Comparison Of Hand Reaction Ability Among The Different Racket Game Players

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Abstract

The researchers are hoping to learn how the various racket game players' hand response times compare. The participants in this research were 45 male athletes from Manipur who had competed in competitions at the state level or above. Of them, 15 were picked from table tennis, 15 from badminton, and 15 from tennis. The participants' ages varied from seventeen to twenty-five. Readings were recorded to the nearest hundredth of a second using the Whole-Body Reaction Type IV (Takei Kiki Kogyo Co. Ltd) to get the relevant data. Data features and statistically significant variations in hand response skill among the various racket game players were determined using descriptive and analysis of variance (ANOVA) approaches. After identifying statistically significant differences between the groups, we used Scheffe's approach to find the paired mean differences between them, as a post hoc test. We used a 0.05 threshold of significance. With a computed F-value of 3.59 and a tabulated F-value of 3.22 at a 0.05 level of confidence (P<0.05), the study's results show that there are substantial mean differences in hand response skill across the various racket game players. This was determined using analysis of variance (ANOVA). Moreover, when comparing table tennis and tennis using a paired mean test, there was a significant difference in hand response ability, with a mean difference of 0.14 and a p-value less than 0.05, respectively. Nevertheless, there were notable disparities in hand reaction ability among table tennis, badminton, and tennis players; however, these differences were not statistically significant (mean differences of 0.06 for badminton and 0.08 for tennis) (P>0.05). Additionally, when comparing table tennis players to tennis players using a paired mean comparison post hoc test, a statistically significant difference in hand response ability was found. On the other hand, players of badminton and tennis, as well as table tennis and badminton, did not vary significantly on average in their hand response skills.

Keywords: Hand Reaction Ability, Racket Games, Whole Body Reaction Type IV.

1. Introduction

The three most common and widely played racquet sports in the world are tennis, badminton, and table tennis. The racquet sports are defined by rapid, intense, and brief bursts of motor action (Lees, A. 2003). Competitors need to be nimble and able to change directions on the fly (Tiwari, et al., 2011). Top players, however, need to be as fast, agile, flexible, durable, and powerful as possible (Raman & Nageswaran 2013). Constantly hyper-

stimulated and involved in repeated motor activity of great intensity and velocity, racket sports are defined by continuous quick strokes (Lees, 2003).

Rapid thinking and action are key components of success in racket sports. When you have good reaction time, you may respond better to the opponent's moves, smashes, serves, and strokes. According to many studies (Mead et al., 2000; Jui-Hung Tu et al., 2010; Uzu et al., 2009), the ability to react quickly to a stimulus is a manifestation of superior coordination. "Complex" means that the signals might be diverse and that the response can be selected from among many potential options, while "simple" means that a single signal corresponds to a single planned action (Buzzelli, 2020; Zajdel & Nowak, 2007; Buzzelli, 2021). According to Solanki et al. (2012), reaction time is a solid measure of how quickly the central nervous system processes sensory input and then turns that processing into a motor response. Regular exercise may enhance reaction speed, which is a key performance indicator in several sports (Çetinkaya, 2011).

Schmidt and Lee (2011), Woollacott and Shumway (2011), and Hülsdünker et al. (2019) all agree that table tennis is one of the most complicated and rapid sports since it demands players to adapt to constantly changing environments while under extreme time constraints. Hülsdünker et al. (2019) and Sève et al. (2002) both state that table tennis performance is influenced by quick and expansive movements as well as by environmental factors. According to Likkustyawati et al. (2016), reaction time plays a crucial role in table tennis by allowing players to adapt to the direction of the ball and predict its speed.

As a racket sport, badminton is among the quickest. As a result, badminton requires a wide range of physical attributes, including swiftness, agility, strength, speed, agility, flexibility, etc. A badminton player must maintain a keen eye on the court at all times and respond swiftly and accurately (Dube et al., 2014).

An athlete's ability to begin movement in response to the sound of the gun or a tennis player's timing of the ball's kick are crucial factors in determining performance (Karagöz, 2008). According to Reid and Schneiker (2008), there are a lot of physical and technical qualities needed to be good in tennis.

