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Laboratory 6 & 7-Sensory Physiology

Tuesday Lab

Purpose- Sensation is the process of monitoring environmental stimuli, which involves three different basic components of the nervous system. The receptors generate impulses in response to specific environmental stimuli, the sensory neurons relay the impulses through afferent pathways to the central nervous system, and interpretation centers of the cerebral cortex translate these impulses into perceived sensations. Each of the receptors generates a graded potential, which, if strong enough, will depolarize a connecting sensory neuron. The receptors may also excite sensory neurons by delivering many sub-threshold impulses per second using a process called summation. The purpose of the experiments are for us to perform a series of experiments that measure the capabilities of your sensory neurons, which are cutaneous, olfactory, auditory, proprioceptive, and visual systems that observe basic principles of human sensory physiology.

Procedures- In laboratory 6 and 7 there were many different experiments that were performed, meaning that there are many different procedures that took place. For experiment A1 we were to have our partner close their eyes and apply a two caliper pinpoint that is close together on the skin of the palm of their hand. We were then to move the pins 1 millimeter apart until our partner could distinguish the feeling of there being two pins touching them. We were then to repeat the process on the back of the hand, fingertip, the edge of the lips, and the back of the neck and also have our partner do it on us, recording our results. For experiment A2 we were to place our left hand in 15 degree celsius water and our right hand in 37 degree celsius water for two minutes and record the sensation of both hands. We were then to place both hands in 25 degree celsius water and record the mediate sensation in both hands. For experiment B we were to block our left nostril and smell cloves, peppermint oil, and camphor until we couldn't smell anything anymore and record how many seconds it took for the smell to go away. We were then to distinguish the smells of the cloves and peppermint oil again and then hold the camphor vial under our nose until the smell went away and record how many seconds it took. For experiment C1 we were to plug our left ear and hold a vibrating tuning fork to the right mastoid process. When the sound disappeared we were to then move the tuning fork near the external auditory canal and determine if we could still hear the sound. If we could still hear the sound it determined that there is no damage to the middle ear, then we were to repeat the process covering the right ear. For experiment D we were to spin someone in a chair 10 times to the right with their head bent at a 30 degree angle and record their eye movement after, then we were to repeat the process spinning them to the left. For experiment E1 we were to cover our left eye and focus the right eye on the center of the cross on the paper. We were then to move the paper closer to our face until the black dot disappeared in our peripheral vision and record the distance of our face to the paper. In experiment E2 we were to stand 20 feet away from the Snellen chart and cover our left eye and attempt to read the line designated “20”. If we couldn’t see the letters on the line we were to move up the chart until we could read the letters clearly and record the results, we repeated the same steps covering our right eye. In experiment E3 we had to stand about 8-10 inches away from the radial astigmatism eye chart so that it fills our

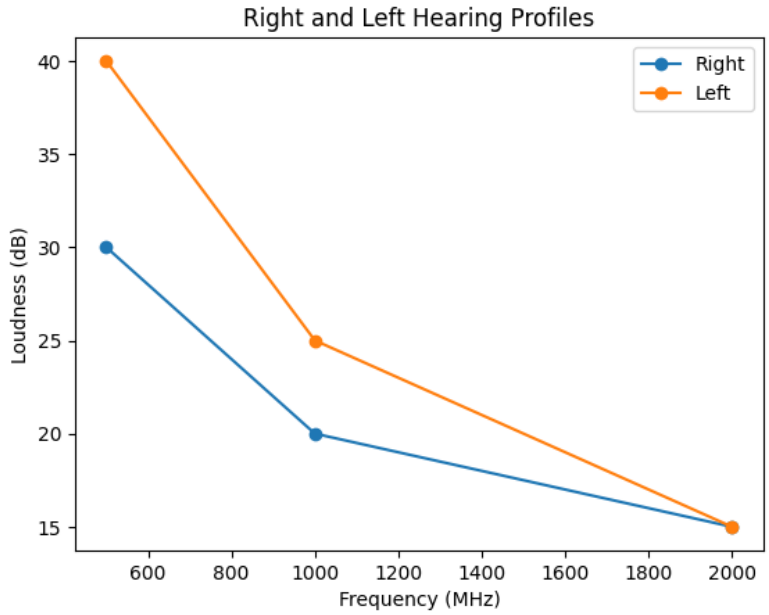
field of vision and cover our left eye. We were to focus on the lines with our right eye and if a blur appeared in the lateral lines or the lines converge into one, it determined if we have an astigmatism in that eye, and we were to repeat the process covering our right eye. In experiment E4 we were to stare at different colored pictures for 30 seconds and then shift our vision from the picture to a blank piece of paper and record our observations. For the color blindness test we were to look at the Ichikawa color blindness chart and attempt to read the practice test panels, after that we were to look at the next 10 panels and see if we can determine the numbers showing to determine if we have color blindness or not. For experiment E5 we were to sit in front of a perimeter board and stare at the center line closing our left eye. Our lab partner was to introduce different colored blocks into our field of vision (red, green and blue). Without taking our eye off the centerline, we were to determine at which degree the colors were discriminated and record the results, repeating the same process covering our right eye.

