Experiment HN-4: Hand vs. Foot Reactions

Equipment Required

PC or Mac Computer

IXTA, USB cable. IXTA power supply

EM-220 Event marker

FRS-220 Foot Reaction Switch (directions for use below and in the **Lab** document)

Event Marker Setup

1. Locate the EM-220 event marker and the FRS-220.
2. Plug the connector of the EM-220 into the EM1 Channel input on the back of the IXTA.
3. Plug the connector of the FRS-220 into the EM2 Channel input on the back of the IXTA.

Figure HN-4-S2: The EM-220 event marker and FRS-220 connected to the EM ports on an IXTA.

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Experiment HN-4: Hand vs. Foot Reactions

Exercise 1: Eye-Hand Reaction Times

Aim: To measure the reaction time of a subject to a visual signal when responding with the hand.

Approximate Time: 15 minutes

Procedure

1. Instruct the subject to:
    - Sit in a chair and face the computer screen.
    - Hold the event marker and be ready to click the button.
    - Watch the right side of the computer screen and quickly press the event marker when the signal generated by the F1 key first appears.
2. Another student should prepare to quietly press and release the F1 key on the keyboard. In this exercise, the subject will perform ten trials.

Warning: In this exercise, it is important to press F1 key quietly because any sound could be used by the subject as a signal.

3. Type **Visual-Hand** in the Mark box.
4. Click on the Record button. Instruct the subject to press the event marker as soon as they see the visual signal on the right side of the computer screen. Click the Mark button.
5. Use the F1 key to deliver ten visual signals to the subject. The signals should **not be less than three seconds nor more than six seconds apart.**
6. After the tenth signal, click Stop to halt recording. Select Save As in the File menu, type a name for the file. Click on the Save button to save the data file.

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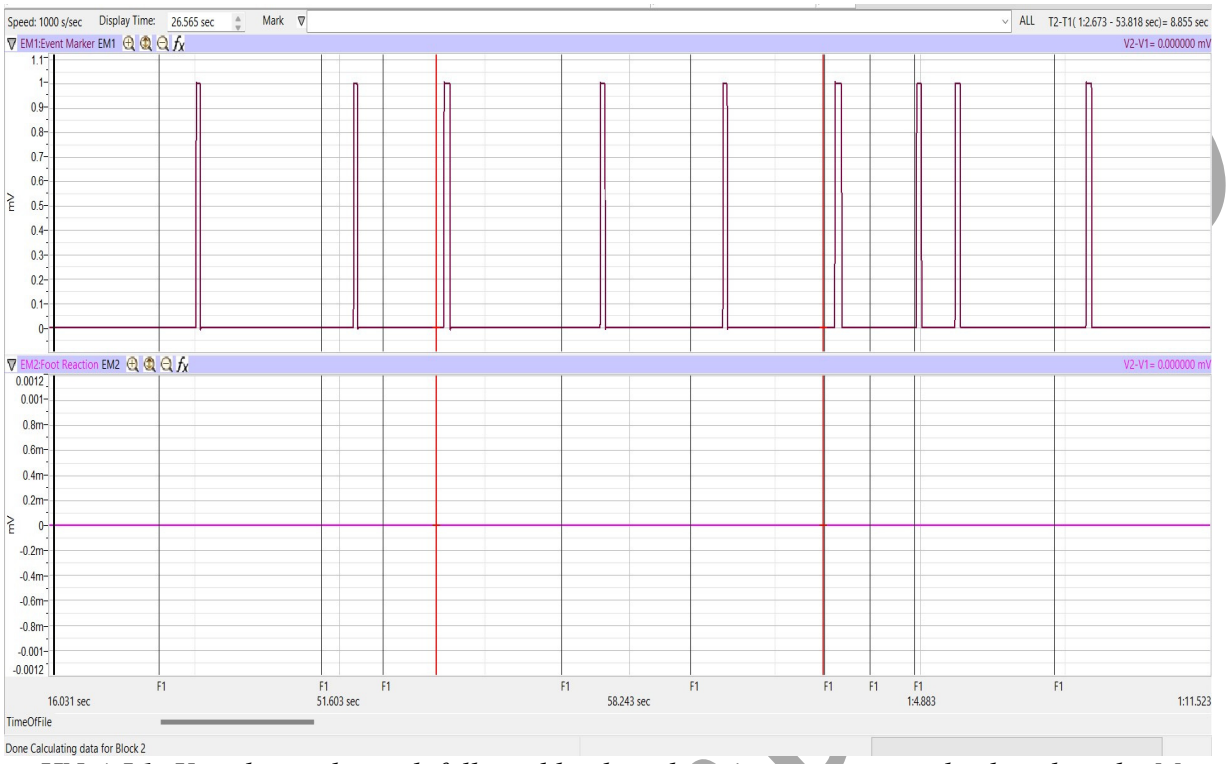

