Original Article

Fast attack starts, in soccer. Analysis of Real Madrid

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Abstract:
Within an observational design aimed at studying the significant repeated and regular behavior, emerging from the diversity of game actions, determining the behavioral variables that define and characterize the Offensive Game Methods, in fast attack. Every one of the sequential patterns obtained using the lag technique, by the SDIS-GSEQ software. The selected team is Real Madrid (RM 2010/2011) and the analyzed was by systematic observation. We seek the relation between the start of the offensive process (criteria conducts) and (conducts behaviors), developments, pace of the game, the zones of the field, the interaction contexts. The results allow us to better understand the game actions. Using the fast attack method, the team of Real Madrid (RM) performed 134 attacks.
Key Words: Soccer, Fast Attack, Real Madrid.

Introduction

Soccer is a modality of complex understanding and strongly influenced by randomness; this preconception comes from the multiple factors that involve the game, as: players of the same team and opponents (Lago et al., 2011), the influence of match location, (Lago, 2009) result, condition of pitch (Fradua, Zubillaga & Caro, 2012), psychic state of players (Lago, 2007), among many other aspects that articulate promoting the growth of randomness.

The increasing research on this game was consolidated, above all, in the realization of studies oriented to the description and explanation of physical and/or physiological or quantification of actions performed, an attempt to quantify the activity of footballers (Sanches, Casal & Brandão, 2004, June; Gregson, Drust, Atkinson & Di Salvo, 2010; Lago-Ballesteros & Lago-Peñas, 2010). Traditional approaches to the quantification of team sports have proved to be limited in their ability to identify complex structural regularities that, despite being unobservable, nonetheless underlie the development of the sporting contest between opposing teams (Camerino, Chaverri, Anguera & Jonsson, 2012).

From this statistical practice comes the performance result, therefore they are indicators, unable to determine the performance regarding technical-tactical aspects. The result doesn't have the capacity to identify areas that influence, the much desired question: "how can we improve the player's behavior?" With these types of studies, we verified the search for partial elements to explain the complex and integrative phenomenology that characterizes the game.

The final product is valued, however, less significant and more unnoticed is the path taken, the process which allows achieving the desired result. Magnusson (2005) considers that quantification is not enough, and that it should be recognized the structure of this behavior, expressed through patterns that are apparently hidden to the eyes of the observer, but that does exist and it can be detected.

It should be noted, however, that the analysis of behavior structures is not being proposed as a substitute for conventional approaches in sports research. Coaches should have as main concern how to collect game information and realize how is it possible to intervene in the processes of teaching-learning and training, becoming more effective/efficient supervising the process applied to the players. The enormous amount of factors that condition the football game, affect deeply its accuracy, without implementation of proper scientific means, the development is dependent on random factors.

Soccer consists of the sum of technical elements with and without the ball that, at all times, should serve a higher purpose which is the tactical element, the collective ideology that should be recognized by the several players of the same team and promote an individual and collective response. The focus is to provide the

164--
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players with knowledge that enable them to understand a set of guidance standards. The referred guidance allows achieving solutions for the problems that emerge from game diversity.

Given the need to analyze the game, some researchers have resorted to notational analysis. It represents a significant advance as observational methodology, and demands fulfillment of the requirements of the scientific method along the process. This methodology applied to football context provides unbiased and necessary information for coaches, to promote more adequate processes in the game context. Sequence analysis, has been presented as a model that supplies relevance and innovation, helping to achieve better relations, collective and individual behaviors, in particular in football as revealed by the work of Barbosa (2013), Camerino, et. al (2012), Sarmento (2012) among others.

The observational methodology provides a quantitative but also a qualitative analysis and ultimately helps define the type of behavior in the game context. According to Bakeman & Quera (2011) one of the main reasons for using observational methods is the ability to capture behaviours displayed along the time, which allows sequential analysis to be carried out. For Bakeman & Gottman (1986) observation enables one to quantify behavior (Sánchez-Algarra & Anguera, 2013), which is a great advance against numerous authors who considered it as a qualitative methodology.

The lag technique, as a classical sequential analysis procedure, dates back to studies by Sackett (1987), completed with subsequent contributions by Bakeman (1991), Bakeman and Quera (2011) and Quera (1993). The use of this technique has been considerably amplified by the SDIS-GSEQ software (Bakeman & Quera, 1995), which facilitates the calculation of adjusted residuals and the subsequent interpretation of statistically significant differences between conditional and unconditional probabilities, in the successive lags that relate.

