



ORIGINAL RESEARCH PAPER

Physiology

COMPARISON OF VISUAL REACTION TIME FOR RED AND GREEN COLOR

KEY WORDS: Visual reaction time, Red light, Green light

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ABSTRACT

Aim: The purpose of the study was to compare visual reaction time for red and green color.
Material and Methods: Visual reaction time of 50 second year MBBS students was measured first for red and then for green color using audiovisual reaction time measuring apparatus manufactured by Anand agencies Pune. After collection of data, it was compiled and statistically analyzed by 'paired t' test.
Results: Reaction time for green color was shorter as compared to red color which was statistically highly significant (p value < 0.001).
Conclusions: Our study concludes that color has significant impact on visual reaction time which is shorter for green color as compared to red color.

INTRODUCTION:

Reaction time is defined as the time interval between the presentation of the stimulus and the initiation of response¹. It is a physical skill closely related to human performance. Reaction time acts as a reliable indicator of rate of processing of sensory stimuli by central nervous system and its execution in the form of motor response(the receipt of information, its processing, decision making and giving the response)². It is thus considered as an index to the speed of processing³. Reaction time determines the alertness of a person and should be shorter in certain occupations like drivers, military people, pilots, sportmen, doctors, nursing staff and security guards where alertness is essential for them.

In visual reaction time the light signal is perceived by photoreceptors. This information is processed in occipital cortex and communicated to motor area through occipital frontal association fibers. The motor neurons arising from the motor area supply the skeletal muscles and exhibit the desired response for visual reaction⁴.

Very few studies are undertaken regarding comparison for visual reaction time for red and green color. It has been reported in studies done by Shenvi D et al⁵, Kalyanshetti SB⁶ that visual reaction time with red color elicits a faster response when compared to green. On the other hand studies conducted by Balkrishan G et al⁷, Venkatesh D et al⁸, and Bamne SN et al⁹ showed that reaction time for green color was shorter. Hence, to make the concept clearer the present study was undertaken where comparison between reaction time for red and green color was done.

AIMS AND OBJECTIVES:

The present study was undertaken to analyze and compare visual reaction time for red and green color in second year MBBS students.

MATERIAL AND METHODS:

The study was done on 50 second year MBBS students of age group between 20-25 years. After permission from institutional ethical committee the study was carried out at Ashwini Rural Medical College and Hospital, Solapur. Informed consent of the subjects was taken. Before taking reaction times, visual acuity of the subjects for far and near vision was determined by Snellen's and Jager's chart respectively. Subjects with corrected visual defects were recruited for the study. Reaction time was measured in milliseconds only by dominant hand(right hand).

Exclusion criteria:

Students with red-green color blindness and sensory motor

disabilities were excluded from the study. Left handed subjects were not included in the study.

Methodology:

Audiovisual reaction time apparatus manufactured by Anand agencies, Pune was used for the study. Reaction time apparatus had a stimulus box and a switch which the subject is supposed to press in response to red light and then to green light stimuli. Chronoscope measured the time interval in milliseconds between the appearance of stimuli and response. Time required for the response was noted down. The best of the three trials was measured.

'Paired t' test was used for statistical analysis.

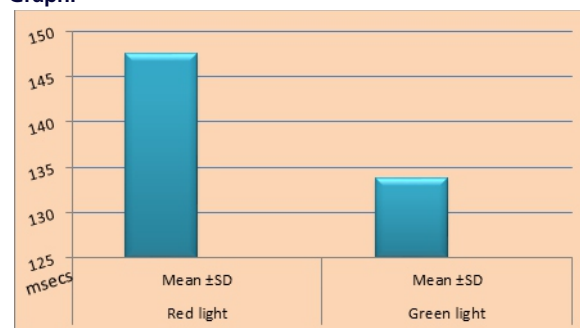
OBSERVATIONS AND RESULTS:

Table: Comparison of visual reaction time to red and green light

Red light	Green light	p value	Significance
Mean± SD	Mean± SD		
147.52±21.80	133.8±20.73	<0.001	HS*

HS*: Highly significant

Graph:



Results: Above table and graph shows that visual reaction time for green color is shorter than red color which is statistically highly significant (p value<0.001)

DISCUSSION AND CONCLUSION:

Reaction time is one of the important methods to study a person's central information processing speed and coordinated peripheral movement response⁷. Color stimulus changes visual reaction time of an observer. The present study was conducted for comparison of visual reaction time for red and green color as there are fewer studies with conflicting results.

Our study showed that reaction time for green color (133.8 ± 20.73) was shorter as compared to red (147.52 ± 21.80). Our findings matched with studies done by Grishma Balkrishan et al⁷, Venkatesh D et al⁸, and Bamne et al⁹. The results are contradictory to Shenvi D et al⁵, Sunita kalyanshetti⁶ where visual reaction time for red color was faster as compared to green color.

Green color evoked a faster response due to its stronger stimulation on the visual receptor than for red color. This can be explained on the basis of corpuscular theory given by Max Plank. The theory explains the relation between wavelength and energy carried by different colored lights. It indicates that one quantum of red light has maximum wavelength and carries least energy. The green light of same quantum has shorter wavelength and carries greater energy than red light. This greater energy carried by green light stimulates visual receptor faster, when compared to red light producing shorter response time⁸.

So, we conclude from the study that color stimulus has a serious impact on visual reaction time which is faster for green color as compared to red color.

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