

General

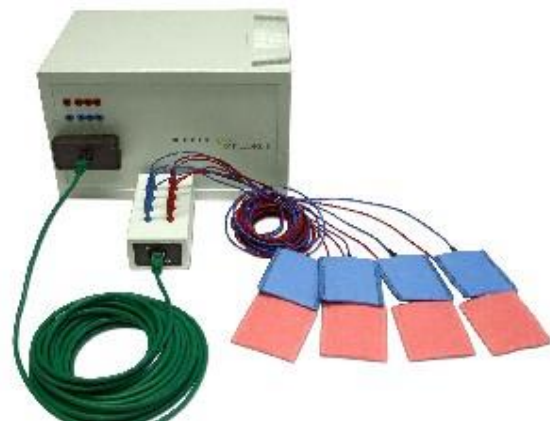
Transcranial Current Stimulation (tCS) is a technique that allows for the stimulation of the brain from outside the head. Weak (5 mA or less) electric direct currents (tDCS) or alternating currents (tACS) will be applied to the head using skin electrodes (mostly large rubber/sponge pads). These weak currents can slightly increase or decrease the activity in the brain areas under the electrodes. If tCS is given for longer durations (e.g., 10-20 minutes) these effects can last for up to an hour after the stimulation. In the last decade tCS has been intensively studied and has become an important technique to investigate the function of certain brain regions. Because the effects of tCS are not directly visible, tCS is often combined with other techniques, for example behavioural tasks, neuroimaging techniques like MRI, or other non-invasive brain stimulation techniques like TMS. While you will not notice the brain stimulation itself, you might sometimes experience mild tingling, itching, or burning sensations on the skin under the electrodes.

Preparation

Before the experiment you have to remove all metal objects from your head (hairpins, ear rings, etc.). To ensure good current flow, it is important that the resistance of the skin is sufficiently low. Therefore, the experimenter will thoroughly prepare parts of your skin using alcohol and abrasive gel before attaching the electrodes. Often the rubber electrodes will be wrapped in sponges that are soaked with saline solution and will be attached to your head with elastic straps (as in the left picture). Sometimes, the rubber electrodes will directly be attached to your skin with a sticky paste. After the experiment you can wash your hair to easily remove the remaining electrode paste. Shampoo, towels, and a hair-dryer are available (for hygienic reasons you are asked to bring your own comb if needed).



tCS device with an example of how the electrodes could be attached to your head



tCS device with four pairs of rubber/sponge electrodes

The experiment

The details of the experiment are specific for each study, but a few components are regularly used. Before the experiment you will be asked to fill in a consent form and a screening questionnaire about your health and other safety aspects of tCS. On the basis of your answers the investigator will decide whether you can participate in the experiment. Often the researcher will take ample time to determine the exact location of the electrodes and to adjust the intensity of the stimulation before the experiment starts. What exactly happens during the experiment itself differs from study to study. A description of this is provided in the study-specific information brochure.

Additional Information

The risk associated with participation can be considered as negligible. The researchers are well trained and the used equipment conforms to international safety standards. During the stimulation, you might experience mild tingling, itching, or burning sensations which usually disappear after a while. These sensations can be unpleasant and are experienced by some participants as mildly painful. In any case, the experimenter will make sure that the stimulation is fully tolerable for you at the beginning as well as throughout the experiment. The most common side effects are a transient mild headache which is short lasting and responds well to light painkillers like paracetamol, as well as a mild feeling of fatigue. In rare cases, nausea and vertigo have been reported.

You can **NOT** participate in a tCS experiment if one of the following applies:

- 1) You have or have had a serious head trauma or brain surgery
- 2) You have large or ferromagnetic metal parts in the head (except for a dental wire)
- 3) You have an active implant, such as a pacemaker, insulin pump, or neurostimulator
- 4) You are pregnant or you think you are
- 5) You are younger than 16 years of age

If one of the above is applicable, please contact the investigator before the day of the experiment!