Revista de Psicología del Deporte/Journal of Sport Psychology Vol. 30. n.°2. 2021. pp. 208–222
Universidad de Almería / Universitat Autónoma de Barcelona. ISSN 1132–239X ISSNe 1988–5636

Decision Making and Defensive Effectiveness of Ball Screen in Top-Level Basketball

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Abstract

The objective of this study is to analyze the effectiveness of the defensive actions of the pick and roll in basketball by ACB League teams throughout a full season (2010-11), contrasting the results obtained with the opinion of basketball experts on the decision-making process regarding this game action. The research uses direct observation (observational methodology) and indirect observation (in-depth interviews). An observational instrument is used to analyze the actions of pick and roll and this is recorded using the software Dartfish TeamPro v.4.5. For the in-depth interviews, an indirect observation instrument is built and validated. The significant association between different elements of the game and defensive efficiency is determined using Chi-square and a polar coordinate analysis. 8267 actions have been analyzed, of which 26.9% correspond to ball screens. Significant differences ($p < .05$) are detected in the distribution of the different types of defensive aid from the defender of the ball handler and the defender of the screener in relation to defensive effectiveness, the most widely used option being the chase and the show. The coaches express in their in-depth interviews why "pick and roll is such a widely used and effective action" (Scariolo).

Keywords: basketball, ball screen, pick and roll, observational methodology, in-depth interviews, polar coordinate analysis.

Introduction

The analysis of the sports performance of a professional team is important for optimizing training for the game since it enables the development of training concepts and strategies to increase their effectiveness (Jäger & Schöllhorn, 2007). In modern basketball, technical-tactical actions such as ball screens are trained daily so that they lead to the creation of situations that allow a successful shot to the basket (Nunes et al., 2016).

The keys for a correct use of this movement consist precisely in the balance between attacking the basket with aggression and maintaining sufficient control of the body and vision of the rest of the players to make the most appropriate decision. Many of the errors that can be seen have their cause, precisely, in not considering the maximum aggressiveness with.respect.to all the possibilities of threatening the opposite basket; or in not seeing the defensive reaction generated with a high risk of losses: bad shots or offense misses (Santana, 2016).

In the literature, pick and roll is expressed as one of the offensive situations that presents the most challenge for the opposing defense (Coello, 2005; Harris, 2007; Ivanovic, 2006; Messina, 2005; Ociepka, 2004). Comas (1991) defines ball screen as the interaction between two players of a team with the aim of freeing one of them from his screener using a legal obstruction of his movement. Screening implies that the screener moves towards his partner, or that the screener is stationary, and that the ball handler leads his defender to the ball screen. The blocked player cannot stay static, and the screener's defender has to adjust his position at all times.

The advantage offered by the screen must be exploited quickly, in such a way as to provide the best space conditions in the field, with the intention of achieving the optimum possible shooting moment, either directly from the advantage created, or forcing aids, rotations or defensive changes, thus breaking his balance.

However, the movements that occur in time and space must be directed to an end and the key to the effectiveness of the pick and roll is not how fast the offensive player performs the screen, but the ability of the ball handler to read the best offensive option according to the defensive response (Hollins, 2003). For this, the two main offensive players have their roles defined: the screener chooses an intervention area while the dribbler frames his action with the teammate, changing the rhythm and dynamics of the game to make it difficult for the opposing team to decide. This technical-tactical action creates an advantage of time and space over the opponents (Garganta, 2009; Gréhaigne & Godbout, 2013).

Due to that, Messina (2005) exposes the difficulty of the defense of the ball screen, referring that this situation is a collective work of 5 against 5 (and it is not about closing a

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1 against 1) where the attack tries to create its advantages and the defense to counteract them.

A clear perception of an offensive advantage situation reveals the importance of a correct decision-making on the part of the defense. This must be fast and effective due to the short time available (Jimenez Sanchez & Ruiz Perez, 2006). The systematized training of the technical-tactical actions leads the defending players to a more perfect knowledge of the game, enabling them to better explore, identify and take advantage of a situation of defensive imbalance.