In particular, in the field of physical activity and sport, there are many studies that use SDIS-GSEQ, mainly with multicode event sequences (Ardá, Casal & Anguera, 2002; Castellano & Hernández-Mendo, 2000; Barbosa, Sarmento, Anzano & Campaniço, 2013a; Castellano, Hernández-Mendo, Morales & Anguera, 2007). There are very few studies that, in this area, consider the temporal dimension with SDIS-GSEQ (Anguera, 2007).

Method

Design

The design used was based on an observational methodology for data collecting (Bakeman & Gottman, 1987; Anguera, Blanco-Villaseñor, Losada, & Hernández-Mendo, 2000). It indicates the conceptual structure according to the objectives and represents the scheme or framework of the process to be followed (Anguera, Blanco-Villaseñor & Losada, 2001). The observational design used is, according to Anguera, Blanco & Losada (2001) and Anguera, Blanco-Villaseñor, Hernández-Mendo & Losada (2011), follow-up / idiographic / multidimensional: follow-up - we reviewed and coded, several matches over two sporting seasons; idiographic – analyze one team; multidimensional - several possible answers - the gestural performance - the way in which those actions that result in the starts of a play are specified.

Participants

The sample was collected using indirect observation, included 12 soccer games of domestic competitions, 6 games played at home, 6 played away, from the sports season 2010/2011 of the Real Madrid F.C (RM). Matches were observed for the regular period (90 min, excluding extra time). For coding data, all the recording was done using the televised games. The image records the evolution of the game, at all times following the player with the ball and his performance with it. Were excluded from the analysis: I) the attack didn´t end in the offensive sector; II) a team had 10 or fewer players on the pitch; III) if there was an interference which limited the complete visualization of the offensive sequence.

Instruments

Observation instruments

To collect data, we used an observational instrument developed and validated by Sarmento, Anguera, Campaniço & Leitão, (2010) (Table 1). The instrument was used in this study and has been used in recent research (Barbosa, 2013; Barbosa, Sarmento, Martins, Leitão & Campaniço 2011; Barbosa, Sarmento, Anzano & Campaniço, 2013a; Sarmento, 2012). It is specific to observe the offensive process. It is a combination of field format and category system (Anguera, Magnusson & Jonsson, 2007). This tool makes it possible to observe and record the occurrence of perceivable behaviors in natural context and data exporting in multiple formats that suits sequential data analysis with SDIS-GSEQ.

Table 1. Adapted version of observational instrument

Beauvoir criteria			
Criterion	**Sub-criterion**	**Categories**	**Description**
Start of the	Start of fast attack using actions were the players can be immediately pressed	IPi	Recovery of the ball possession by interception
		IPd	Recovery of the ball possession by disarming

--- 165

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process with ball possession	Start of fast attack using actions were the players, can´t be immediately pressed by the opponent.	IPgr	Recovery of the ball possession by Goalkeeper action
		IPera	Recovery of the ball possession due to a regulatory interruption in favor
Developments		Dpc	Development by short / medium pass
		Dpl	Development by long pass
		Dcd	Development by conduction of the ball
		Drc	Development by reception / control
		Ddr	Development by dribble (1x1)
		Ddu	Development by duel
		DPgr	Development by action of the goalkeeper from the team in the offensive phase
		Dre	Development by shot
		Dcz	Development by crossing
		Dia	Development with unsuccessful intervention of the opponent
		Dgra	Development with action of the goalkeeper of the opposing team
End of the process with ball possession	End of Offensive Game Method - with success	Fgl	Shot with goal obtaining
		Frr	Final with shot
		Fsoc	End reaching the offensive sector and maintaining the ball possession
	End of offensive Game Method - without success	Fpga	Pass into the opposing penalty box
		Fbad	Recovery of the ball possession by the opponent
		Flj	End do to the laws of the game

Other field criteria		
Criterion	**Categories**	**Description**
Direction and steering of the pass	PFr	Pass forward
	PPt	Pass directed to the back
	PPl	Pass directed to the side
	PDf	Oblique pass forward
	PDt	Oblique back pass
Height of the pass	Pr	Low Pass
	Pma	Pass mid height
	Pa	High pass
Pace of the game	RJr	Rapid pace
	RJl	Slow/médium pace
Game Center	Pir	Relative inferiority
	Pia	Absolute inferiority
	Pip	Pressed equality
	SPinp	Not pressed equality
	SPsr	Relative superiority
	SPsa	Absolute superiority
Spatial characterization	Z1	Defensive sector/left corridor
	Z2	Defensive sector/central corridor
	Z3	Defensive sector/right corridor
	Z4	Defensive midfield sector/left corridor
	Z5	Defensive midfield sector/central corridor
	Z6	defensive midfield sector/right corridor
	Z7	Offensive midfield sector/left corridor
	Z8	Offensive midfield sector/central corridor
	Z9	Offensive midfield sector/right corridor
	Z10	Offensive midfield sector/left corridor
	Z11	offensive sector/central corridor
	Z12	offensive sector/right corridor

