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Exploring the coincidence anticipation timing among racket sports athletes

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Abstract
Objective: To compare the coincidence-anticipation time among different racquet sports.
Methodology: A total of 30 male subjects were selected from badminton, tennis, and table tennis from Gwalior city, M.P.by using the purposive sampling technique. The age of the subjects ranged from 18 to 26 years and all were regular players with a good and sound level of skill. Coincidence- anticipation time was taken in this study as an I.V. (Independent Variable) and D.V. (Dependent Variable) were the players of all three sports respectively. The test was measured on the Bassin Anticipation Timer. Subjects were acknowledged about the test and its very functioning beforehand the test took place. All the subjects were given 5 initial trials before measuring the final best of two scores. The best score out of the two final trials was considered. The test was administered under the supervision of two research scholars and an expert to avoid the non-response error and to mitigate any confounding effects.
Conclusion: From the evaluation of the test results on SPSS 25 by one-way analysis of variance and HSD Turkey for the post hoc test. It was found that male tennis players have shown a significant difference at a 0.05 level of significance.

Keywords: Basin anticipation timer, racquet sports, coincidence-anticipation time, non-response error, confounding effect

Introduction

In the fields of sports and exercise psychology, anticipation often refers to the capacity to swiftly and correctly forecast the result of an opponent's action before that action has been finished. Skilled athletes can utilize physiological clues to predict outcomes at earlier stages in an action sequence than can unskilled athletes. This gives skilled athletes more time to carry out an acceptable reaction in situations when there is a lot of pressure to complete the job promptly. To have even the most fundamental grasp of expectation, one must comprehend how competent athletes anticipate movements, the most effective method for testing anticipation, and the most important consequences for the practical application of training anticipation. The most frequent method for evaluating anticipation is to obscure the observer's line of sight at a crucial juncture in an action sequence. After this, the observer is tasked with predicting the result of the action. For instance, a tennis player may see an opponent player complete a service, but during the contact phase in racquetball, eyesight is obscured, and the receiver of the service is required to make an educated guess as to the trajectory of the ball. Tennis players, soccer goalkeepers, squash players, and batters in baseball and cricket all do better in these tests than less competent athletes do. This is the case across a broad variety of sports. Occlusion may be produced in the laboratory with the help of video material that has been manipulated, or it can be produced in the field with the use of liquid crystal glasses that can swiftly and selectively obscure vision.

Athletes who are skilled at anticipating action outcomes based on events provided earlier in a movement sequence have a unique edge when it comes to performing a sport skill that must be done under severe time limits. It has been shown, via the selective occlusion of various body segments in video displays (such as the arms or legs), that professionals, in comparison to beginners, depending on the movement of body segments that are farther away from the end effector. For instance, in badminton, rookie players often predict based on the movement of their opponent's racquet, but good players utilise both the movement of their opponent's racquet and arm. A temporal advantage may be gained by focusing on the arm since movement in the arm comes before movement in the racquet while playing tennis.

Instead of relying on figural or contextual signals, skilled anticipators have a heightened sensitivity to kinematic movement patterns, which gives them an edge in the game. Point-light displays substitute video footage of an opponent with a sequence of isolated points of light situated at crucial joint locations. When athletes see these displays, the variations in anticipation that exist between experts and novices are recreated. Evidently, experienced athletes have evolved the capacity to recognize the repercussions of the underlying kinematic movement pattern of their competitors, which enables them to gain an advantage over them. It is possible that this talent was acquired not just as a result of seeing expert athletes make these moves but also by skilled athletes themselves completing the same activities. Recent research has demonstrated that anticipating an action depends on the same area of the brain as is employed when creating the same action. This suggests that perception and the generation of action may share a reciprocal type of neural programming. The ability to anticipate something may be evaluated by a variety of display cues and reactions. It is preferable to use settings that correctly represent those found in the natural environment; however, due to the necessity for consistency and control in testing conditions, this is not always attainable. It is best to utilize conditions that accurately mirror those found in the natural environment. However, the degree of advantage will be an underrepresentation of the genuine talent that would be seen in the natural environment. Skilled sportsmen perform better than less skilled players in simulated situations. Predictive ability in young athletes may be boosted by perceptual training programs. These applications speed up the learning process by exposing students to a large number of action sequences that they may witness on video displays or in the real world, with or without guidance. Predictive ability may be honed by perceptual training, albeit the most beneficial methods of training are up to debate. Educators have, intuitively, tried to provide students with clear direction on where to look for and what to make of kinematic clues. Recent studies have shown that training using implicit methods, which direct attention without providing explicit instructions, may improve a skill's resilience and make it more likely that it will be preserved.

