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Report #5: Reflexes and reaction time

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Introduction

Reaction time is a measure of how quickly an organism can respond to a particular stimulus. The aim from this experiment is test hypotheses regarding reaction times and study it. There are many factors that influence reaction times, including age, gender, physical fitness, fatigue, distraction, alcohol, personality type, and whether the stimulus is auditory or visual.

This reflex action requires:

* A receptor.
* An afferent neuron to transmit impulses to the central nervous system where synapse with other neurons occurs.
* An efferent neuron to transmit impulses peripherally.
* An effector that responds to the nerve impulses.

Produce

**1) Reaction time –light & sound**

RT for target stimulus that is, for the beep tone for measuring ART, and red circle for measuring VRT was determined using sensitive device. The task was to press the spacebar as soon as the stimulus is presented. three readings of each stimulus were taken, and their respective fastest RTs for each stimulus were recorded.

Their response was rather quick and the difference between them was very little

The sound reaches the ear and then to the middle ear, the cochlea picks up the amplified sound waves, to sense the nerve endings, then the vibration occurs and the message translated into electrical impulses is transmitted to the cochlear nerve.

The impulses are sent by the cochlear nerve along the auditory nerve to the auditory pathways in the brainstem

. Finally, the electrical impulses are interpreted by the brain, and the sound is heard

Nerve signals from each eye travel along the corresponding optic nerve and other nerve fibers (called the optic pathway) to the back of the brain, where vision is sensed and interpreted

**2) Reaction time-touch**

Methods: Use thin wooden chopsticks to prick your colleague once in the shoulder and once in the leg. Results The response was longer in leg compared with shoulder, because the axons in leg are farther from the brain, due to the distance is far from them.

Sensory information from a specific cutaneous segment is carried by sensory nerve fibers to the spinal nerve root of a specific vertebra. For example, sensory information from a strip of skin along the back of the thigh is carried by sensory nerve fibers to the root of the second spinal sacral nerve

**3) Two-point discrimination**

We use two wood chopsticks to apply pressure on two adjacent points in longitudinal direction or perpendicular to the long axis of the finger.[5] The minimal distance with which the patient can distinguish between two stimuli is found by moving from proximal to distal. This distance is called threshold for discrimination. The area being tested must not be seen by the patient and the patient must concentrate on feeling the points. For accurate results, the hand must be immobile on a hard surface and it must be ensured that the two points are simultaneously touching the skin. The patient is asked to report whether one or two points was felt. The smallest distance between two points that still results in the perception of two distinct stimuli is recorded as the patient's two-point threshold.[6] Performance on the two extremities can be compared for discrepancies

We tested the participants on two skin sites on the hand and cheek

|  |  |  |
| --- | --- | --- |
| Cheek | Hand |  |
| 1.5cm | 1.5cm | Lamis |
| 1.5 cm | 2.5cm | Majdal |
| 2.5 cm | 3 cm | Ola |
| 2.8cm | 2 cm | Aya |

Two-point discrimination is the ability to discern those two nearby objects touching the skin are truly two distinct points, not one. It is often tested with two sharp points during a neurological examination and is assumed to reflect how finely innervated an area of skin

The ability to perform point localization and two-point discrimination is best for the face (around the lips), hands (fingertips), and feet (toes). Somatosensory acuity, the ability to distinguish fine detail by touch, is directly related to the amount of neural tissue devoted to the representation of a body part, i.e., to the peripheral innervation density and to the volume of cortex representing the region. In general, the greater the peripheral innervation density, the smaller the receptive fields of the innervating neurons, and the larger the volume of cortex representing that region. Surround (lateral) inhibition also enhances the ability to localize stimuli and perform spatial discriminations by sharpening the profiles of activity within the somatotopic ally organized neural system.

**4) 3D-2D connect finger**

All two partners did this experiment together, where one of them closed his eye and the other eye remained open, then the other put his finger in front of his partner, then tried to match his finger to the finger of his partner

No one has succeeded touched their partner's finger

Humans have two eyes, but we only see one image. We use our eyes in synergy (together) to gather information about our surroundings. Binocular (or two-eyed) vision has several advantages, one of which is the ability to see the world in three dimensions. We can see depth and distance because our eyes are located at two different points (about 7.5 centimeters apart) on our heads. Each eye looks at an item from a slightly different angle and registers a slightly different image on its retina (the back of the eye). The two images are sent to the brain where the information is processed. In a fraction of a second our brain brings one three-dimensional image to our awareness. The three-dimensional aspect of the image allows us to perceive width, length, depth and distance between objects.

