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 cue when responding with the hand.

Procedure

1. Instruct the subject to:
    - Sit in a chair and face the computer screen.
    - Position a hand on the keyboard in a manner that enables the subject to push the Enter key as quickly as possible.
    - Watch the right side of the computer screen and quickly press the Enter key on the keyboard when the signal generated by the event marker first appears.
2. 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.

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

3. Type <Subject's Name> Visual Cues-Hand in the Mark box that is to the right of the Mark button.
4. Click on the Record button. Instruct the subject to press the Enter key on the keyboard to mark the recording as soon as he or she sees the visual cue on the right side of the computer screen (Figure HN-4-L2).
5. Instruct the subject that the exercise has begun and that a visual cue could appear on the screen at any time
6. Use the event marker to deliver ten visual cues to the subject. The cues should not be less than five seconds nor more than ten seconds apart.
7. After the tenth cue, click Stop to halt recording. Select Save As in the File menu, type a name for the file. Choose a destination on the computer in which to save the file, like your lab group folder). Designate the file type as *.iwxdata. Click on the Save button to save the data file.

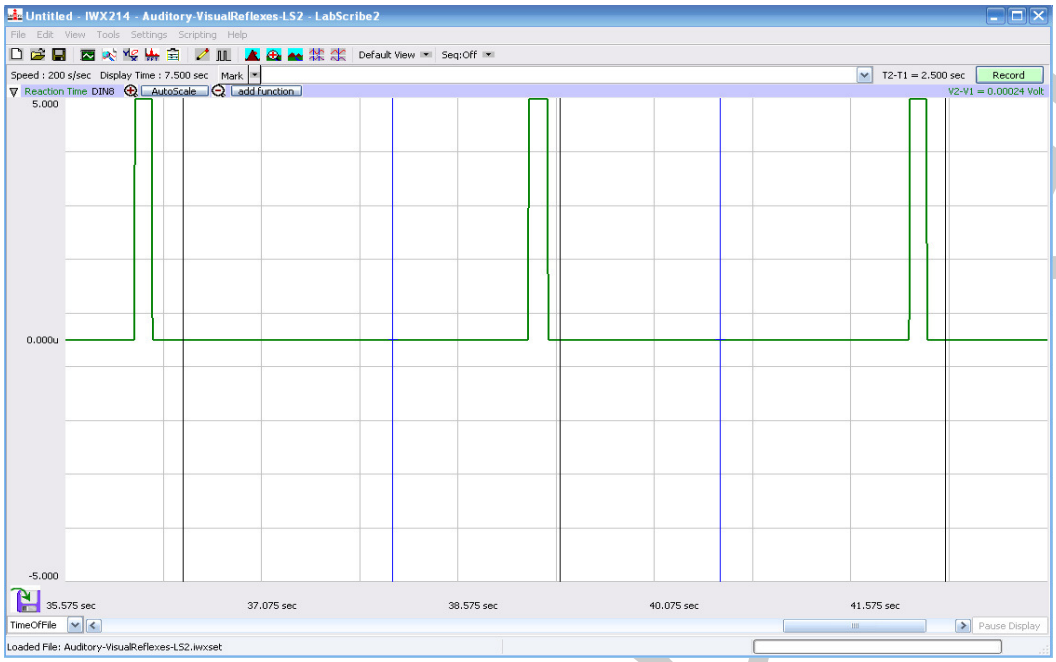

Figure HN-4-L2: Three visual cues, each followed by the subject's response, are displayed on the Main window. Each visual cue is made by pushing the button of the EM-100 event marker momentarily; each response mark is made by the subject pushing the Enter key on the keyboard.

Data Analysis

1. Scroll to the beginning of the data recorded for Exercise 1 to display the first trial on the Main window.
2. Use the Display Time icons to adjust the Display Time of the Main window to show both the visual cue made with the event marker and the mark made by the subject's response on the Main window. This trial can also be selected by:
    - Placing one cursor before the beginning of the visual cue and the second cursor after the mark made by the subject; and
    - Clicking the Zoom between Cursors button on the LabScribe toolbar to expand the complete reaction trial to the width of the Main window.