Figure HN-4-L1: Visual signals, each followed by the subject's response, are displayed on the Main window.

Data Analysis

1. Scroll to the beginning of the data recorded for Exercise 1 to display the trials on the Main window.
2. Use the Display Time icons to adjust the Display Time of the Main window to show both the visual signals and the mark made by the subject's response on the Main window.

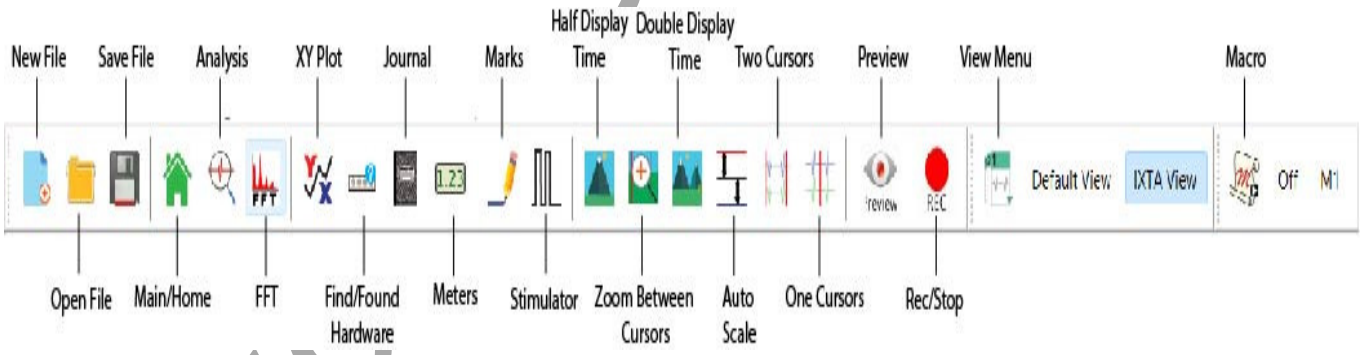

Figure HN-4-L2: The LabScribe toolbar.

3. Data can be collected from the Main window or the Analysis window. If you choose to use the Analysis window, click on the Analysis window icon in the toolbar.
4. The mathematical functions, T2-T1 should appear on screen. The value T2-T1 is shown in the upper right of the Main window or the upper left of the channel in the Analysis window.

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5. Use the mouse to click on and drag a cursor to the onset of the signal used as the visual signal. Drag the other cursor to the onset of the mark made by the subject.
6. Once the cursors are placed in the correct positions for determining the reaction time, record the value for T2-T1 in the Journal. The value can be recorded in the on-line notebook of LabScribe by typing its name and value directly into the Journal. You may also record any data on separate data tables.
7. Once the reaction time in the first trial is measured and recorded, repeat Steps 5 and 6 on the data from the other 9 trials
8. Once the reaction times in all ten trials have been measured and recorded, open the Journal and use the values to determine the mean reaction time of the subject. Discard the longest and shortest times from the data set, and determine the average of the eight remaining reaction times. Record the mean reaction time for this exercise in Table 1.

