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Lab 6/7: Sensory Physiology
10/03/23

Purpose: The purpose of this experiment was to measure the capabilities of our sensory system. To do so we had to perform various exercises like cutaneous, olfactory, auditory, proprioceptive, and visuals to get a basic understanding on sensory physiology.

Procedures:

A-1) Two-point discrimination

1. With your partner's eyes closed, apply two caliper pinpoints as closely together as possible on your partner's skin on the palm of his/her hand.
2. Remove the pins and move them 1 millimeter apart. Reapply the caliper points to your partner's skin. Repeat this procedure until your partner can discriminate two distinct points.
3. Record this distance between pins at which your partner can discriminate two separate caliper points.
4. Compare results obtained from the following areas:

    a. palm of hand
    b. back of hand
    c. fingertip
    d. outer edge of the lips
    e. back of neck

5. Have your partner repeat this experiment on your skin.
6. Interpret the results you have obtained.

A-2) Accommodation of thermoreceptors

1. Place left finger in 15°C water and your right fingers in warm water (37° C) and record the sensation of each. Keep hands immersed for 2 minutes.
2. After two minutes, describe the sensation in each hand.
3. Remove hands and promptly place them both in 25° C water. Describe the immediate sensation in each hand.

6/7 B) Olfactory adaptation

1. Block left nostril. Uncork and hold bottle of camphor oil under nose until no smell is detected. Record the adaption time.
2. Remove the camphor and place the bottles of cloves, then peppermint oil under your nose. Distinguish the smells of cloves and peppermint oil.
3. Uncork and hold the bottle of camphor under your nose again until the smell is no longer recognized. Record this second adaptation time.

4. Unblock your left nostril determine if the camphor is detected.
5. Interpret results.

C-1) Tunning fork tests

1. Plug Lt ear and test Rt ear.
2. Hold handle of vibrating tuning fork to Rt mastoid process.
3. When sound disappears, move fork near external auditory canal.
4. Reappearance of sound indicates no middle ear damage.
5. Repeat test with Lt ear.
6. Record results for each ear.

C-2) Audiometry

1. In a quiet room, the instructor will demonstrate the proper method of operating the audiometer.
2. Audiometry tests will be conducted in pairs. Each student will take his/her partner's audiogram.
3. Record your results on the worksheet on page 44.
4. Analyze the audiograms in the following way:
   a. Average the values obtained for each ear for the frequencies of 500 Hz, 1000 Hz, and 2000 Hz.
   b. Subtract 26 dB from each average.
   c. If the difference is greater than 26, multiply this number by 1.5%. This equals the percent impairment of each ear.
5. To determine the percent of biaural impairment perform the following calculation:
   Biaural impairment = (% impairment of good x 5) + (% impairment of bad ear)/ 6
6. Record the results of these calculations.

6/7 D) Equilibrium- demonstration of nystagmus

1. A student volunteer will be seated on a swivel stool with his/her head bent 30 degrees forward.
2. The instructor will spin the student rapidly to the right for 10 turns.
3. The instructor will suddenly stop turning the student and have the student look straight ahead.
4. The instructor will suddenly stop turning the student and have the student look straight ahead.
5. The instructor will suddenly stop turning the student and have the student look straight ahead.
6. These procedures will be repeated with a second student spun to the left.

E-1) Demonstration of the blind spot

1. Cover left eye and focus the right eye on the center of the cross below.
2. Slowly bring the page closer to eye until spot disappears.

3. Have partner measure distance from your eye to the page.
4. The image of the spot is now superimposed on the optic nerve.

E-2) The Snellen test

1. Stand 20 ft away from the Snellen chart. Cover left eye.
2. Attempt to read the line designated "20".
3. If you can't read line 20, attempt line 30, 40, 50, 70, 100 or 200 until a line is legible. Perform these attempts with your left eye, covering your right eye.
4. The Snellen chart is analyzed in the following way:

   Visual acuity = Distance you read the letters /Lowest line read clearly at 20 feet

E-3) Astigmatism

1. Stand approximately 8 – 10 inches away from the radial astigmatism eye chart so that it fills your field of vision. Cover your left eye.
2. Focus on the lines in the vertical plane with your right eye.
3. If a blur appears in the lateral lines or the lines converge into one, you have an astigmatism in this plane of your eye.
4. Record the results of this test and repeat with the left eye.