According to Yıldırım and Kızılet (2020¬¬), tennis is often a game that requires quick thinking and action in order to reply to the opponent's balls. Tennis players must possess a quick response time. Responding swiftly to an opponent's actions is crucial for tennis players (Reid et al., 2013). The amount of time that passes between the moment an individual perceives a stimulus and the beginning of their conscious response to that stimulus is known as reaction time (Schimidt, 1991). There has been a long-term effort to reduce reaction time as it is a critical component of success in many sports (Göral et al., 2012). We focus on visual response time because, according to Kovacs (2014), visual cues are more relevant to tennis than aural stimuli.

2. Objective of the Study

The objective of the study was to find out the significant differences among the different racket game players.

3. Methodology

3.1 Selection of Subjects

The participants in this research were 45 male players (N=45), with 15 participants drawn at random from the table tennis, badminton, and tennis groups, all of whom had competed in tournaments at the state level or above. The participants' ages varied from seventeen to twenty-five. All of the players are hand-picked from the most prestigious Manipur clubs.

3.2 Collection of Data

Using the Whole-Body response Type IV (Takei Kiki Kogyo Co. Ltd), which measures hand response capacity, forty-five participants (N=45) were tested; fifteen (15) were selected from table tennis, badminton, and tennis players, respectively. Readings were recorded to the closest hundredth of a second. The visual signal of the individuals' eye-hand response time was used to evaluate their hand reaction skills.

3.3 Data Analysis

Data features and statistically significant variations in hand response skill among the various racket game players were determined using descriptive and analysis of variance (ANOVA) approaches. When we looked for statistically significant differences across the categories, we ran a post hoc test using Scheffe's approach to find the paired mean differences among the table tennis, badminton, and tennis players. We used a 0.05 threshold of significance.

4. Results

The descriptive analysis was used to find the mean (M) and standard deviation (SD) of the hand response ability data, which are shown in Table 1.

Table 1: Descriptive analysis of hand Reaction Ability among the Different Racket Game players

Variable	N	R	Min	Max	M	SD	SE
Table Tennis	15	0.50	0.33	0.83	0.46	0.15	0.04
Badminton	15	0.38	0.35	0.73	0.52	0.11	0.03
Tennis	15	0.48	0.36	0.84	0.60	0.17	0.04

The hand response ability of table tennis, badminton, and tennis players had mean (M) scores of 0.46 ± 0.15, 0.52 ± 0.11, and 0.60 ± 0.17, respectively, according to Table 1. Table 2 displays the findings of the analysis of variance (ANOVA) that was used to determine the statistically significant variations in hand response capacity across the various racket game participants.

Table 2: Significant Mean Differences of Hand Reaction Ability among the Different Racket Game Players

Group	Mean	SD	F	Sig. (p-value)
Table Tennis	0.46	0.15		
Badminton	0.52	0.11	**3.59***	0.04
Tennis	0.60	0.17		

Significant at 0.05 level of confidence, where, $F_{(0.05)\,(2,42)} = 3.22$

At the 0.05 level of confidence (P<0.05), Table 2 shows that the various racket game players had significantly different mean hand response abilities, with an F-value of 3.59 compared to 3.22 in the tabular data.

Table 3 displays the results of a post hoc test that used Scheffe's approach to find a statistically significant difference in the paired mean comparison of several racket games.

Table 3: Paired Mean Differences of Hand Reaction Ability among the Different Racket Game Players

Mean			Mean Difference	SE	Sig. (p-value)
Table Tennis	Badminton	Tennis			
0.46	0.52		0.06	0.05	0.55
	0.52	0.60	0.08	0.05	0.30
0.46		0.60	**0.14***	0.05	0.04

Significant at 0.05 level of confidence (P≤0.05).

