Running EEG

Before Subject Arrives:

1. Check if they need to be consented
2. Petty cash
3. Drug test
4. Make sure all equipment is ready
5. Have BBLID

Turning on computers:

1. In room with subject:
   1. Connect eye tracking camera to power
   2. Turn on monitor on table
2. In the other room: turn on computer with experiment builder (far left on the ground, monitor on table by itself)
   1. Password is normal password w/ T
3. Turn on eye tracking computer:
   1. An error message will come up, press F1
   2. On the next screen, click exit advanced mode then discard changes and exit
   3. The next command screen will have two options: to start Windows or to start Eyelink. Select Eyelink (if you ever want to grab data off this computer, you will select Windows at this step)
4. Computer with Actiview
   1. When computer is turned on, locate the folder on the Desktop titled CONTE. In this folder, create another folder with the name of the subject’s BBLID
   2. Open Actiview on the desktop
   3. On the far right at the top of the screen, click on About Actiview
   4. Load Config file (in folder Config files, titles N100+P300+N400.cfg)

When Subject arrives:

1. First have the subject sit in the chair in the testing room and adjust the chair so that they can sit comfortably with their chin in the chin rest, use the answer pad, and answer the trial questions. DO NOT MOVE THE CHIN REST. If they are not at a good height, they can adjust the chair height
2. If they are wearing eye makeup, have them take it off (causes problems for eye tracker)
3. If they are wearing glasses, clean the lenses (dirty glasses can cause problems for the eye tracker)

Applying cap and electrodes

1. Measure head circumference from nasion to inion. This will give you the information needed to select the correct sized cap
2. Measure 10% from nasion to inion – this is where Nz should be when the cap is on
3. Put cap on before flat electrodes. Cap should be on straight with Cz half way between Iz and inion and half way from ear to ear
   1. Hair should be evenly distributed across scalp and as flat as possible so that each electrode is also evenly on top of the scalp
4. Flat electrodes
   1. Clean skin with alcohol pad where flat electrodes will be places. Clean with cap on so you can place them in a manner you know will not interfere with the cap
      1. 4 flat electrodes: left mastoid (EXG4), right mastoid (EXG3), below and left of right eye when looking at participant (EXG2), above right eye, directly above pupil (EXG1)
      2. The flat electrodes get double sided sticky applicators. PICTURE HERE OF HOW THIS LOOKS
      3. Inside the hole, insert a little gel
5. Fill cap with gel
   1. Explain that gel will feel a bit cool and tell them you are going to apply the first now
   2. Poke down, scratch around a bit, insert gel as you pull syringe out. Ask them if they felt the cool gel. If no, you may not have done it right, try again. If yes, tell them to let you know if they do not feel that, as it means you haven’t done it right. Fill all spots.
6. Insert electrodes into cap
   1. Make sure that they are all in their correct positions

Move into testing room making sure there is a good deal of slack. Plug cables into box and turn it on. There should be a blue light. Check what EEG recordings look like by going to Actiview screen and pressing START in upper left hand corner (this will not start recording any data). Check the Offsets (tab on top of screen). They should be below 25 and steady. If they are all high, turn machine off and on again. If this doesn’t help, reapply gel to CMS/DRL. If only one offset is very high, reapply gel to that electrode alone.

Getting ready to start experiment

1. Focus eyetracker
   1. Ask participant to place chin in chin rest so you can set up the eye tracking system, close the door and turn off the lights
   2. Make sure pupil size and corneal reflection look good. There should be as much dark blue as possible without picking up any other darkness and as little light blue as possible.
   3. Have the participant follow the edges of the screen with their eyes and look for dropout

Recording Resting States

1. Resting state
   1. There will be for 1 minute long resting state recordings. 1 minute of eyes open followed by 1 minute of eyes closed, then repeat.
   2. Naming convention: O1\_bblid, C1\_bblid, O2\_bblid, C2\_bblid
   3. Click on start file to open and name the file
   4. Then click on PAUSE on lower right to start recordings
   5. To stop, click on stop in upper left of screen
2. For this, the subject can be sitting back in their chair in a way that is comfortable but also remind them to not move as it can distort the data
3. When resting states are done, go in and giver the participant ear buds
   1. The ear bud with the blue wire goes on the left ear, red wire goes on the right ear