When considering what can be done in the event of a screen, it is common for the team's coaching staff to study the opponent's offensive capabilities. The most aggressive attitude basically consists of preventing the opponent from performing a ball screen. However, in modern basketball it is particularly difficult to make the right decision and employ only one way to defend the ball screen. In addition, offensive and defensive tactical decisions are influenced by factors such as the place where it occurs, the time of possession, function and characteristics of the players involved in the ball screen, positioning of the rest of the players or special situations of the match (Coello, 2005)

The objective of this study is to analyze the effectiveness of the defensive actions of the *pick and roll* in basketball by ACB League teams throughout a full season (2010-11), contrasting the results obtained with the opinion of basketball experts on the decision-making process regarding this game action. For this, the study will focus on aspects such as the type of defensive transition, collective defensive organization, screening effectiveness (EB) and on more individual concepts about the defensive response of the defender of the ball handler (ADB1), of the screening player (ADB2) and defensive support between the two (AD2D).

Method

Design

The observational methodology (direct observation) was used to analyze the defensive effectiveness of the *pick and roll*, and an in-depth interview (indirect observation) was used to analyze the decision-making process and opinion of expert basketball coaches.

In both, the observational design (Argilaga, Villaseñor, Mendo, & López, 2011) was N/P/M (Nomothetic / Punctual / Multidimensional). Nomothetic, for the differential analysis of the plurality of the teams in direct observation, and because an indirect observation was made through an in-depth interview with several coaches; *punctual*, as it was a record from a single team competition, but with intra-session follow-up in direct observation and a single in-depth interview with each coach in indirect observation; and multidimensional, with several dimensions that corresponded to the different criteria of the observational instrument, both direct and indirect observation. It was a non-participant observational process, since the observer did not interact with the participants during it.

Participants

18 teams from the ACB league (2010-11) have been analyzed in 34 games of the regular season of the Unicaja Málaga team, against 17 different rivals. As it was an observational study in a natural environment (official competition) and public broadcasting (matches broadcast on television and with public capacity), the informed consent of the athletes (n=204) was not deemed necessary in accordance with the ethical requirements established by the American Psychological Association (Association, 2002).

Regarding indirect observation, an in-depth interview had been conducted with six high-level coaches (See Table 1), with the following profiles: two of them were the head coaches of the Unicaja Málaga team (Coaches Aíto and Chus); three were assistant coaches of that team (Coaches Quim, Paco and Ángel); and finally, the national men's basketball head coach of Spain (Coach Scariolo), who had been chosen for his neutral position with respect to the results obtained by the team in the period considered.

All those interviewed have been Unicaja coaches, have been part of the coaching staff of the Spanish team, have achieved a national or international title as coaches or players and were currently active.

Table 1.

Description of names of the experts and codes used in in-depth interviews

Coach full name	Sports name	Code
Alejandro García Reneses	Aíto	Coach 1
Joaquim Costa Puig	Quim	Coach 2
Jesús Alfonso Mateo Díez	Chus	Coach 3
Francisco Aurioles Moreno	Paco	Coach 4
Ángel Luis Sánchez-Cañete Calvo	Ángel	Coach 5
Sergio Scariolo	Scariolo	Coach 6

Instruments

As a direct observation instrument, an adaptation (See Table 2) of the VTP&R instrument (Pereira Nunes, 2020) was carried out for the defensive criteria of the *pick and roll*. It was recorded using the software Dartfish TeamPro v.4.5. and the data were treated with Microsoft® Excel® 2013

Indirect observation was carried out using in-depth interviews (Pereira Nunes, 2020) (Table 3).

The records were processed using Microsoft® Excel® 2013

and their subsequent analysis with PASW Statistics for Windows (v.18, SPSS Inc., Chicago, IL).

The analysis of polar coordinate was carried out using the free program HOISAN v.1.6.3.3.6. (Hernández Mendo, López López, Castellano Paulis, Morales Sánchez, & Pastrana Brincones, 2012), and the graphing of the vectors could be optimized using the R program (Rodríguez-Medina, Arias, Arias, Hernández-Mendo, & Anguera, 2019).

Table 3.

