

## Experiment HP-18: Posner Attention Test

### Equipment Required

PC or Mac Computer

IXTA, USB cable, power supply

EM-220 Event Marker

ROAM EOG electrodes

Optional – iTrax Eye-Tracking System

Ruler

If using the iTrax, EOG and the event marker will not be used.

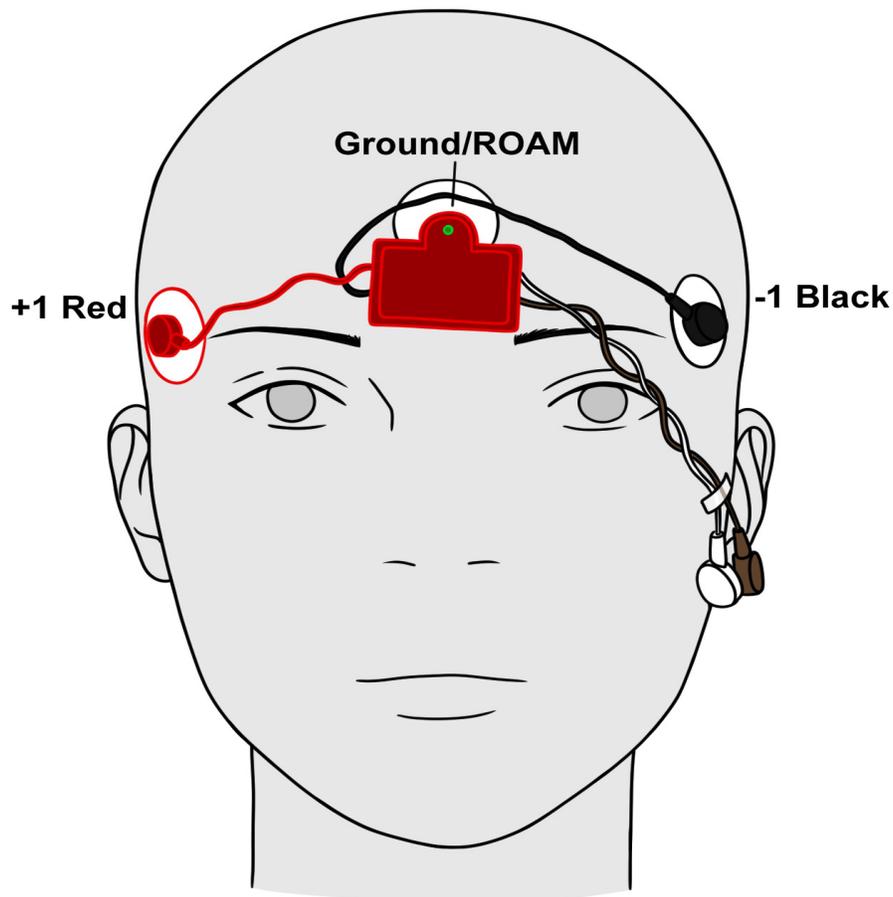
### Setup

1. Locate the EM-220 Event Marker and plug it into the EM1 input on the back of the IXTA.



Figure HP-18-S1: The TA shown with both the EM-220 and ROAM in the dock.

2. Remove the ROAM from the dock and attach the electrodes as shown in Figure HP-18-S2.
  - the + Red electrode is on the right temple
  - the - Black electrode is on the left temple
  - the ROAM is in the center of the forehead
  - tape the brown and white leads to the cheek so they do not interfere with vision



*Figure HM-18-S2: Placement of electrodes for recording an electroculogram (EOG).*

5. Have the subject hold the event marker in their dominant hand.
6. When the subject is ready, click the Record button and click the “Instructions” sequence to learn what needs to be done for this experiment.

You will be shown a fixation screen with 6 squares. This is so you can understand what the next set of screens will look like.

In the first screen, one of the 6 squares will be brightened (it will not be gray in color).