Results-

Results for A1-Two point discrimination

Palm of hand	Back of hand	Fingertip	Outer edge of lips	Back of neck
10mm	19mm	3mm	3mm	20mm

Results for C2-Audiometry



Results for A2-Accommodation of thermoreceptors

In the 15 degree celsius water after two minutes my hand started to go numb, and in the 37 degree celsius water my hand felt warm. Once I had put both of my hands into the 25 degree celsius water, my hand that was in the cold water felt warmer and my hand that was in the warmer water then felt colder.

Results for B-Olfactory adaptation

Cloves vial	Camphor vial	Peppermint oil vial
16 Sec	32 Sec	20 Sec
14 Sec	24 Sec	21 Sec

Results for C1-Tuning fork tests

When I hit the vibrating tuning fork it put off a loud ringing sound. When the sound stopped I placed it behind my ear and I was still able to hear the ring sound for a while in both ears. This determines that I have no middle ear damage.

Results for D-Equilibrium

After spinning around in a chair for 10 times or more we observed the movement of our eyes. The eyes move in the opposite direction as the way we spinned around in the chair. The eyes moving in opposite directions is for maintaining stable equilibrium and visual image.

Results for E1-Demonstration of the blind spot

Honestly I could see the black dot the entire time in my peripheral vision. I feel this is because the paper is smaller, if we looked at it on a screen it would show different results.