Summary of the description of the dimensions / criteria, subdimensions, categories, and codes used in the in-depth interviews

Dimension	Sub-dimension	Category	Code	Recoding
General Answer (D1)	**Significant content (D11)**	Positive or favorable	D111	General and favorable evaluation (R1)
		Positive or favorable evaluation reinforced	D112	
		Negative or unfavorable evaluation	D113	General and unfavorable evaluation (R2)
		Negative or unfavorable evaluation reinforced	D114	
		Neutral evaluation	D115	General and neutral evaluation (R3)
		Neutral evaluation reinforced	D116	
	Non-significant content (D12)	Non-significant evaluation	D121	
	Emotional content (DI3)	Emotional or expectation evaluation	D131	
		Emotional or expectation evaluation reinforced	D132	
	Limiting content (DI4)	Conditional or limiting valuation	D141	
		Conditional or limiting valuation reinforced	D142	
Answer Justification (D2)	**Team planning argument (D21)**	Roster	D211	
	Game time argument (D22)	Regular time	D221	
		Action time	D222	
	Game area argument (D23)	Regular area	D231	
		Action area	D232	
	Regulatory argument (D24)	Regulations	D241	
	Result-oriented argument (D25)	Scoreboard	D251	
	Technical Argumentation (D26)	Offensive technique	D261	
		Defensive technique	D262	
	Individual tactics argumentation (D27)	Individual offensive tactics	D271	
		Individual defensive tactics	D272	
	Team tactics (D28)	Collective offensive tactics	D281	
		Collective defensive tactics	D282	
	Reasons leading to decision making (D29)	Decision making	D291	
	Physical argumentation (D210)	Individual Physic	D2101	
		Collective Physic	D2102	
	Psychological argumentation (D211)	Psychological	D2111	
	Team argumentation (D212)	Main team observed (Unicaja)	D2121	
		The other team observed	D2122	
		The other team no observed	D2123	
	Player/coach argumentation (D213)	Player/coach of the main team observed (Unicaja)	D2131	
		Player/coach of the other team observed	D2132	
		Player/coach of the other team no observed	D2133	
	Comparisons (D214)	Inter-team	D2141	
		Inter-player	D2142	
		Inter-coach	D2143	
		Inter-competition	D2144	
		Inter-season	D2145	
	Different support (D215)	Visual support	D2151	
		Numerical or statistical support	D2152	

Table 4.

Coding of the dimensions / criteria and defensive categories, and codes of the observation instrument (adapted from (Pereira Nunes, 2020))

Dimension	Category		Code
Action (AA)	When any action is taken in the match		A
Team (E)	Team performing the action		UNI
			MAN
Player (J)	Defender of the ball handler		DB1
	Defender of the screener		DB2
	Ball handler		B1
	Screener		B2
Offense (AT)	When performed in a new offense		TR
	When performed in the same offense		MA
Action performed (ACR)	Ball screen performed		S
	Simulated screen by B1		SB1
	Simulated screen by B2		SB2
	ball screen not performed (offense fault)		BNR
	Other action		TRA
	Fault		F
	converted shot		TM
	missed shot		TNM
	End quarter		FC
	Time-out		TMU
Timing of the action (MRA)	1 to 24 seconds		From 1 to 24
	Free throw		TL
	End time		FT
Defense-offense transition time (TTDA)	16 to 24 seconds		From 16 to 24
	End of transition time		FTT
Score (P)	Unicaja is winning		GUNI
	Manresa is winning		GMAN
	Draw		E
	Scoreboard		XX-XX
Offense transition (TO)	Defense	Full court	TC
		3/4 court	TCC
		Middle court	MC
		1/4 court	UCC
		Recovering	REC
	Offense	Fast break	CA
		Fast offense	AR
		Positional offense	AP
Ball screen way (FB)	Forehead ball screen		BF
	Back ball screen		BE
Ball screen type (TB)	Vertical ball screen		BV
	Horizontal ball screen		BH
	Diagonal ball screen		BD
How many screeners performed the ball screen action (ABB2)	1		AB1
	2		AB2
	3		AB3
Ball screen of ball handler defender (BBDB1)	Ball handler defender does not escape		NE
	Ball handler defender escapes out of time		EFT
	Ball handler defender come out clean		SL
Quarter (C)	1		1C
	2		2C
	3		3C
	4		4C
	Extra time		TE
Ball handler defender (defensive help) (ADB1)	Chase		DB1P
	Over the top		DB1P2
	Behind the pick		DB1P3
	Under the screen		DB1P4
	Deny		DB1N
	Can't cross		DB1NP
	Other action		DB1TR
Screener defender (defensive help) (ADB2)	Hedge		DB2FV
	Show		DB2FH
	Push		DB2P
	Open		DB2PEN
	Deny		DB2N
	Other action		DB2TR
Type of defense performed (TDU)	Man to man		HH
	Zone 2:3		Z23
	Zone 3:2		Z32
	Zone 1:3:1		Z131
	Zone 2:1:2		Z212
	Zone 1:2:2		Z122
	Mixed		M
	Match-up		MU
	Other		DEFTR

