

EEG lab user guide DCC

November 2019

In this document, you will find some general rules and procedures with regard to usage of the EEG-labs at the DCC. In case of questions, remarks or suggestions about these rules and procedures or in case of other questions related to the EEG-labs, please contact the lab coordinator: dcclabcoordinator@socsci.ru.nl, tel. 12699.

Advance notes

1. EEG lab introduction

New employees of the DCC who intend to use the EEG labs have to be introduced to the EEG labs by a member of the lab support team. The lab coordinator will set up an appointment for an introduction to the EEG labs, available hardware/software, lab rules and -procedures.

Furthermore, one capping and cleaning session has to be done together with the lab support team. In addition, researchers that are new to the EEG- method have to run at least 4 sessions with an experienced EEG researcher. Lab users who do not comply with these criteria are not allowed to make use of the EEG labs.

2. Handle EEG equipment with care!

The EEG equipment is highly valuable as well as vulnerable. Cables and wires are extremely fragile. Do not twist or pull the cables, and follow the [cleaning guidelines](#).

3. Take good care of your participants

Although running an EEG experiment may become all-day routine for you, this is mostly not the case for your participants. Remember to explain what you are doing, and make sure the participant feels free to ask questions at all times. In addition, the participant should feel comfortable at any time. Be careful while preparing the (skin of the) participant for the EEG measurement. Scrubbing should not be painful.

Also, **work in a hygienic fashion**: do not use the same gel, needles, gauze sponges, etc., on more than one participant. Do not dip cotton swabs or syringes in the jar with gel after usage. Throw away gauze sponges, needles etc. that fell on the floor (i.e., do not use them on the participant again). It is allowed to reuse syringes after cleaning with hot water and soaking for 15 minutes in Sekusept.

Before arrival of the participant

Controller room

- Boot EEG PC
- Open *Vision Recorder* (desktop shortcut)
- Create/open your personal workspace - save this file on the data drive (do NOT store any data on the desktop / local drive!)
- Information on default workspace settings can be found at the TSG Wiki page:
<http://tsgdoc.socsci.ru.nl/index.php/Brainvision>
- Boot Exp-PC
- Make sure the network connection is switched OFF
- Open your experiment
- Use the switch box to choose which screen is displayed in the participant room




Participant room

- Check if the caps and electrodes (and other items in the lab) are properly cleaned. If dirty or defect, please notify the lab coordinator; the last registered user will be held responsible.
- Turn off the socket strip for the power pack chargers. Make sure NONE of the power pack(s) is charging, also those that you may not be using.
- Take a splitter box holder (a white wire rack with the splitter box secured inside) and carefully place it in the designated outlet on the back of the participant's chair (white hanger on a blue, movable arm). If you use two bundles of electrodes, do that one splitter box at a time. Move the splitter box hanger only using the blue arm. If you pull the white wire rack itself, it can break.
- Prepare facial electrodes. If you use active electrodes (from the bundles) to record from the face, prepare adhesive rings, with which you can fixate the electrodes on the face. If you use passive (loose) electrodes to record from the face, prepare tape or smaller size adhesive rings.
- Connect the Splitter Box cable(s) and amplifier(s) to the Control box ('triangle-to-triangle'); press gently on the plastic bar until it clicks
- Splitter box 1 / amplifier 1 to channel 1-32 (green)
- Splitter box 2 / amplifier 2 to channel 33-64 (yellow)
- Connect Ground and REF cables to the Control Box
- Connect mini USB cable to the back of the Control box; use plastic cube to fixate the cable.
- Switch on amplifier(s) (switch button on the backside, power light on the front side of the box)
- Switch on the control box

After arrival of the participant



- Inform the participant on the study, give the participant the opportunity to ask questions. Sign the consent and screening forms and registration list together with the participant.
(forms available at the [DCC intranet](#))
- Ask whether participant needs to go the toilet beforehand
- Make sure their phone is switched off
- Adapt the chair height
- Instruct participant to, once connected to the EEG equipment, avoid abrupt, large movements, as these may damage EEG equipment