In the second screen, one of the 6 squares will have a star shape  through it

After the 2<sup>nd</sup> screen is shown, click the event marker ONLY if the star shape is in the same square that was brightened.

- Measure the distance from the screen to where the subject needs to be sitting.
- Make sure the subject understands to ONLY click the event marker when the cue and the target are the same box.

### OPTIONAL - Eye Tracker Setup

You must chose the iTRAX View from the View menu on the LabScribe toolbar.

1. Open “External Devices” on the main menu bar.

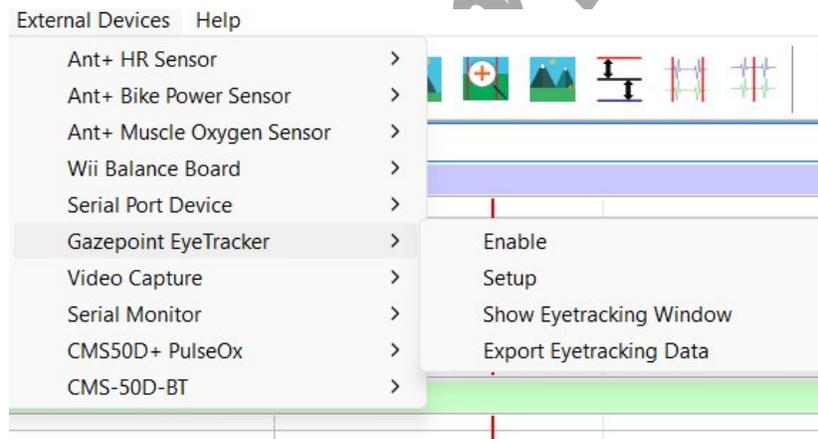


Figure HP-18-S3: External Devices set up window.

2. Click Gazepoint EyeTracker.
3. Click Set Up. Enter the license information provided and set up the parameters for eye tracking:
  - **Gaze Duration (msec):** The amount of time, in msec, before the current time that fixation information will be displayed in the Eye Tracking window.
  - **Outlier Filter (msec):** The amount of time, in msec, that the eye has to be fixated at a single spot. If the fixation duration is less than the Outlier Filter value, then the fixation will not be displayed in the Eye Tracking window.

- **Time Offset (msec):** This can be used to take care of any time offset between the eye tracking data and LabScribe data.
- **Display Scaling (%):** The Eye Tracker tracks the complete screen. We want to analyze LabScribe data as well as eye tracking data. Display scaling allows for the eye tracking window to show a scaled version of the screen.
- **Fixation Size:** The “fixation” data is shown as a circle whose radius is proportional to the fixation duration. The circle size is the radius of the circle in pixels corresponding to a 1 second fixation duration.

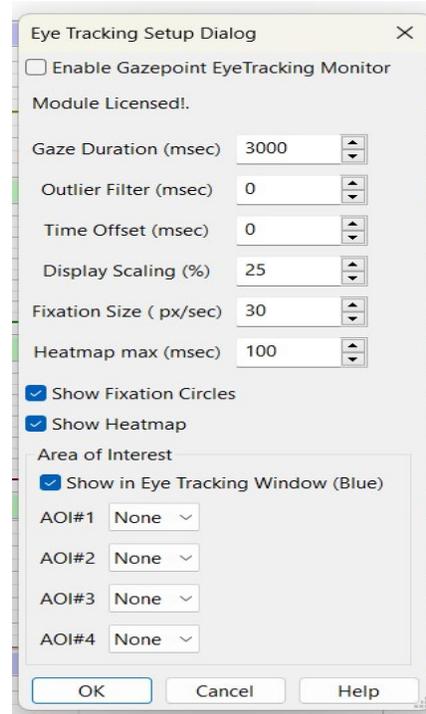


Figure HP-18-S4: Eye tracking set up dialog window.