Procedure

Direct observation provided a matrix with the records of the 34 matches analyzed. Each unit of observation corresponds to the possession of the ball by a team, or, in successive plays, within the same possession, if there are foul situations or game interruptions.

The study used the following criteria to record the effectiveness of the game (Pereira Nunes, 2020):

a) Efficiency of the *pick and roll* (EB): confirms the incidence of success of the screen on the defender of the ball handler (DB1).

b) Defensive efficiency (ED): when the defending team avoids the opponent's offensive efficiency by preventing the shot and without committing a foul (M.-Á. Gómez et al., 2015; M.-A. Gómez, Lorenzo, Ibañez, & Sampaio, 2013).

Indirect observation was analyzed by coding the verbal responses of the trainers. The interview consisted of 16 questions divided into eight general questions about the pick and roll and eight about the Unicaja team. In Table 4, the 3 issues with their analyzed defensive arguments were exposed.

Table 4.

In-depth interview questions with basketball experts about the pick and roll defense in the analysis (Pereira Nunes, 2020) the Club Baloncesto Málaga (Unicaja Málaga) of the ACB League

8. If we analyze the defensive phase of the pick and roll, we see how the defender of the ball handler escapes the screen on 28% of the occasions. What do you think of this percentage? What can defenders do to improve their response to this technical-tactical action?
15. In Unicaja (10/11), the main defensive responses of the ball handler's defender have been to *chase* (38%; n=439), *over the top* (23%; n=261), and *behind the pick* (18%; n=205). For you, are these the best options to defend the pick and roll? Why?
16. In Unicaja (10/11), the main defensive responses of the screener' defender have been *open* (41%; n=466), *show* (36%; n=411), and *hedge* (15%; n=176). For you, are these the best options to defend the direct pick and roll? Why?

Data Analysis

The records of direct observation were analyzed in order to contrast the defensive effectiveness and the effectiveness of the ball screen with different factors that affect the team's play such as the defensive transition zone, the type of defense, the actions of the defender of the ball handler and the screener, the situation of the scoreboard and the defensive aids. For this, the existence of a significant association between these factors and defensive efficacy is analyzed using Chi-square. These records were also analyzed using the polar coordinate technique proposed by Sackett (1980).

The results of this direct observation analysis were presented to the 6 study coaches (Table 4) through an interview (16 questions). The narrative of his speech in the responses reflected his positioning and his emotions about study (Campo, Mackie, & Sanchez, 2019). In this case, they highlighted the reasons for their decision-making on ball screens based on the different factors that influence the game. The responses were coded, and a polar coordinate analysis (Sackett, 1980) was applied, in order to determine the significance of the relationships of the coded responses and represent them graphically using vectors. This analysis required the prior performance of a lag sequential analysis (Bakeman, 1978), from a sequential record of code occurrences/co-occurrences (Anguera, Portell, Hernández-Mendo, Sánchez-Algarra, & Jonsson, 2021). From the values obtained in the adjusted residuals in the lag sequential analysis, the parameter Z_{sum} (Cochran, 1954) was calculated, as suggested by Sackett (1980), to obtain representative values of the positive lags (prospective Z_{sum}) and negative lags (retrospective Z_{sum}), and from which the angle of each of the vectors was calculated and, consequently, the quadrant in which they were located, which indicated the nature of the interrelation between the focal behavior and each conditioned behavior, and its length, which indicated the presence or absence of statistical significance (Sackett, 1980).