E-4) Color vision

Negative after images

1. Stare at different colored objects provided by your lab instructor for 30 seconds each, and then shift your glance to a white sheet of paper. These may include but not be limited to colored squares on white paper, stripes of various colors against white paper, colored flags, or scenic views.
2. Record the negative after-images seen for each color.

Color-blindness test

1. Obtain the Ichikawa color blindness charts.
2. Attempt to read the numbers of each pattern on the test panels. (There are some "practice" panels before the actual test panels begin.)
3. After the first 10 test panels, if your score indicates color blindness, continue with the next five test panels to determine which color deficiency exists.
4. Record your results on the worksheet on page 46.

E-5) Perimetry

1. Seat yourself before the perimeter board with your right eye at the edge of the semicircle. Cover your left eye. Stare at the center line.

2. Your lab partner will introduce several different colored blocks into your field of vision. Identify these blocks by color. Do not take your eye from the center of the chart or uncover your left eye.
3. Your partner will record the degree at which the colors were discriminated on the perimetry score sheet on page 47.
4. Repeat these procedures for each block for both the horizontal and vertical perimetry charts. Record the data and connect the same-colored dots to form an outline of cone placement of your right eye on your data sheet.
5. Explain these results regarding cone placement in your retina.

Result:

A-1)

Palm of hand	8-millimeter
Back of hand	10 millimeters
Fingertip	3 millimeters
Outer edge of the lips	27 millimeters
Back of neck	20 millimeters

A-2)

My hand felt colder when I placed it in the 15-degree Celsius water than when placed in 37-degree Celsius. However, after placing both hands in the 25-degree Celsius water the hand in the 15-degree water felt warmer in the 25-degree water. The hand in the 37-degree water felt cold in the 25-degree water.

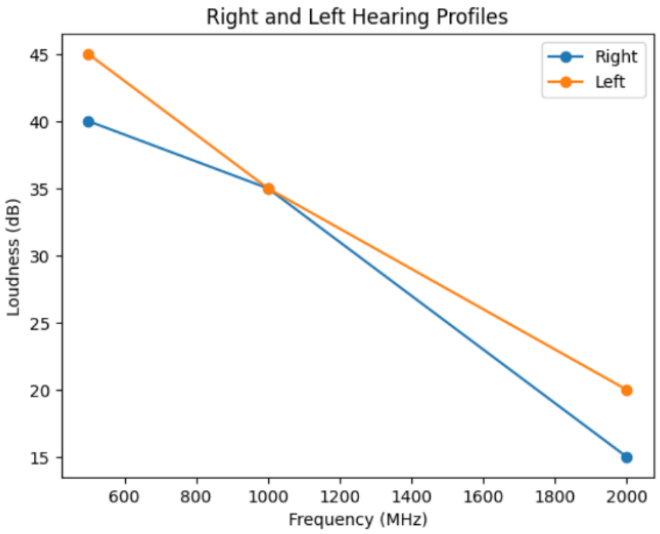
6/7-B)

Camphor	35 seconds
Cloves	30 seconds
Mint	37 seconds

C-1) Tuning fork test

Right Ear	No damage
Left Ear	No damage

C-2) Audiometry

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Average Right after subtraction: 4.0 Percent Impairment Right: 6.0 %
Average Left after subtraction: 7.333333333333336 Percent Impairment Left:
11.000000000000004 %
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6/7-D) Equilibrium -> Demonstration of Nystagmus

Spun 10 times	No eye movement detected

E-1) Demonstration of the blind spot

12 cm because the brain is filling the circle.