3. Set up the Area of Interest (AOI) if there is a specific location on the image you wish the subject to focus on. Note that some experiments will just want to see where the subject is focusing rather than knowing when the subject focuses on the “designated” area.
  - Choose AOI#, click the drop down to have the AOI shown as a circle or rectangle
  - Open the image that the subjects will be looking at in an image editing program such as Paint, Photoshop, Lightroom
  - Hover over the AOI, note the X and Y pixel coordinates – and enter these in the boxes to the right of AOI#
  - When you choose to “Show the EyeTracking Window” - the image the subject is looking at will be shown on one monitor with the AOI in blue. The actual image the subject will be looking at on the second monitor will not show the AOI.

**NOTE:** If you want to know when the subject looks at a specific location, you must set the AOI.

4. To acquire eye tracking data, the GazePoint module has to be enabled in LabScribe and the GazePoint application has to be running.
5. Calibrate the GazePoint Eye Tracking sensor.



Figure HP-18-S5: Eye tracking calibration window.

5. Choose the screen that the subject will be using. Then calibrate the Eye Tracker.
6. Refer to the GazePoint manual for more instructions to calibrate the system.
7. The image window in LabScribe should be moved over to a second monitor if using multiple monitors. Note that 2 monitors is preferable in this experiment especially when looking at AOI data.
8. Enable the Eye Tracking window by choosing External Devices → GazePoint Eye Tracker → Show Eye Tracking Window.

