LABORATORY 5 – ELECTROENCEPHALOGRAPHY & REACTION TIME

<mark>5-A: Recording Visual Reaction Times</mark>
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<mark>5-B: Recording Auditory Reaction Time</mark>

Purpose: The purpose of this lab was to record and analyze visual and auditory reaction times using the IWX/214 unit and the LabScribe3 program. Visual and auditory reaction times provide valuable insights into the processing speed of sensory stimuli by the human nervous system.

Procedures;

<mark>5-A: Recording Visual Reaction Times</mark>

1. To get things started:
Before you turn anything on, be sure the IWX/214 unit is plugged in, and that the IWX/214 unit is connected to the laptop by USB cable.
Be sure that the EM-100 Event Marker is fully connected to the Channel 3 socket in front of the IWX/214 unit (Fig. 5-4).

: The EM-100 Event marker plugged into Channel 3 of the IWX/214 unit.

Once everything is connected, FIRST turn on the laptop and allow it to fully boot up before you turn on the IWX/214 unit. Once the Iworx unit is on, the red indicator light on the Iworx unit should light up and you may hear the USB chime from the laptop if the laptop does not default to mute (many are set to default to mute).

2. Open the Labscribe3 program by clicking on the LabScribe3 icon on the desktop. As soon as the program opens, you should see a window pop-up that says "Hardware found IWX214:2008-1-24," click "OK." If you see a window pop-up with procedures for installing new hardware, you may have turned the IWX/214 unit before the laptop fully booted up. Simply turn off the IWX/214 unit, close the Labscribe3 program and start over again by first turning the IWX/214 back on and then re-opening the Labscribe3 program as described above.

3. In the second from the top row (the row that says "File Edit View Tools Settings Advanced External Devices Help"), click on the "Settings" tab. A little more than halfway down the drop-down window should be a tab called "Human Nerve." Click on that tab and that should lead you to the second tab called "Auditory-VisualReflexes," click on that tab. Close the pdf file that opens automatically, you don't need it.

4. Pair up with a lab partner and arrange yourselves according to this recording setup:
 The student subject should sit in a chair facing the laptop computer with their hand in position so that they can press the "Enter" key as quickly as possible.
 The lab partner holding the EM-100 Event Marker should stand out of sight of the subject. They need to be able to quietly press and release the button of the Event Marker once the test begins.

5. Type the subject's name and "Visual" in the Mark box that is to the right of the Mark button just above the data recording. Click the red "Record" button then click the Mark button, this will put a vertical line in your recording and the words in the Mark box at the bottom of the vertical line. Leave the cursor mouse over the Mark box (not Mark button).

6. Each time the lab partner quietly clicks the Event Marker button, the green line coming in from the right side of the computer screen will jump up then back down. As soon as the subject sees the green line jump up, they need press the "Enter" key as quickly as possible. When this happens a small "Enter Mark Text" window will pop up, ignore it. However, the subject will have to click on the "Enter" key again to clear it. Do not worry, the Mark line will still be in the right place. The subject will have to hit the "Enter" key twice for every trial: once to leave the Mark line and a second time to clear the "Enter Mark Text" pop up window.

7. Repeat this for ten trials but the lab partner should be sure to click the Event Marker button at irregular intervals (not less than 5 seconds apart, but not more than 10 seconds apart). After ten trials click the "Stop" button (it's the same button that turns from the red "Rec" button to the black "Stop" button once it is recording).

8. Multiple lab partners can use the same Iworx file. Just click the red "Rec" button again and let a good 20 seconds of flat line go by before you click the black "Stop" button. Then repeat steps 5-7 above with the new subject's name. If a third student will be using the same file, just click the red "Rec" button again and let a good 20 seconds of flat line go by before you click the black "Stop" button. Then repeat steps 5-7 with the third student's name.

