



COMPARATIVE STUDY OF SIMPLE AND CHOICE VISUAL REACTION TIME ON MEDICAL STUDENTS OF BHAVNAGAR REGION

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ABSTRACT

Reaction is a purposeful voluntary response to stimulus. There is certain time period between application of stimulus and appropriate motor response. Reaction time is one of the important physiological parameter which gives information how fast and quickly person responds. The measurement of visual reaction time has been used to evaluate the processing speed of Central Nervous System and the co-ordination between the sensory and motor systems. Aim of the present study is to compare the simple and choice visual reaction time. Present study was carried out of 50 male medical students of Govt. Medical College, Bhavnagar. Study was done under three module. In first module detail medical history of subject were taken, in second module simple and choice visual reaction time of subjects was measured using reaction time instrument and in third module statical analysis was done by paired 't' test. From the study it was concluded that simple reaction time is shorter than choice reaction time.

KEY WORDS: Simple Visual Reaction Time, Choice Visual Reaction Time, Medical Students, Bhavnagar Region

INTRODUCTION

The visual system faces the daunting task of rapidly processing an enormous range of information in everyday perception. Within any given scene, the visual system must identify items, determine their layout and finally guide action to them. In order for humans to explore and interact successfully with an environment, one object out of several must be selected as the target for action. During day to day life majority of motor work is done by using visual information of surrounding¹. Reaction time is defined as interval of time between presentation of stimulus and appearance of appropriate voluntary response in a subject².

Components Of Reaction Time³ :

When a person responds to something he/she hears, sees or feels, the total reaction time can be decomposed into a sequence of components.

Mental Processing Time : It is a time required for responder to perceive the stimulus, identifying and analyzing of stimulus and decide the proper motor response. It is composed of three stages.

- Sensation : The time is takes to detect sensory input from an object.
- Perception/Recognition : The time needed to recognize the meaning of sensation.
- Response selection and Programming : the time necessary to decide which if any response to make and to mentally program the movement.

Movement Time : It is time required to perform movement after selection of response.

Donders proposed a classification scheme of reaction time. Donders first reaction, the a-reaction was the simple response to stimulus. The b-reaction required sensory discrimination and the motor selection in signaling the choice. Thus donders give background of simple reaction time and choice reaction time⁴.

Lauce and welford described reaction time as follows⁵⁻⁷:

Simple Reaction Time : Here there is one stimulus and one response. So in experiment responder has to response to single colored stimulus.

Choice Reaction Time : Here there are multiple stimuli and multiple response. Responder has to respond different colored stimuli.

In this study we compare the simple and choice visual reaction time of medical students of Bhavnagar region.

MATERIAL AND METHOD :

The present study was carried out at Department of Physiology, Govt. Medical College, Bhavnagar, Gujarat, India on 50 medical students. All the subjects were male. The study was done under three module.

Subject Preparation :

This included a detail medical history of subjects which included history of present illness, past history (hypertension, diabetes, tuberculosis, psychiatric disorders, E.N.T. diseases, ophthalmic disease, head injury, epilepsy, drug therapy etc.) , personal history (diet, sleep pattern, exercise & sports habits, vehicle driving, addiction). The medical history was taken to rule out any medical or surgical disease which would affect reaction time of individual. The experimental protocol was explained to all the subjects and written consent was obtained from them. Subject was explained and demonstrated about the procedure to be performed.

Measurement of Visual Reaction Time :

This was recorded with the multiple choice apparatus 653 MP (reaction time apparatus), an Inco company product (Ambala) has resolution of 0.001 seconds. The visual stimuli are red, green yellow and orange lights The subjects sits to one side and examiner sits to other side of instrument. When examiner press switch visual stimuli appear on screen which is in front of the subjects. The instrument automatically starts counting of time. When subject press the key as a response to visual stimuli instrument stops counting of time. This time is taken as reaction time. During the reaction time testing, visual stimuli was given for three times and minimum reaction time was taken as the final reaction time for that sensory modality of that subject.

In measurement of simple visual reaction time subject were asked to respond by pressing any key with any colour of visual stimuli while in choice reaction time subject had to

respond by pressing specific key for that particular colour (red, green, yellow or orange)

Statistical Analysis :

The part consisted of the statistical analysis of the reaction time measurements. The reaction time were taken as mean+standard deviation. The level of significance between simple and choice reaction time was tested by the paired t-test. The observation was taken as significant if p-value < 0.05.

RESULTS :

Measurement of Simple and Choice reaction time was done on 50 male medical students.

TABLE 1 SHOWS MEAN VALUES OF MEASUREMENT.

Simple Visual Reaction Time (Sec)	Choice Visual Reaction Time (Sec)	P- Value
0.16590±0.02685	0.30868±0.07499	<0.005

DISCUSSION

From table 1 it is clear that mean value of simple reaction time is 0.16590±0.02685 sec while that of choice reaction time is 0.30868±0.07499 sec. p value is statically significant. In our study simple visual reaction time is shorter than choice visual reaction time.

The pioneer reaction time study was that of Donders. He showed that a simple reaction time is shorter than the choice reaction time⁴.

Many previous studies by Brebner and Welford, Teichner and Krebs, and Luce found the similar results^{3,5,8}

Miller and Low (2001) determined that the time for motor preparation and motor was the same in all types of reaction time test, implying that the differences in reaction time are due to processing time⁹.

Henry and Rogers proposed the "memory drum" theory according to that theory more complex responses require more stored information, and hence take longer time¹⁰.

CONCLUSION

Simple visual reaction time is shorter than choice reaction time in healthy young male subjects.

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