Isabel Ramos-Cervantes
BIOL 125 - 20895
Lab Day: Thurs
09/14/2023

# Physiology Lab Report #6/7-
## Lab 6/7: Sensory Physiology I & II

## Purpose

- In this lab we explored the different ways our sensory systems work and how they contribute to our perception of the world around us. We performed a series of exercises that examined the capabilities of our cutaneous, olfactory, auditory, proprioceptive, and visual systems. The purpose of these experiments is for us to observe and learn the basic principles of human sensory physiology.

## Procedures

*6/7 A: Tests of cutaneous sensation*

A-1: Two-Point Discrimination

1. Working with a partner, apply two caliper points as close together as possible to your partner's skin on the palm of their hands (ensure their eyes are closed while doing this)
2. Remove the pins & move them 1mm apart. Reapply the caliper points to your partner's skin. Continue this process until your partner can discriminate between two separate caliper points.
3. Ensure to record the distance between the pins at which your partner can feel the two caliper points
4. Compare the results from all the following areas

a. palm of hand
b. back of hand
c. fingertip
d. back of the neck

5. Repeat this experiment on your partner & document data.

A-2: Accommodation of Thermoreceptors

1. Place your left fingers in 15°C water and your right in 37°C water. Record the sensation of each & continue to keep fingers immersed in the water for 2 minutes.
2. Describe the sensation after two minutes.
3. Remove both hands and immediately place them both in 25°C water. Describe the sensation in each hand.

*6/7 B: Olfactory Adaptation*

1. Block your left nostril and hold the bottle of camphor oil under your nose until you can no longer smell it. Be sure to not consciously sniff it! Note the adaptation time.
2. Remove the camphor and smell the bottles of cloves and peppermint oil. Differentiate the scents.
3. Hold the camphor bottle under your nose again until you can't recognize the smell. Record the second adaptation time.
4. Unblock your left nostril and check if you can detect the camphor.
5. Analyze and interpret the results.

*6/7 C: Auditory Measurements*

<u>C-1: Tuning fork tests</u>

1. Cover your left ear and test the right ear.
2. Place a vibrating tuning fork on the right mastoid process.
3. Move the fork near the ear canal when the sound disappears.
4. If the sound reappears, it shows that you have no middle ear damage.
5. Repeat the test with your left ear & record the results for each ear.

<u>C-2: Audiomentry</u>

1. Read on how to operate the audiometer.
2. Then, conduct audiometry tests with your partner, each will take each other's audiogram.
4. Analyze the audiograms as follows:
   a. Calculate the average values for each ear at 500 Hz, 1000 Hz, and 2000 Hz.
   b. Subtract 26 dB from each average.
   c. If the difference is greater than 26, multiply it by 1.5% to find the percent impairment for each ear.

Percent impairment:
Right ear = 0 x 1.5% = 0.0%
Left ear = 4 x 1.5% = 6.0%

5. To calculate the percent of biaural impairment, use the following formula:
Biaural impairment = (% impairment of good ear x 5) + (% impairment of bad ear)
6. Record the results of these calculations.

*6/7 E: Visual Elements*

<u>E-2: Snellen Test</u>

1. Stand 20 feet away from the chart and cover your left eye.
2. Try to read the line labeled "20". If you can't, move on to lines 30, 40, 50, 70, 100, or 200 until you find a legible line.
3. Repeat the process with your right eye covered.
4. The Snellen chart is analyzed by determining the smallest line you can read clearly.

<u>E-3: Astigmatism</u>

1. Stand about 8-10 inches away from the chart, covering your left eye.

2. Use your right eye to focus on the vertical lines.
3. If you notice blurriness in the horizontal lines or if the lines appear to merge together, it indicates astigmatism in that plane of your eye.
4. Note the results and repeat the test with your left eye.

E-5: Perimitery

1. Position yourself in front of the perimeter board with your right eye at the edge of the semicircle, covering your left eye. Focus on the centerline.
2. Your partner will present colored blocks within your field of vision. Identify the colors without shifting your gaze or uncovering your left eye.
3. Your partner will record the degree at which you discriminated against each color on the perimeter score sheet.
4. Repeat the process for both horizontal and vertical perimeter charts. Record the data and connect the dots of the same color to outline cone placement in your right eye.
5. Analyze the results based on cone distribution in your retina.

