

# Comparative Study of Simple Choice Auditory Reaction Time of University Sports and Sedentary Female Students

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**Abstract:** Simple choice auditory reaction time plays a vital role in daily life including sports. The balanced reaction of both sides of the human helps in achieving the highest movement output. The purpose of the study is to compare simple reaction time between university sports and sedentary female students based on preferred and non-preferred hand. Subjects were selected from Jashore University of Science and Technology, Bangladesh. They were bachelor and master students and were between 19-26 years old. There were 20 students in each group of sports and sedentary female students. Data was collected using the AVR machine. An average of 5 trials was calculated as the time score in millisecond. The result shows that in simple choice auditory reaction time of hands between sports and sedentary female students in the preferred hand, sport female mean = 18.25 ms and SD = 2.07 ms and sedentary female students' mean = 20.45 ms and SD = 1.67 ms with  $t_{(0.05)}(38) = -3.695$  and  $p = 0.001$ . On the other hand, in the non-preferred hand Sport female mean = 20.20 ms and SD = 1.80 ms, and Sedentary female mean = 21.70 ms and SD = 0.98 ms with  $t_{(0.05)}(38) = -3.382$  and  $p = 0.002$ . Moreover, in the simple choice auditory reaction time between the preferred and non-preferred hand of sports and sedentary female players' preferred hand mean = 19.35 ms and SD = 2.167 ms, and non-preferred hand mean = 20.35 ms and SD = 1.616 ms,  $t_{(0.05)}(39) = -5.639$  and  $p = 0.00$ . So it is concluded that University sports female students are superior to sedentary female students in simple choice auditory reaction time in both the hands. Further, University female students' preferred hand is faster in simple choice auditory reaction time than that of non-preferred hand.

**Keywords:** Simple Choice Auditory Reaction Time, Preferred Hand, Non-Preferred Hand

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## 1. Introduction

Reaction time is "the interval between stimulation and response" [1]. Collins dictionary [2] suggests that in psychology it is termed as "the lapse of time between stimulation and the beginning of the response." Deary [3] notated that since the middle of the nineteenth century reaction time has been a favorite topic of experimental psychologists. Michael [4] observed as the task became more complex Reaction time lengthens accordingly. According to Dana [5], reaction time increases with response complexity. Madanmohan reported that the decrease of reaction time indicates an enhancement in the information processing and reflexes [6]. Stimuli are of three types. Simple response reaction time: only one stimulus available in it and in its appearance one needs to respond. In the choice response reaction time: multiple numbers of stimuli are there and

every stimulus needs a different response. Selection reaction time: there are different stimuli but only one needs to respond to one stimulus. Chandra confirmed that at rest, difference in reaction time is insignificant in preferred and non-preferred hands but it is significant while exercise was performed at elevated temperatures [7]. The simple auditory reaction time is one of the fastest reaction times; it is usually less than 100 ms and even neuromuscular-physiological components of simple auditory reaction times may reach less than 85 ms [8]. Chandra proposed that Visual reaction time is longer than auditory reaction time in all circumstances [7]. Shelton [9] noted that the mean auditory reaction time is approximately 284 milliseconds and faster than the visual reaction time; further, males have faster reaction times in comparison to females in both auditory and visual stimuli. Pancar [10] opined sedentary children exhibit faster reaction with increasing age between 11-18 years. Woods [11], Simple

Reaction Time latencies increase in progression of age. In aerobic exercises as compared to non-exercisers irrespective of age and gender, auditory reaction time is better [12]. Healthy adults had longer simple reaction times and made fewer correct choices under the influence of distracters compared to normal conditions [13].

The purpose of the study is to compare simple reaction time between university sports and sedentary female students based on preferred and non-preferred hand.

## 2. Method

### 2.1. Selection of Subject

Subjects were the student of Jashore University of Science and Technology, Bangladesh. Twenty sports female students and twenty sedentary female students were randomly selected and data were collected in the year 2019 at Human Performance Laboratory, Jashore University of Science and Technology, Bangladesh. All the students were undergraduate and postgraduate students. Subjects' age detail has shown in the table:

*Table 1. Age of the Subjects.*

Sports Female Students				Sedentary Female Students			
Min. (Year)	Max. (Year)	Mean. (Year. Month)	SD (Year)	Min. (Year)	Max. (Year)	Mean. (Year. Month)	SD (Year)
19	26	21.9	1.86	18	22	20.2	0.99

### 2.2. Equipment

Two-Choice Audio-Visual Reaction (AVR) time Machine, MEDI System ISO 9001:2015 (QMS).

### 2.3. Test Administration

AVR machine was kept on the table and subjects were on the chair at sitting position. From a comfortable sitting position, students kept their index finger in contact with the AVR button to press after listening to the sound stimulus. The test administrator sat opposite side to the subject and kept his hand on the button of blowing sound with a screen of the AVR machine, and pushes the same button to create a sound of the same amplitude. Therefore, the subject could not realize when the administrator is going to blow the sound. Subjects were given detail instructions about the test and AVR machine function and cleared all doubts by the test administrator. Subjects had the opportunity of several trials to be familiarized with the AVR machine and test.

