Study Information Sheet

Title of Project: TIME EEG

Investigators: Eleonora Marcantoni and Simon Hanslmayr

You are being invited to take part in a research study. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others, if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.
Thank you for reading this.

What is the purpose of this study?
We would like to record your brain activity using electroencephalography (EEG) while you perform a cognitive task. We are interested in how rhythmic activities from different parts of the brain play a role in human cognitive functions. To do so, we will use flickering videos and fluttering sounds to modulate your visual and auditory activities. This technique is called Rhythmic Sensory Stimulation (RSS).

What is RSS? The brain can be safely stimulated at specific rhythms via flickering or fluttering visual or auditory stimuli. At slow frequencies, the flicker sensation is perceivable and neurons in your brain will follow this manipulation, which will allow us to test whether particular rhythms are relevant for cognitive functions.

What will the study involve? How long will it take?
The first step involves the EEG set-up. During this procedure, you will be comfortably seated in a chair, while the experimenters adjust the position of the EEG cap on your head and prepare the electrodes. This process includes the application of a conductive gel to each electrode to enhance signal detection from the scalp. Although this step may take some time, it is crucial for obtaining a high-quality signal during the subsequent task.

Following preparation, you will be sitting in a room wearing the EEG cap in front of a pc. The EEG cap is connected to a computer that records your brain activity while you are performing the task.
During the task you will be presented with a video, along with a sound for three seconds each time. You will be instructed how to respond to these stimuli e.g. by a button press on the keyboard. The task usually takes no longer than 1 hour in total, depending on how you self-pace the procedure (e.g. break durations).
For the entire duration of the task, you will be asked to keep your eyes focused on a fixation cross in the middle of the screen and to sit still in a comfortable position, since movements and muscular tension will lower the quality of the data. The experiment will be interspersed by breaks during which you can freely move your eyes and relax.

In total, the EEG session should last no more than 120 minutes.

Once the test is completed, the EEG cap will be removed, and the electrode gel will be washed off with warm water.

What is the device involved?
We can learn a great deal about how the brain works by measuring the electrical currents produced by the neurons while the brain performs different tasks. EEG is a completely non-invasive imaging technique that allows us to measure the tiny magnetic fields produced by electrical activity in the brain via extremely sensitive devices. This provides us with a window into the dynamics of neuronal activity, and thus of the associated cognitive processes, with a very accurate temporal resolution.

Who can take part? What are the possible risks/side effects of taking part?
EEG is a safe and non-invasive technique widely used in both clinical and research settings to measure brain activity. EEG recordings are associated with no known or foreseeable risks or side effects. Although painless, some individuals may experience mild discomfort. You are encouraged to promptly communicate any concerns, ensuring your comfort throughout the study. This is particularly relevant if you have a skin condition, such as psoriasis, or any other condition affecting your scalp, which may necessitate reconsideration of your participation.
On the day of the experiment, we kindly ask you to avoid hair products and make-up because they can interfere with signal detection and introduce artefacts.

Before you register as a participant in this study, we will check with you whether you have a neuropsychological condition that could potentially affect specific aspects of the study. Conditions we will screen for include a formal diagnosis of attention deficit (hyperactivity) disorder (AD(H)D), or autistic spectrum disorder (ASD).

Additionally, due to the audio-visual nature of the task it is crucial that you do not suffer from impaired eyesight and/or hearing.
Our experiment will be using rhythmic sensory stimulation. The brain can be safely stimulated at specific rhythms via flickering visual stimuli or fluttering auditory stimuli. The frequency of these flickering/fluttering stimuli varies from slower rates (1 Hz) to higher rates (100 Hz). At slow frequencies the flicker/flutter is more perceivable whereas at higher frequencies the flicker/flutter is less perceivable. Neurons in your brain will follow this manipulation which allows us to test whether particular rhythms are relevant for cognitive functions. Some people, especially those with a history of photosensitive epilepsy (1 out of 4000), may be prone to have a seizure related to an epileptic fit during perceiving flickering visual stimuli. Other side effects include headache, especially in subjects suffering from migraine or general discomfort (Yoshimoto et al., 2017). You will complete a screening questionnaire before signing the consent form.

Reference
Yoshimoto, S., Garcia, J., Jiang, F., Wilkins, A.J., Takeuchi, T., Webster, M.A. (2017) Visual discomfort and flicker. Vis Res., 138, 18-28.

Can I withdraw from the study?
Your participation to this research project is voluntary, and you may withdraw from the research at any time and for any reason, without explaining why.

Confidentiality - who will have access to the data?
The data will be stored confidentially. You will be given a participant number and will not be identifiable by any of the data collected. When reporting the analysis, descriptive summary of the sample will be performed,

not on an individual level, thus making it impossible to infer the participants' identities. The data will be stored on a secure network and only members of the Centre for Cognitive Neuroimaging (CCNI) of the Psychology Department at University of Glasgow, will have access to the data. It is possible that the data may be used by researchers working with CCNi, for other similar ethically approved research protocols, where the same standards of confidentiality will apply.

What are the possible benefits of taking part? What happens at the end of the study?
We will reimburse you for your time and travel, and you will have the pleasure of knowing that you have made a contribution to our understanding of the relationship between brain and behaviour.

The results of this study may be published in a journal or used for teaching purposes. The results may also be presented at scientific meetings or in talks at academic institutions. Results will always be presented in such a way that data from individual volunteers cannot be identified.
Since we believe that the data we are about to gather might be useful for other researchers interested in a broad range of scientific questions, we plan to make the anonymised dataset openly available once we have used it for our purposes. We will take precautions to prevent any association of the data with your identity. If you agree with this, you can sign the corresponding "Open Brain Consent Form".

Can I ask questions about the research project?
You may ask more questions about the study at any time - before, during and after the study. The investigator(s) will provide their telephone number, so that they are available to answer your questions or concerns about the study.

Can the investigators interrupt the study?
The research may be interrupted by the investigators at any time, and for several possible reasons, such as new selection criteria.

Will I receive a financial compensation?
You will receive a compensation of £9 per hour for your participation to this study.

The project has been reviewed by the College of Medical, Veterinary & Life Sciences Ethics Committee.
Thank you for taking the time to read this information sheet.
If you are interested to hear more, please contact one of the persons listed below.

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