Consent Form

Title of Research Study: ***Investigating the causal and phase-dependent role of prefrontal theta oscillations in approach/avoidance behavior***

Investigator Team Contact Information: ***Prof. Alexander Opitz***

For questions about research appointments, the research study, research results, or other concerns, call the study team at:

Investigator Name: Alexander Opitz Investigator Departmental Affiliation: Biomedical Engineering Phone Number: 612-624-1094 Email Address: aopitz@umn.edu	Study Staff (if applicable): Ivan Alekseichuk Phone Number: 626-5004 Email Address: ialeksei@umn.edu

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Key Information About This Research Study

The following is a short summary to help you decide whether or not to be a part of this research study. More detailed information is listed later on in this form.

What is research?

Doctors and investigators are committed to your care and safety. There are important differences between research and treatment plans:

- The goal of research is to learn new things in order to help groups of people in the future. Investigators learn things by following the same plan with a number of participants, so they do not usually make changes to the plan for individual research participants. You, as an individual, may or may not be helped by volunteering for a research study.
- The goal of clinical care is to help you get better or to improve your quality of life. Doctors can make changes to your clinical care plan as needed.

Why am I being asked to take part in this research study?

We are asking you to take part in this research study because we are looking for healthy adult volunteers to investigate how the human brain processes emotions.

What should I know about a research study?

- Someone will explain this research study to you.
- Whether or not you take part is up to you.
- You can choose not to take part.
- You can agree to take part and later change your mind.
- Your decision will not be held against you.
- You can ask all the questions you want before you decide.

What are TMS and EEG?

Transcranial magnetic stimulation (TMS) is a safe, non-invasive application of a magnetic field to the head. It is used to briefly excite some brain area and record the outcome. We will use noninvasive sensors placed on the head (electroencephalogram, EEG) and face to record the responses of your body.

Why is this research being done?

We want to learn more about how your brain processes the emotions and what brain mechanism helps you to approach or avoid different emotional stimuli.

How long will the research last?

We expect that you will be in this research study for three sessions total.. The first visit will last up to 2 hours. Subsequent visits will take up to 4 hours. Depending on scheduling, we expect to finish all three sessions within 1-3 weeks.

What will I need to do to participate?

You will be asked to attend up to three visits. In the first meeting, we will record your brain anatomy with magnetic resonance imaging (MRI). The first visit will take up to 2 hours of your time. You will be asked to lay still in the supine position for up to 1 hour inside the MRI machine during this session. In the second and third session, you will perform a simple computer task using a joystick, while we probe and record your brain activity with TMS and EEG. The task with TMS will last for ~6 min per round, 8 rounds per visit, with short breaks in between rounds for rest. The whole visit will take up to 4 hours of your time, including the introduction and preparation time. You will be asked to avoid alcohol for 24 hours and coffee/tea/soda drinks/chocolate for 4 hours prior to visits. You will fill out a short questionnaire during each session.

More detailed information about the study procedures can be found under ***"What happens if I say yes, I want to be in this research?"***

Is there any way that being in this study could be bad for me?

TMS is an FDA approved procedure for mood disorders and is commonly used in biomedical research. Common side-effects include small muscle twitches on the head, neck, or face area. These should not provide any discomfort. No long-lasting side effects have been reported. Potential adverse effects include rare cases of 1. head and neck aches and 2. transient hearing changes. In very rare cases seizure and seizure-like events can occur. We follow all safety guidelines to minimize risk of adverse events.

The MRI scanner uses a strong magnet and radiofrequency electromagnetic fields to take images of your head. Possible adverse effects include 1. cases of claustrophobia, 2. twitching or muscle contractions, 3. heating of certain types of fabric and tattoo ink, 4. hearing damage due to the loud noise, and 5. disruption of implanted or wearable devices. The trained personnel will give you necessary hearing protection and will guide your preparation for the scanning procedure to minimize risks.

More detailed information about the risks of this study can be found under ***"What are the risks of this study? Is there any way being in this study could be bad for me? (Detailed Risks)" and in the "What happens to the information collected for the research?" section.***

Will being in this study help me in any way?

There are no benefits to you from your taking part in this research. We cannot promise any benefits to others from your taking part in this research. However, possible benefits to others include the development of new therapies for mood disorders.