Data Quality Control

For direct observation, the quality of the data (Blanco-Villaseñor & Anguera, 2000) was determined through the validity and reliability processes. Using a panel of experts (n=20) in high-level basketball, the validity of the observational instrument had been confirmed by calculating the percentage of positive coincidences using the free statistical *software* "R" 3.5.3 (© 2019 The R Foundation for Statistical Computing).

Intraobserver reliability was analyzed using the Kappa coefficient (Cohen, 1960), with values of 0.93 to 1. The interobserver reliability was analyzed with 4 experts and obtained a canonical agreement of 0.98 (Krippendorff, 2018).

For indirect observation, an expert observer recorded 15% of the total material. The intraobserver agreement had been calculated using GSEQ5 (Bakeman & Quera, 2011)

resulting in a Kappa coefficient of 0.97 (Cohen, 1960).

Results

In the set of 34 games analyzed, the study takes a total of 419696 records in 8267 game actions, of which 26.9% correspond to pick and roll (n=2224).

Regarding the degree of effectiveness of the screen (EB) on the defender of the ball handler (DB1), it is observed that in 27.6% (n=614) the defender escapes from the screen without apparent problems, in 38.9% (n=866) the defender tries to escape the screen but with difficulties, and in 33.5% (n=744) the screen is effective (p<.001). Of the 744 effective screens, in 236 (31.7%) the defender is unable to continue his defensive work, being unable to pass the screen and becoming trapped.

In Table 5 the defensive efficiency (ED) is appreciated, when the team that defends the ball screen manages to avoid the opponent's offensive efficiency. The study shows that the most effective point range of the 34 analyzed matches is between 21 and 25 points with a favorable score for the Unicaja team (54.1%; n=33) (n.s.).

Analyzing the most adjusted results in the scoreboard (between 1 and 10 points of difference), the researcher finds that the best percentage has been achieved while Unicaja had a punctual superiority between 6 to 10 points reaching a value of 45.7% of defensive success, finding significant (p<.001) differences between its rivals and Unicaja.

Figure 1 expresses the defensive response in the defensive aids of the defender of the ball handler (ADB1). In relation to defensive effectiveness, the most used actions are chasing (39.9%; n=888), over the top (22%; n=489) and behind the pick (15.5%; n=345) (p<.001).

Table 5.

General defensive effectiveness of the pick and roll according to the difference in points on the scoreboard

	Defensive effectiveness		
	No %	Yes %	Total n
Draw			
0 points	55.6	44.4	117
Unicaja winning			
1 a 5 points	57.3	42.7	466
6 a 10 points	54.3	45.7	348
11 a 15 points	61.9	38.1	194
16 a 20 points	54.3	45.7	81
21 a 25 points	45.9	54.1	61
26 or more points	55.6	44.4	18
Total	56.3	43.7	1168
Unicaja losing			
1 a 5 points	60.9	39.1	491
6 a 10 points	57.1	42.9	233
11 a 15 points	49.5	50.5	91
16 a 20 points	54.7	45.3	86
21 a 25 points	57.9	42.1	38
26 or more points	0	0	0
Total	58.1	41.9	939
General total	57.1	42.9	2224