Procedure

Quality of the data

The recording was made in the first place by a group of two observers using a qualitative form of concordance, which was the consensual agreement (Anguera, 1990). Another observer was responsible for making a second record of which the quantitative concordance was verified using Cohen's Kappa coefficient (Bakeman, McArthur & Quera, 1996; Bakeman, Quera & Gnisci, 2009). All the observers followed a theoretical-practical training process as described in Anguera (2003). The Kappa Cohen values obtained using the SDIS-GSEQ software, and values above 0.89 for all criteria were achieved (see Table 2).

166 ---

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Table 2. Kappa Cohen values Intra and Inter-observer

Observed Categories	Intra-observer	Inter-observer
	Kappa	Kappa
Start of the offensive process	0.94	0.91
Development of the offensive process	0.99	0.98
Finale of the Offensive Process	0.96	0.95
Spatial characterization	0.96	0.93
Game Center	0.93	0.90
Direction and steering of the pass	0.97	0.92
Height of the pass	0.98	0.97
Pace of the game	0.94	0.89

Sequential analysis

The collected data was introduced in the SDIS-GSEQ program for Windows (version 5.1). The technique facilitates the direct and exact identification of patterns of occurrence between conducts establishing an approximation. The determination of the motivational value of transitions between the different behaviors considered as criteria categories and object, occurred considering the pattern sequence up to the transition limit of 5 delays (D) (figure 1), prospectively, since after this number, "the sequence awareness is greatly reduced" (Castellano, 2000). According to Bakeman and Quera (2011), the adjusted residual is positive if the conditional probability obtained from the observed frequency is greater than would be obtained if only left to chance (unconditional probability) and negative if it is less. This study has considered transitions greater or equal to 1.96 which, being significant ($P < 0.05$), represent a greater probability than that expected if left to chance (Bakeman & Gottman, 1986).
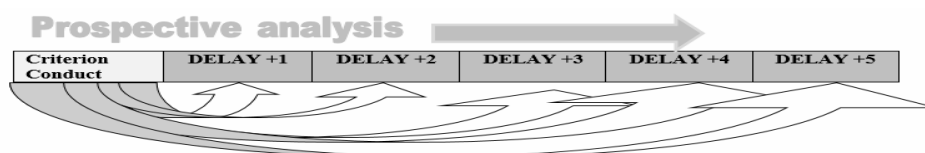

Fig 1. Representation of the analysis technique or delayed transitions, prospective analysis

Results

This type of analysis seeks to identify the probability of transition between behaviors that is greater than that predicted by chance (Sackett, 1987). This probability does not imply direct linear relationships between two consecutive events in that time. Actually, the relationship should not be regarded from a deterministic point of view, but rather in terms of probability or statistically; that is, the first event is simply the antecedent and the second the consequent, there being a certain degree of probability of transition of an associative nature (Castellano, Hernández-Mendo, Morales & Anguera, 2007). The results were interpreted according to the conceptual model of the dynamic organization in the soccer game (see Figure 2).
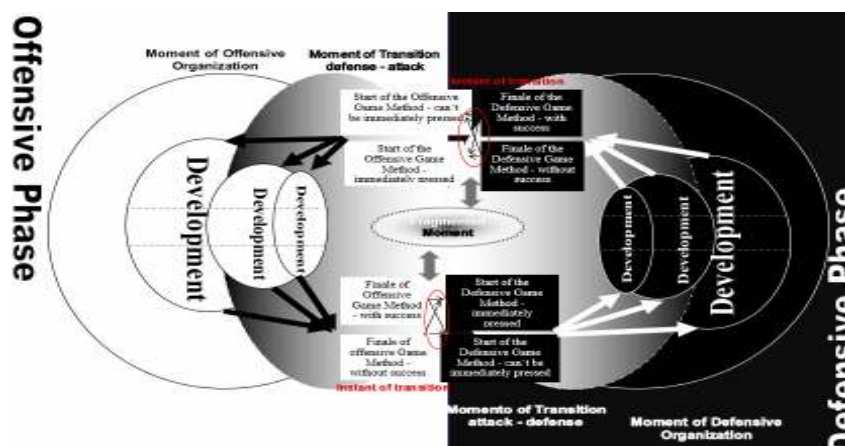

Fig. 2. Updated version of the conceptual model of the dynamic organization in the soccer game (Barbosa, Sarmento, Anzano & Campaniço, 2013b).

