

The effects of internal versus external attentional focus on a simple leg movement task under single and dual-task conditions in acquired brain injury

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Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Structural brain disorders
Study type	Interventional

Summary

ID

NL-OMON39787

Source

ToetsingOnline

Brief title

Attentional focus effects on single & dual-task performance of ABI patients

Condition

- Structural brain disorders

Synonym

acquired brain injury, stroke

Research involving

Human

Sponsors and support

Primary sponsor: Revalidatiecentrum Heliomare

Source(s) of monetary or material Support: Heliomare

Intervention

Keyword: ABI, Attention, dual-task, stroke

Outcome measures

Primary outcome

Motor task: the duration of one movement cycle (i.e., time needed for flexion and extension). Shorter duration represents better performance.

Cognitive task

1) Letter fluency task: The number of words named in one minute. The more words, the better the performance.

2) Auditory recognition task: Number of correct responses & response time

Dual task performance is assessed by calculating dual task cost (DTC) with the following formula:

$$\text{DTC} = (\text{dual task performance} - \text{baseline performance}) / \text{baseline performance} \times 100\%$$

Secondary outcome

Automaticity of movement: The level of automaticity of movement will be measured with the jerk (derivative of the acceleration) of the lower leg.

Higher jerk values represent a lower level of movement automatization.

Cognitive functioning: The neuropsychological tests will be transformed into demographically corrected standard scores. These scores will be averaged within

each cognitive domain: attention, working memory, and executive functioning.

Motor functioning: Scores on the lower extremity items of the Fögl-Meyer assessment and Motricity Index

Reinvestment: Score on the Movement Specific Reinvestment Scale (MSRS).

Study description

Background summary

Many patients with acquired brain injury (ABI) are limited in their ability to perform multiple tasks simultaneously. These impairments in dual task performance can have serious consequences for their daily functioning and quality of life. Therefore, it is necessary to develop interventions aimed at improving dual task performance.

In essence, the mechanism behind dual task performance is relatively simple. Task execution places a certain demand on working memory capacity. When simultaneous execution of a secondary task is required, and the additional demand on working memory capacity exceeds its limits, performance on one (or both) task(s) will deteriorate. Therefore, reducing the demand placed on working memory capacity by the execution of the primary task will yield more residual capacity for the execution of a secondary task. An intervention that might be able to effectuate this is manipulating focus of attention. The constrained action hypothesis predicts that focusing on the effects of movement (i.e., an external focus) induces automatic control of movement, whereas focusing on the execution of one's movements (i.e., an internal focus) results in consciously controlled (hence not automatized) movements. In this way, an external focus of attention is hypothesized to result in superior movement execution than an internal focus of attention. Indeed, it has been demonstrated that an external focus results in superior motor learning and performance in a broad range of tasks in healthy adults. However, to date, the effects of focus manipulation on motor performance and motor-cognitive dual task performance of ABI patients is virtually unknown.

Study objective

The primary aim is to investigate the effects of attentional focus manipulation

on the performance of a repetitive leg movement task under single and dual-task conditions in ABI patients. Furthermore, it will be investigated to what extent the effects of attentional focus are influenced by location of brain damage, and time since injury.

The secondary aim is to investigate whether an external focus of attention leads to more automatized movements compared to an internal focus of attention.

The tertiary aim is to investigate to what extent the effects of attentional focus on performance are mediated by aspects of cognitive and motor functioning.

Study design

The effects of internal and external focus of attention will be investigated in a randomized combined cross-sectional (part A) and short longitudinal (part B) study. In part A, a group of recent ABI patients, a chronic group of ABI patients and a healthy control group will be compared (T=1). This procedure is described below. In part B the recent ABI group and healthy control group will be measured again, following the same procedure as on T1, 6 months after completion of the first assessment (T=2).

Part A

Participants will perform a cyclic leg movement task for which they were required to alternately flex and extend their leg on a comfortable pace for one minute. Attentional focus will be instructed before the start of each trial via standardized written instructions. In two-thirds of the trials participants will perform the leg movement task concurrently with a cognitive task. Half of these trials this will be a letter fluency task, for which participants are required to name as many unique words as possible during one minute starting with a specified letter. In the other half of the trials this will be an auditory recognition task, in which participants are required to verbally respond to an auditory target stimulus (by saying "yes") as fast as possible, but ignore irrelevant stimuli.

Procedure:

All participants complete a neuropsychological assessment and the Reinvestment Scale on day 1. For the patient groups motor functioning is assessed as well.

On the second measurement day baseline performance on the motor task, auditory recognition task, and letter fluency task is assessed. To this end, participants perform the leg movement task with no specific instructions regarding attentional focus with both legs. Next, 6 trials are performed with one leg, and after a short break of 10 minutes 6 trials are performed with the other leg. Trials are separated by at least three minutes of rest, or more if requested by the participant. All trials on this measurement day will be performed with either an external or an internal focus of attention.

On the third measurement day, the same procedure is applied as on the second measurement day with the other focus of attention.

It is counterbalanced whether participants start with an external or an internal focus and whether they start with their dominant/less affected leg or with their non-dominant/paretic leg.

Intervention

The experimental intervention is the manipulation of attentional focus. Participants will be instructed to focus on alternately placing their foot in front of/behind a line on the ground (i.e., an external focus), or to focus on alternately flexing and extending their leg (i.e., an internal focus).

Study burden and risks

The risks associated with participation in this study are negligible. The experimental tasks resemble daily activities of low intensity with which the participants have ample experience. Moreover, the resting periods between trials are of considerable length to minimize fatigue. Adverse events caused by fatigue or unsafe situations are almost entirely ruled out, especially since the experimenter is continuously in the room to monitor the participant's safety and comfort. Therefore, the physical and psychological burden is expected to be low, as is the risk of adverse events.

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

- Unilateral brain damage caused by stroke or other type of acquired brain injury confirmed by neurological assessment and CT-scan or MRI-scan
- First measurement within 11 weeks after brain injury (recent patient group) or more than 1 year after injury (chronic patient group)
- Patient must be able to cooperate with neuropsychological assessment and the experimental task
- Patient must have hemiparesis as indicated by aberrant scores of on the Fugl-Meyer Assessment or Motricity Index
- Patient must be able to remain in seated position independently
- Patient's age is between 18 and 75 years.;Control group:;- Age-matched healthy adults

Exclusion criteria

- Presence of progressive degenerative neurological disorder
- Presence of a severe language comprehension deficit (i.e., to the degree that the participant cannot understand the instructions)
- Inability to perform the leg movement task for one minute

Study design

Design

Study type:	Interventional
Intervention model:	Other
Allocation:	Non-randomized controlled trial
Masking:	Open (masking not used)

Control:	Active
Primary purpose:	Diagnostic

Recruitment

NL	
Recruitment status:	Recruitment stopped
Start date (anticipated):	01-05-2013
Enrollment:	75
Type:	Actual

Ethics review

Approved WMO	
Date:	15-04-2013
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	NL42742.029.12

Study results

Date completed: 31-05-2014

Actual enrolment: 40