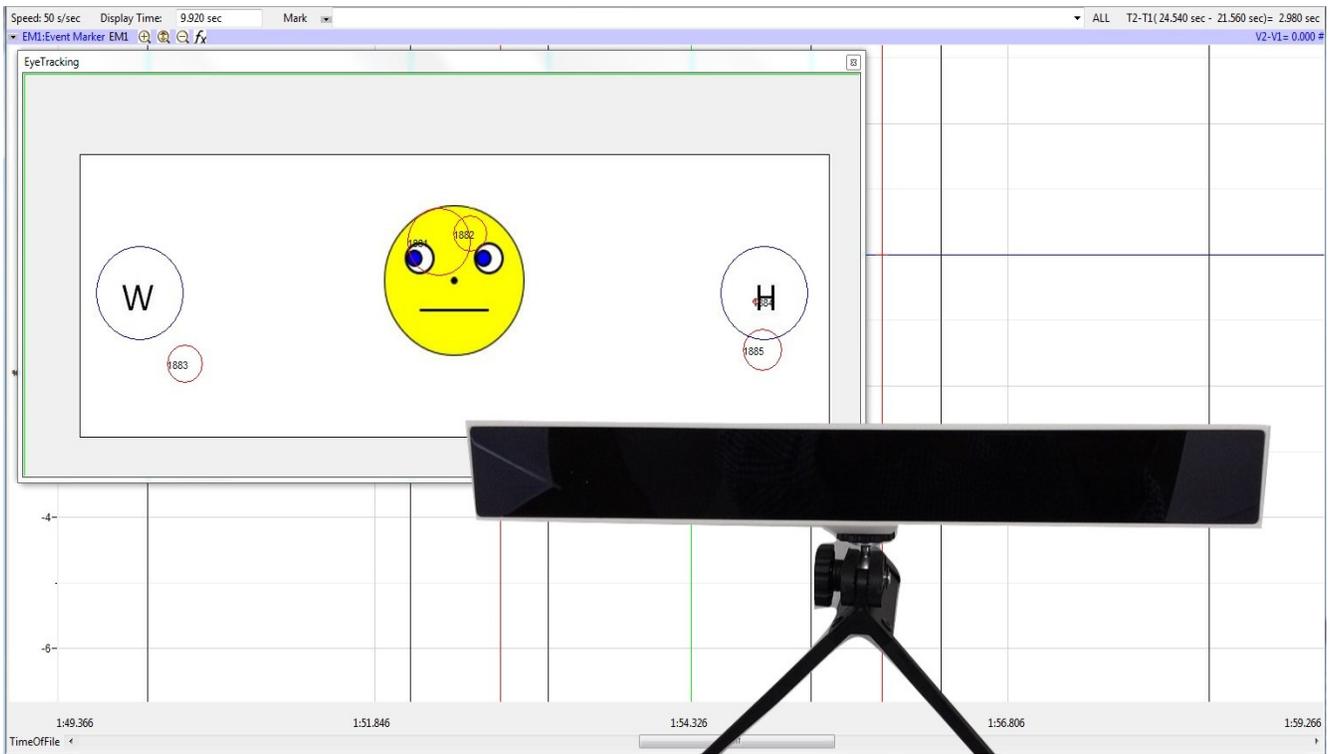


Figure HP-18-S7: Eye tracking window and GazePoint Eye Tracker.

IWORX SAMPLE

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Increase the viewing window for the images. If not, the screen may flash when the macro resets the images. This may be dangerous to those who have epileptic tendencies

### General Directions:

- Subjects will be shown a series of 150 cues and 150 targets.
- Each cue will have a fixed center cross (for vision fixation) with 3 square boxes on each side. One of the boxes will be white, the other 5 will be gray. The cue will be shown for 150 msec.
- Once the cue is shown, a target will appear.
  - It will appear 100 to 600 msec after the cue.
  - The target will have the same center fixation cross and square boxes. One of the square boxes will have a “target star” in it, the other boxes will be gray. The target will be shown for 150 msec.
- The subject will click the event marker ONLY if the “target star” shows up in the SAME box as the white cue.

It helps if the subject looks at the center of the image to start.

### Procedure

**Warning:** *It is important to press the event marker immediately upon recognizing if the target and cue match. Accuracy is important here, but timing is also a factor.*

1. Click on the Record button.
2. Click the **Instructions** macro on the toolbar and run the macro. Follow the instructions to situate your subject at the proper distance from the computer screen.
3. Click Stop once you have followed the measurement procedure.
4. When ready to start the experiment, click the Record button.
5. Choose the **Attention** macro on the toolbar and run the macro.
6. Follow the **General Directions** as outlined above.
7. After the last cue and target have been shown, click Stop to halt recording.
8. Click on the Save button to save the data file.

