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Thursday Lab

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Lab #5 Electroencephalography and Reaction Time

Purpose: Record our visual and auditory reflexes.

Procedures:

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.
- 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 Labscribe3program and start over again by first turning the IWX/214 back on and then re-opening theLabscribe3program 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 10seconds 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 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

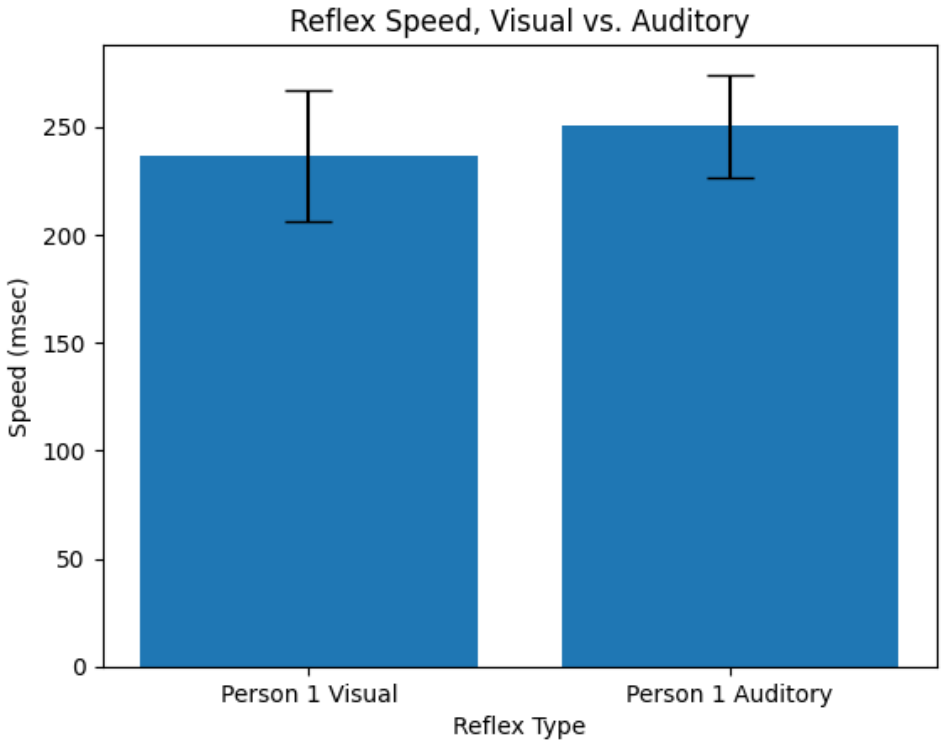
1. Once all students using your Iworx unit and laptop have reported their 5-A averages, arrange yourselves for 5-Baccording to this recording setup:

- 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-100Event 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 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 10seconds 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 #9-10of 5-Atoanalyze 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?

Results:



Discussion: The study of the electrical activity of the brain is called Electroencephalography. Superficial dendrites of the cerebral cortex are the sources of this activity. The thalamus establishes the synchrony of the electrical signals. Electroencephalograms are graphical records that measure brain wave activity. For my lab (Thursday) we were not able to be in the lab to do this, so we did it online. The websites we used were human benchmark.com and playback.fm. On the playback website, we did the auditory test to see our reaction time involved with hearing. For the benchmark website we tested our visual reaction time.

Conclusion: In conclusion, we were able to identify the basic EEG patterns, and know their amplitudes and frequencies. We were able to understand the areas responsible for generating different brain waves. We also learned about the clinical significance of EEGs in diagnosing brain disorders. We were able to understand the factors that determine the time it takes to complete a reflex and understand the difference between monosynaptic and polysynaptic reflexes in terms of why they have different speeds. Lastly, we learned about the normal range of reaction times found in large enough samples and what kinds of factors account for this range and distribution.