Results for E2-The Snellen test

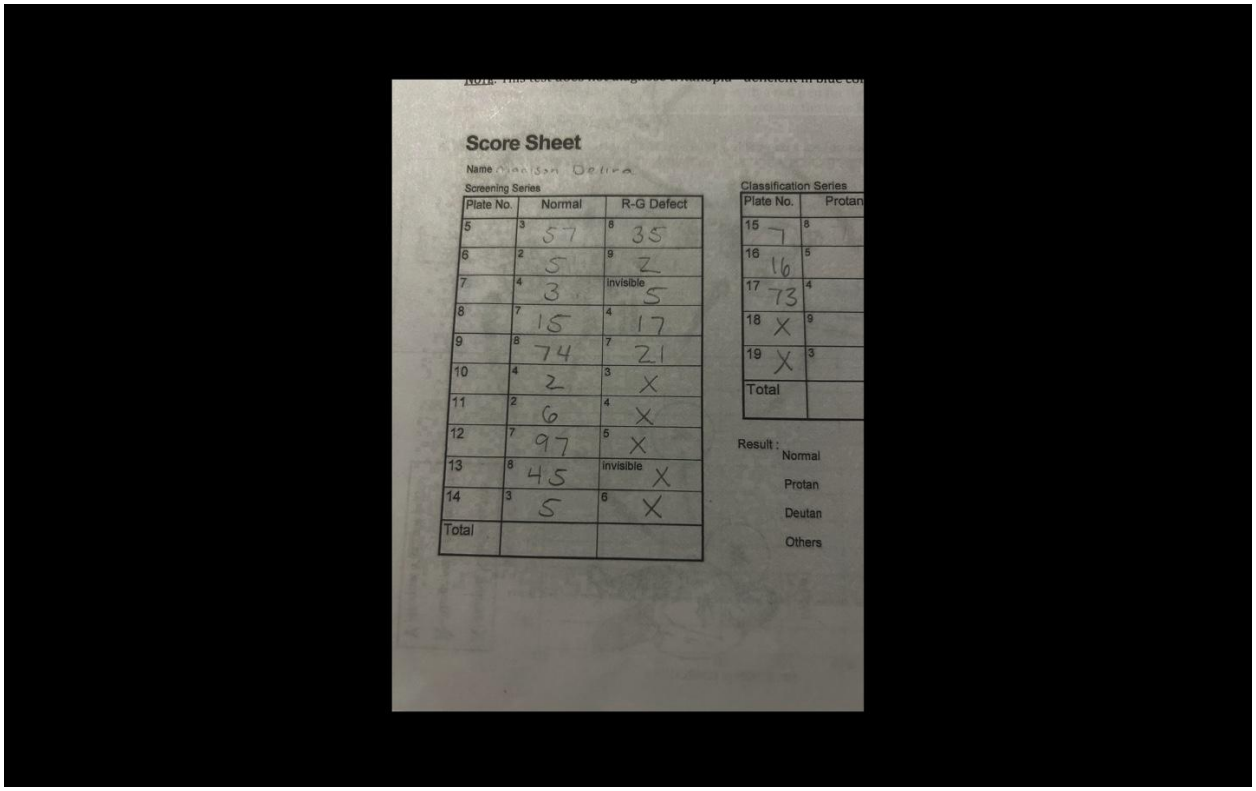
Left eye: 20/70

Right eye: 20/20

Results for E3-Astigmatism

With my left eye close up I could see all three lines, but they were blurry. My left eye farther away I saw only two solid black lines, this shows I do have an astigmatism in my left eye. With my right eye close up I saw all three lines, same for the right eye being farther away.

Results for E4-Color blindness test



Score Sheet

Name [illegible]

Screening Series

Plate No.	Normal	R-G Defect
5	3 57	8 35
6	2 5	9 2
7	4 3	invisible 5
8	7 15	4 17
9	8 74	7 21
10	4 2	3 X
11	2 6	4 X
12	7 97	5 X
13	8 45	invisible X
14	3 5	6 X
Total		

