



## DO YOU WANT TO PARTICIPATE IN OUR STUDY?

### «The effect of transcranial temporal interference stimulation (tTIS) on value-based decision making in healthy adults»

*Institute for Psychology at UiT – The Arctic University of Norway*

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#### The purpose of the study and why we would like you to participate!

We would like your participation in our study on the effects of non-invasive brain stimulation on decision making in healthy adults. The dorsal anterior cingulate cortex (dACC) is involved in higher-level functions including decision making. We are interested in better understanding how transcranial temporal interference stimulation (tTIS) on the dACC will affect decision making in a computer-based card game task.

You will undergo three 1-hour sessions in which you will randomly receive each time either real or fake (sham) stimulation. Neither you nor the experimenter will know which one.

The tTIS consists of two high-frequency electrical fields that will flow through the brain and will stimulate its activity. High frequency transcranial electrical stimulation (250Hz) has been employed in previous studies and has been proven to be a safe way to investigate brain functions in healthy adults. The stimulation protocol we will implement will last approximately 20 minutes and it is supposed to be painless.

We are recruiting healthy adults between the ages of 18-50

- Participants should have normal or corrected vision, no prior or current psychological and neurologic condition (for example depression, bipolar disorder, epilepsy, migraine, serious head injuries, brain surgery, etc.) and cannot be on medication that affects the central nervous system (for example anti-depressives, anti-epileptics, etc.). Participants cannot be allergic to lidocaine or other local anesthetics. People who are pregnant/nursing cannot participate either.
- Participants cannot have any form of metal implants (such as pacemakers or cochlea-implants). In addition, participants cannot have any form of electronic devices in their bodies.
- It is important that you get sufficient sleep the days before testing, and you cannot be under the influence of alcohol or narcotics 24 hours before testing.
- Participants are allowed to take/use caffeine and nicotine according to your regular use.

### What does the study entail for you?

In this study, we will collect and register data about you. We will not collect data that can be traced back to you. We will be asking your age, gender and your dominant hand. We will also be collecting data related to your performance on our card game in order to get insight into your decision-making strategies.

- The experiment will take place in our lab at the Institute of Psychology (IPS) at UiT. There will be three different sessions with a minimum of two days between each session. Before the start of the first session, you will have to sign the informed consent. After that we will proceed with the study, which will last for approximately 60 minutes (about 1 hour). One of our researchers will guide you through the experiment.
- For each session, you will play the computer-based card game three times. Each block will last approximately 10 minutes. During the second and the third block you will receive 20 minutes of active or fake tTIS.
- After the card game, you will be asked to fill out a tTIS-checklist about your experience with the stimulation in order to ensure that we catch any potential side-effects as soon as possible.
- After completing the three sessions, you will receive a gift card of either **300 or 400 NOK** (depending on your task performance) to “Jekta Storsenter”.

### Potential pros and cons regarding participation

- The benefits of participation are several. Firstly, you get to experience brain stimulation in a lab setting. You will be contributing to the advancement of research on brain stimulation and decision making. In addition, you will receive a gift card valued at **300 NOK** to Jekta Storsenter for your full participation in the study, after completing all three sessions. With sufficient performance on the task, you will receive an additional bonus of **100 NOK**.

- We will introduce non-invasive brain stimulation using tTIS. The stimulation takes place during the second and third blocks and lasts for approximately 20 minutes. Potential side effects are tingling, itchiness, and skin redness. Headache, neck pain, pain on the head, mild burning sensations, fatigue, problem with concentration, sudden mood changes, phosphenes (seeing light without light entering the eye) and general discomfort have also been observed, but these side effects are rare. We will follow safe protocols, and we will keep an eye on every participant in order to ensure your safety. If strong or long-lasting side-effects should occur, we would like you to contact us as soon as possible for proper follow-ups. We are using two DC Stimulator Plus machines (model-no: 0021, serial-no: 0337), which is produced by the NeuroConn company. This machine has been approved by EU for the use of tDCS and tACS on healthy adults and patients.

## Voluntary participation and the option to withdraw consent

- It is voluntary to participate
- If you would like to participate, you will need to sign on the last page of this info sheet in our lab before participation.
- You have the right to withdraw your consent during any time of participation without having to justify why. In the event of withdrawn consent, data that has been collected thus far will be destroyed/deleted and not used in any form. There are no negative consequences if you choose not to participate or withdraw your consent later.
- You can ask for insight into the data that has been collected from you, and we will then provide you with this within 30 days.
- The possibility of demanding that we delete or retrieve data collected from you is not valid if the data has been anonymized or published. This access can also be reduced if the data has been implemented in a larger analysis, or in the data has been manipulated.
- If you wish to withdraw, or have any questions regarding the project, feel free to contact the project leader (info on last page).

