

fMRI Experiment Procedure

Support Unit For Functional Magnetic Resonance Imaging (fMRI Unit)

Our Web Site : <http://www.cbm.brain.riken.jp/~mri/home.html>

1. Receive a subject. Follow the formalities within the experimenter's lab, as needed.
2. Bring the subject to the MRI site.
 - 2.1. Ask the subject to put his/her luggage into a locker.
 - 2.2. The experimenter should remove all metal from his/her person and instruct the subject to do the same.
 - 2.3. Bring a copy of informed consent documents for the experimenter's protocol, completed and signed by the subject.
3. Filling out an MRI Informed consent document. [The experimenter and operator should both take care.]
 - 3.1. Ask the subject to read the MRI informed consent document and taboo list carefully. Pay particular attention to questions regarding dental bridges and define lenses, confirm these points with the subject orally. Explain the withdraw document for informed consent.
 - 3.2. After the confirmation, ask the subject to complete a form in the computer. Confirm the subject does not fall under any of the exclusion criteria. If the subject meets any of the exclusion criteria the experiment can not proceed.
 - 3.3. Have the subject sign on the printed informed consent form. Give the withdraw document to the subject.
4. Check list just before the experiment
 - 4.1. Make sure all stimuli and response devices work.
 - 4.2. Make sure respiration and cardiac signal devices are ready.
 - 4.3. Turn on an infrared camera system for monitoring a subject, and make sure it is working.
 - 4.4. Explain to the subject about a process of the experiment, e.g. tasks and time required.
 - 4.5. (If the subject needs,) ask the subject to choose the correct MRI glasses.
5. Confirming cloth and belongings
 - 5.1. Visually and orally confirm that the subject doesn't have any metal on their body.
 - 5.2. Finally confirm using a metallic detector.
 - 5.3. Ask the subject to go to toilet before starting the experiment.
 - 5.4. Ask the subject to change into slippers.
6. Entering the magnet room
 - 6.1. <If there are needed, ask the subject to adjust the focus of the goggles before sitting on the patient table.>
 - 6.2. Ask the subject to sit on the patient table and insert wear earplugs tightly.
 - 6.3. Ask the subject to lie down slowly, to avoid hitting his/her head on the RF coil.
 - 6.4. Put pillows under the legs. (If the subject wishes.)
 - 6.5. Put a marker on left side of subject's forehead.
 - 6.6. Put the respiration sensor on the subject's stomach and check the respiration signal.
 - 6.7. Put a blanket on the subject.
 - 6.8. Confirm that position and orientation of subject's head (target domain) are adequate.
 - 6.9. Fix the subject's head with pads.
 - 6.10. (If it is necessary,) mount the bite bar (with mouthpiece) on the coil.
 - 6.11. Set up the goggle / the screen and the mirror.
 - 6.12. <Adjust the eye tracking system.>
 - 6.13. Place the response device and test it (and confirm the task with the subject).
 - 6.14. Place the cardiac sensor on the subject's finger and confirm cardiac signal.
 - 6.15. <Slide the transmit coil over the subjects head, if a separate transmit coil is used.>
 - 6.16. Instruct the subject to press the button when the subject hears the buzzer.

- 6.17. Instruct the subject to press the button continually or to detach the cardiac sensor when the subject wants to stop the experiment.
- 6.18. Instruct the subject to refrain from moving inside MRI as much as possible.
- 6.19. Instruct the subject not to breathe deeply and to not stop breathing during the EPI scan (task).
- 6.20. Instruct the subject to inform us if he/she feels pain or get sick.
- 6.21. Ask the subject to report if he/she gets too sweaty.
- 6.22. Moving the patient table
 - 6.22.1. Ask the subject to close his/her eyes while the patient table is moving.
 - 6.22.2. While moving the patient table into the magnet, at least one experimenter or support unit staff person should be on each end of the magnet, confirming that nothing gets caught or stuck.
 - 6.22.3. Emergency switches on sides of the patient table can stop the table immediately.
 - 6.22.4. Visually check to avoid anything (screen, fixture, etc.) on the patient table hitting the gradient coil.
 - 6.22.5. Visually check to ensure that coil cables do not become tangled.
 - 6.22.6. Hold cables for respiration, the cardiac sensor and response devices, and fix them once the table is in position.
 - 6.22.7. Push the patient table to an appropriate final position by hand.
- 6.23. Check connection of the RF cables and adjust the projector.
- 6.24. Check that the visual stimulus is displaying properly (position, magnitude and focus).
- 6.25. Turn off the lights in the magnet room before closing the door (of shield room).
- 6.26. Close the door tightly.
- 6.27. (4T site) Confirm 2CH/8CH switch is in the appropriate position for the experimenter's purpose.
- 6.28. Check the status of the subject through the infrared monitor.
- 6.29. Check the subjects' cardiac signal.

7. MRI Scanning

- 7.1. shimming : making magnetic field uniform.
- 7.2. scout scanning : positioning for a high resolution anatomical imaging
- 7.3. high resolution anatomical imaging
- 7.4. scout scanning : positioning for EPI scanning
- 7.5. EPI test scanning : verification of position and quality of EPI images
- 7.6. EPI noise scanning : for SENSE or t-SENSE reconstruction
- 7.7. Before EPI scanning with task
 - 7.7.1. <Adjust detecting eye motion.>
 - 7.7.2. Make sure analogue signals are adequate. (If needed, adjust baseline of respiration signal.)
 - 7.7.3. Start recording analogue signals.
 - 7.7.4. EPI scanning with task
 - 7.7.5. Low resolution 3D anatomical imaging, 2D anatomical imaging
 - 7.7.6. If the subject reports that he/she cannot continue the experiment (by detaching cardiac sensor, etc..) during experiment, stop the experiment immediately.
 - 7.7.7. Avoid asking the subject to speak. Instruct the subject not to speak during whole scanning.
 - 7.7.8. Criterion for aborting the experiment, due to increased cardiac rate:
 - 120 per 1 min, continuing more than 1 minute.

8. After the MRI scanning

- 8.1. Ask the subject to fill out the questionnaire in the computer.
- 8.2. If the subject reports 'yes' to any of the items 1-6 (abnormal), ask the subject about the issue in detail and report it to fMRI unit leader. [fMRI unit]
- 8.3. Ask the subject to put his/her signature on the printed questionnaire form.
- 8.4. Show the subject the high resolution 3D anatomy (you may give him/her printed image).
- 8.5. Copy printed documents (the informed consent and the questionnaire).
- 8.6. Confirm the fee for the experiment and ask the subject's bank account.
- 8.7. Make sure the subject has everything.