-- 167

1.1 - *Quantitative analysis*

In the 12 matches a total of 130 attacks were analyzed. Regarding the sector where the possession of the ball is recovered, the teams have similar results for the different offensive styles of play (see table 3).

The most import area for recovery of the ball possession is the DMS, with 46,9%.

The recovery of the ball possession by interception (Ipi) is the most often used behavior. Generally occurs in interaction contexts of relative superiority (SPsr) that means the observe team has one or two more players in the center of the game.

Table 3. Sector of the field, behavior and interaction context in the recovery of ball possession (percentage)

Teams	Sector				Beauvoir				Interaction Contexts				
	DS	DMS	OMS	OS	Ipd	Ipera	Ipgr	Ipi	Pir	Pip	SPinp	Spsr	Spsa
RM	23,1	46,9	24,6	5,3	27,0	23,1	4,6	45,4	6,9	20,0	11,5	60,0	1,5

1.2 - *Qualitative analysis*

1.2.1 - Start of fast attack sequences, using actions where the players can be immediately pressed by the opponent. In Table 4 we show the patterns detected by prospective analysis. Criteria conduct - recovery of the ball possession by disarming.

Table 4. Start of fast attack, conduct criteria recovery of the ball possession by disarm

Conduct Criteria	Recovery of the ball possession by disarm				
Prospective analysis	D+1	D+2	D+3	D+4	D+5
	Dcd (2.13)	Dcd (3.12)	---	---	---
Real Madrid (RM)	Pr (2.34)				
	Rjr (2.06)				

The RM team, activates the development by conduction of the ball (Dcd) - we believe it is performed by the player himself, who recovered the ball or a teammate, who proceeded to the defensive cover - with a fast pace of the game (Rjr). The conduct Rjr, seems to indicate the importance of mental/procedural transition needed when the team gains possession of the ball (alternating phases depends on procedural speed in the moment of transition defense-attack). We assume that the activation of these conducts is intended to take advantage of the inter space between lines and, hindering the opposing defensive reorganization. When the fast attack starts by disarm, RM team leaves the pressure zone using the conduction of ball with fast pace.

Observing table 5 we can verify the patterns detected by prospective analysis. Criteria conduct - recovery of the ball possession by interception.

Table 5. Start of fast attack sequences, conduct criteria recovery of the ball possession by interception of the ball

Conduct Criteria	Recovery of the ball possession by interception				
Prospective analysis	D+1	D+2	D+3	D+4	D+5
Real Madrid (RM)	Z4 (2.05)	---	Z5 (2.05)	Z7 (2.21)	---

Regarding RM, there is the activation of field format criteria, with triggering of zones: left corridor of the defensive sector (Z4), the central corridor of the defensive middle sector (Z5) and the offensive middle sector (Z7). The defensive midfield sector is the primary area to recover the ball possession when the team starts the offensive process by intersection. We should also refer the verticality of the game, exposed by activation of areas of the central corridor.

1.2.2 - Start of fast attack using actions where the players can´t be immediately pressed by the opponent. In Table 6, we can verify the patterns detected by prospective analysis. Criteria conduct - recovery of the ball possession by goal-keeper action.

Table 6. Start of fast attack, conduct criteria recovery of the ball possession by goal-keeper action

Conduct Criteria	Recovery of the ball possession by goal-keeper action				
Prospective analysis	D+1	D+2	D+3	D+4	D+5
	Dpl (3.79)	Ddu (4.34)	Dcd (2.58)	Dia (3.00)	---
	Ddu (3.04)	Pma (2.96)	Pma (2.07)		
Real Madrid (RM)	Pal (2.98)	Pdf (2.45)	Pal (2.40)		
	Pdf (2.19)				

168 --

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Studying the development conducts, there is the activation of long pass (Dpl), duel (Ddu), conduction of the ball (Dcd) and the unsuccessful intervention of the opponent (Dia). We also found the activation of conduct high pass (Pal), and pass forward (Pdf). The spatial conduct activated are related to the central corridor of the defensive sector (Z2) and the left corridor of the offensive midfield sector (Z9). In the game center there is the activation of the absolute superiority relationship (Spsa). The activation of several conduct objects, is associated with the frequent implementation of these actions. Through the analysis of the described results we are compelled to presume that teams seek to explore the offensive profundity. Despite of significant differences among the teams the results demonstrate the attempt to explore a possible disorganization during the transition moment defense-attack of the opponent team.

