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NOTATIONAL ANALYSIS FOR COMPETITION IN TABLE TENNIS (PART I): BASED FORMAT ANALYSIS

Abstract

The supporting tools for table tennis player strategic direction during competition are mainly related to pre-competition studies, video-analysis and coach's judgement during match. However, it is evident a lack of tools for quantitative data collection in match analysis. In this first part of the work a compilation, description and usage of formats for notational analysis of Table Tennis is presented. The obtained quantitative information is then used to perform basic statistical analysis for developing strategies for direction during competition.

Key words: *notational analysis, table tennis, real time, competition, format*

1. Introduction

In [2], notational analysis is defined in the context of racket sports as "*the process of recording and analyzing players during play*". In the general case of table tennis, mainly this process is developed by coaches using video records, but the process of real time quantitative data collection is barely employed during competition, reducing the task to qualitative analysis based on perception of the match.

The fact that in table tennis this process is carried in that way is due to the complexity of the game, in which a great variety of technical, tactical, and psychological factors become crucial in very small laps of time. All these concepts can be reduced to one word "speed". It is the main factor that makes difficult the process of data collection in real time, and what makes challenging to search tools for improving the development of table tennis in this aspect.

Notational analysis (as a discipline) in sports is a new topic of research; as a result, there is not enough written support for table tennis. In general ball sports, cricket, soccer, golf and baseball are the most studied, whereas for racket sports, the major attempts have been developed to squash, tennis and badminton.

In the case of table tennis, some studies can be found in [4,3], but in general there is a lack of literature for this discipline. Furthermore, the fact that the term notational analysis has been recently introduced, makes difficult the search of previous studies on applied statistic to table tennis or systems of notation used on it. Due to these facts, this work pretends to establish a written support for future studies on this sport based on the research carried by the authors, the references cited, and information collected from racket sports in general.

The present article is structured in the following way. Section 2 presents a motivation to the notational analysis in table tennis, in which the main characteristics of the topic are described. After that, two formats that can be used to get table tennis data in competition are introduced. The work finishes with conclusions about format methods for notational analysis in table tennis.

2. Notational Analysis in Table Tennis

In table tennis, as in any discipline, statistics play a important role in terms of data handling and analysis, with it, we can understand in a quantitative way the system that is the center of attention, in this case, the table tennis match; but this understanding

depends in great proportion on the quality of the information that is used to improve the performance of the players. For that reason, the process of real time data collection becomes important for people interested in improving its results on competition, that added to the subsequent analysis makes what is called "Notational analysis for competition in table tennis".

To design notational analysis tools for table tennis, it is necessary to define the characteristics of the game in order to determine the strategy that can be used to get the information. In this case, the following characteristics are suggested to develop a tool for notational analysis:

- The structure of the match (sets)
- The structure of the set.
- The kind of strokes (offensive, defensive, transition)
- The style of the player.
- The different strokes.

In addition, the most important feature of the game, "speed", is taken into account. In table tennis the rallies are very fast, and the process of data collecting has to be made in very small laps of time. Then, the methods should be designed in a way that the analyst can obtain the more reliable information with the simplest method, otherwise the process becomes greatly complex.

One of the benefits of table tennis as a sport, is that players can talk with its coaches between the sets. Usually, that time is employed by the coach to give advices to the player, looking for the best performance during the match. More often, those directions are based on the perception of the coach during the game, and generally its character is qualitative. Based on that statement, what it is presented in this work is a way to get quantitative data from the matches, looking for objective information during the matches or competition.

The following section presents a method to get quantitative information from table tennis matches, which is based in formats that can be designed for each analyst depending on the factors that want to be analyzed.

3. Format Methods

To establish a foundation for notational analysis during competition in Table Tennis, two type of formats are presented, which are separated by levels depending on the degree of complexity of the analysis.

i. Level 1

This is a simple format that can be used for Table Tennis. Its goal is to obtain specific information of one single stroke during the match. Usually this format can be used for the first stages of the rallies and the information is correlated with the final result of those (win or lost).