Students were instructed to press the button as soon as possible after listening to the sound of the AVR machine. Laboratory was totally noise-free to have full concentration on the sound of AVR machine.



*Figure 1. Sports Female Student Participating in Test.*



*Figure 2. Sedentary Female Student Participating in Test.*

### 2.4. Data Collection Procedure

Data was collected using both the hands' index fingers. First two digits of millisecond were considered for the study. All the students have given five trials of both the hands and the average score was calculated. This calculated average has accepted as individual data.

### 2.5. Statistical Procedure

Shapiro-Wilk test established that data were approximately normally distributed. Further, in the descriptive statistics- Mean, SD, and in the inferential statistics- paired & independent sample t-test were employed. The level of significance was set at  $p \leq 0.05$ .

### 2.6. Used Terms

**Preferred Hand:** The hand, which one usually moves first without any specific intention and gets more strength compared to others.

**Non-Preferred Hand:** The hand, which one usually moves less without any specific intention and gets less strength compared to others.

### 3. Analysis of Data

**Table 2.** Independent sample t-test of simple choice auditory reaction time of hands between sports and sedentary female students.

Parameter		Descriptive		Inferential: Independent Sample t-test		
		Mean (ms)	SD (ms)	t	df	Sig. (2-tailed)
Preferred Hand	Sports Female	18.25	2.07	-3.695	38	.001
	Sedentary Female	20.45	1.67			
Non-preferred Hand	Sports Female	20.20	1.80	-3.282	38	.002
	Sedentary Female	21.70	0.98			

\*Required value for being significant at  $\alpha = 0.05$  level of significance is  $t(38) = 2.024$  &  $p \leq 0.05$ .

**Table 3.** Paired Sample t-test of simple choice auditory reaction time between the preferred and non-preferred hands of sports and sedentary female students.

Parameter		Descriptive		Inferential: Paired Sample t-test		
		Mean (ms)	SD (ms)	t	df	Sig. (2-tailed)
Pair 1	Preferred Hand	19.35	2.167	-5.639	39	0.00
	- Non-preferred Hand	20.95	1.616			

\*Required value for being significant at  $\alpha = 0.05$  level of significance is  $t(39) = 2.023$  &  $p \leq 0.05$ .

### 4. Result

Table: 2 of independent sample t-test of simple choice auditory reaction time of hands between sports and sedentary female students shows that in the preferred hand sport female mean = 18.25 ms and SD = 2.07 ms. On the other hand, sedentary female students' mean = 20.45 ms and SD = 1.67 ms with  $t_{(0.05)}(38) = -3.695$  and  $p = 0.001$  is statistically significant. Whereas, in the non-preferred hand Sport female mean = 20.20 ms and SD = 1.80 ms, and Sedentary female mean = 21.70 ms and SD = 0.98 ms with  $t_{(0.05)}(38) = -3.382$  and  $p = 0.002$  is statistically significant as tabulated value of  $t_{(0.05)}(38) = 2.024$  &  $p \leq 0.05$ .

Table: 3 of Paired Sample t-test of simple choice auditory reaction time between preferred and non-preferred hand of sports and sedentary female shows that preferred hand mean = 19.35 ms and SD = 2.167 ms, and non-preferred hand mean = 20.35 ms and SD = 1.616 ms,  $t_{(0.05)}(39) = -5.639$  and  $p = 0.00$ . It is statistically significant as tabulated value of  $t_{(0.05)}(39) = 2.023$  &  $p \leq 0.05$ .

### 5. Discussion

Sports female students have exhibited their excellence in both the cases preferred and non-preferred hands in simple choice auditory reaction time over sedentary female students. Nature of the sports activity exposes athletes to react with the simple choice auditory reaction time after time in the playing field, maybe because of that reason sports female students exposed their dominance in it. This finding is partially consonance with the study of Chandra [7] confirms that at rest difference in reaction time is insignificant in preferred and non-preferred hands but it is significant while exercise was performed at elevated temperatures. Long term exercising male adults' reaction time is better than the sedentary male adults [14].

In the auditory simple choice reaction time, preferred hand's reaction time is better than non-preferred hand's reaction time in the university female students. The reason

may be of being such difference that simple choice reaction time plays a great role in daily-to-day life as well as in sports, further, our instinct drives us to use our preferred hand more than non-preferred hand. Thus, the preferred hand is better trained with this stimulus than the non-preferred hand. On the preferred and non-preferred hands, the effects of warning and location of limbs are not the same [15]. Dane & Erzurumluoglu reported that between male and female young handball players, there is no difference in left-handed players in visual reaction time but it exists in the right-handed players with male players' dominance [16].

### 6. Conclusion

University sports female students are faster than sedentary female students in terms of the simple choice auditory reaction time of preferred and non-preferred hands. University female students' preferred hand is faster in simple choice auditory reaction time than that of non-preferred hand.

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