# Results

A-1: Two-Point Discrimination

| Two-Point Discrimination Areas | Me | Dayana |
|---|---|---|
| palm of hand | 18mm | 12mm |
| back of hand | 7mm | 8mm |
| fingertip | 3mm | 4mm |
| back of neck | 13mm | 16mm |

A-2: Accommodation of Thermoreceptors

| Time | Left | Right |
|---|---|---|
| Initial feeling of hands immersed in water<br>Left: 15 °C<br>Right: 37°C | Water felt freezing cold, like snow. | Warm and comfortable. |
| After 2 minutes of being in the water | Still cold, but less freezing. | Still nice and warm. |
| Immediately after being immersed in lukewarm | Nice and warm, no longer cold. | Ice cold and uncomfortable. |

| | | |
|---|---|---|
| water(25°C) | | |

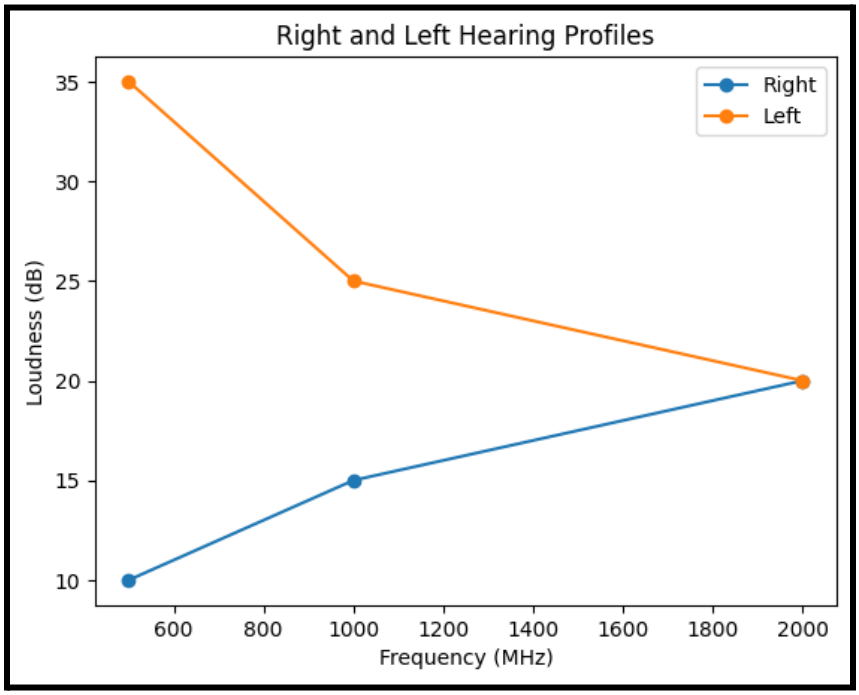
6/7 B: Olfactory Adaptation

| Scent | Adaptation Time |
|---|---|
| Camphor | 6.0 secs |

C-1: Tuning fork tests

Left ear: No middle ear damage.
Right ear: No middle ear damage.

C-2: Audiomentry




E-2: Snellen Test

20/30 Near Sightedness

E-3: Astigmatism

| Left Eye | Blur present |
|---|---|

| | |
|---|---|
| Right Eye | Blur present |
| Results | Astigmatism present in both eyes |

E-5: Perimitery

| Perimitery | Horizontal | Vertical |
|---|---|---|
| Red | 45° | 30° |
| Blue | 30° | 22° |
| Green | 35° | 12° |

# Discussion

- In this lab we learned how our nervous system works to respond to stimuli. The one I found really interesting was the two-point discrimination because it was weird to feel one pin, but realize there were actually two. I also liked the thermoreceptor one because it is odd to see how the water reacted with the sudden change in temperature and feeling the opposite sensation in both hands. Overall, every single experiment was really interesting and it was neat to see the differences in both mine and my partner's results.

# Conclusion

- The basis of this experiment was for us to understand how our nervous system works when it interacts with different stimuli. We learned how our receptors work to detect and respond to different situations when it comes to our senses like vision, smell, and hearing. Overall, we were able to observe our brain responses to the signals it receives. This lab allowed us to gain a better insight on the strengths and weaknesses of our own senses.