9. Once all lab partners have made their Visual Cues recording, go back to the first of ten trials for each student. Move the red cursor lines (there are two) by left clicking on the red cursor line and while holding down the left mouse pad button, sliding your finger on the mouse pad to move one red cursor line to the left base of the green rectangle, then releasing the left mouse pad button. Move the other red cursor line to the black Mark Line.

10. Look at the top right of the screen where it says "T2 – T1" = _____ msec. Record that number and repeat this step for all ten trials and for each of the students using your laptop. Calculate the average for the ten trials. Report these numbers to the lab instructor who will compile the class numbers.

5-B: Recording Auditory Reaction Time

1. Once all students using your Iworx unit and laptop have reported their 5-A averages, arrange yourselves for 5-B according to this recording setup:
 Turn the laptop so the subject can still press the "Enter" key but cannot see the screen. The subject's hand should be in a position so that they can press the "Enter" key as quickly as possible.
 The lab partner holding the EM-100 Event Marker close to one of the subject's ears should stand out of sight of the subject.

2. Type the subject's name and "Auditory" in the Mark box that is to the right of the Mark button just above the data recording. Then click the red "Record" button then click the Mark button, this will put a vertical line in your recording and the words in the Mark box at the bottom of the vertical line. Leave the cursor mouse over the Mark box (not Mark button).

3. Each time the lab partner clicks the Event Marker button near the subject's ear, the click should be audible to the subject. As soon as the subject hears the "click," they need press the "Enter" key as quickly as possible.

4. Like in 5-A, when this happens a small "Enter Mark Text" window will pop up, ignore it. However, the subject will have to click on the "Enter" key again to clear it. Do not worry, the Mark line will still be in the right place. The subject will have to hit the "Enter" key twice for every trial: once to leave the Mark line and a second time to clear the "Enter Mark Text" pop up window.

5. Repeat this for ten trials but the lab partner should be sure to click the Event Marker button at irregular intervals (not less than 5 seconds apart, but not more than 10 seconds apart). After ten trials, click the black "Stop" button.

6. Like in 5-A, multiple lab partners can use the same Iworx file. Just click the red "Rec" button again and let a good 20 seconds of flat line go by before you click the black "Stop" button between each student.

7. Once all lab pairs have made their Auditory Cues recording, repeat Steps #9-10 of 5-A to analyze the data. Be sure to report the average of the ten auditory trials to the lab instructor

Results:
5-A: Recording Visual Reaction Times

Visual	Visual Person 1 (time)	Visual Person 2 (time)
Reaction 1	915	735
Reaction 2	1.360	780
Reaction 3	1.150	255
Reaction 4	910	681
Reaction 5	915	589
Reaction 6	690	503
Reaction 7	605	555
Reaction 8	560	533
Reaction 9	610	563
Reaction 10	620	553

5-B: Recording Auditory Reaction Time

Auditory	Auditory Person 1 (time)	Auditory Person 2 (time)
Reaction 1	735	426
Reaction 2	780	398
Reaction 3	255	273
Reaction 4	681	421
Reaction 5	589	411
Reaction 6	503	416
Reaction 7	555	488
Reaction 8	533	397
Reaction 9	563	434
Reaction 10	553	480

Auditory/ Vision	person 1 (time)	person 2 (time)
Reaction 1	735	426
Reaction 2	780	398
Reaction 3	255	373
Reaction 4	681	421
Reaction 5	589	411
Reaction 6	503	416
Reaction 7	555	488
Reaction 8	533	397
Reaction 9	563	434
Reaction 10	553	480
Average	574.7	424.4
Stdev	145.079327	35.8738531
Sterror	45.8781115	11.3443084

