Biology 125- Human Physiology

Laboratory 5- Electroencephalography & Reaction Time

Brianna Kingsland

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I. Purpose

The purpose of this lab is to demonstrate the concepts of action potential velocities and synaptic delays in complex visual and auditory responses, as well as the diversity of reaction times seen in your community.

II. Procedure

5-A: Recording Visual Reaction Times

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).
   - 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-Visual Reflexes**," 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 theEM-100Event 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 flatline 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 often 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-Baccording 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 theEM-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 to press the "Enter" key as quickly as possible.
4. Like in5-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.
8. Discuss the class results for both 5-A and 5-B. Does your lab show a normal bell-shaped curve? Why or why not? What accounts for the diversity seen in reaction times?

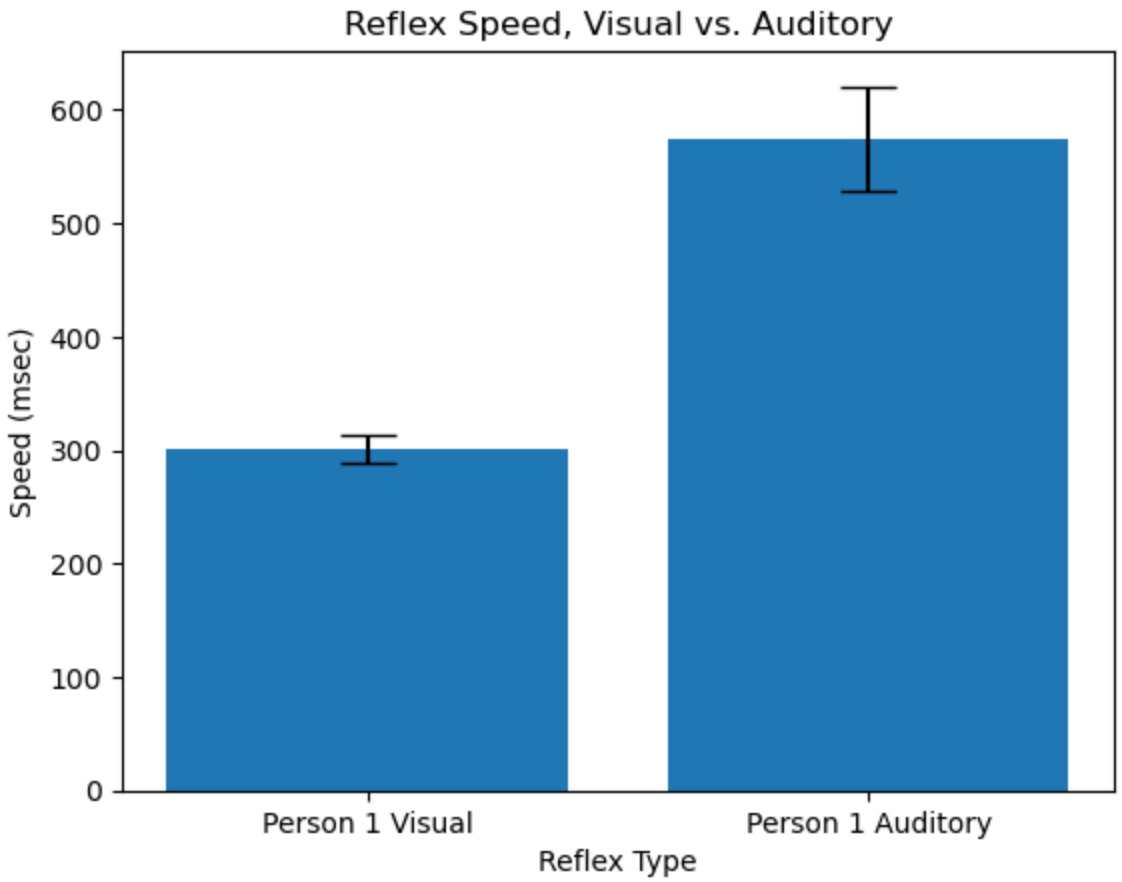
1. Result

5-A: Recording Visual Reaction Times

	Visual 1	Visual 2	Visual 3	Visual 4	Visual 5	Visual 6	Visual 7	Visual 8	Visual 9	Visual 10
Reaction 1	319	208	300	309	333	365	240	352	380	315
Reaction 2	308	196	356	225	271	301	266	306	376	319
Reaction 3	360	203	281	236	290	382	247	294	361	322
Reaction 4	332	275	293	305	278	817	216	280	275	321
Reaction 5	264	215	316	277	294	322	252	265	264	303
Reaction 6	240	177	296	295	333	359	286	234	381	318
Reaction 7	252	259	282	266	271	347	243	242	324	346
Reaction 8	307	184	267	236	290	299	212	222	337	310
Reaction 9	293	225	262	240	278	347	222	226	309	319
Reaction 10	331	205	269	262	294	324	261	216	306	281

5-B: Recording Auditory Reaction Time

	Auditory 1	Auditory 2	Auditory 3	Auditory 4	Auditory 5	Auditory 6	Auditory 7	Auditory 8	Auditory 9	Auditory 10
Reaction 1	735	426	384	342	339	213	227	245	217	282
Reaction 2	780	398	353	223	290	190	252	223	195	315
Reaction 3	255	373	428	222	335	206	208	243	182	276
Reaction 4	681	421	308	258	247	274	142	257	177	218
Reaction 5	589	411	367	249	297	237	238	248	187	270
Reaction 6	503	416	527	182	285	315	123	237	155	294
Reaction 7	555	488	350	231	256	293	222	249	178	212
Reaction 8	533	397	331	220	289	252	141	219	216	233
Reaction 9	563	434	346	219	290	184	137	215	172	254
Reaction 10	553	480	391	213	276	189	170	192	177	245



2. **Discussion**

   Visual and auditory reaction tests were conducted. The reaction times were documented in a chart and converted into a graph to show the average between the results. It was interesting how each person had a difference in reaction times, and some were a large difference in reaction time.

3. **Conclusion**

   I learned today that reaction times differ between each individual even if the experiment/test each conducted the same each time.