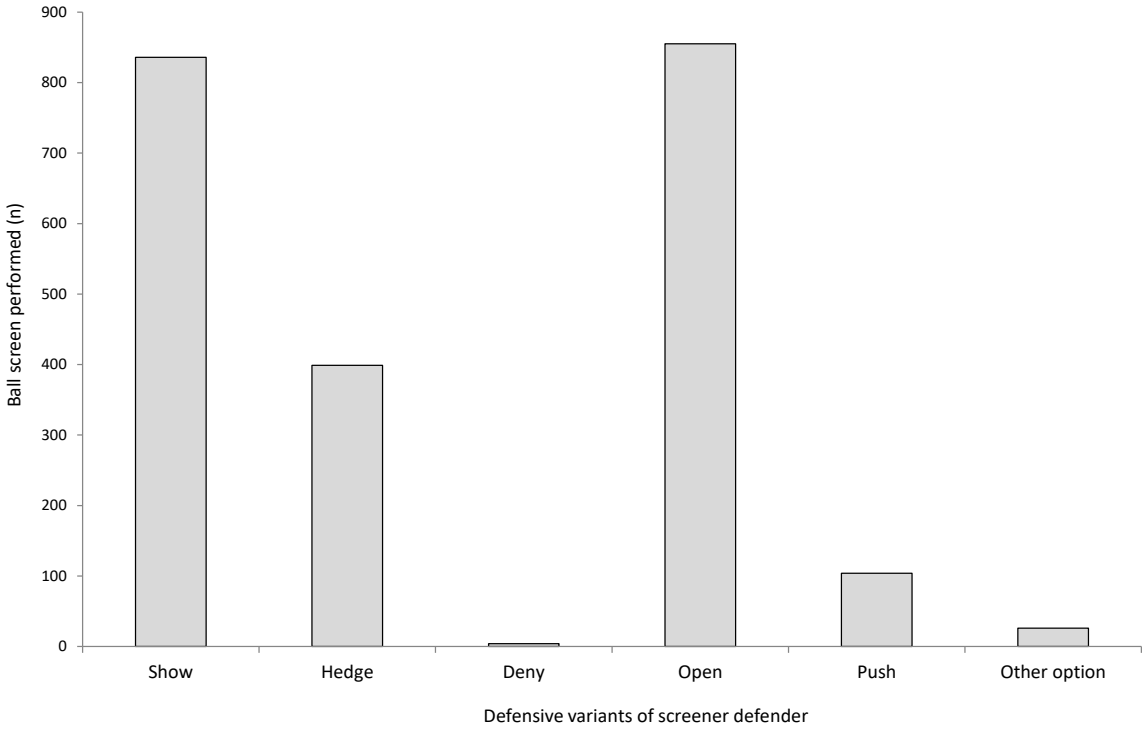

Figure 1. Defensive response of the defender of the ball handler (ADB1)

Responses in the defensive aids of the screener player's defender (ADB2) present a differential distribution based on defensive efficiency, the most used actions being *open* (38.4%; n=855), *show* (37.6%; n=836) and *hedge* (17.9%; n=399) (Figure 2) (p <.001).

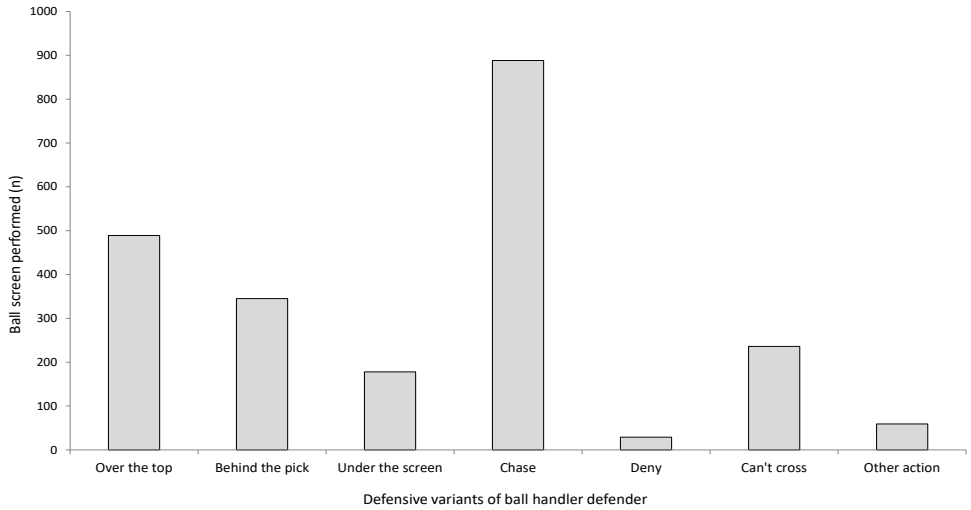

Figure 2. Defensive response of the defender of the screener (ADB2)

When we relate the data of the defensive aid of the defender of the ball handler (ADB1) and of the defensive aid of the defender of the screener (ADB2), we observe the most used collective defensive decision between these two participants (See Figure 3). The most popular option in the ACB League has been the *chase* and the *show* (17.8%; n=396).