Running the experiment

1. First set up file name in Actiview before starting experiment.
   1. Naming convention: AVC\_bblid, RVC\_bblid, OPA\_bblid, OPB\_bblid
2. On Experiment Builder Computer: There are two different experiment groups under Conte: 1 and 2, check which one needs to be run next
3. The folder with the experiments is on the Desktop of the computer in the far left of the room (Current Conte)
4. There are 4 trials within the experiment that are always done in the following order:
   1. AVC
   2. RVC
   3. OPA
   4. OPB
5. The naming conventions are as follows: avbblid, rvbblid, oabblid, obbblid
6. To start, click on trial that needs to be run
7. THIS NEEDS MORE WITH PICTURES
8. Once presentation computer is all set, go in and read instruction to the participant. Place emphasis on the correct keys – biggest common issue is their inverting their responses
9. Tell them that before each experiment, dots will appear on the screen and this is to help calibrate the eye tracker. Tell them to start at the dot until it disappears. Then to look at the next dot until that disappears and so on. However they should not anticipate where the next dot is going to appear.
10. Calibration
    1. Once you have read the instructions to the subject, go into other room to begin.
    2. Press the space bar on the Experiment Builder computer to activate eye tracking calibration.
    3. To begin calibration, click on Calibrate on eye tracking computer. This will bring up the dots on their screen. You will be able to tell if they are looking at the dot when the pupil and corneal reflection are both green on the side
    4. Hit enter to accept a fixation point
    5. Once you have gone through all of these, you will then validate these scores.
    6. Click validate and the same process will repeat itself.
    7. Try to get their eyes to be as close to the dot that appears on the screen.
    8. When you have gone through all of the them and they are as accurate as possible, it will have a GOOD rating and you can accept the validation.
    9. This will exit out of the calibration
    10. MUST CLICK PAUSE ON ACTIVIEW TO BEGIN RECORDING EEG BEFORE ANYTHING ELSE
    11. Then click on Exit Setup on eye tracking experiment, this will begin the experiment
11. Keep an eye on both eyetracker and EEG
    1. EEG will tell you if they are making responses
    2. Eyetracker will give you info on if they are falling asleep

Between tasks, check in and see how they’re doing. Let them stretch and try to get them to be as awake as possible. Emphasize this and not moving each time

When experiment is completed:

1. Remove ear buds
2. Unplug from machine
3. Move into other room
4. Remove electrodes and cap
5. Have them fill out questionnaire
6. Offer them a towel so they can clean their hair in the bathroom in 10 Gates
7. Be sure to clean electrodes and cap as soon as you can. Do not let gel dry.

Troubleshooting

1. In case they really cannot stand the sounds and it is a sound or leave situation, try and see if they can tolerate 80% or even 75% if really necessary
2. Make sure that the Eyetracker is recording at 250Hz, not 1000Hz
3. If the offset is high for a single electrode, put more gel in and check the offset again
4. If the offset is high for all electrodes, turn off machine and add more gel to CMS/DRL
5. If you are unable to type on the Experiment builder computer, unplug and replug the cord in the picture below
6. If the experiment is not loading, you may need to uninstall and reinstall the sound driver that is associated with the sound card (Creative Sound Blaster X-Fi Xtreme Gamer SB0770)