Classification Series

Plate No.	Protan
15 7	8
16 16	5
17 73	4
18 X	9
19 X	3
Total	

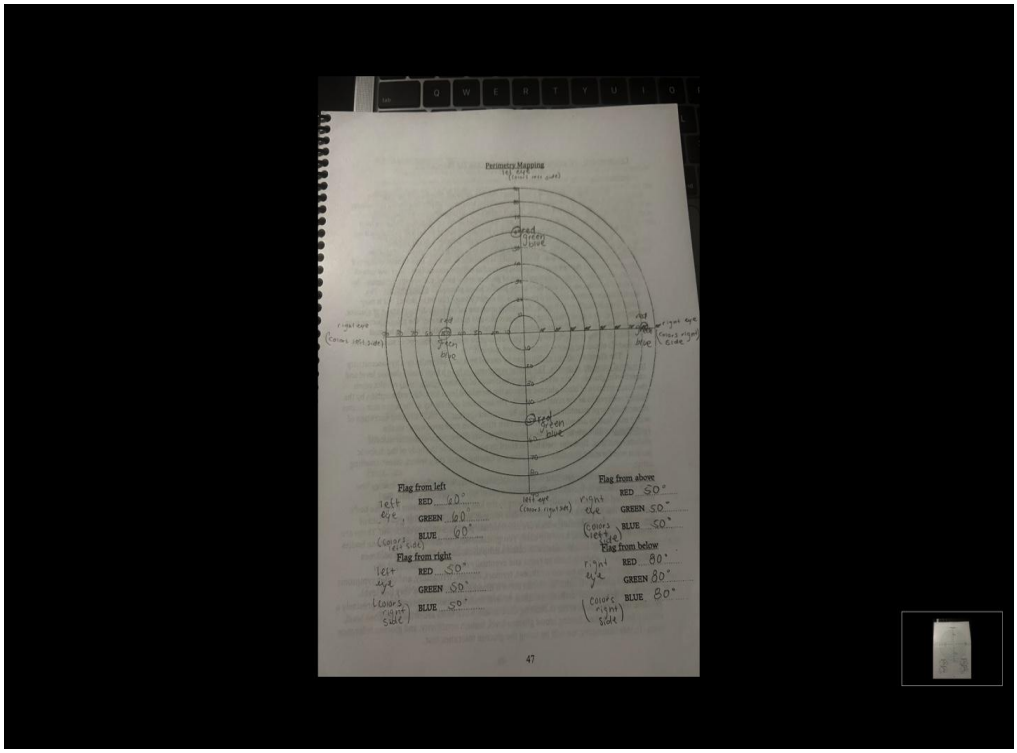
Result : Normal

Protan

Deutan

Others

Results for E5-Perimetry



Perimetry Mapping

Flag from left

left eye (colors right side) RED 60°, GREEN 60°, BLUE 60°

Flag from right

left eye (colors right side) RED 50°, GREEN 50°, BLUE 50°

Flag from above

right eye (colors left side) RED 50°, GREEN 50°, BLUE 50°

Flag from below

right eye (colors right side) RED 80°, GREEN 80°, BLUE 80°

47

Discussion- The experiments done in laboratory 6 and 7 were very interesting experiments to do because it was cool to see the different results of the cutaneous, olfactory, auditory, proprioceptive, and visual systems. For experiment A1, the two point discrimination one, it was interesting to see that the feelings on the palm of my hand to the back of my hand have differences in how many millimeters the caliber pinpoints were apart to be able to determine that there really are two points touching the skin. The outer edge of the lips and the fingertip are two places where the two caliber pinpoints were pretty close together and I was able to determine the two points quickly. For experiment A2 we were to place one hand in cold water and the other in warm water for 2 minutes and then place them both in medium temperature water and record the sensations of both our hands. For the experiment the hand in the cold water felt warmer in the regular temperature water and the hand in the warm water felt colder in the regular temperature water. The only problem for that experiment was that the water that was supposed to be warm started to get room temperature the more it sat there so I believe that it could have created some experimental errors. For experiment B the first time I smelt the vials the cloves smell went away after 14 seconds, the camphor smell went away after 24 seconds, and the peppermint oil smell went away after 21 seconds. After smelling the cloves and peppermint oil again I then smelt the camphor vial a second time and the smell went away after 32 seconds. The auditory measurement experiments determined that my ears and hearing seem healthy and good, and I had no middle ear damage. For the equilibrium experiment the student volunteer who got spun in the chair, her eyes didn't move as much as I thought they would after spinning her. We even spinned her around in the chair a second time for more times around to see if it worked the second time, it did work a little bit better the second time around. Doing the visual tests in laboratory 6 and 7 were very interesting for me to do and a little embarrassing because I have really bad eyes. I have a feeling it was more interesting for my partner because she had a lot better eyesight than I, and it must've been different for her to see someone do the same

experiments she is doing but having major differences in our results, especially in the astigmatism one. Doing the color blindness experiment determined that I have no color blindness. Going into the experiment I knew I am not color blind, but it was interesting to see the different panels and thinking that some people actually cannot read the number that was shown due to color blindness.

Conclusion- The results shown in the two point discrimination and accommodation of thermoreceptors experiments showed results of cutaneous sensation by having us write about the sensations in our hands after doing the experiments. Experiment B results showed the adaptation of olfactory chemoreceptors by having us smell different vials and timing how long it takes for the smell to go away. In the auditory measurements experiment the results showed us if we had middle ear damage or not by placing a vibrating tuning fork behind our ear and seeing if we could still hear the sound. In experiment D the results were shown by spinning someone in a chair 10 times and writing down the observation of their eye movement when they stop spinning. The visual measurement experiments determined if we have an astigmatism or color blindness by looking at charts and pictures and recording results. The Snellen test results determine if our eyesight was normal, nearsighted, or farsighted. In conclusion the experiments done in laboratory 6 and 7 showed many different results that belong in the categories of cutaneous, olfactory, auditory, proprioceptive, and visual systems that observe basic principles of human sensory physiology.