



A Comparative Study of Either Sex on Visual Reaction Time

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Abstract

Human reaction time denotes time taken by an individual to react to an external stimulus. The response obtained while measuring human reaction time is voluntary response obtained after training and is specific in nature. The purpose of this study was to find out whether the reaction time was faster for green light stimuli or red-light stimuli. And to compare the visual human reaction times in males and females. Reaction is a purposeful voluntary response to stimulus. The time interval between presentation of stimulus and getting an appropriate voluntary motor response is a reaction time. It measures alertness and processing speed of CNS which gets influenced with age, gender, physical activity and IQ of a subject. Different studies were conducted worldwide among different individuals have reported the prevalence of stress ranging from 27% to 73%. Different stress acts as an acute stressor which affects cognitive functions. It is found that the stress elicits elevated activity in the hypothalamic-pituitary-adrenal axis and increased release of cortisol. The study was planned to investigate gender difference. Choice reaction time (CRT) was used to evaluate the cognitive performance of digital reaction time. Randomly occurring visual tasks were presented. The readings were analyzed.

Keywords: Either Sex; Visual Reaction Time; Choice Reaction Time; Gender Stress

Abbreviations

CRT: Choice Reaction Time; VRT: Visual Reaction Time; ART: Auditory Reaction Time; GABA: Gamma-Amino-Butyric Acid; CNS: Central Nervous System.

Introduction

Cognitive neuropsychology [1] deals with structure and function of brain which relates to various psychological processes. One of the cognitive domains is psychomotor speed and accuracy which can be measured by reaction time [2]. Reaction time [2] is defined as the time interval between presentation of stimulus and appearance of voluntary motor response in a subject. There are various factors which can

affect reaction time like age, gender, IQ, visual acuity, physical activity. Reaction time can be measured as either visual reaction time (VRT) [3,4] or auditory reaction time (ART) in milliseconds.

Materials and Methods

A Comparative Study was conducted on 180 healthy individuals with 90 Males & 90 Females of age group 30 to 40 years. This study was carried at Owaisi Hospital and Research Centre Deccan College of Medical Sciences Hyderabad Kanchan Bagh, Hyderabad 500058 Telangana State, India. With prior Informed Consent it was done under 3 Modules [5].