Running MRI

* Set up practice laptop
  + Bring: practice laptop (with power cord and mouse), response device, iPad (you will need this later), all paperwork and consent forms, drug screen, and for females, pregnancy test
    - May also need to bring down glasses if subject needs them
  + Set up the laptop making sure to plug in power
  + Test response device
  + Set up their logfile
* Meet subject in front lobby
  + Wait 10 minutes before calling if they are late
* Drop script off at Radiology
* Consent subject
  + This includes going over the consent quiz at the end
* MRI metal screening form
* Prescan ratings on laptop
* Go down to HUP 6
* STAI prescan and drug/pregnancy test
  + Key for bathroom is in HUP6 as well as gloves
  + STAI info:
    - Site id: conte12
    - Fam id: nonfam
    - Subject ID: bblid
* At the scanner:
  + First bring in the battery behind the MRI and place on top of base of screen (do this first to weigh the screen down)
  + Next attach eye tracker to the screen. The parts that screw in go inside the circles on the frame of the screen. Do not tighten these too tightly
  + Then attach black cords from eye tracker to battery – doesn’t matter which end of the cords go where
  + The orange fiber optic cable attaches to the remaining cord in the eye tracker. Remove white caps from optic fiber cable and place inside the cap for the camera – place both nearby where they won’t get knocked over or lost
  + Make sure projector is turned on and turn on the eye tracker, on/off switch on battery
  + Bring the headphones and microphone to the front of the scanner
  + Next bring the audio console next to the presentation computer
  + In/Out AUX cable above presentation computer and filter is located in the case above presentation computer
  + Filter plugs into the computer and In/Out cable plugs into the audio console
  + Plug in power for Audio Console
  + Turn on and press the screen to start
  + Turn on eye tracking camera
    - When command screen comes up, select Eyelink – the other option is Windows which you can select when you want to grab data from that computer
  + Switch red cable plugged in back for blue cable
  + Switch out MRI mirror for our personal mirror
    - BE VERY CAREFUL not to touch the mirror, grab by the plastic parts only
  + Bring out response device and check that response device is working
    - Open notebook on the presentation computer and scroll up and down and click a few times
  + Bring in subject
    - Make sure that they have removed all metal and other objects from their bodies – jewelry, cell phones, wallets (can damage credit cards), change, belts, etc.
  + When they lay down in the scanner, make sure to give them the headphones. Their head position should be as close to the top as they can so that their eye is in an optimal position for the eye tracker. If they have a large head, you can remove the top part of the headphones and carefully place just the ear parts over their ears. Make sure they’re covering their ears completely
  + Techs will give them a pillow to put under their legs and ask if they want a blanket – it does get cold!
  + Give them the response device and the tech will give them the emergency squeeze ball
  + Place the PMU recorder on the index finger of the hand with the squeeze ball
  + The mirror goes on top of the coil. The mirror should be placed about an inch from the front of the coil
  + When they get raised up, ask if they can see the screen behind them
  + Once subject gets put into scanner make sure you can see their eye on the eye tracking computer
    - You can make adjustments to the camera if you’re unable to see their eye
    - Also make sure lights are off (middle light on the switch by the door), this makes a huge difference
  + Go through audio check with them to make sure they can hear
  + Talk to them and let them know that we will be starting some initial scans. They won’t be hearing any noises or seeing anything on the screen during this time. They should just try to stay awake and as still as possible
  + Right before the first fear conditioning task, calibrate the eye tracker. This will be under the Conte protocol labeled: Shortcut to Preslink
  + Let them know that they will be seeing dots appear on the screen and that they should look at them until they disappear and then the next will appear. Important to let them know that they should not try to anticipate where the next dot is going to appear
  + When calibration is done, start the experiment
  + The first thing they will do is pupillometry. For this, they will see the screen flash
    - Before starting experiment: click output/record on eyetracking computer
    - Open file
      * Name it: bblid\_P
      * Hit enter
    - For this, the presentation must be started at the same time someone clicks record on the eyetracking computer
  + Once pupillometry is done, they will be ready to go to the task
    - Before the task: for the first fear conditioning, the eyetracking file will be labeled bblid\_R1 (the reversal will be named bblid\_RR)
      * These will begin automatically with the scanner
    - The PMU file will be labeled scanid\_r1, scanid\_rr, scanid\_rb
  + Keep an eye on whether or not they are hearing a sound, if they are clicking down on the response device, and what their eye tracking data looks like for notes
  + Check for motion after each scan
  + After fear conditioning 1 and 2, they will answer questions about the faces they just saw –no scanning happens during this time
* Once they have completed everything, carefully but quickly put everything back in it’s original place.
* MAKE SURE TO PUT THE RED CABLE BACK IN WHERE THE BLUE CABLE WAS BEHIND THE COMPUTER