Reaction Time Ruler

Theory

Catching a dropped ruler begins with the eye watching the ruler in anticipation of it falling. After the ruler is dropped, the eye sends a message to the visual cortex, which perceives that the ruler has fallen. The visual cortex sends a message to the motor cortex to initiate catching the ruler. The motor cortex sends a message to the spinal cord, which then sends a message to the muscle in the hand/fingers. The final process is the contraction of the muscles as the hand grasps the ruler. All of these processes involve individual neurons that transmit electrochemical messages toother neurons.

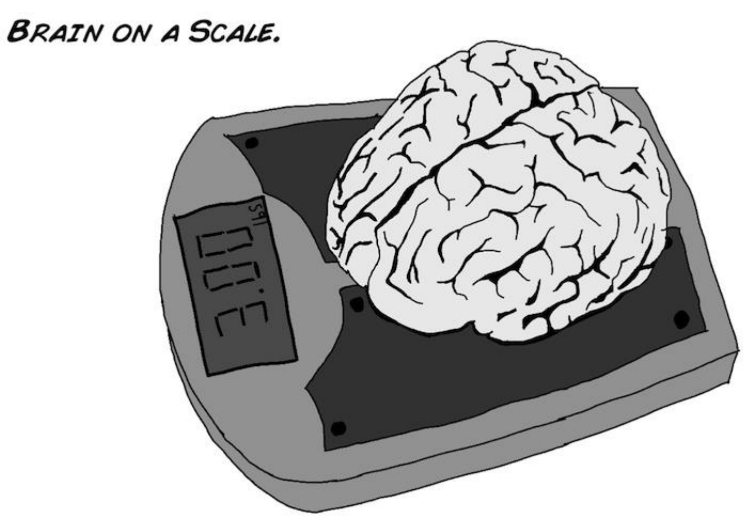
Practice does make perfect because you can create a “muscle memory” that means you do not have to think so much to catch the ruler. You can take the time it takes to decide things out of the equation. Much of the time it takes you to react to the ruler dropping is the time it takes electrical signals to travel along your nerves. Moving at about 100 meters per second, a signal telling a finger to move has to travel from your brain down your spinal cord and into your arm. Signals for muscle control generally move faster than other ones. (Pain signals for example, move very slowly, often less than one meter per second). But these signals are “involuntary” which means that no matter how hard you try, you cannot control how quickly they occur.

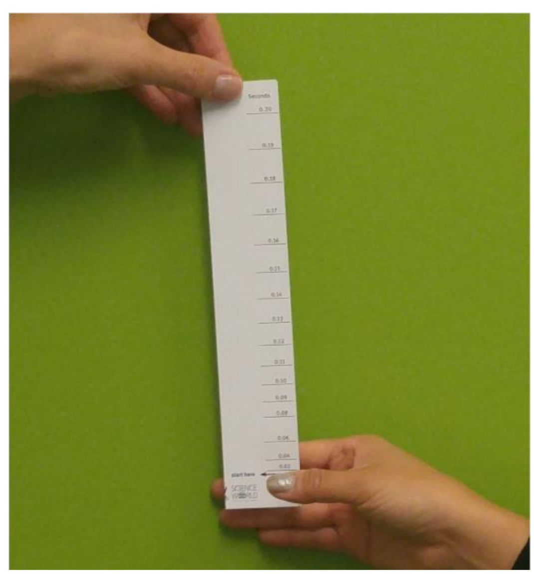
The speed of your reactions plays a large part in your everyday life. Fast reaction times can produce big rewards, for example, like saving a blistering soccer ball from entering the goal. Slow reaction times may come with consequences. Furthermore, the quickness of reaction times can differ depending upon what type of stimulus you are reacting to and what kind of task you are doing.

The distance (***y***) the reaction timer travels before you catch it has been converted to time (***t***) using the equation of kinematics with constant acceleration;

$$y = \frac{1}{2} g t^2$$

Where g is the acceleration due to gravity





Objective

Equipment:

1- 30 cm Ruler

Procedure:

1.Have your friend sit at a table with their dominant hand over the edge.

2.to test visual response, hold the ruler at the **30 cm** mark so that the **0 cm** end is just at your friend's index

3. Tell your friend that when you release the ruler (*see the figure above*), they are to grab it as fast as possible. Do not make any sounds or gestures that you are releasing the ruler. They have to react to the visual stimulus of seeing the ruler being released. Record the centimeter mark.

4. Repeat the experiment **two times**. Then switch places with your partner and redo it.

5. Now you will record auditory reactions. Have your partner sit at the table as before, also be sure your partner puts on the eye shades.

6.Again testing the dominant hand, tell your partner that you will say the word "**Release**" as you release the ruler. Once they grab it record the centimeter mark and repeat **2 times**. Switch places with your partner again.

Record the measurements in tabular form:

Table I

Subject	**Visual Stimuli**		**Auditory Stimuli**	
You	**Dominant hand**	**Non-dominant hand**	**Dominant hand**	**Non-dominant hand**
Average				

Calculation

Questions and Discussion

1- Which stimulus has a faster reaction time on average? How much faster is it?

2- Would you expect a difference in the average reaction times between a male and female? What about a more athletic person compared to a more sedentary person?

3- Is there any difference between dominant and non-dominant hands (right and left dominant people)?

4- What had to happen in your body for you to catch the ruler?

5- How can reaction time be improved?