Cerebral ordening of space and time in the anticipation of events.

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Research questions:1. Which cerebral regions are involved in space- and time perception: which of them are specific for either space- or time processing, and which regions are involved in both.2. What are the differences in cerebral activation...

Ethical review	Approved WMO
Status	Pending
Health condition type	Movement disorders (incl parkinsonism)
Study type	Observational non invasive

Summary

ID

NL-OMON29745

Source
ToetsingOnline

Brief title
Cerebral space-time ordening

Condition

- Movement disorders (incl parkinsonism)

Research involving
Human

Sponsors and support

Primary sponsor: Universitair Medisch Centrum Groningen
Source(s) of monetary or material Support: Ministerie van OC&W,deels Hazewinkel fonds (onder beheer RUG)

Intervention

Keyword: anticipation, brain, fMRI, space-time dissociation

Outcome measures

Primary outcome

Analysis:

Block design implies a summation of local BOLD responses in 30 s time segments,

thus enabling optimal regional localisation of focal neuronal responses.

Analysis is with SPM.

Secondary outcome

not relevant

Study description

Background summary

The fMRI study is related to previous studies on reaching and grasping. Those studies addressed visuomotor control in relation to a static environment. This study will provide information about the perception of a dynamic environment, needed for making goal-directed movements, in which anticipation plays an important role. E.g., in order to catch a ball, your brain needs to estimate *when* that flying object is at a specific location, thus preparing the commands for the appropriate movements. Novelty in the present design is that spatial and temporal characteristics can be studied by contrasting conditions with identical visual stimuli, motor responses and levels of attention. Moreover, on a philosophical level, the topic is of interest because the clear distinction between time and space, as we perceive it, is a construct of the brain itself.

Study objective

Research questions:
1. Which cerebral regions are involved in space- and time perception: which of them are specific for either space- or time processing, and which regions are involved in both.
2. What are the differences in cerebral activation related to event anticipation and the recall of very recent events: (a) regarding selective processing of either their spatial or their temporal characteristics, and (b) regardless which of these two is dealt with.

Study design

Design:
In the fMRI study, a block design is used, which has the advantage of a straight forward *simple* design. Subjects have to watch a monitor screen, on which a little ball is moving. The ball moves with different speed and along different curves. At specific moments it stops, which provides the signal for subject to make a motor response by pushing a button of a response box. Its new starting point is at (pseudo)random positions on the screen.
- In the control condition (1), subjects always push the same button when the ball stops.
- In the condition of locating its actual stop-position (2), subjects indicate such location by pushing a corresponding button.
- In the condition of spatial anticipation (3), subjects push a button that corresponds to the location where the ball would have touched the bottom of the screen, if it had followed its trajectory.
- In anticipatory timing (4), subjects indicate when the ball would have touched the bottom of the screen.
- Similarly, in condition (5), subjects indicate the location from where the ball started.
- In condition (6), subjects indicate when the ball started its present trajectory.

For both the spatial and the temporal estimations, subjects choose 1 out of 3 options, which is expressed by pushing 1 of 3 buttons of a responsebox. As to enable a spatial choice, the bottom of the screen is divided in 3 segments (left, middle, right). For the temporal conditions, the options short ($t < 2s$), in-between ($2 < t < 5s$) and long ($t > 5s$) are given. The paradigm implies identical visual presentation and motor responses, which means a balance concerning basic visuomotor processing. At the start of each task block, the instruction is given on the screen. In (pseudo)randomised 30s blocks, the 6 successive conditions constitute a run. By designing 8 runs, each condition is repeated 8 times. Each run starts and ends with a non-motor condition in which subjects only attend a central fixation mark.

Study burden and risks

no specific risks,
burden includes spending time for the study, about 2 hours.

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

healthy right-handed subjects, age 18 - 65 y

Exclusion criteria

medical history concerning neurological or visual disease,
pregnancy, claustrofobia,
carrier of ferromagnetic materials

Study design

Design

Study type: Observational non invasive

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

Recruitment

NL

Recruitment status:	Pending
Start date (anticipated):	01-06-2006
Enrollment:	18
Type:	Anticipated

Medical products/devices used

Registration:	No

Ethics review

Approved WMO

Application type:	First submission
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

No registrations found.

In other registers

Register	ID
CCMO	NL12106.042.06