

Abstract Reasoning Experiment - Procedure

General Preparation

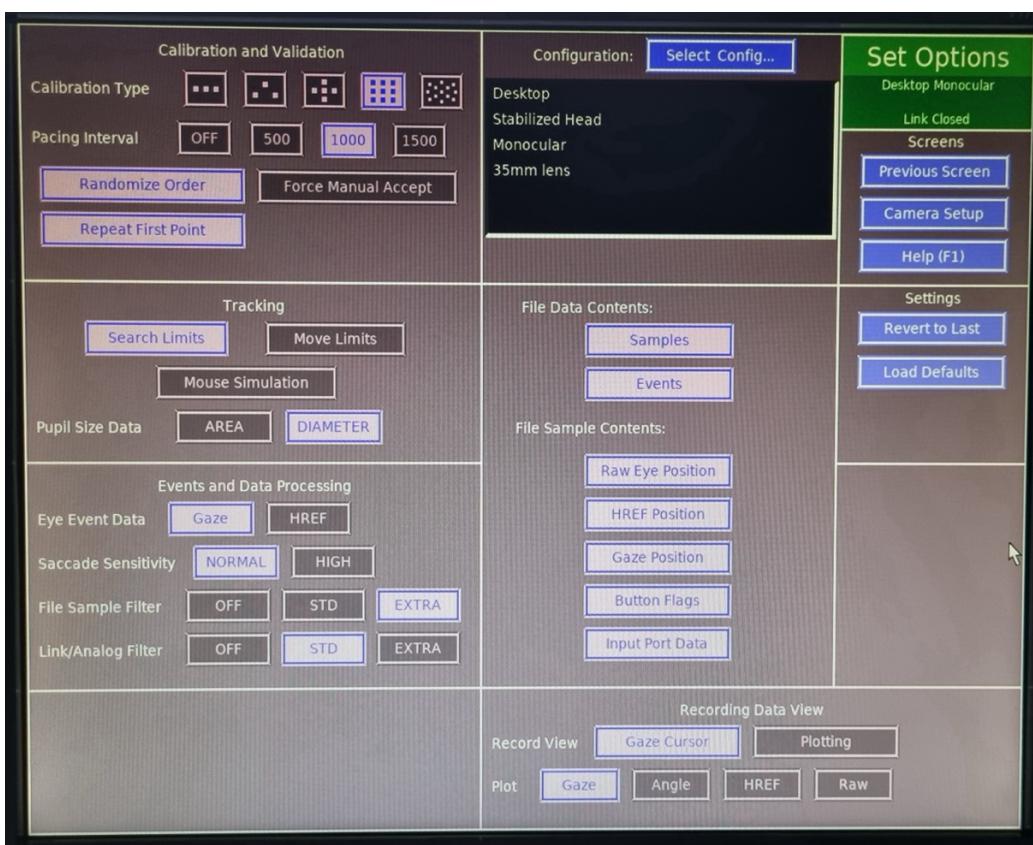
1. Instructions to participants:
 - Before the day of the experiment:
 1. No hair product
 2. No eye makeup
 3. If corrected-vision, wear contact lenses instead of glasses if possible
 - Try to refrain from moving, clenching their jaw, and blinking as much as possible
 - During breaks, take as long as needed but try to keep head still and not move too much
2. Measure screen to chin-rest distance
3. Check tape marks on location of screen and EyeLink camera
4. Check screen resolution and refresh rate
5. File naming:
 - Pattern: “cp<participant ID><session number>”
 - using two digits (leading zero) for both Participant ID and Session number
 - e.g., participant 1, session 1: “cp0101”