What happens if I do not want to be in this research?

There are no known alternatives, other than deciding not to participate in this research study.

Detailed Information About This Research Study

The following is more detailed information about this study in addition to the information listed above.

How many people will be studied?

We expect about 26 healthy adult volunteers will participate in this research study.

What happens if I say "*Yes, I want to be in this research*"?

Three visits will be scheduled in the following weeks, all at the University of Minnesota Twin Cities Campus. We will confirm your appointment 24 hours in advance via phone or email. Please contact the investigator as soon as possible if you decide to reschedule.

During the first session, we will begin with the paper questionaries. Afterwards, we will record your brain image with magnetic resonance imaging (MRI). This begins with an MRI-specific screening questionnaire to ensure the MRI will be safe. Then we will have you change into medical scrubs that we provide. We will use special ear plugs that protect your ears while allowing us to speak to you. You will lie flat and rest with an MRI head coil around your head. The scan itself will take 1 hour and preparation for the scan will take about 15 minutes.

Specific CMRR procedures may include: Screening procedures, including testing procedures needed before participation in MRI (e.g. pregnancy testing); MRI screening procedures and duration of scanning (e.g. remove all metallic objects, wear hospital gown, etc.); whether study specific positioners like bite bars will be used or additional devices will be placed to communicate with or monitor the subject (e.g. heart rate or respiration monitoring, headphones) or conduct imaging (endo coils, etc.); additional procedures subjects will be asked to perform in this study while in the MRI scanner (e.g. perform tasks while lying in the scanner); and procedures associated with completion of the study (e.g. completion of exit questionnaires, etc.).

The second and third visits will be nearly identical. Each visit will take up to 4 hours of your time. You will be asked to sit in a chair for the duration of the experiment. First, we will prepare the EEG cap which allows us to record brain activity. We will place the cap on your head then fill each electrode with an electrode gel. In addition, we will place several more non-invasive sensors on your face, arm, and hand. All preparation will take up to 1 hour. Please note that during preparation and removal, the investigator may touch your head, face, hands, and arms. The main experiment will last approximately 2 hours as well. During this time, you will perform a simple computer test with a joystick, while we are probing and recording your brain activity using EEG and TMS. The task with TMS will last for 6 minutes per round, 8 rounds per visit, with breaks in between for rest. After the session, you will have the opportunity to wash your hair to remove the electrode gel. Finally, you will be asked to fill out a questionnaire about your state and possible adverse effects.

What happens if I say "Yes", but I change my mind later?

If you take part in this research study, and want to leave, you should tell us. We will cancel future appointments and arrange the final monetary compensation for your time. You may be asked few questions regarding your reason and potential adverse effects to the experimental procedures. Your choice not to be in this study will not negatively affect your right to any present or future medical care, your academic standing as a student, or your present or future employment. If you stop being in the research, information about you that has already been collected may not be removed from the study database.

What are the risks of being in this study? Is there any way being in this study could be bad for me? (Detailed Risks)

TMS machine uses a magnetic field to briefly stimulate a focal brain area. Common side-effects include small contractions in the muscles of the head, neck, forearm and/or hand. These should not cause any discomfort. No long-lasting side-effects of stimulation within the regime as in this study have ever been reported. Potential adverse-effects of TMS include rare cases of: (1) head and neck aches; (2) transient hearing changes. In very rare cases seizure and seizure-like events can occur. You cannot participate if you have reasons to believe that you are pregnant.

MRI machines use a strong magnet and radiofrequency magnetic fields to take images of your body. The scanning process is similar to an x-ray or CT scan, but MRI does not use ionizing radiation (high-energy radiation that can potentially cause damage to DNA) like x-rays or CT scans. The risks associated with MRI scans are:

Projectiles: Objects with magnetic properties can be pulled into the magnet and turn into projectiles. To minimize this risk we ask that subjects remove all metallic items (watches, cell phones, hair pins, etc.) prior to entering the scanner and by controlling access to the scanner.

Claustrophobia: The scanner is a long narrow tube that may cause some people to feel claustrophobic.

Hearing Damage: The noise generated by the operation of the scanner during a study is loud enough to cause hearing damage if you do not wear hearing protection. Hearing protection is required and is provided by the investigator.