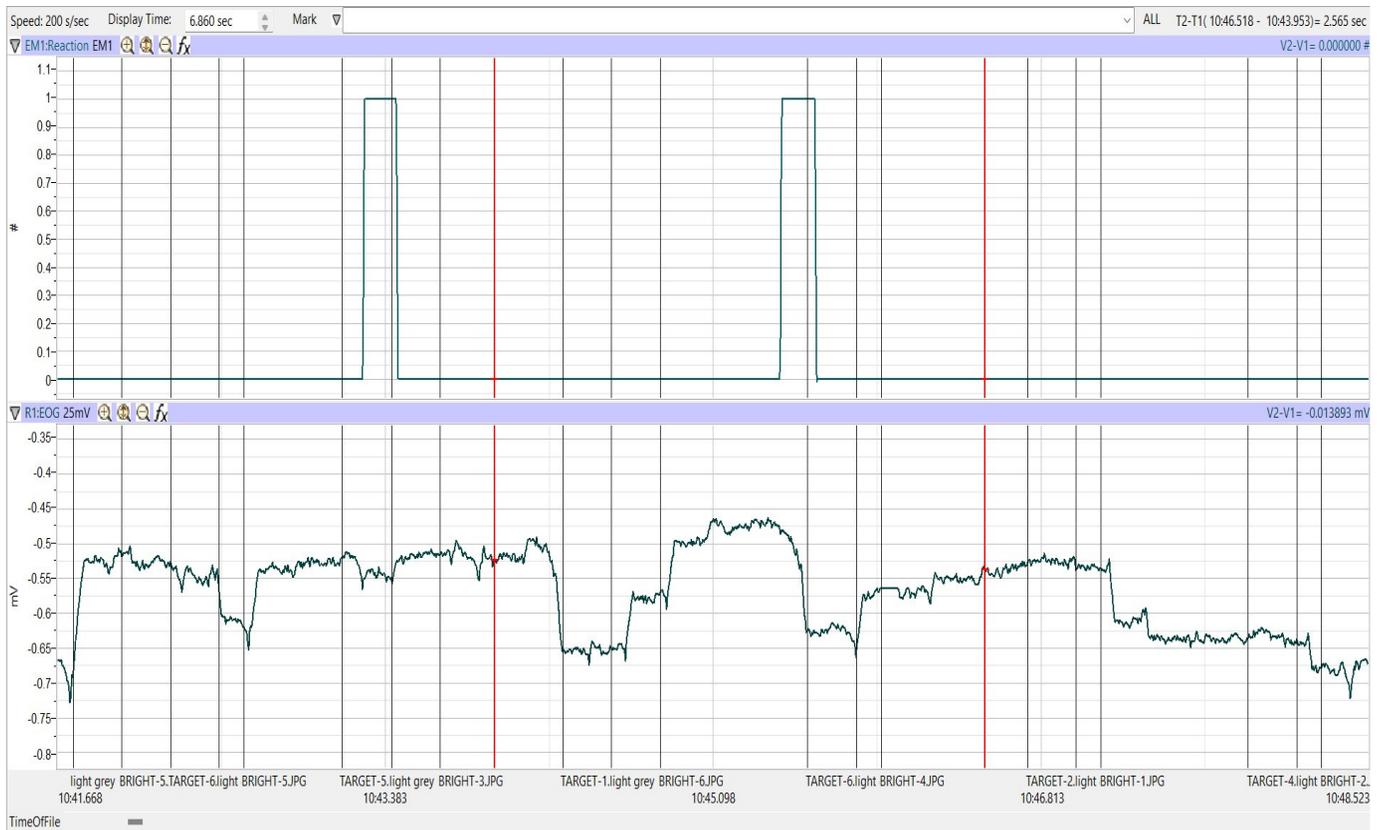


Figure HP-18-L1: Sample of what the data may look like. This sample only shows one graph of data. For this experiment, there will be two graphs of data, one representing the Reaction and one for the EOG.

Note – if using the I-TRAX, there will be 2 graphs: AOI and Eye Velocity.

## Data Analysis

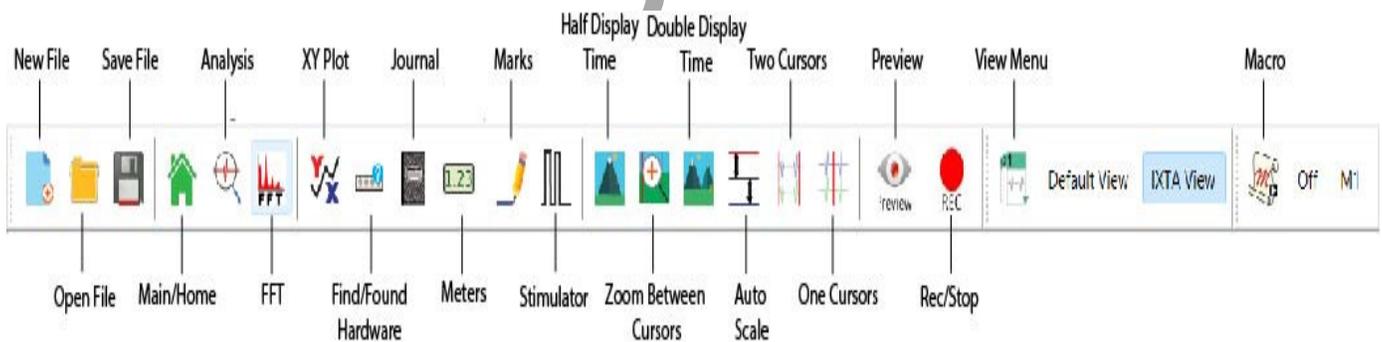


Figure HP-18-L2: LabScribe toolbar.