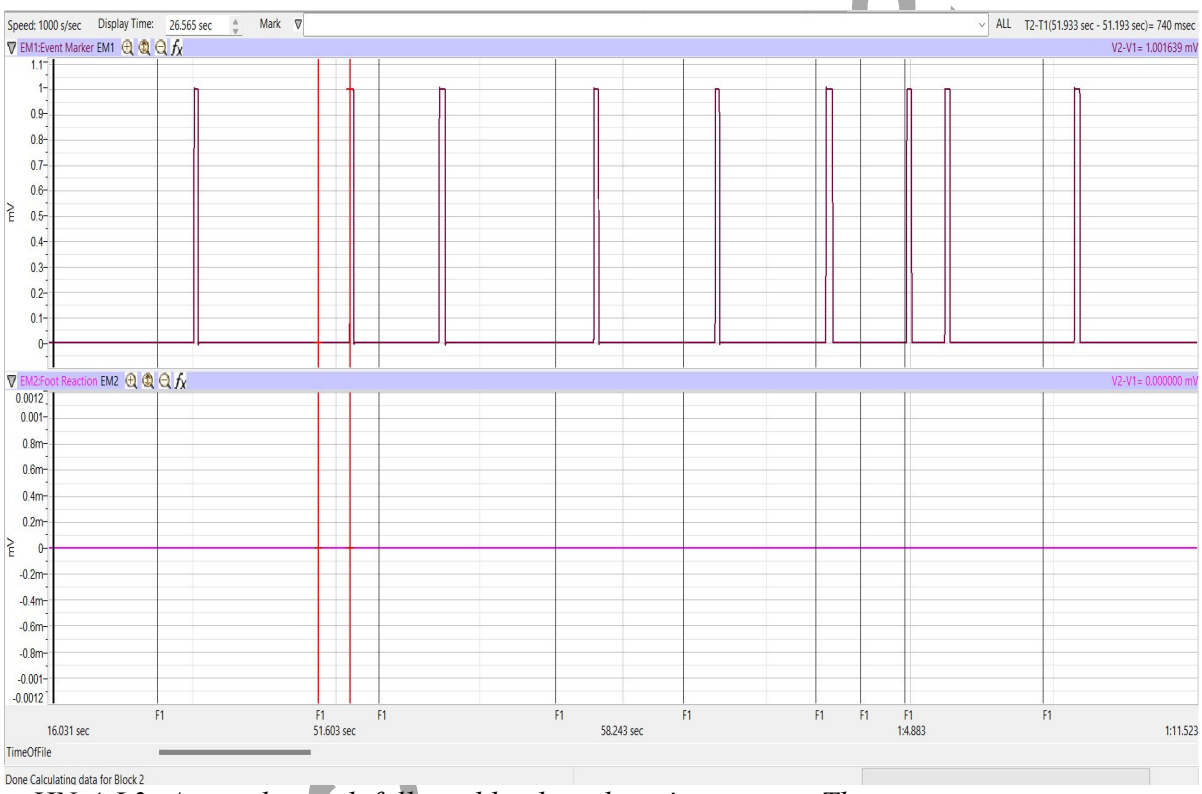

Figure HN-4-L3: A visual signal, followed by the subject's response. The two cursors are positioned at the beginning of the visual signal and on the mark for measurement of the subject's reaction time (T2-T1) in this trial, 740 msec.

Exercise 2: Ear-Hand Reaction Times

Aim: To measure the reaction time of a subject to an auditory signal when responding with the hand.