- Measure head size (forehead to bone at back of the head: nasion - inion) and take a cap with corresponding size (available sizes 54-56-58-60; cap should fit tightly)
- Clean face around the eyes using alcohol and scrub gel (NuPrep). Tell the participant to close their eyes. *NB Don't scrub too hard! Make sure that you do not hurt your participant*
- Stick electrode holders to the face with adhesive rings (conventional locations are: above and below the eye for vertical EOG, on the temples for horizontal EOG).
- It is advisable to use electrode holders for mastoids as well (positions TP9/REF and TP10), since in most participants the cap does not fit tightly in these sites and the quality of recording can be compromised. Prepare the skin behind the ears just the way you worked on the face and stick plastic electrode holders with adhesive rings on the hard part (bone).
- Put the cap on
- Make sure the Cz electrode holder (14) is in the middle of the head, i.e.,
 - between eyebrows and bone at back of head
 - between left and right ear
- Fill the electrode holders with active electrode gel. *Tell and show to your participant that the needles you use are blunt.*
- Put the electrodes in the holders on the cap, releasing them from the splitter box hanger one sub-bundle of 4 electrodes at a time
- Open impedance window in Vision Recorder
- Default settings:

Good level	20 kOhm (start with this number! NB tests have proven that a good signal is obtained with impedances <20)
Bad level	60 kOhm
Time-out	60 minutes
- Use the needles to move hairs to the side, to gently scrape the skin and to add gel to the electrode holders *NB tell your participant that this process should never hurt, and check with them whether this is indeed not the case*
- *NB hygiene: do not use the same gel, gauze sponges, needles, tissues etc. on different participants; do not dip cotton swabs or syringes in the jar with gel after usage; throw away gauze sponges, needles etc., that fell on the floor.*
- Work on the Reference and Ground electrodes first, continue with those electrodes that are showing very high impedance levels (or out of range). Make sure to get all the electrodes to a level of 20 kOhm. If you want to continue and go lower than 20 kOhm, reset the Good level to 10 kOhm and continue working on the impedances until you are satisfied.
- Once impedance is OK (<20 kOhm): turn off Control box, replace mini USB cable with rechargeable batteries (keep the black strap below batteries to facilitate removal afterwards)
- turn Control Box back on
- Click on the 'eye' button in Vision Recorder to check the signal 
- Let the participant produce artifacts (blink, look left/right, chew, etc.) and explain their effects on the EEG signal.
- **Start recording the EEG signal by pressing the 'play' button in Vision Recorder** 
- Enter a name for the data file and press 'save'; you will see a red box appearing in the bottom of the screen 

- Open 'view camera' shortcut on the desktop of the EEG-pc to monitor the participant's behavior
NB *tell the participant that this is for online observation purposes only, and that the data are not recorded.*
- Tell your participant that they can be heard at all times via the intercom.
- Start your experiment

End of experiment

- Stop recording  stop monitoring 
- Take care of the participant first!
- Switch off the control box and the amplifiers
- Detach facial electrodes (if you used active electrodes) or remove them completely (if you used passive electrodes)
- Detach the electrodes from the cap and place them on the white wire rack
- Remove cap
- Detach Ref and Ground cables from Control box
- Show participant where to wash their hair, give them a towel and show them where to hang the towel after use (to prevent wet towels from ending up in the laundry basket)
- Reset electronics:
 - Plug charging cable back into power pack
 - Put batteries back in the charger
- Clean and disinfect EEG-cap and electrodes following the [cleaning procedure](#) (see instructions on the wall in the lab, or on the TSG wiki)
- Save your data (EEG pc and EXP pc) on the network drive or an encrypted external hard drive and remove the data from the lab computer.
- Leave the lab in its original state: throw away used needles, tissues etc., put equipment and supplies back in their original location, throw away consumables, bring dishes to the kitchen.