Nerve Stimulation: Some people experience localized tingling, twitching, or muscle contractions during MRI scans. This is expected, but if it is uncomfortable please notify the investigator.

Disruption of Devices: Some devices can be damaged by magnetic fields and should not be brought into the scanner room. This includes some implanted devices such as pacemakers, cochlear implants, insulin pumps, nerve stimulators, etc. If you have any implanted device notify the investigator.

Heating of Devices: The radiofrequency waves used in MRI can heat conductive materials such as metal implants (screws, plates, rods, wires, artificial joints, etc.), certain tattoo inks, certain clothing fabrics, jewelry, medication patches, wigs, etc. You will be asked to remove these items if possible. If they cannot be removed you will be asked to provide more information to allow MRI staff to be able to make determination on the safety of proceeding with the scan.

A thorough pre-scan questionnaire will allow us to minimize the risk of device disruption and heating. You will be in constant contact with the investigator and should notify the investigator immediately, via the squeeze ball, if you notice anything unusual, become claustrophobic, think that your hearing protection is not adequate, or if you experience nerve stimulation that is uncomfortable.

In addition, there is a risk of unknown effects related to participation in MRI research. Long-term effects of exposure to high magnetic fields are unknown. Most people experience no short-term ill effects from the strong magnetic field, but some people report dizziness, mild nausea, headache, a metallic taste in their mouth, or sensations of flashing lights. These symptoms, if present, subside shortly after leaving the magnet. If any sensations experienced during participation cause discomfort or pain, notify the researcher right away and your participation will stop and you will be taken out of the magnetic field.

Will I receive any imaging results after an MRI?

The pictures created during this study are for research purposes only and are not intended to provide

health care to you. The investigator in charge of this study has decided that results from your scan will not be shared with you or your physician.

What do I need to know about reproductive health and/or sexual activity if I am in this study?

The risks of exposure to high magnetic fields are unknown for fetuses. Therefore, if you are a female who is capable of becoming pregnant, and you have any reason to believe that you might be pregnant, you should not participate in this study.

Will I know about any new information about the effects of MRIs on human health?

You will be told of any important new information that is learned during the course of this research study, which might affect your condition or your willingness to continue participation in this study.

Will it cost me anything to participate in this research study?

Taking part in this research study will not lead to any costs to you.

What happens to the information collected for the research?

Efforts will be made to limit the use and disclosure of your personal information, including research study and medical records, to people who have a need to review this information. We cannot promise complete confidentiality. Organizations that may inspect and copy your information include the Institutional Review Board (IRB), the committee that provides ethical and regulatory oversight of research, other representatives of this institution, including those that have responsibilities for monitoring or ensuring compliance (such as the Quality Assurance Program of the Human Research Protection Program (HRPP)), and National Institute of Health.

Certificate of Confidentiality

To help protect your privacy, the National Institutes of Health has granted a Certificate of Confidentiality. The researchers can use this Certificate legally to refuse to disclose information that may identify you in any federal, state, or local civil, criminal, administrative, legislative, or other proceedings, for example, if there is a court subpoena. The researchers will use the Certificate to resist any demands for information that would identify you, except as explained below. It is unclear if the Certificate will work in foreign countries.

The Certificate does not prevent a researcher from reporting information learned in research when required by other state or federal laws, such as mandatory reports to local health authorities for abuse or neglect of children/vulnerable adults, or information to the Food and Drug Administration (FDA) when required in an FDA audit. However, the Certificate limits the researcher from disclosing such information in follow up civil, criminal, legislative or administrative legal proceedings if the information was created or compiled for purposes of the research.

You also should understand that a Certificate of Confidentiality does not prevent you or a member of your family from voluntarily releasing information about yourself or your involvement in this research. If an insurer, medical care provider, or other person obtains your written consent to receive research information, then the researchers will not use the Certificate to withhold that information.

Will I receive research test results?

Most tests done on samples in research studies are only for research and have no clear meaning for health care. The investigator(s) will not contact you or share your individual test results.

What will be done with my data when this study is over?