The results show that table tennis and tennis players had significantly different hand response abilities, with a mean difference of 0.14 and 0.13, respectively (P<0.05), as shown in Table 3. But, with a mean difference of 0.06 for badminton players and 0.08 for tennis players (P>0.05), we find no statistically significant variations in hand reaction capacity across these sports.
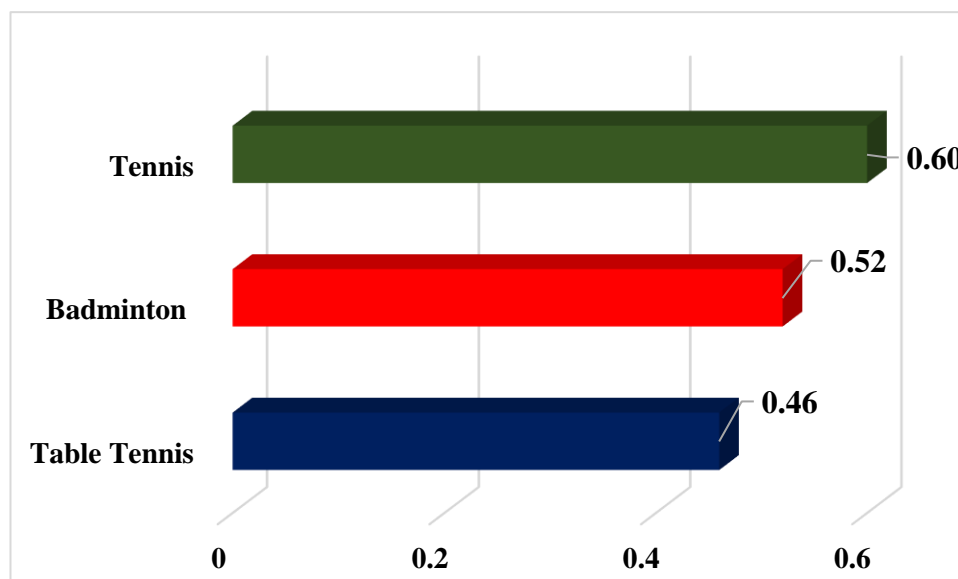
Various racket game players have varying average hand response times, as seen in figure 1.

Figure 1: Means of Hand Reaction Ability of Table Tennis, Badminton and Tennis Players

5. Discussion

Results from the analysis of variance (ANOVA) test revealed that the various racket game players' hand response abilities varied significantly, according to the current research. The size of the court, length of the match, playing style, and overall character of table tennis are significantly different from those of badminton and tennis, which would explain the findings. Table tennis players, in contrast to their badminton and tennis counterparts, possess lightning-fast reflexes and exceptional vision due to the game's compact court and high ball speed.

Additionally, in order to find the differences in paired means across the various racket game players, a post hoc test was conducted using Scheffe's approach. The average hand response time of table tennis players was much lower than that of tennis players. The outcomes might be attributed to the fact that they varied significantly in terms of, for example, the kind of game played, the length of the match, the players' approaches, the size of the court, etc. As a result, when compared to tennis players, table tennis players are more nimble and responsive. The average reaction time findings showed substantial differences ($p<0.05$) between the reactions of table tennis players, tennis players, and the inactive group in a research (Can et al., 2014).Table tennis and badminton players, as well as badminton and tennis players, have similar levels of hand response skill. Possible explanations for the discrepancy in outcomes include the vast differences between table tennis and badminton with respect to court size, match length, playing style, and overall characteristics of the game. Although both games use rackets, badminton is played at a much faster pace, requiring participants to be on the edge of their seats in anticipation of their opponent's moves. Rapid thinking, excellent hand-eye coordination, and strategic acumen are all necessities in each game. When comparing young male table-tennis and badminton players, Nikolakakis and Telopoulos (2023) found no statistically significant differences in left- and right-hand simple response time or choice reaction time.

The capacity to quickly respond with one's hands was not significantly different between badminton and tennis. The findings might be explained by the fact that the court dimensions are almost identical to those of table tennis. Both sports use rackets and require a great deal of physical and mental stamina as well as tactical and strategic thinking.

6. Conclusion

The study's findings reveal that the various racket game players' hand response abilities varied significantly, as shown by the analysis of variance (ANOVA) test. Additionally, in order to find the differences in paired means across the various racket game players, a post hoc test was conducted using Scheffe's approach. When comparing table tennis and tennis players, there is a statistically significant difference in their hand response skills. On the other hand, the average differences in hand response skill between badminton and tennis players and table tennis and badminton players were not statistically significant.

7. Recommendation

Everyone from physical education teachers and instructors to table tennis, badminton, and tennis coaches and players should know how important hand response speed is. To learn more about players' response times, researchers may do a comparable study for other sports and games.

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