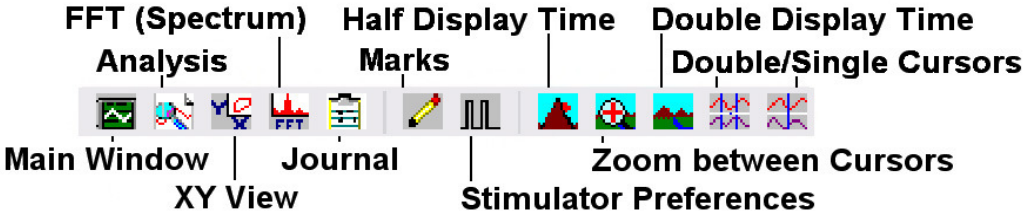

Figure HN-4-L3: The LabScribe toolbar.

3. Click on the Analysis window icon in the toolbar (Figure HN-4-L3) or select Analysis from the Windows menu to transfer the data displayed in the Main window to the Analysis window (Figure HN-4-L4).
4. Look at the Function Table that is above the display of the Stimulus channel displayed in the Analysis window. The mathematical function, T2-T1, should appear in this table. The value for T2-T1 is seen in the table across the top margin of the Stimulus channel.
5. Use the mouse to click on and drag a cursor to the onset of the signal used as the visual cue. Drag the other cursor over the mark made by the subject responding to the visual cue.
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. The functions in the channel pull-down menus of the Analysis window can also be used to enter the name and value for T2-T1 into the Journal. To use these functions:
    - Place the cursors at the locations used to measure the reaction time.
    - Transfer the name of the T2-T1 function to the Journal using the Add Title to Journal function in the Stimulus Channel pull-down menu.
    - Transfer the value for T2-T1 to the Journal using the Add Ch. Data to Journal function in the Stimulus Channel pull-down menu.
8. Once the reaction time in the first trial is measured and recorded, use the scroll bar at the bottom of the Analysis window to move the data from the second trial onto the window. If needed, use the Display Time icons to adjust the width of the Analysis window to show both the visual cue and the subject's response on the same window.
9. Repeat Steps 5 through 7 on the data from the second trial.
10. Use the same techniques used in Steps 5 through 8 to measure the reaction times from the other eight trials.
11. 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 HN-4-L1.

Exercise 2: Ear-Hand Reaction Times

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

Procedure

1. Cover the computer screen with an opaque piece of construction paper to prevent the subject from seeing any signal on the screen as a visual cue.