Most assessments of anticipation (verbal or written) require athletes to make perceptual predictions, but it's possible that leaving perception out of the equation leaves out an essential part of an athlete's ability. Athletes that are proficient at their craft depend on a distinct vision-for-action channel to generate spontaneous movements in their natural environment, while perceptual reactions are likely to only test the vision-for-perception neurological pathway. Movement-based reactions, as opposed to merely perceptual ones, have been demonstrated to be more accurate measures of competent anticipation. After a nascent start in the late 1970s, sports psychology's study of anticipation has grown in prominence. Our knowledge of competent anticipation in sports and how this talent is formed has been bolstered by early research. Researchers are now able to answer more complex problems using more sophisticated methodologies because of an increase in theoretical and practical knowledge and technological breakthroughs. As a student at California State Polytechnic University, Pomona, Dr. Stanley Bassin created the Bassin Anticipation Timer. The device may be used to measure human eye-hand coordination and anticipation-related aspects of visual acuity. Watching a light go down the runway, the subject is taught, they have to guess when the light will reach the target and then hit a button or do anything else to correspond with its arrival. - In sports that include striking, such as tennis, badminton, and table tennis, it is of the utmost importance to correctly predict the path and speed of the item that is coming towards you (for example, a ball). To execute the correct footwork, assume the proper stance, and become ready for a return shot, athletes competing in these sports need a high level of anticipation and timing skills. The timing of the stroke and the location of the ball or shuttlecock when it makes contact with the racket or paddle are two of the parameters that determine the path that the ball will take when it is hit the court of the opponent. A slight change in timing may cause the ball to go out of the court or table (Ak & Koçak, 2010) [2]. Through this impeccable piece of study, the researcher has conducted a comparative analysis to investigate the role of coincidence-anticipation time among the 3 Racquet sports namely Tennis, Badminton & Table Tennis, Furthermore, it provides the most comprehensive insights acquired from this study.

Methodology

The purpose of the research was to undertake a comparative analysis of male players who compete in the sports of badminton, tennis, and table tennis. A total of 30 male subjects were selected from all three above-mentioned Sports from Gwalior city, M.P. by using the purposive sampling technique. All the players were participants of All India University & west zone Inter-university. The age of the subjects ranged from 18 to 26 years and all were regular players with a good and sound level of skill. Coincidence-Anticipation Time was taken in this study as an I.V (Independent Variable) and D.V (Dependent Variable) consisting of the players of all three sports respectively. The test was measured on the Basin Anticipation Timer. The precision of the players' coincidence-anticipation timing was measured using a device called a Bassin anticipation timer, which was manufactured by the Lafayette Instrument Company and has model number 50575. The LED lights on the system are spread out over the runway in the Bassin anticipation timer's three separate 2.24-meter portions (49 lamps). The first bulb was a warning light that was colored yellow, while the next 48 lamps were movement-simulating lights that were colored red. The runway was wired up to a controller, which enabled the controller to switch the lights on and off in a predetermined order as it moved down the length of the runway. There is a button that must be pressed in order to reply to anticipate the arrival of the light at the target bulb. The sequentially lit LED lights glow in a linear pattern and are meant to produce the illusion of a moving stimulus approaching the participants. This is accomplished by lighting the lamps in a manner that successively illuminates each bulb in turn. The stimulus “velocity” is determined by how rapidly the lights were turned on and off (Lyons, et al., 2008) [5]. The stimulus velocity was set at 2m/sec. Subjects were acknowledged about the test and its very functioning beforehand the test took place. All the subjects were given five initial trials before measuring the final best of two scores. The best score out of the two final trials was considered. The test was administered under the supervision of two research scholars and an expert to avoid the Non- response Error and to mitigate any confounding effect.

