

ERP Recording Procedures: Checklist & Steps

I. Before the subject arrives

1. Check the battery, change & charge if necessary
2. Gather everything you need:
 - a. Syringe
 - b. Electrode gel
 - c. Cotton sticks & pads
 - d. Scrub gel
 - e. Elastic band
 - f. Stickers for external electrodes
 - g. Alcohol to disinfect
 - h. Cap
 - Make sure the cap is dry before use. If necessary, dry it with the hairdryer (cold air)
3. Start up computers



II. Preparing the subject

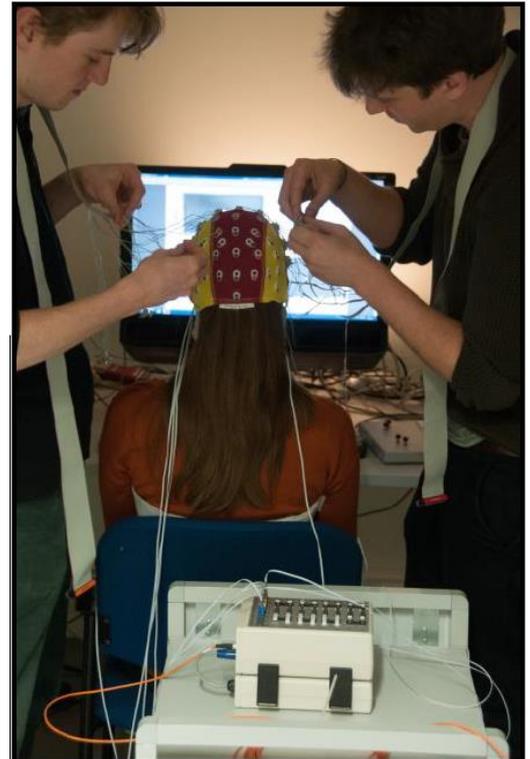
1. Have the participant fill in the questionnaires / consent form
2. Put on the elastic band which will hold the cap in place around the subject's chest
3. Use alcohol to disinfect all places where external electrodes will be placed
 - a. VEOG: below & above the eye
 - b. HEOG: next to left and right eye
 - c. Mastoid: behind each ear
 - d. EMG
 - e. Etc
4. Scrub these places using Neuroprep & wipe away excess scrub gel with cotton pad
5. Disinfect again, to make sure all scrub gel is removed
6. Place all external electrodes you need
 - a. Place a sticker on the electrode
 - b. Fill with electrode gel, don't use too much
 - c. Attach it to the subject
 - d. It can be helpful to ask the subject to hold the wires to avoid anyone stepping on them
7. Measure the circumference of the subject's head and choose the appropriate cap
 - a. Cap measures can be found in the cap's label



8. Place the cap on the subject's head
 - a. Make sure electrodes are placed according to 10/20 system:
 - Measure the distance between the nasion and inion, B16 (Cz) should be in the middle
 - Measure the distance between the earlobes, B16 should be in the middle
 - If necessary, pull the subject's ears through the cap (this can help prevent noise on electrodes surrounding the ear)
 - Measure position of FPz, Fz, Pz accordingly (see picture 1)
 - b. Attach the cap to the elastic band, make sure it is still comfortable for the subject to wear
9. At this point, you do not want the subject to move too much anymore, to avoid gel moving and later on, electrodes breaking. Therefore, first escort the subject to the faraday cage and make sure she/he is comfortably.



10. Connect the cables of the external electrodes to the amplifier
11. In case your subject wears glasses, put them back on. Headphones (use the in-ear type, the standard headphones can damage electrodes), voice-keys (hang these around the neck) etc should be put on now as well
12. Put electrode gel in each electrode hole
 - a. Release gel while going upwards with the syringe
 - b. It can help to fiddle around with the syringe first, as this can help expose more skin tissue instead of hair (but be gentle)
 - c. Make sure not to use too much gel, to avoid creating bridges between individual electrodes
13. Put the electrodes in the appropriate holes and connect them to the amplifier
 - a. Electrodes are particularly sensitive to kinked wires, so always handle them with great care!!!
 - b. Tape the electrodes to the subject's shoulder, not too tight, to avoid putting stress on the cables
 - c. Electrodes are numbered. Place electrodes in ascending order, to avoid tangling the wires
 - d. Hold the cables in such a way that wires are never under stress
 - e. If necessary, tape individual electrode wires (or groups) to the cap, in order to avoid too much stress on the bundles
14. Start the amp



III. Recording software

1. Start biosemi
2. Load the configuration file
3. Start a new file, make sure all settings are as you wish them to be
 - a. Make sure to use the same sample rate for each participant
4. Check electrodes offsets (should be between +/-20)
 - a. If the offsets are not within range then try adding gel to the CMS/DLR
5. Check whether all electrodes are functioning properly (see below)
6. Press PAUZE to start recording (color switches to green)
7. Press again when finished recording



IV. Clean up & storage

1. Switch off the amplifier
2. Disconnect the bundles and external electrodes from the amplifier
3. Remove the electrodes from the cap
 - a. Never pull wire, or bend the wire where it enters the electrode Put the plastic cover back onto the connector
4. Remove the cap
5. Let the subject remove the external electrodes him/herself, tell him/her to hold the electrodes so they do not drop them on the floor
6. Clean the external electrodes
 - a. Gently remove the sticker
 - b. Place the electrode under running warm water until the gel has dissolved
 - c. Make sure the connectors do NOT get wet



7. Clean the bundles
 - a. These electrodes are particularly sensitive to kinked wires, so again, handle them with great care!!!
 - b. Hold the bundles under running warm water
 - Do not fiddle too much with the electrodes, avoid bending the wires, especially where it enters the electrode
 - c. Try to avoid touching the electrodes too much
 - d. VERY GENTLY pat the electrodes with a towel, only when especially wet
 - e. Disentangle the electrodes; be careful, don't force it
 - f. Hang them in such a way that the connector hangs higher than the wet electrodes
8. Clean the cap
 - a. Use the small brush to clean each hole whilst emerging the cap in warm water
 - b. Rinse using warm water
 - c. Roll up a towel, place it in the cap and allow it to dry
9. Bring dirty towels to Lies, and clean up the lab



V. Problems & solutions

1. Noisy/unstable electrodes
 - a. If all are noisy: add gel to CMS/DRL, if one is noisy, only add gel to this electrode (to increase contact between the electrode and the scalp)
2. No signal
 - a. Switch on the amplifier
3. CMS/DRL light flickering
 - a. Add gel
 - b. Check whether orange cable is properly connected
 - c. Check whether an electrode might be broken
4. Rainbow signal, one flat line, CMS/DRL flickering
 - a. Remove the electrode associated with the flat line, this electrode is probably broken
5. All rainbow signal, CMS/DRL flickering
 - a. One or more electrodes are not functioning properly
 - b. Remove bundle one by one to define which bundle holds the broken electrodes.
 - Remove electrodes one by one until CMS/DRL stops flickering
 - If CMS/DRL keeps flickering, repeat with external electrodes

Please report any broken electrodes asap to Elisah so they can be send of be repaired. Do not continue recording with a broken bundle, but use one of the backup-bundles instead.