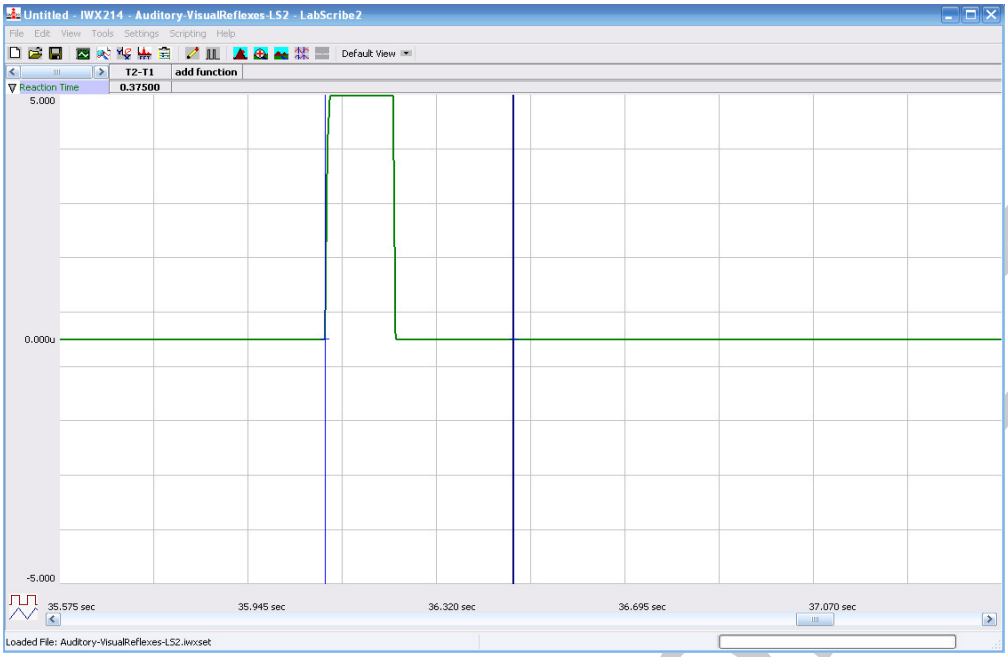

Figure HN-4-L4: A visual cue, followed by the subject's response, are displayed on the Analysis window. The two cursors are positioned at the beginning of the visual cue and on the mark for measurement of the subject's reaction time (T2-T1) in this trial, 0.370 sec.

2. Instruct the subject to:
    - Sit in a chair in front of the computer keyboard.
    - Position a hand on the keyboard in a manner that enables the subject to push the Enter key as quickly as possible.
    - Listen for the click (sound) of the event marker as the other student presses the button and then press the Enter key as quickly as possible.
3. Out of sight of the subject, another student should prepare to sharply tap the button of the event marker to create a auditory cue that is also recorded as a signal on the Stimulus channel. In this exercise, the subject will perform ten trials.
4. Type Auditory Cue-Hand in the Mark box that is to the right of the Mark button.
5. Click on the Record button. Instruct the subject to press the Enter key on the keyboard to mark the recording.
6. Instruct the subject that the exercise has begun and that a auditory cue could be heard at any time
7. Use the event marker to deliver ten auditory cues to the subject. The cues should not be less than five seconds nor more than ten seconds apart.
8. After the tenth cue, click Stop to halt recording.
9. 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 cues and responding using a hand switch.
2. Enter the mean reaction time for this exercise in Table HN-4-L1.

Questions

1. How does the subject's mean reaction time to visual cues compare to his or her mean reaction time to auditory cues?
2. What would cause a longer reaction time to one type of cue 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 cue?

Exercise 3: Eye-Foot Reaction Times

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

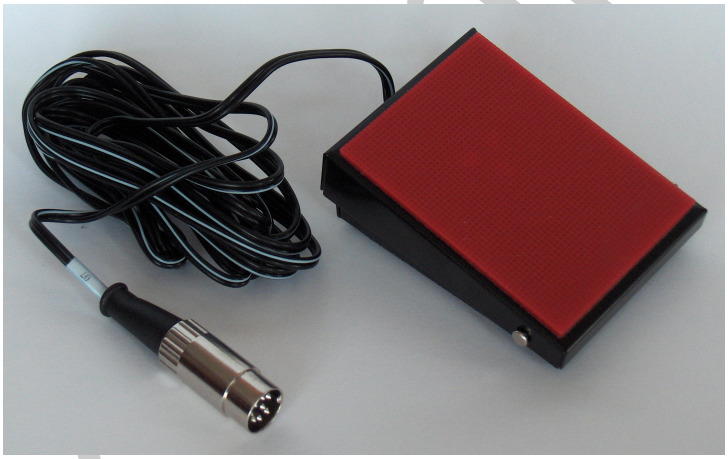

Figure HN-4-L5: The FRS-100 foot reaction switch.

Procedure

1. Plug the DIN8 connector on the cable of the FRS-100 foot reaction switch (Figure HN-4-L5) into the Channel 4 input of the IWX/214 (Figure HN-4-L6) or Channel A5 of the IXTA ((Figure HN-4-L7) .
2. Instruct the subject to:
   - Sit in a chair and face the computer screen.
   - Position a foot on the FRS-100 foot reaction switch in a manner that enables the subject to press the pedal with his or her 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 an IWX/214.

Figure HN-4-L7: The EM-100 event marker and FRS-100 foot reaction switch connected to an IWX/214.

