

Stimulus – Response: Reaction Time

Problem: To observe the process of stimulus – response.

Background Information: Your body reacts to your environment because of your **NERVOUS SYSTEM**. Any internal or external change that causes a **RESPONSE** is called a **STIMULUS**.

Coordinated movements of the human body do not happen by themselves. Movements are controlled by the **CENTRAL NERVOUS SYSTEM** - the brain, and spinal column. The central nervous system gets information from the outside through special systems called senses. (sight, sound, touch, taste, and smell).

Your body has **SENSORY RECEPTORS** that produce **ELECTICAL IMPULSES** and respond to stimuli, such as changes in temperature, sound, pressure, and taste.

The basic units of the nervous system are nerve cells, or **NEURONS**. A neuron is made up of a **CELL BODY** and branches called **DENDRITES** and **AXONS**. Dendrites receive messages via **NEUROTRANSMITTERS** from other neurons and send them to the cell body. Axons carry messages away from the cell body. Any message carried by a neuron is called an **IMPULSE**. It is created by a wave of electrical **DEPOLARIZATION** down the nerve axon.

There are three types of neurons — **SENSORY (AFFERENT) NEURONS**, **MOTOR (EFFERENT) NEURONS**, and **INTERNEURONS**—that transport impulses.

- Sensory neurons receive information and send impulses to the brain or spinal cord.
- Interneurons relay these impulses to motor neurons.
- Motor neurons move impulses from the brain or spinal cord to muscles or glands throughout your body.

REACTION TIME is a measure of time between a stimulus and a response.

Materials:

1 Pieron stick, 1 “clicker”

The numbers on the edge of the Pieron stick is the time in seconds as the it falls. (notice the lines increase in distance due to acceleration of a falling object)

Procedure:

Part I.

1. Work with a partner.
2. Hold the stick at the top.
3. Your partner will place thumb and forefinger **two inches apart** outside the stick at .00 mark
4. Drop the stick.
5. Have your partner catch the stick as fast as possible.
6. Record the reaction time
7. Repeat 9 times, for a total of 10 times. Do not average the data.

Part II.

1. This time the “catcher” will close their eyes.
2. The “holder” will squeeze the clicker and Pieron stick together.
3. When the stick is released, a click will sound. (practice a few times)
4. The catcher will respond to the sound and catch the stick as fast as possible.
5. Record the reaction time
6. Repeat 9 times, for a total of 10 times. Do not average the data

Data:

Part I: Visual Response

TRIAL	TIME (sec.)
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Part II: Auditory Response

TRIAL	TIME (sec.)
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Analyze Data:

Use graph paper to construct a *line graphs* of this data. Staple the graphs to this lab. What relationship does this data show? (Does the number of trials have anything to do with reaction time?)

Questions:

1. You probably did not get the exact same reaction time for each of your ten trials. What factors might cause this?

2. Which reaction was quicker, visual or auditory? expected? Why or why not?

Was this what you

3. List at least 3 factors that might affect reaction time. That is, what might make one person have a faster or slower reaction time than another person?

Conclusion:

On a separate sheet of paper, write a *detailed* explanation of what happened in your body during one of your visual trials. Make sure to include these terms (not in this order) : *brain, neuron, axon, dendrite, stimulus, eye, sensory neuron, motor neuron, interneurons, response, reaction time, synapse, ions, depolarization, impulse, neurotransmitter, muscles.*