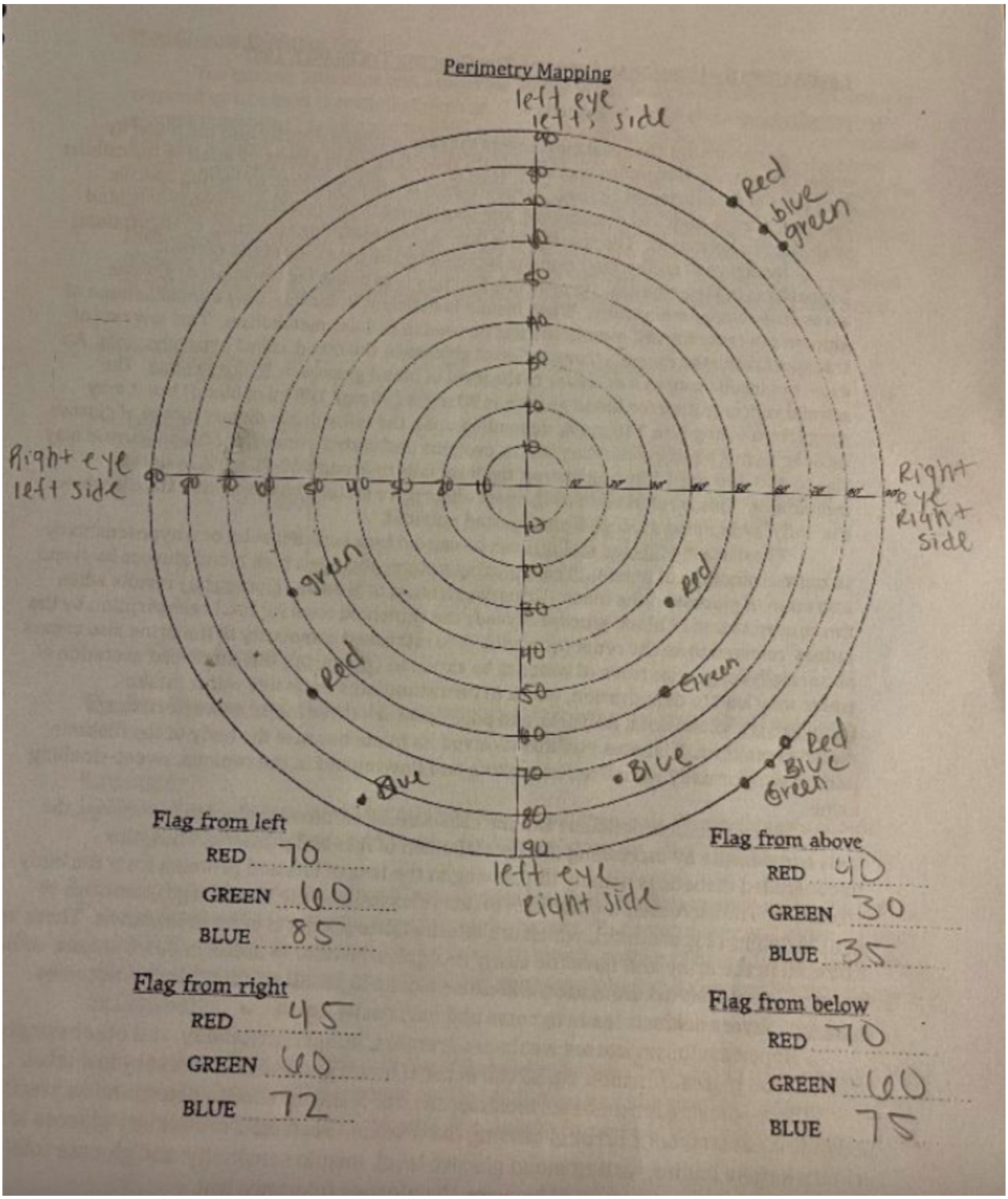
E-2) The Snellen test

Right eye	20/30
Left eye	20/30

E-3) Astigmatism

Right eye	No astigmia
Left eye	Astigmia

E-5) Color vision



Discussion:

For this lab I found interesting since we were testing our senses, and I was surprised on some of the results. I think I mostly enjoyed doing the tunning fork test. I wasn't surprised that my

hearing was good since I tend to pick up on any sound close to me. I also enjoyed doing the smelling test. It was a good experiment to really test our senses which my whole group had a good time doing and seeing who scored best. Overall, I wouldn't mind repeating this lab another time maybe with some other new experiment added.

Conclusion:

In Conclusion, these experiments that were done were to measure our senses. It proves how receptors generate impulses like cutaneous receptors, olfactory receptors, gustatory receptors, phonoreceptors, proprioceptors, and photoreceptors. We also learned how intensity coding is dependent on the frequency not on the amplitude.