Modulation of Somatosensory Stimulus Evoked Potentials and Pain by Self-Touch

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The main objective of this study is to investigate the brain mechanisms underlying the modulatory effect of self-touch on afferent somatosensory (Exp 1) and pain signals (Exp 2).

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

Summary

ID

NL-OMON34275

Source
ToetsingOnline

Brief title
Modulation of SEPs and Pain

Condition

- Other condition

Synonym
nociception, pain

Health condition

pijn

Research involving
Human

Sponsors and support

Primary sponsor: Universiteit Utrecht
Source(s) of monetary or material Support: Ministerie van OC&W

Intervention

Keyword: Body representation, Self-Touch, Somatosensory, Stimulus Evoked Potentials

Outcome measures

Primary outcome

The main study parameter in Experiment 1 is the somatosensory evoked potential recorded bilaterally from EEG electrodes over the primary and secondary somatosensory cortices. In particular, we are interested in differences between ipsilateral SEPs evoked during self-touch as compared to external touch. These differences would indicate inter-hemisphere interaction as a result of self-touch.

Similarly, the main study parameter in Experiment 2 is the difference in the pattern of evoked potentials whilst subjects are experiencing an illusion of mild thermal pain, recorded on the entire scalp during self-touch as compared to external touch.

Secondary outcome

We will not have secondary study parameters. However, we will analyze several distinct characteristics of the evoked SEPs (Exp 1) and ERPs (Exp 2), including raw waveforms, trial-locked synchronization, and interhemispheric coherence.

Study description

Background summary

We have recently shown that acute pain can be reduced by multisensory integration through self-touch, which provides proprioceptive, thermal, and tactile input forming a coherent body representation (Schütz-Bosbach, Musil, & Haggard, 2009; Ehrsson, Holmes, & Passingham, 2005; Kammers, de Vignemont, &

Haggard, 2010). However, the question remains what the precise underlying brain mechanism of this reduction in perceived pain is. Consequently, in the present study we want to expand this behavioural finding by looking at the precise brain mechanism underlying self-touch. The primary prediction is that the processing of afferent peripheral somatosensory and pain signals to the brain is altered when one is experiencing self-touch versus when one is touching something or someone else.
In Experiment 1 we will use light shocks to simulate tactile stimulation and look at SEPs during self-touch or external touch (touching the experimenter) while in Experiment 2 we will use (an illusion of) pain and look at the ERPs during self-touch versus external touch. For the induction of pain we will use the well-known thermal grill illusion (TGI) (Craig & Bushnell, 1994). To induce the TGI the participant's index and ring fingers of each hand will be immersed in mild warm water while the middle finger will be slightly cooled in mild cool water. Immediately after induction of 50 seconds, the fingers will be removed from the water and pressed either against each other or on the hands of the experimenter. For both the SEPs (Exp 1) and the ERPs (Exp 2) the EEG signals for self-touch versus external touch will be compared.

Study objective

The main objective of this study is to investigate the brain mechanisms underlying the modulatory effect of self-touch on afferent somatosensory (Exp 1) and pain signals (Exp 2).

Study design

The study consists of two experiments, the first of which investigates somatosensation and the second of which investigates pain processing. Both experiments are within-subjects designs. Different participants will take part in the two experiments. During each experiment brain activity is monitored in the participant by means of electro-encephalography, forming the main set of dependent measures.
All participants visit the laboratory once for testing which will take about 2 hours.

Study burden and risks

This study is non-therapeutical, uses no medicinal products, no invasive techniques, no interventions and will not include minor and/or incapacitated adults or dependent subjects. Due to the design of this study (see section 3 for details), no medical risks are associated with participation. Discomfort of the participation by the SEP stimulation is minimal, and several studies in our lab showed no medical or psychological risks associated. The risks of this project are therefore regarded as minimal.

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

Right-handed

Exclusion criteria

n/a

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):	14-02-2011
Enrollment:	40
Type:	Actual

Ethics review

Approved WMO

Date:	21-01-2011
Application type:	First submission
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	NL34357.041.10