These documents provide some guidelines as to the information which should be given to the *FIMS Research Ethics Committee* (EthicsForm) and your participants (InformedConsentForm), when preparing an application or conducting an experiment using "standard TMS protocols". The forms outline the basic purpose of TMS (point 2), parameters of "standard protocols" (single pulse/paired pulse, repetitive) (point 4) as well as their ethical and safety issues (points 5-6). All other points (1,3/7-15) cover information specific to your project.
Please also read the document 'USING TMS FACILITIES AT THE CCNi' before designing your TMS experiment.

TITLE AND INVESTIGATORS

Top-down control of visual processing and awareness: Studies with transcranial magnetic stimulation.

Marie-Helene Grosbras
Jason Lauder

1. DESCRIBE THE BASIC PURPOSES OF THE PROPOSED RESEARCH

This is a standard TMS experiment, with single pulses.

The ultimate goal of this proposal is to better characterise functional connectivity in the human visual system and the mechanisms for visual awareness. We will focus our investigation on a frontal region that participates both in eye movements control and in vision: the frontal eye field (FEF).

We want to examine the role of the frontal eye field in the processing of visual motion and its interaction with a visual area dedicated to motion perception: V5.

We will use single pulses of TMS to briefly interfere with neuronal activity in FEF and in V5 during a visual discrimination task. By varying the timing between FEF-TMS and V5-TMS, we will be able to infer how the two areas interact for processing visual motion.

2. INDICATE WHO IS FUNDING THE RESEARCH (IF COMMERCIALLY FUNDED, ENSURE THAT PARTICIPANTS ARE INFORMED).

BBRSC research grant award: "Top-down control of visual processing and awareness: Studies with transcranial magnetic stimulation and electroencephalography".

3. DESCRIBE THE DESIGN OF YOUR EXPERIMENT (E.G. CONDITIONS, NUMBER OF PARTICIPANTS, PROCEDURE AND EQUIPMENT WHERE APPROPRIATE) see BPS 2 & 8

3.1. The experiment will consist in assessing performance in a visual motion discrimination task. Participants will sit comfortably in front of a CRT monitor. Patches of moving dots will appear on the monitor for a brief period of time. Most of the dots move randomly, but a small proportion move coherently in one direction. The task of the participant is to indicate by a key press the direction of the coherent motion. An initial training will familiarise them with the task and allows us to adjust the parameter for them to reach a performance of 70-80% correct responses. After this training session, participants will perform the task while we apply TMS.

3.2 Eye tracking

During the experiment, participants are asked to keep their eyes within a small central fixation window. We will verify that they do so by recording the movements of their eyes, using a video-infrared based eye tracker system (Eye Link, SR research). This consists of a source of infrared light illuminating the eyes and a video camera. The camera tracks the pupil and corneal reflection, which provide an accurate measure of eye positions. Participants are informed that the camera records only the movements of their eyes and not actual images of their face.

3.3 TMS settings and protocol

The design will match the description provided in the template for standard TMS experiment.

We will use two Magstim stimulators to deliver single pulses into figure-of-eight coils.

After screening for exclusion criteria, we will determine the motor threshold, as described in the standard experiment.

We will use frameless stereotaxy to target the regions of interest, as described in the "standard TMS experiment".

We will place two coils on the head of the subjects, one over FEF and one over V5, as determined on the subjects' MRIs. We will deliver single pulses at various timings relative to the task, either in one of the coils or in two coils with an interval varied between 25 and 150 ms. We will interleave baseline trials without TMS. We will ensure that at least 6 seconds separate two TMS pulses or pairs of pulse. We will administer a total of 480 trials in blocks of seven minutes.

The experiment, including settings, takes about 1h 15 mins to complete.

Participants will be asked to come for at least two sessions on separate days to test the two hemisphere, as well as a control site. The control site will be over the vertex, with the second coil still placed over V5.

3.4 Number of participants
We will test 20 participants

4. DESCRIBE HOW THE PROCEDURES AFFECT THE PARTICIPANTS

4.1 Visual discrimination task.
Such a highly demanding task can be very tiring. Participants will be given sufficient breaks every seven minutes.

4.2 Video based eye tracking.
Participants will be fully informed of the methods. They will be informed that only the movements, not the actual image of their eyes, is recorded.

4.3 TMS
There are a few potential adverse effects for TMS, as well as contra-indications. They have been described in the "standard TMS experiment" protocol. All precautionary measures will be taken and safety guidelines will be strictly applied.

5. STATE WHAT IN YOUR OPINION ARE THE ETHICAL ISSUES INVOLVED IN THE PROPOSAL (see BPS All Sections)

The ethical issues associated with single pulse TMS studies have been described in the "standard TMS experiment" protocol. All safety guidelines, as well as guidelines for using TMS facilities at the CCNi, will be strictly followed. Both investigators are highly experienced in using TMS. They will be the only people involved in conducting the experiment and in giving the screening questionnaire.
Participants will be given all the necessary information regarding the technique and procedure, as provided in the Template for standard TMS experiments. They will be given full contact information for the responsible investigators.

6. SPECIFY THE NATURE OF THE PARTICIPANTS. INDICATE IF THE RESEARCH INVOLVES CHILDREN OR THOSE WITH MENTAL DISABILITIES OR HANDICAP (see BPS 3) IF SO, EXPLAIN THE STEPS TAKEN TO OBTAIN PERMISSION FROM L.E.A.s, HEADTEACHERS, PARENTS, ETC...

Participants will be normal adult volunteers.

7. STATE IF PAYMENT WILL BE MADE TO SUBJECTS

Participants will receive a compensation of £9 per session.

8. DESCRIBE THE PROCEDURES FOR ADVERTISING, FOR RECRUITING PARTICIPANTS AND FOR OBTAINING CONSENT FROM PARTICIPANTS (see BPS 3)

Participants will be recruited by adverts detailing the purpose and duration of the experiment. Screening questionnaire and written informed consent will be obtained from participants prior to the study.

9. STATE WHETHER THE PROPOSAL IS IN ACCORD WITH THE BPS CODE OF CONDUCT (see BPS All Sections)

"Standard TMS studies" are in accord with the BPS code of conduct.

10. DESCRIBE HOW THE PARTICIPANTS' ANONYMITY AND CONFIDENTIALITY WILL BE MAINTAINED (see BPS 7)

Participants' anonymity will be assured by only referring to a subject number for data storage and analysis. Records of personal details will only be kept if subjects agree (for example to contact them for other studies).

11. DATE ON WHICH PROJECT WILL BEGIN

The project will begin on February 1st, 2008.

12. LOCATION AT WHICH THE PROJECT WILL BE CARRIED OUT

The projects will be carried out in one of the TMS laboratories in the Department of Psychology, University of Glasgow.

13. DESCRIBE HOW PARTICIPANTS WILL BE DEBRIEFED AT THE END OF THE EXPERIMENT (THIS MUST INCLUDE THE OPPORTUNITY TO CONTACT THE EXPERIMENTER - OR SUPERVISOR - FOR FEEDBACK ON THE GENERAL OUTCOME OF THE EXPERIMENT) (see BPS 5 & 10)

Participants will be given contact details of the senior-investigators of the CCNi (TMS facility) and the experimenters. They will be encouraged to ask questions about the experiment, as well as more general questions about TMS - before, during and after the experiment.

14. ATTACH PARTICIPANT INFORMATION FORM AND CONSENT FORM (see BPS 3 & 6)