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

4. Type Visual Cues-Foot in the Mark box that is to the right of the Mark button.
5. Click on the Record button. Instruct the subject to press the pedal as soon as he or she sees the visual cue on the right side of the computer screen
6. Instruct the subject that the exercise has begun and that a visual cue could appear on the screen at any time
7. Use the event marker to deliver ten visual cues to the subject. The cues should not be less than five seconds nor more than ten seconds apart.
8. After the tenth cue, click Stop to halt recording.
9. Select Save in the File menu.

Data Analysis

1. In Exercises 3 and 4, the response of the subject in marked on the Response channel by the use of the foot pedal. To measure the reaction time of the subject in Exercises 3 and 4, use the cursors to measure the time between the onset of the signal from the EM-100 event marker recorded on the Stimulus channel and the onset of signal from the FRS-100 foot reaction switch recorded on the Response channel (Figure HN-4-L7).

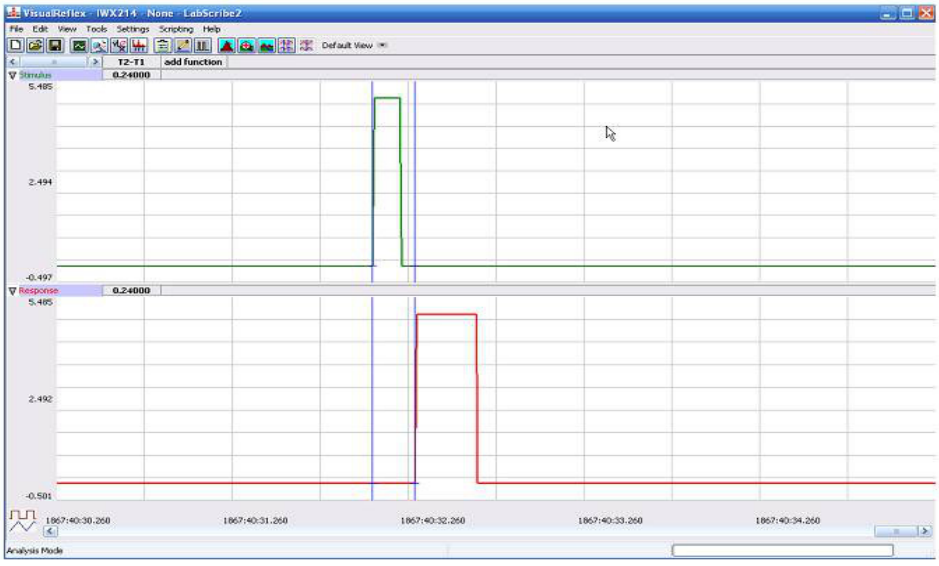

Figure HN-4-L7: A visual cue on the Stimulus channel, followed by the subject's response using the FRS-100 foot reaction switch on the Response channel, are displayed on the Analysis window. The two cursors are positioned at the beginnings of the visual cue and the response signal for measurement of the subject's reaction time (T2-T1) in this trial, 0.240 sec.

2. Use the techniques explained in Exercise 1 to measure and record the reaction times of the subject presented with a visual cue and responding using a foot switch.
3. Enter the mean reaction time for this exercise in Table HN-4- L1.

Exercise 4: Ear-Foot Reaction Times

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

Procedure

1. Cover the computer screen with an opaque piece of construction paper to prevent the subject from seeing any signal on the screen as a visual cue.
2. Instruct the subject to:
    - Sit in a chair and face the computer screen.
    - Position a foot on the FRS-100 foot reaction switch in a manner that enables the subject to press the pedal with his or her 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. Out of sight of the subject, another student should prepare to sharply tap the button of the event marker to create a auditory cue that is also recorded as a signal on the Stimulus channel. In this exercise, the subject will perform ten trials.
4. Type Auditory Cues-Foot in the Mark box that is to the right of the Mark button.
5. Click on the Record button. Instruct the subject to press the pedal as soon as he or she hears the auditory cue.
6. Instruct the subject that the exercise has begun and that an auditory cue could heard at any time
7. Use the event marker to deliver ten auditory cues to the subject. The cues should not be less than five seconds nor more than ten seconds apart.
8. After the tenth cue, click Stop to halt recording.
9. Select Save in the File menu.

Data Analysis

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

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

Cue	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				