First Steps

1. If it is the participant's first session:
 1. Informed consent form
2. Turn on all three experimenter's PCs and the participant's PC
3. Turn on light, decrease brightness to minimum. Make sure the neons are not flickering, otherwise try to increase the brightness a bit until they stop.
4. Plug in the Eye tracker
5. connect the battery to the EEG amplifier and turn it on
6. turn off the speakers
7. Ask participant to put phone / electronic devices away
8. Log in to the **FMG-research server** (see guide at the end)
 1. Navigate to '**Projects/2024_Pinier_FMG-7163_reasoning_EEG/data/Lab'**
9. **EEG computer:**
 1. Launch ActiView
 2. Check the battery level, swap the battery if needed
 3. Select configuration file:
 1. Click on "About / configure" tab
 2. Click on "Load CFG File"
 4. Select "Michael2.cfg"
 5. Press start on upper left corner

10. EyeLink computer:

1. click on "Tracker"
2. Load the correct configuration:
 1. Click on "**Set options**" -> "**Select Config...**"
 2. Select the **first config**: "Desktop | Stabilized Head | Monocular | 35mm lens"
 3. Then, click on "**Load Defaults**"
 4. Click on "**DIAMETER**" next to "Pupil Size Data"
 5. Click on "**Button Flags**" under "File Sample Contents"
 6. Make sure the settings match the ones below:



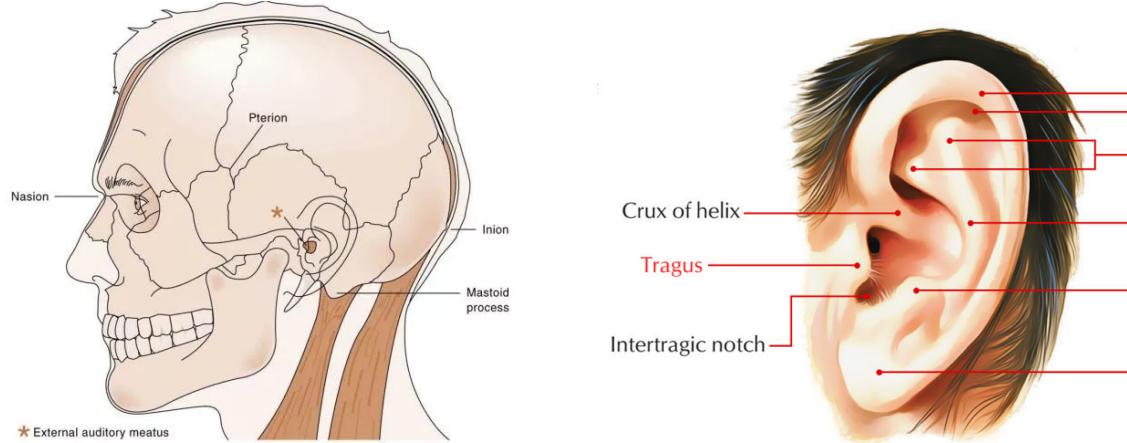
Setting up EEG – Part 1

- Measure the head's circumference and select the right cap size

Small / Medium	52-56 cm	Yellow & Red
Medium	54-58 cm	Red
Medium / Large	56-60 cm	Blue & Red
Large	58-62 cm	Blue

- Fit the cap on the head, get ears out if more comfortable for participant

- Make sure the cap is aligned:



- Measure the distance between the inion and nasion, Cz should be at the midpoint
- Measure the distance between the tragi (protrusion on front of the ear), Cz should be at the midpoint

- Fasten the cap's strap and ensure it is relatively tight

- Apply conductive gel to EEG cap

- Fill a clean syringe with conductive gel
- Gently part the hair beneath each electrode's hole by slowly rotating the tip of the syringe on the scalp
- Slowly inject a small amount of gel while gradually withdrawing the syringe

- Place the eye electrodes



- Check the electrodes activity on the monitor and readjust the cap / gel if necessary

- Note any problematic electrodes or unusual circumstances in a “notes.txt” file in the session’s folder

Setting up Eye-tracking – Part 1

1. Launch the experiment’s script:

1. open the command line and cd to the experiment’s folder:
C:\Users\topuser\Documents\ChrisPinier\abstract_reasoning\experiment-Lab
2. run “**poetry run python experiment.py**”