Approximate Time: 15 minutes

Work Lab

Procedure

1. Repeat the procedure from Exercise 1, except – have the subject face away from the computer screen, another student should prepare to sharply click the F1 key on the keyboard to create an auditory signal. The F1 key needs to be clicked loudly. In this exercise, the subject will perform ten trials.
4. Type **Auditory-Hand** in the Mark box.
5. Click on the Record button. Instruct the subject to press the event marker. Click the Mark button.
6. Use the F1 key to deliver ten auditory signals to the subject. The signals should **not be less than three seconds nor more than six seconds apart.**
7. After the tenth signal, click Stop to halt recording.
8. Select Save in the File menu.

Data Analysis

1. Use the same technique explained in Exercise 1 to measure and record the reaction times of the subject presented with auditory signals and responding using a hand switch.
2. Enter the mean reaction time for this exercise in Table 1.

Questions

1. How does the subject's mean reaction time to visual signals compare to his or her mean reaction time to auditory signals?
2. What would cause a longer reaction time to one type of signal as compared to another?
3. How do your subject's mean reaction times compare to those of other subjects?
4. Do all subjects respond more quickly to the same signal?

Exercise 3: Eye-Foot Reaction Times

Aim: To measure the reaction time of a subject to a visual signal when responding with the foot.

Approximate Time: 15 minutes

Procedure

1. Plug the DIN8 connector on the cable of the FRS-100 foot reaction switch into the EM2 port of the IXTA.
2. Instruct the subject to:
    - Sit in a chair and face the computer screen.

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- Position a foot on the FRS-100 foot reaction switch in a manner that enables the subject to press the pedal with their foot as quickly as possible.
- Watch the right side of the computer screen and quickly press the pedal when the signal generated by the event marker first appears on the screen.

3. Out of sight of the subject, another student should prepare to quietly press and release the button of the event marker. In this exercise, the subject will perform ten trials.

Figure HN-4-L6: The EM-100 event marker and FRS-100 foot reaction switch connected to a TA..

Warning: In this exercise, it is important to press and release the event marker button quietly because any sound could be used by the subject as a signal.

3. Type **Visual-Foot** in the Mark box.
4. Click on the Record button. Instruct the subject to press the pedal as soon as they see the visual signal on the right side of the computer screen. Click the Mark button.
5. Use the event marker to deliver ten visual signals to the subject. The signals should **not be less than three seconds nor more than six seconds apart.**
6. After the tenth signal, click Stop to halt recording.
7. Select Save in the File menu.

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Data Analysis

1. Use the techniques explained in Exercise 1 to measure and record the reaction times of the subject presented with a visual signal and responding using a foot switch.
2. Enter the mean reaction time for this exercise in Table 1.

Exercise 4: Ear-Foot Reaction Times

Aim: To measure the reaction time of a subject to an auditory signal when responding with the foot.

Approximate Time: 15 minutes

Procedure

1. Instruct the subject to:
    - Sit in a chair and face away from the computer screen.
    - Position a foot on the foot reaction switch in a manner that enables the subject to press the pedal with their foot as quickly as possible.
    - Listen for the click (sound) of the event marker as the other student presses the button and then press the pedal as quickly as possible.
3. Repeat the procedure from Exercise 2.
4. Type **Auditory-Foot** in the Mark box.
5. Click on the Record button. Instruct the subject to press the event marker. Click the Mark button.
6. Use the F1 key to deliver ten auditory signals to the subject. The signals should **not be less than three seconds nor more than six seconds apart.**
7. After the tenth signal, click Stop to halt recording.
8. Select Save in the File menu

Data Analysis

1. Use the same technique explained in Exercise 3 to measure and record the reaction times of the subject presented with an auditory signal and responding using the foot.
2. Enter the mean reaction time for this exercise in the table.

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Table HN-4-L1: Mean Reaction Times for Different signals and Reactors.

signal	Reactor	Mean Reaction Time of Your Subject (ms)	Mean Reaction Time of All Subjects (ms)	Shortest Mean Reaction Time in Class (ms)	Longest Mean Reaction Time in Class (ms)
Visual	Hand				
Auditory	Hand				
Visual	Foot				
Auditory	Foot				

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