**5) Flashlight on one eye**

We put a flashlight inside one eye and the other eye there is

flashlight on it. When the light is placed inside one eye, the pupil becomes larger, and the other eye has a smaller pupil. The pupil of the eye becomes large in low light and becomes smaller in high light, and in medium light, the size of the pupil is medium. The size of the pupil of the eye becomes smaller when there is a lot of bright light, the pupil becomes smaller to protect the eye from harmful high light (as is the case when placing a large intensity of light in a person’s eye when he is in a dark room, the pupil of the eye becomes smaller and this action causes disturbance to the person). In low light, more light is allowed to enter the eye, which helps to see better and facilitates vision. The size of the pupil that was not put on flashlight increased in order to see the two eyes better and to compensate for the shortcoming that afflicted the other eye (which is overpowered by light).

**6) Saliva**

There are two methods to measure saliva.

The first method was without eating anything and spitting inside the tube for 30 second, the second method was by eating a chewing gum on the taste of strawberry and spitting through the tube for 30 second.

In the first tube containing saliva alone (without eating anything), its quantity was less than in the tube containing saliva when eating a chewing gum, The result is the same for everyone.

: for this experiment is that in the second tube, the chewing gum worked to stimulate the salivary glands to secrete saliva in a larger amount because the gum tastes of strawberry, meaning there is sugar in it, and this led to the digestion of part of the starch (which leads to an increase in the amount of saliva).



Figure 1: The tube on the right is the tube that contains saliva after chewing gum, and the one on the left is the tube of saliva without eating anything.

**7) Hands out**

The balance test was conducted on one leg, by standing with the hands extended forward and raising a leg back and closing the eyes, in order to find out how long the individual may be able to continue.

The following results appeared

:

|  |  |
| --- | --- |
| **Name** | **equilibrium time period** |
| Majdal | 5:30 s |
| Ola | 2:48 s |
| Aya | 5:70 s |
| Lamis | 2:35 s |

This test, the neurologist notes the amount of sway with the patient’s eyes open and compares it with the amount of sway with the eyes closed. An abnormal accentuation of swaying with the eyes closed or actual loss of balance is called a positive Romberg sign. The visual sense can compensate for this loss of proprioception of muscle and joint position if it is caused by a dorsal column disorder, so the patient may correct balance problems by opening his or her eyes. If the lesion is in the cerebellum rather than the dorsal columns, the cerebellar ataxia of balance will not be corrected by visual compensation, as is the case in the sensory ataxia of the dorsal column.

If subjects moved their feet to gain stability, opened their eyes when they were in an eyes closed condition, or released their arms, the condition was rated as a failure.

**8) Leg Reflex (hit leg)**

The reflex that your doctor checks for tapping on your knee is called the patellar reflex, or knee twitching. Also known as the deep tendon reflex (DTR). Where the patient sits on the table and is tapped with a rubber mallet on the knee to see how well he responds.

Only the results showed during this experiment that all the team members (Majdal, Ola, Lamis, Aya) responded to this test and the foot was moved as a reaction.

Because it is actually tapping on a tendon called the patellar tendon (e.g.: puh-TEL-Ur). This tap works to stretch the tendon and the thigh muscle attached to it. Then a message is sent to the spinal cord that the muscles have been stretched.

The spinal cord very quickly sends a message back to the muscle telling it to contract. The contraction of the muscle causes your lower leg to kick out. You might wonder why such a reflex exists. This type of reflex is important in keeping your balance. When you're standing up, gravity might cause your knee to bend slightly, and this could make you fall if you didn't have the protective DTR to straighten that knee and keep you standing upright.

A doctor often checks for DTRs to make sure that the nervous system is working properly. Aside from the knee, they also can be checked along the outside of the elbows, in the crooks of the arms, and at the wrists and ankles

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