Picture 1: Administering the Test In The Presence Of an Expert

Picture 2: The subject getting acquainted with the instrument

Analysis of the data

For the analysis of data descriptive statistics were applied which were mean, standard deviation, skewness, and kurtosis. Furthermore, One Analysis of Variance was used to obtain the mean difference along with the post hoc test HSD turkey was applied. For this study, the level of significance was set at α 0.05.

Results and Discussion

A deviation from symmetry can be indicated if a skewness value is more than twice its standard error. As the variables' skewness is less than twice its standard error, hence all the variables are symmetrically distributed. Similarly, the value of kurtosis for the data was normal for the variable and is less than twice its standard error of kurtosis. In other words, the distribution of all the variables is Meso-Kurtic.

The below-mentioned table-1 shows the Mean and Standard deviation scores on the Basin Anticipation Test. The results from below the table show a significant mean difference in Tennis Players in comparison to Badminton and Table tennis players.

Table 1: Descriptive Statistics

Sport	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Tennis	10	.02260	.012886	.004075	.01338	.03182	.007	.045
Badminton	10	.05290	.024933	.007885	.03506	.07074	.008	.091
Table Tennis	10	.03560	.021475	.006791	.02024	.05096	.001	.062
Total	30	.03703	.023387	.004270	.02830	.04577	.001	.091

For the Homoscedasticity of variance, Levene Statistic was used shown in table 2 below and found to be significant at .194.

Table 2: Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.744	2	27	.194

In the below-mentioned Table 3 of ANOVA, it was found significant at 0.05 level of significance, between the group and within-group mean of at least one game i.e., Tennis showed a significant difference when measured. For the post hoc result of the test to verify the one mean Honest Significance difference among three Racquet Sports Turkey HSD Test was applied.

Table 3: Anova table

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.005	2	.002	5.551	.010
Within Groups	.011	27	.000		
Total	.016	29			

Table 4: Tukey HSD

Game	N	Subset for alpha = 0.05	
		1	2
Tennis	10	.02260	
Table tennis	10	.03560	.03560
Badminton	10		.05290
Sig.		.343	.159
Means for groups in homogeneous subsets are displayed.			
a. Uses Harmonic Mean Sample Size = 10.000.			

Conclusion

The purpose of the study was to compare three Racquet sports namely- Tennis, Badminton, and Table Tennis through the Basin Anticipation Test on the Male Athletes of Gwalior city. Results from scores were taken in msec (milliseconds). For analyzing the results on descriptive statistics and as there was only one assignable cause (Factor) i.e., Coincidence-Anticipation time, way Analysis of Variance was used to analyze the mean difference within the group with that of the Between-group. Mean ($\bar{x}$) and the (σ) standard was employed. From the evaluation of the test results, it was found the male Tennis players showed a significant difference at a 0.05 Level of significance. For the Homoscedasticity of variance, Levene Statistic was used which is shown in table 2 above and found to be significant at .194. As a consequence of the findings, it is clear that one of the primary advantages of tennis players who anticipate the ball well is their faster response time, which gives us more time to set up and steady ourselves before the shot. Reading the kind of shot (e.g., flat, spin, slice) and seeing how the ball bounces may also be used as additional methods which give an edge to tennis players. Predicting an opponent's game pattern is the most critical sort of anticipation when we play a match. The sport in which the competitions go for extended periods has more challenges, both physically and emotionally. Your energy is rapidly depleted with each shot and step until it seems as if you have none left. Tennis is that one sport that requires not only the fast exchanges of rallies but also covering the court religiously east to west and north to south. The game's demand lies upon both the aspect i.e., aerobic and anaerobic capacity of an individual. Due to the high level of hand-eye coordination, flexibility, agility, strength, and speed required to play tennis, many people believe it to be one of the most difficult sports to master. Players are required to

become proficient in a variety of shots and the mental aspect of the game, which is often regarded as the most challenging aspect. Tennis players need to have the stamina to play through matches that last five hours while also running five kilometers in sprints around the court. They have to make hundreds of judgments throughout each match, which requires them to have lightning-fast responses.

Discussion of the findings

Racquet Sports are one of the fastest games in terms of exchanging rallies in the match. From the results obtained in this study, the researcher found Tennis has a significant difference in the Bassin Anticipation Test. But the results obtained can differ or manipulate in terms of the level of athletes participating in the sports. As the perception of athletes grows with the level of experience he/she gains with the increasing stage of playing the tournaments.

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