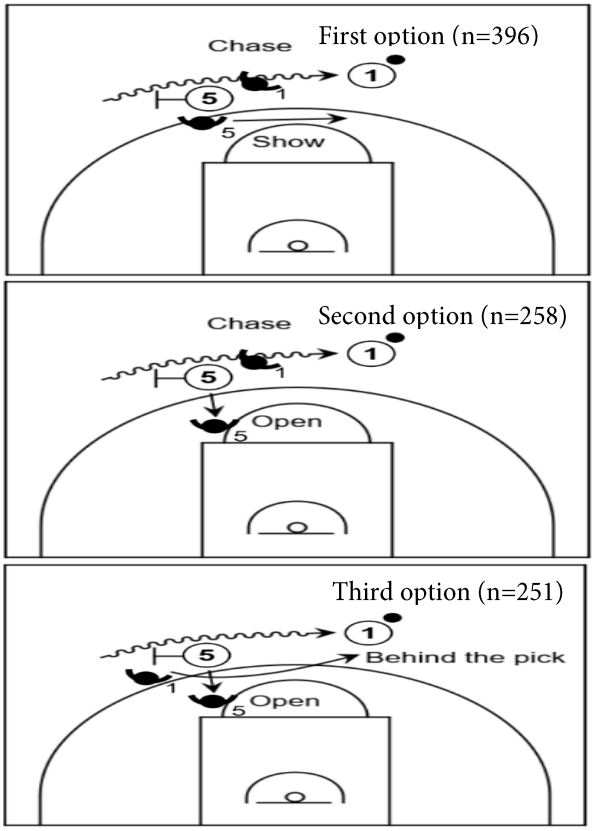

Figure 3. Spatial arrangement of the defensive aid by the two defending players of the ball screen

Polar Coordinate Analysis

To investigate the relationship between the positive / negative perception of the six coaches and the defensive tactical aspects of the pick and roll we have carried out a recording process recoding some basic categories into macrocategories with more global characteristics, according to the level of observation defined by Schegloff (2000). Based on an evaluation criterion, the present study structures three new macro categories: R1, R2, R3. R1 expresses the general favorable evaluation of the coach on the aspects of *pick and roll* presented on the question (aggregation of the categories D111 (positive or favorable evaluation) and D112 (reinforced positive or favorable evaluation)). R2 corresponds to a general unfavorable evaluation of the data presented through the question, based on the aggregation of categories D113 (negative or unfavorable evaluation) and D114 (reinforced negative or unfavorable evaluation). Finally, R3 expresses a neutral overall evaluation of the coaches. It is the result of the aggregation of categories D115 (neutral evaluation) and D116 (reinforced neutral evaluation). Given the neutral nature of this data, the study has decided to focus only on R1 and R2 as focal behaviors.

The results obtained are presented in Table 6 to 9, where the value of the parameters is shown (quadrant, prospective and retrospective Zsum, length and angle of each vector), and the Figures 4 to 7 where the corresponding vectors that are significantly related to the evaluation criteria in the interviews are graphically represented. Related encodings can be identified in Table 3.

Table 6.
Values resulting from the analysis of polar coordinate of the data matrix of question 8 of the in-depth interviews, taking the category "unfavorable assessment" as focal behavior

Category	Quadrant	Prospective Z_{sum}	Retrospective Z_{sum}	Radius	Angle
D2111	I	1.49	1.47	2,09 (*)	44.51
D2145	I	2.15	1.85	2,83 (**)	40.74
D232	I	2.24	0.1	2,24 (*)	2.44
D281	I	2.15	1.56	2,65 (**)	36.02
D282	I	0.26	3.53	3,54 (**)	85.78
D291	I	2.57	0.97	2,74 (**)	20.68
D272	II	-0.54	2.92	2,97 (**)	100.5
D2102	III	-2.4	-2.52	3,48 (**)	226.3
D2151	III	-2.5	-2.52	3,55 (**)	225.29
D262	III	-2.23	-2.13	3,08 (**)	223.75
D271	III	-2.15	-2.93	3,64 (**)	233.73
D2142	IV	0.87	-3.53	3,64 (**)	283.89

(*) Means that vector is significative (>1.96)
(**) Means that vector is very significative (>2.58)
Table 6 and Figure 4 depict the relationship of conditioned behaviors that present a significant relationship with the focal behavior "unfavorable evaluation" analyzing question 8 of the in-depth interviews.