Reflex Speed Auditory(1) vs. Visual (2)
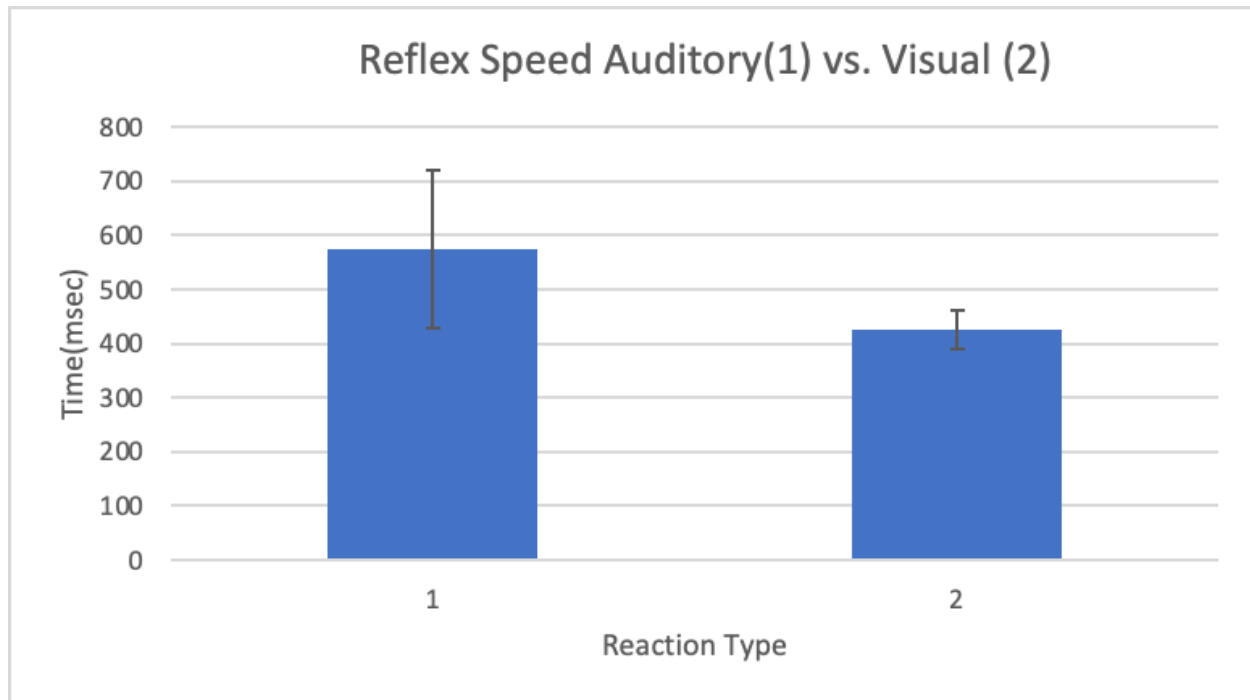
Discussion: The experiment was meant to target measuring visual and auditory reaction times. Visual reaction times involve the processing of visual stimuli, while auditory reaction times involve the processing of auditory cues. In both cases, the time taken for the nervous system to detect the stimulus and generate a response was recorded. The results show that reaction times varied among individuals and conditions. Visual reaction times were typically faster than auditory reaction times, which can be attributed to differences in sensory processing and neural pathways. I enjoyed this Lab very much, but again I had a hard time fully engaging in what the purpose of what this lab was. Moving forward in order to fully understand what the lab is demonstrating, I plan to read the procedures prior to attending labs on my designated lab day. In order to minimize the time that I am spending to read the procedures and figure out what the instructions are asking of me.

Conclusion:

- Understand the factors that determine the time it takes to complete a reflex.
- Understand the difference between monosynaptic and polysynaptic reflexes in terms of why they have different speeds.
- Understand the normal range of reaction times found in large enough samples and what kinds of factors account for this range and distribution.

In conclusion, this lab experiment successfully recorded and analyzed visual and auditory reaction times. These measurements provide insights into the speed of information processing by the human nervous system. Visual reaction times were generally faster than auditory reaction

times, highlighting differences in sensory perception. These findings contribute to our understanding of sensory processing and reaction times in the human body.