## What happens with the DATA WE COLLECT from you?

- The data we collect from you will only be used as described in the goal of the study.
- You have the right to insight in which information is registered about you, and you also have the right to have it corrected if said information is incorrect.
- You have the right to be informed of the security around the information collected from you and can contact “Datatilsynet” or the institution’s data protection official.
- All data will be collected anonymously, and they will be only marked by a special code. The data will be marked with a special code that will be kept in a locked drawer in the lab. Only employees at IPS, UiT that are in our research group will have access to the lab, and only employees associated with this project will have access to the locked drawer.
- This info sheet will contain your name and signature; therefore, it will be locked in Gabor Csifcsak’s office, which only he has access to. Due to potential side-effects caused by our non-invasive brain stimulation protocol (tTIS), we will also create a sheet where we will note ourselves of your name and whether you received active or sham (placebo) stimulation. This is important, in order to see whether potential symptoms are caused by

our protocol or not. This sheet will also be locked in Gabor Csifcsak's office. Neither this info-sheet nor the sheet containing name and stimulation will contain the participation code given that will be used in association with data collection. And since the info-sheet and the stimulation-sheet are locked in another room than the data collected from you during experimentation, none of the data collected during the experimentation can be traced back to you.

- You have the right to insight on the data collected from you (performance on our card game, and the results on our questionnaires) by request, but you will have to memorize your participation code and date of experimentation.
- Since the data collected in our experiment is not personally identifiable, the data collected will remain 100% anonymous. The data collected will be used to publish results from our study in a scientific journal. The data collected will be presented at a group level and not at an individual level, meaning that no individual data will be presented in scientific publications or university theses, only results that are made by the entire group.
- Publication of results is a necessary part of the research process. All publishing is done in a manner where individual participants cannot be recognized, but we are required to inform you that there is a possibility that it could happen.
- We will also share the data with other scientists in order to pursue better scientific development within this scientific domain.

## Sharing Information and transferring to other regions

By participating in this project, you are consenting to coded information about your performance on our card game, and answers from the questionnaires can be transferred internationally in line with publication forementioned, and the transparency of the research community. Your anonymous coded data will be made available for other scientists worldwide for research purposes. And due to this, we will use the non-profit Open Science Framework (osf.io), which is a platform used with the intention of sharing scientific research data and promoting transparency within the research community.

- By signing this informed consent, you agree that data collected from you can be shared with other researchers. Other researchers can use this data to learn more about tTIS as a non-invasive brain stimulation technique and its effects on decision-making. We plan to share this data for an unlimited period of time.
- We would also want to make you aware of the fact that it is the rules and regulations for the country the data is kept that are applicable.

## Insurance

The act relating to product liability is applicable for this project.

## Economy

You will receive a gift card to Jekta Storsenter in Tromsø that is valued at either 300 or 400 NOK depending on performance. This research project is funded by IPS at UiT, and the Norwegian research council.

## Approvals

The Research Ethics Committee at the Institute for Psychology (IPS-REC) have reviewed and approved the project. Case nr. 20/22/R1

UiT and project leader Gabor Csifcsak are responsible for the data protection in this project.

## Contact information

If you have any questions regarding the project, would like to withdraw your consent, or are experiencing any side-effects after 24 hours, please contact:

**Responsible researcher, Gabor Csifcsak**

[gabor.csifcsak@uit.no](mailto:gabor.csifcsak@uit.no)

**+47 776 46 776**

If you have any questions regarding data protection, you can contact our institution's data protection official:

**Data protection official at UiT, Joakim Bakkevold**

[personvernombud@uit.no](mailto:personvernombud@uit.no)

I hereby acknowledge that I understand the conditions mentioned above, and I give my consent to partake in the study.

I understand that it is within my rights to withdraw whenever I see fit, without having to justify my decision. In this case, all data collected from me thus far will be destroyed and not used in any way.

All data will be collected and held anonymously, and available for the researchers involved in this study. The results of this study will only be presented in scientific publications or in a university thesis on a group level.

I understand that the data collected in this study will be used for our research purposes, and not to establish any clinical diagnostics. Therefore, I will not ask about any diagnostical opinion.

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Place and date

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Participants' signature

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Participants' name in block letters