We will use and may share data for future research. They may be shared with researchers/institutions outside of University of Minnesota. We will not ask for your consent before using or sharing them. We will remove identifiers from your data, which means that nobody who works with them for future research will know who you are. Therefore, you will not receive any results or financial benefit from future research done on your data.

Will anyone besides the study team be at my consent meeting?

You may be asked by the study team for your permission for an auditor to observe your consent meeting. Observing the consent meeting is one way that the University of Minnesota makes sure that your rights as a research participant are protected. The auditor is there to observe the consent meeting, which will be carried out by the people on the study team. The auditor will not document any personal (e.g., name, date of birth) or confidential information about you. The auditor will not observe your consent meeting without your permission ahead of time.

Whom do I contact if I have questions, concerns or feedback about my experience?

This research has been reviewed and approved by an IRB within the Human Research Protections Program (HRPP). To share feedback privately with the HRPP about your research experience, call the Research Participants' Advocate Line at 612-625-1650 (Toll Free: 1-888-224-8636) or go to z.umn.edu/participants. You are encouraged to contact the HRPP if:

- Your questions, concerns, or complaints are not being answered by the research team.
- You cannot reach the research team.
- You want to talk to someone besides the research team.
- You have questions about your rights as a research participant.
- You want to get information or provide input about this research.

Will I have a chance to provide feedback after the study is over?

The HRPP may ask you to complete a survey that asks about your experience as a research participant. You do not have to complete the survey if you do not want to. If you do choose to complete the survey, your responses will be anonymous.

If you are not asked to complete a survey, but you would like to share feedback, please contact the study team or the HRPP. See the "Investigator Contact Information" of this form for study team contact information and "Whom do I contact if I have questions, concerns or feedback about my experience?" of this form for HRPP contact information.

Can I be removed from the research?

The person in charge of the research study or the sponsor can remove you from the research study without your approval. Possible reasons for removal include repeated non-appearance for the experimental sessions, lack of motivation to participate in the study, disrespectful behavior towards the investigators and university staff, and any legal or medical reasons why you cannot continue.

What happens if I am injured while participating in this research?

In the event that this research activity results in an injury, treatment will be available, including first aid, emergency treatment and follow-up care as needed. Care for such injuries will be billed in the ordinary manner, to you or your insurance company. If you want information about those circumstances or if you think you have suffered a research related injury let the study investigators know right away.

Will I be compensated for my participation?

If you agree to take part in this research study, we will pay you $15/hour for your time and effort.

Payment will be made using a pre-paid debit card called Greenphire ClinCard. It works like a bank debit card. We will give you a debit card and each time you receive a payment for participation in this study, the money will be added to the card after each completed visit. You may use this card at any store that accepts MasterCard or you can use a bank machine to remove cash. However, there may be fees drawn against the balance of the card for cash withdrawals (ATM use) and inactivity (no use for 6 months). We will give you the ClinCard Frequently Asked Questions information sheet that answers common questions about the debit card. You will also receive letters with additional information on how you can use this card and who to call if you have any questions. Be sure to read these letters, including the cardholder agreement, for details about fees. The debit card system is administered by an outside company. The company, Greenphire, will be given your name, address and date of birth. They will use this information only as part of the payment process. Greenphire will not receive any information about your health status or the study in which you are participating.

Payment you receive as compensation for participation in research is considered taxable income. If payment to an individual equals or exceeds $600 in any one calendar year, the University of Minnesota is required to report this information to the Internal Revenue Service (IRS). Research payments to study participants that equal or exceed $600 during any calendar year will result in a FORM 1099 (Miscellaneous Income) being issued to you and a copy sent to the IRS.

Optional Elements:

The following research activities are optional, meaning that you do not have to agree to them in order to participate in the research study. Please indicate your willingness to participate in these optional activities by placing your initials next to each activity.

Yes, I agree	**No, I disagree**	
_____	_____	The investigator may contact me in the future to see whether I am interested in participating in other research studies by Alexander Opitz.
_____	_____	The investigator may audio or video record me for use in scholarly presentations or publications. My identity may be shared as part of this activity.

Your signature documents your permission to take part in this research. You will be provided a copy of this signed document.

_____ _____
Signature of Participant Date

_____
Printed Name of Participant

_____ _____
Signature of Person Obtaining Consent Date

_____
Printed Name of Person Obtaining Consent