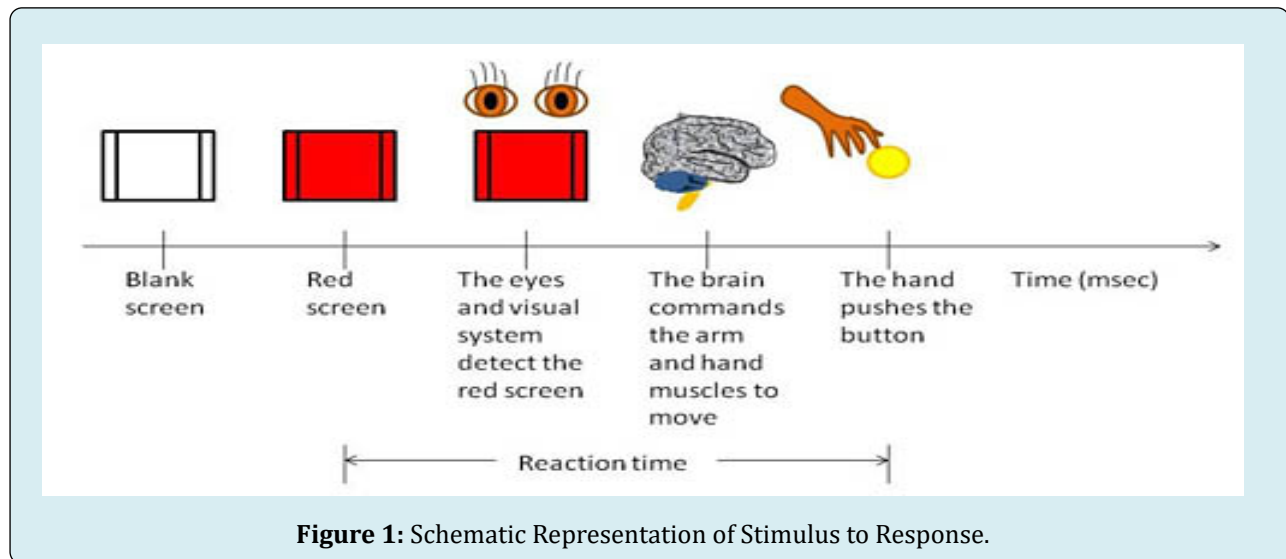
- Detailed Medical History

- VRT recorded on Smart phone through an Android Application
- Statistical Analysis Unpaired t Test of the Data Collected.

Visual Reaction Time Procedure (VRT)

- The Individuals were instructed about the test procedure prior.

- They were asked to keep the index finger of dominant hand on the centre of the button and press it as soon as the Blank screen turns red.
- Reaction time¹ values were directly read from the Digital Display.
- Total of 5 values of VRT [3,4] were recorded and the average of 5 values was taken as final VRT in milliseconds.

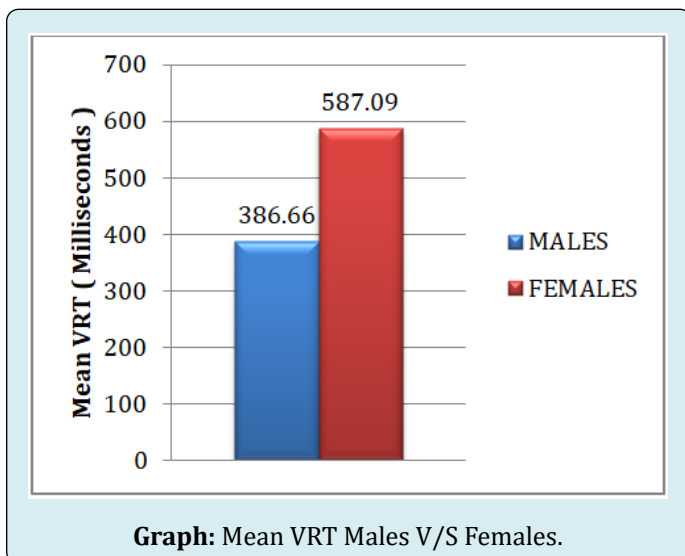


Observation

Parameter	Males (N= 90)	Females (N =90)	P Value
VRT (Milliseconds)	386.66 ± 174.72	587.09 ± 248.23	<0.001 *Hs

The mean VRT in females (587.09± 248.23milli seconds) was significantly higher than that of males (386.66± 174.72milli seconds) (p <0.001)

Table 1: Mean VRT Males V/S Females.



Discussion

Prolongation of VRT [3,4] could be due to the female sex hormones [6,7] that cause salt and water retention, which in turn influence the process of axonal conduction and availability of neurotransmitters at the synapse. Estrogens [7] modify the speed of transmission at the brain stem by secretion of gamma-amino-butyric acid (GABA) [7]. As GABA being an inhibitory neurotransmitter, an endogenously produced anxiolytic-like compound favours influx of chloride ions into the cells. Increased chloride entry into brain cells hyperpolarizes the membrane and thereby inhibits neural transmission. This neural transmission inhibition affects sensory-motor association and processing capability of central nervous system.

Whereas Testosterone [7] causes decreased influence of GABA-ergic inhibitory pathways which favours Excitatory

Neuro transmission pathways which favours Excitatory neurotransmission. This modulation of neurotransmitter coupled with altered rate of impulse transmission due to fluctuation in the levels of hormones affect the sensory motor association with the processing speed at the Central Nervous System (CNS)

Conclusion

The present study reveals that VRT of Males is less when compared to Females.

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