 50 percent (Snellen chart);
4) visually field defects (Donders technique);
5) cognitive impairment, which is assessed by Mini-Mental State Examination. The cut-off point is <26.
Exclusion criteria fMRI:
6) presence of implantable devices (electronically, magnetically or mechanically activated, for example implanted insuline pumps, cardiac pacemakers, cardioverter-defibrillators, metallic prosthetic heart valves, cochlear implants);
7) medical disorders because of which patient are unable to lie flat for about 30 minutes, for example poorly controlled heart failure and poorly controlled or severe respiratory disease;
8) ferromagnetic clips;

9) intraocular metallic bodies;
10) pregnancy;
11) claustrophobia;
12) colored tattoos;
13) coils (exception: Mirena);
14) weighing more than 140 kg.;Furthermore, healthy controls are being excluded if they ever have had a psychotic episode; or experience VH (besides due to severe sleep deprivation or use of medication/alcohol/drugs), or if they have a first degree family member who had a psychotic episode or has a psychotic disorder.

Study design

Design

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

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	16-04-2013
Enrollment:	51
Type:	Actual

Ethics review

Approved WMO Date:	17-01-2013
Application type:	First submission
Review commission:	METC Universitair Medisch Centrum Groningen (Groningen)
Approved WMO Date:	23-05-2014

Application type:	Amendment
Review commission:	METC Universitair Medisch Centrum Groningen (Groningen)
Approved WMO Date:	02-09-2015
Application type:	Amendment
Review commission:	METC Universitair Medisch Centrum Groningen (Groningen)
Approved WMO Date:	29-03-2016
Application type:	Amendment
Review commission:	METC Universitair Medisch Centrum Groningen (Groningen)
Approved WMO Date:	23-05-2018
Application type:	Amendment
Review commission:	METC Universitair Medisch Centrum Groningen (Groningen)

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

ID: 24629
Source: Nationaal Trial Register
Title:

In other registers

Register	ID
Other	5103
CCMO	NL39518.042.12
OMON	NL-OMON24629
OMON	NL-OMON27034