

## Original Study

## Comparison of Visual and Auditory Reaction Time of Right and Left Side in Right Handed Young Adults

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### Abstract

Present study was conducted to compare Visual Reaction Time (VRT) & Auditory Reaction Time (ART) of right and left side in right handed young adults. VRT & ART of right hand and left hand and right foot and left foot in milliseconds was determined with the help of "Response Analyzer" in 87 males & 13 females in the age group 17 to 25 years and compared. VRT of right hand and right foot was significantly shorter than that of left hand and left foot and ART of right hand and right foot was significantly shorter than that of left hand and left foot.

### Keywords

*visual reaction time, auditory reaction time, response analyzer*

### Introduction

The study of reaction time spans more than a century and provides an indirect index of the processing capability of central nervous system.

Majority of people being right handed, the reaction time of right side is shorter than that of left side. Reaction time

of right side is controlled by left cerebral hemisphere and that of left side is controlled by right cerebral hemisphere. As left cerebral hemisphere is specialized for categorization and right cerebral hemisphere is specialized for visuospatial relations, it is observed that the reaction time is shorter on right side than that of left in right handed people.

### Materials & Method

The present study was conducted in 100 subjects, 87 males and 13 females in the age group of 17 to 25 years. All were physically and mentally healthy students from BPED. College having normal visual and hearing acuity. Hand preference of the subjects was ascertained by asking them the hand they prefer for performing the activities like eating, combing hair, brushing teeth and writing. By this it was found that all 100 students were right handed.

VRT & ART of right and left, hand & foot in Msec in above group of subjects was recorded with the help of simple electronic device called "Response Analyzer". The stimulus used for VRT was yellow soothing light with fixed intensity & that used for ART was a continuous buzzer with fixed intensity & frequency. All the readings were recorded between 11 am to 1 pm in daylight in a silent

**Table 1**  
**Comparison of VRT between Right and Left hand and Right and Left foot**

	<b>VRT (n=100) Msec</b>	<b>VRT (n=100) Msec</b>	<b>VRT (n=100) Msec</b>	<b>VRT (n=100) Msec</b>
	<b>RH Mean ± SD</b>	<b>LH Mean ± SD</b>	<b>RF Mean ± SD</b>	<b>LF Mean ± SD</b>
	<b>190.87±8.77</b>	<b>200.43±5.12</b>	<b>213.49±15.49</b>	<b>223.86±4.62</b>
SE	<b>1.02</b>		<b>1.62</b>	
Z Value	<b>9.37</b>		<b>6.40</b>	
p Value	p < 0.001		p < 0.001	
Result	Very highly significant		Very highly significant	
RH – Right Hand, LH – Left Hand, RF – Right Foot, LF – Left Foot, VRT- Visual Reaction Time, ART – Auditory Reaction Time, SD – Standard Deviation, SE – Standard Error				

room. The subject was asked to press & immediately release the subject switch with the thumb of right & left hand and with great toe of right & left foot as soon as he saw the glow of yellow soothing light of heard the buzzer. Each time 3 readings of VRT & ART were taken and lowest was used as final reading. The data was statistically analyzed by “T” test and compared.

### Observations

Visual reaction time of right hand and right foot is significantly shorter than that of left hand and left foot respectively as shown in observation **Table 1** and **Fig. 1**.

Auditory reaction time of right hand and right foot is significantly shorter than that of left hand and left foot respectively as shown in observation **Table 2** and **Fig. 2**.

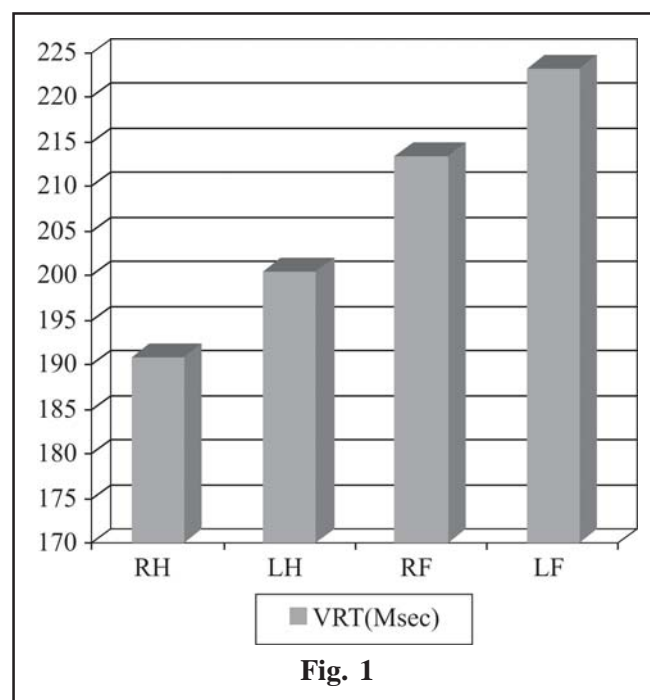
### Discussion

In the present study we observed that the visual reaction time of right hand is shorter than that of left hand, the difference being statistically very highly significant. Similar results are reported by Neena Misra *et al.*<sup>1</sup>, Madan Mohan *et al.*<sup>2</sup> and Berlucchi G. *et al.*<sup>3</sup>.