The conduct activated are related to the pass accuracy of the goalkeeper; or the ability to produce high intensity game actions, using a fast transition time that allow fast offensive reorganization which consequently creates success in the developments, thus, more often repeated increasing the systematization of the conducts.

In table 7, we can verify the patterns detected by prospective analysis. Criteria conduct - recovery of the ball possession due to a regulatory interruption in favor of the observed team.

Table 7. Start of fast attack, conduct criteria recovery of the ball possession due to a regulatory interruption in favor

Conduct Criteria Prospective analysis	Recovery of the ball possession due to regulatory interruption in favor				
	D+1	D+2	D+3	D+4	D+5
Real Madrid (RM)	Drc (3.14) Pma (2.81) Ppt (2.27) Rjl (3.91) Z7 (2.46) Z9 (4.17) Spinp (2.24)	Dpl (2.46) Rjl (3.78) Z9 (2.87) Spinp (3.02)	Drc (2.82) Z9 (3.03) ---	Dpc (3.94) --- ---	Drc (2.71) Dia (3.04) --- ---

When analyzing the results There is the use of the conduct pass directed to the back (Ppt), slow/medium pace of game (Rjl), and the activation of the side corridors from the offensive midfielder sector with higher incidence of the right corridor side (Z9). In the criterion game center, we examined the activation of not pressed equality (Spinp). In delay 2 there is the activation of development by long pass (Dpl) executed from the right corridor of the offensive midfield (Z9) and in a context of not pressed equality (Spinp). In the following delay we identified the development conducts reception/control (Drc), pass (Dpc), reception/control (Drc) and unsuccessful interception of the opponent (Dia). The fact that RM team activates the development conducts described above, is linked with a sequence of the game in which the players seek to move the ball by means of pass, creating activation pass-reception-pass, seeking higher security developments, ensuring the continuity of the attacking process using collective actions that ensures security. The results lead us to suppose that RM adjusts a set of standardized behaviors. The team members identify in this type of start a set of actions which must be developed, and seek to build the process according to predefined tactical-technical principles, showing higher stringency.

Discussion

Considering the purpose of this article, it was identified the existence of conducts in which the probability of occurrence ensured the relationship established beyond pure chance.

Taking into account the sequence analysis previously exposed, in the start of fast attack using actions where the players can immediately be pressed by the opponent, we identified the tendencies. In the recovery of the ball possession by interception the RM team activated spatial characterization conduct which reveals standardization on the field areas where the team plays.

The RM team activates individual actions, resorting to ball conduction, and due to this action, improves the numerical relationship in the offending process. We consider that the team makes use of individual actions resorting to a situation that shortens the defensive reorganization time.

Regarding the start of fast attack using actions where the players can´t be immediately pressed by the opponent, RM makes use of the collective actions pass reception / control and long pass. We assume that these results may be understood as a success factor, in other words, the team recover the ball possession and can move closer to the opposing goal. Regarding the contexts of interaction (game center) it shows a degree of stability, detected by the activation of conducts.

Compared to the other group of starts, we infer the existence of longer patterns with more activated conducts. We believe that the team uses the starts without direct intervention of the opponent on the ball to start the offensive process in a more regular order applying actions of general knowledge by team players.

None of the starts activates conducts related with the end of the offensive process, this aspect is an

--- 169

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example of the difficulty in coding a complete offensive sequence, representative of the entire process: starts, development and the finale.

Compared to the start using actions where the players can immediately be pressed by the opponent, we infer the existence of longer conduct patterns, and more conducts triggered. The team use the this type of start, in a more regular form, in order to develop actions that are of general knowledge by the team players.

We proceeded with the purpose of studying the game given its complex nature. Our aim was to dissect the start of the offensive process of one team. Occasionally we can identify identical conducts, but given the results we can conclude that the team have different game conducts according to the different starts.

This type of analysis in the natural context (the game), enables us to obtain information on how to organize the training process, so that the team understands ways to enhance the teams potential and oppose adversary actions of success (Barbosa, Sarmento, Martins, Leitão & Campaniço, 2011).

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