## REACTION TIME:

1. Click the Double Display time button until approximately 10 responses show on the screen.
2. Move one red cursor line to the mark made when the TARGET was shown and the 2<sup>nd</sup> to the start of the click of the event marker or response pad. Make a notation if the Target shown actually matched the cue shown previous to it to check accuracy.
3. Look at T2-T1 (upper right corner) and record that number.
4. Repeat for the next 9 responses.
5. Repeat the procedure for the next set of 10 targets, keep proceeding in sets of 10 until all 150 targets are analyzed.
6. Create a data table to copy your data into.

## EOG:

1. Move back to the data where the Attention sequence began.
2. Look at the EOG channel to see where saccadic eye movement has occurred.

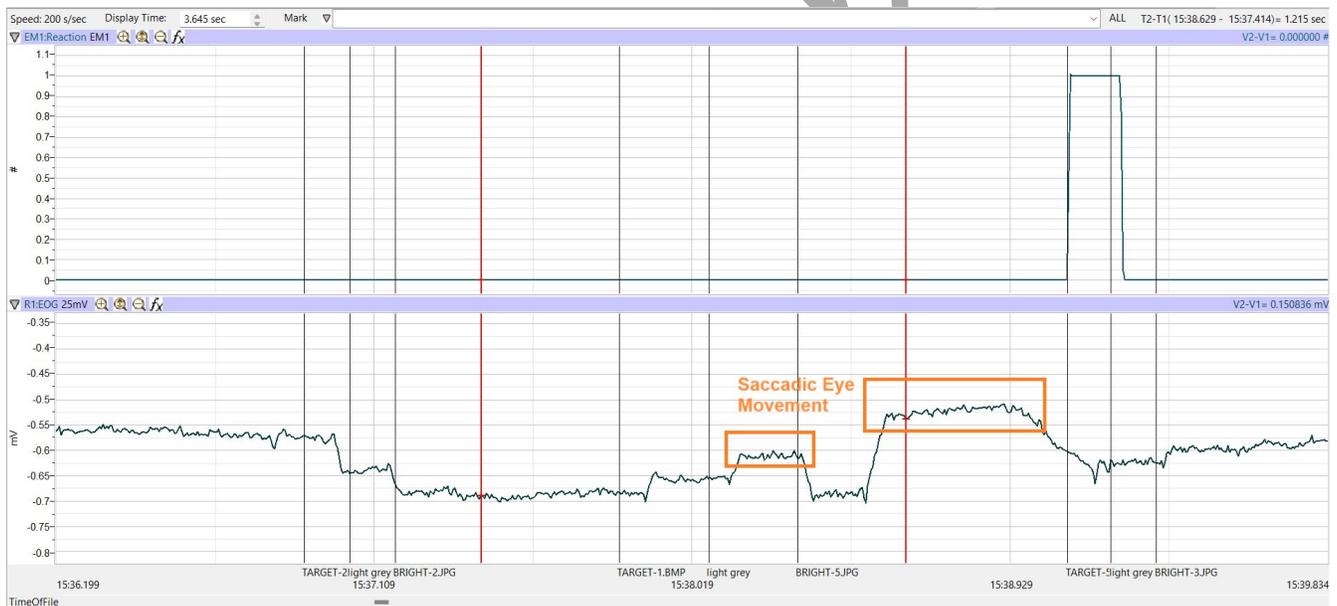


Figure HP-18-L3: Examples of Saccadic eye movement.

3. Place the cursors on either side of the time the cue was presented to when the subject reacted. Look at the EOG signal. Measure the Mean value for EOG during this time period.
4. Repeat the EOG measurements for 20 correct responses, and calculate the average EOG.
5. Repeat step 4 for 20 non-responses (where the subject did not respond at all) by placing the cursors at the start of the cue and 150 msec after the target. Calculate the average EOG.

**Questions:**

1. What was the mean reaction time of the subject?
2. What was the total percentage correct?
3. What was the average EOG when the subject answered correctly? When there were non-responses?
4. Is there a different in average EOG? Why?
5. Explain the Posner Attention Paradigm.

HWorx Sample Lab