As an illustrative example, format 1 is used to analyze the relation between the service of one player and the final result of the point. The match between Michael MAZE and Lin MA in the World Table Tennis Championship of Shanghai, China, in 2005 was selected and the analysis corresponds to MAZE service. This format uses the table as a notational surface, which is divided in six zones where the information is collected, in this case each zone represents the location where the ball bounce after the net. Note that the same analysis can be made e.g. for reception, third ball, last ball.

Format 1: Single specific match information

x		
	x✓✓✓✓x x	xx

NET

a) Set 1

		x
	x✓x✓xx	x

b) Set 2

✓		✓
	xx	✓x✓✓xx

NET

c) Set 3

		x✓✓
	✓xxx	x✓x

d) Set 4

Due to the simplicity of the scheme, what it is looked here are patrons of game in order to discover strong or weak points in the player or opponent, and based on that, build an strategy to play the next game or match.

For these kind of formats, data collection is performed without inconvenient due to its specific properties, but in many cases if the coach wants to have better information that allows him analyze the match, these formats are not sufficient. Based on that reason, in what follows is presented a format which presents better features to gather table tennis data.

ii. Level 2

The goal for a good table tennis match analysis during competition is to obtain more information from the games. The level 1 format allows to get a modest quantity of information, very reliable, but in some cases insufficient for a deep analysis. If instead of one single stroke, more strokes during the rallies are recorded, more information can be analyzed, and better strategies could be suggested to the player during the competition.

The following format presents a compilation of the most common situations in which a player can be exposed during the game. In this case the idea is to obtain a register of strokes, and if it is possible, to relate those strokes with the success of it (win or lost). In any case, the format can be designed for each coach, depending the type of analysis that will be developed. The most information, the most complex is the analysis, and less reliable is the information gathered during the match.

As in the level 1 format case, the match between Michael MAZE and Lin MA in the World Table Tennis Championship of Shanghai, China, in 2005 is analyzed.

Format 2: General match information**Data sheet for offensive players**

		Set # 1	Set # 2	Set # 3	Set # 4	Set # 5
Service	Long			++	++	
	Short		+		+ +	
	Bad service					
Reception	Drop Shot	-	+	-		
	Lifted		-		-	
	Attack					
Transition	Drop Shot	- ++ -	+ - -	+ -	--	
	Push					
	Middle distance	-		-		
Starting attack	Topspin	--	- ---	+ -	- ++	
	Push		-		- -	
	Fast topspin	-++ --	+ -	-++++	++	
Continuous attack	Push					
	Fast topspin	+ +	- +		+	
	Smash				-	
Defense	Block	-+	-	--+- -	---	
	Lob			-	-	
	Counter attack	-	+	-		
Lucky	Net or edge					
	Mistakes					
Score		7:11	6:11	9:11	9:11	

Three kind of symbols were used for the data collection in this case:

- "+" represents that the player won the rally.
- "-" represents that the player lose the rally
- "|" represents that was a intermediate stroke.

With those symbols is possible to have a general perspective of the sets/game, which allows to identify what are the strong and weak strokes of the player, as well as the strategies that can be suggested for the following game/match.

Although the method provides an easy way to get information during the match, there is not possible to register the sequence of movements during a single rally, which means that each stroke is independent, and the development of game tactics based on combination of strokes during a rally cannot be elaborated.

4. Concluding remarks

Notational analysis for table tennis is a useful topic to improve player's performance during competition. The way in which this discipline is applied has to take into account the complexity of the game, that in some extent is due to its inherent speed.

In this work, a method to gather real time information from table tennis matches was presented, which is based in formats. In general format based methods are reliable tools to collect data due to its easy handling and simplicity of the notational system.

Further research has to be done in methods that capture the information with the same confidence that formats, but also the complete sequence of movements during the rallies. Additionally, if all these aspects can be extended to computational tools, the evolution of player's efficacy during the competition will be reinforced.

As a final remark, the goal of these methods is to obtain quantitative information from matches, which come from player's physical actions. Fortunately, table tennis is more than that, mental components are as important as physical ones, that is why table tennis science community have to pursue more researches for developing tools to handle both components in an efficient form.

5. References

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