Visual reaction time of right foot in the present study is shorter than that of left foot, again the difference being statistically very highly significant. The work done by Neena Misra *et al.*<sup>1</sup> & Madan Mohan *et al.*<sup>2</sup>, shows similar results. Like in the present study Peters and Durdning *et al.* too

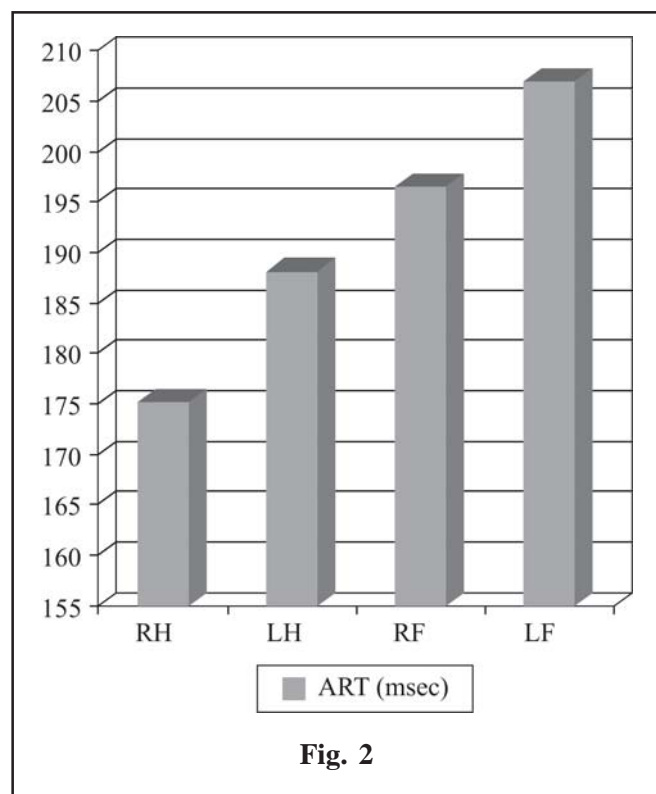
found shorter visual and auditory reaction time in RH and RF than LH and LF<sup>4</sup>.

In our study we found that the auditory reaction time of right hand and right foot is shorter than that of left hand and left foot, the difference is statistically significant. The similar results are reported by Neena Misra *et al.*<sup>1</sup>, while Madan Mohan *et al.*<sup>2</sup> observed no difference in auditory reaction time of right and left side.



**Table 2**  
**Comparison of ART between Right and Left hand and right and Left foot**

	ART (n=100) Msec	ART (n=100) Msec	ART (n=100) Msec	ART (n=100) Msec
	RH Mean ± SD	LH Mean ± SD	RF Mean ± SD	LF Mean ± SD
	175.22±15.41	188.13±13.59	196.46±20.77	207.03±4.01
SE	2.05		2.11	
Z Value	6.30		4.23	
p Value	p < 0.001		p < 0.001	
Result	significant		Significant	
RH – Right Hand, LH – Left Hand, RF – Right Foot, LF – Left Foot, VRT- Visual Reaction Time, ART – Auditory Reaction Time, SD – Standard Deviation, SE – Standard Error				



Cerebral hemisphere concerned with categorization or symbolization i.e. sequential analytical process is categorical hemisphere, has often been called, dominant hemisphere while the hemisphere specialized for spatiotemporal and visuospatial relations is representational hemisphere, has often been called non dominant hemisphere. Hemispheric

specialization is related to handedness. Handedness appears to be genetically determined. In 96% of right handed individuals, who constitute 91% of human population, the left hemisphere is the dominant or categorical hemisphere, and in remaining 4%, right hemisphere is dominant. In approximately 15% of left handed individuals, the right hemisphere is categorical and in 15% there is no clear lateralization. However, in remaining 70% of left handers, the left hemisphere is categorical<sup>5</sup>.

The reaction time of right side is controlled by left cerebral hemisphere that is specialized for speech and language. Levy and Nagylaki *et al.* postulated that the phenotype “Handedness” is related to genetic condition that determines whether hand is guided by a hemisphere that is specialized for speech and language but made no predictions about footedness<sup>6</sup>. Bonin’s statement is that, “We are generally right handed and left footed”<sup>7</sup>.

Majority of the people are right handers. Annet M. *et al.*<sup>8</sup> suggested that right handers possess a right shift factor which predisposes them to performance of skilled movements by right hand and they would also be right footers. Singh *et al.* have reported faster motor conduction velocity in dominant upper limb (right hand in right handed persons)<sup>9</sup>.

Peters and Durdin showed that right handers tend to prefer left leg in propelling the body in broad and high jump. When swinging on to a horse, bicycle or when stepping

on an escalator the left leg supports the body while right leg is used to swing over or towards the object i.e. right leg is preferred for dynamic leading function. When manipulative skills are required right handers prefer the right leg<sup>4</sup>. This may explain the better performance of right hand and right foot over left hand and left foot which may be the reason for shorter reaction time of right side as compared to that of left side.

### Summary

In the present study visual and auditory reaction time was studied in 100 healthy right handed subjects with the help of an electronics instrument "Response Analyzer". The visual and auditory reaction time of right hand, left hand, right foot and left foot was measured in milliseconds and compared.

VRT & ART of Right hand and Right foot is significantly shorter than that of Left hand & Left foot respectively.

### References

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