

Laboratory 6/7- (Sensory Physiology)

Purpose: The purpose of this lab was to inquire into the complex workings of human perception. By studying diverse receptors, neural pathways, and interpretation centers, we seek to unravel the complexities underlying sensory processing. Through hands-on experiments, this lab endeavors to elucidate how the nervous system responds to environmental stimuli, adapts over time, and transforms neural signals into the rich tapestry of sensations that define our interaction with the world.

Procedure: A-1: Two-Point Discrimination- **1.** With the partner's eyes closed, place caliper pinpoints on the palm, back of hand, fingertip, outer edge of lips, and back of neck. **2.** Gradually increase distance between pinpoints until two distinct points can be discriminated. **3.** Record the distance for each area and repeat on the partner's skin. **4.** Analyze and interpret results.

A-2: Accommodation of Thermoreceptors- **1.** Immerse left fingers in 15°C water, right fingers in 37°C water, and record sensations after 2 minutes. **2.** Move both hands to 25°C water, describing immediate sensations. **3.** Record and interpret observations.

B-1: Olfactory Adaptation- **1.** Block left nostril; time how long it takes to lose camphor smell. **2.** Switch to cloves, then peppermint oil, recording adaptation times. **3.** Unblock left nostril; check if camphor smell is detected. **4.** Analyze and interpret results.

C-1: Tuning Fork Tests- **1.** Perform Rinne's test for each ear, noting sound disappearance and reappearance. **2.** If needed, conduct Weber's test, determining lateralization and indicating potential hearing impairment. **3.** Record and analyze findings.

D: Equilibrium - Demonstration of Nystagmus- **1.** Seat volunteer on a swivel stool, bend head 30° forward. **2.** Rapidly spin to the right for 10 turns, stop suddenly, and observe eye movements. **3.** Repeat with a second student spun to the left. **4.** Explain eye movements in terms of endolymph movement.

E-1: Demonstration of the Blind Spot- **1.** Cover left eye, focus right eye on cross. **2.** Bring page closer until spot disappears; measure distance with partner. **3.** Explain lack of vision at the blind spot.

E-2: The Snellen Test- **1.** Stand 20 feet from Snellen chart, cover left eye, attempt to read designated lines. **2.** Record visual acuity. **3.** Analyze results, comparing with standard visual acuity measurements.

E-3: Astigmatism- **1.** Stand 8-10 inches from astigmatism eye chart, focus on vertical lines with right eye. **2.** Record observations, checking for astigmatism. **3.** Repeat with left eye.

(E-4: Color Vision) E-4-1: Negative After-Images- **1.** Stare at colored objects for 30 seconds, then shift glance to a white surface. **2.** Record negative after-images for each color.

E-4-2: Color-Blindness Test- **1.** Use Ichikawa color blindness charts to identify deficiencies. **2.** Record and interpret results.

E-5: Perimetry- **1.** Sit before the perimeter board, cover left eye, focus on center line. **2.** Identify colored blocks introduced by partner. **3.** Record degree of discrimination on perimetry score sheet. **4.** Connect dots to outline cone placement on data sheet.

E-6: Dim-Light Vision- **1.** Darken the room for 15-20 minutes. **2.** Draw an object produced by instructor in dim light. **3.** Reexamine and improve drawing when lights are on. **4.** Identify the object; explain visual sensitivity in dim light in terms of rod photochemistry.

Results:

A-1: Two-Point Discrimination

Palm of Hand (feeling in mm)	0-7 mm No feeling	8-10 mm Slight feeling/tap	11 mm- Yes
Back of Hand (feeling in mm)	0-18 mm No feeling	19 mm- Yes	
Fingertip (feeling in mm)	0-2 mm No feeling	3 mm- Yes	

(Bar graph wasn't working)

A-2: Accommodation of Thermoreceptors

Water Temp

Left Hand	15°C	Cold
Right Hand	37°C	Normal
Both Hands	25°C	L: Felt hotter than the 37°C water R: Felt normal

B: Olfactory Adaptation

Essential Oils	Time for smell to no longer be detected (sec)
Camphor (1st trial)	7:18 sec
Cloves	49:69 sec
Peppermint	13:53 sec
Camphor (2nd trial)	5:73 sec

E-2: The Snellen Test

Left Eye	20/15 (left eye was harder to read than the right eye)
Right Eye	20/15

Discussion: The laboratory outcomes reveal intriguing patterns in sensory responses. Touch sensitivity differs on various body parts, indicating diverse neural processing. Olfactory adaptation varies, underlining individual scent recognition. Auditory and visual tests expose personal disparities in hearing and vision. These findings illuminate the intricate nature of our senses, enhancing our appreciation for the uniqueness of human perception and adaptation to the surrounding environment. For experiment Procedure C-1: Tuning Fork Test, we noticed that after hitting the fork and letting it stop ringing from a distance, I put it up to both ears and I was still able to hear the very loud ringing for another 20-30 seconds. My partner said during those 20-30 seconds, they were not able to hear it. There were some experiments where we didn't get the best results. For example, Procedure E-1: Demonstration of the Blind Spot, was not working and we were still able to see the circle with both eyes. However, I have done experiments like this previously and it has worked where the circle disappears. For Procedure E-3: Astigmatism, the eye chart did not become blurry for either my left or right eye. I do have a slight astigmatism that occasionally affects me and for that I have glasses for driving at night. For Procedure E-4 Color Vision, the charts did not "bleach out" after multiple tries. My partner and I both had trouble with this experiment.

Conclusion: In conclusion, in this sizable laboratory experiment of sensory physiology, the experiments offered an understanding of human perception. Results demonstrated the diverse adaptability of our senses, highlighting variations in touch sensitivity, olfactory responses, and auditory and visual acuity. These findings underscore the intricate interplay between receptors and neural pathways, showcasing the complexity of our sensory systems. As we show the unique ways our body interprets and adapts to stimuli, this knowledge deepens our appreciation for the richness of human perception, emphasizing the dynamic nature of our interactions with the environment through the lens of touch, smell, hearing, and sight.