2. Perform dominant eye test

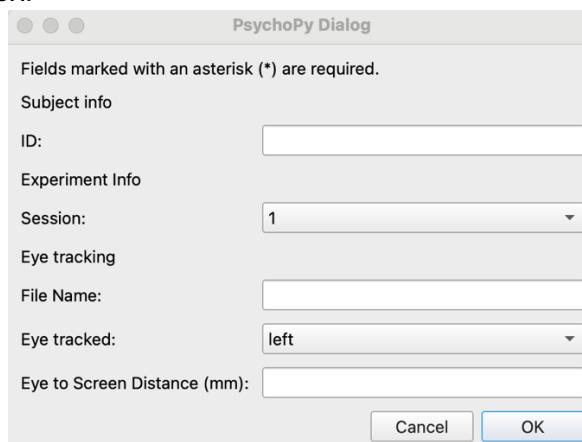
Instructions:

1. **Find a target:** Select a small object or mark in the distance, such as a light switch or a picture on the wall.
2. **Make a circle:** With one hand, form a circle by touching the tip of your thumb and index finger together, leaving a small gap through which you can look.
3. **Hold your hand out:** Extend your arm fully in front of you and center the target within the circle, while keeping both eyes open.
4. **Focus on the target:** Look at the target through the circle you made with your hand.
5. **Close one eye:** Without moving your head or hand, close one eye.
6. **Close the other eye:** Now close the other eye.

Results:

- If the target stays within the circle when you close one eye but moves or disappears when you close the other, the eye that keeps the target in view is your dominant eye.
- If the target shifts out of the circle when one eye is closed, the other eye is your dominant eye.

3. Fill out the dialogue box:



4. Set up chin-rest: have the participant place the chin rest at a position that is comfortable to them
5. Measure eye to screen distance
 1. Ask the participant to take one end of the tape and place it below their dominant eye
 2. Make a straight line to the screen
 3. **record the distance in millimeters** it in the dialogue box
6. On the participant’s computer, click on the pupil of the dominant eye using the mouse
7. Adjust the camera focus

Setting up the EEG – Part 2

1. In ActiView, Click on "**Start File**".
2. Fill out the fields (copy filename), ignore Error 7003 -> click on "**continue**"
3. Navigate to the data folder: **C:\Data\ChrisPinier\abstract-reasoning**
4. Enter the **filename** using the pattern described in the "**General Preparation**" section
5. Click on "**Paused**" to start saving data, the button above will turn green and show "Saving"

Instructions to participant

1. Make sure they place their **fingers on the correct keys**
2. Ask them to **move as little as possible** throughout the experiment
3. Ask them to look at the screen at all time outside of the breaks: **their eyes should follow the stimuli as they flash on the screen**

Launching the Experiment

1. **Press A** multiple times to use the **auto-threshold** until you get stable CR values
2. **Press C** for **calibration**, move mouse cursor away, press enter to start, press enter to continue once calibration done
3. **Press V** for **validation**, move mouse cursor away, press enter to start, press enter to continue once validation done
4. Make sure the participant understands where to place their fingers and which position on the screen they each are associated with
5. Make sure to mention to the participant that they should try to look at the screen at all time, follow the icons when they are briefly flashed, and move as little as possible.
6. **Press O to start the experiment**, move mouse cursor away

End of experiment

1. On the "EEG computer":
 - In ActiView:
 1. click on "**Pause File**" (upper right corner)
 2. click on "**Stop**" (upper left corner)
 - Copy the EEG (.bdf) file to the USB stick
2. On the "main computer":
 - Copy the behavioral data files (practice and experiment; .csv) and the eye tracking files (.edf & .asc) to the USB stick
3. Remove the electrodes, put them in the plastic bucket, making sure they are not touching anything metallic
4. Remove the cap
5. Provide a towel and shampoo to the participant, guide them to the bathroom
6. Clean the electrodes, hang them on the wall, electrodes inward, connector outward
7. Clean the cap, hang it with the electrodes
8. If it is the participant's last session:
 - End survey
 - Demographics form