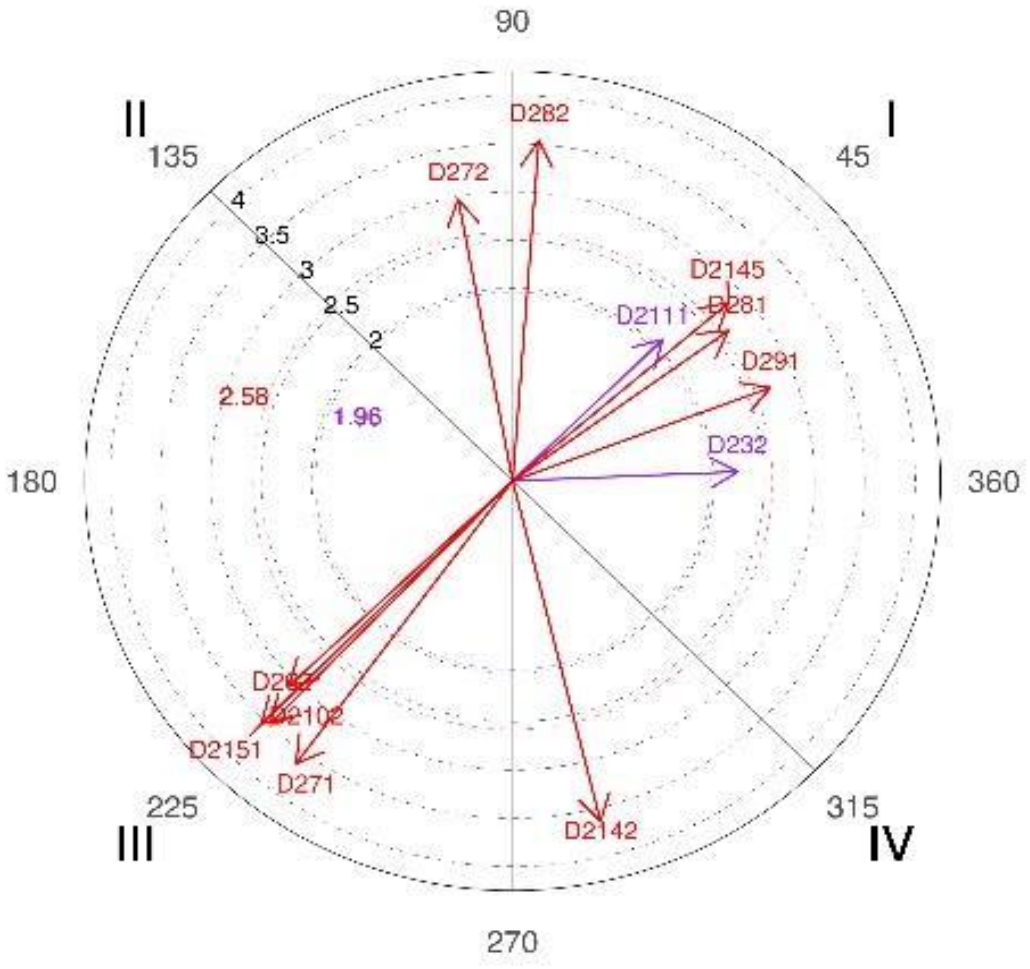

Figure 4. Polar coordinate corresponding to the analysis of question 8 of the in-depth interviews, taking the "unfavorable evaluation" as focal behavior

Table 7 and Figure 5 illustrate the relationship of conditioned behaviors that present a significant relationship with the focal behavior "favorable evaluation", analyzing question 15 of the in-depth interviews.

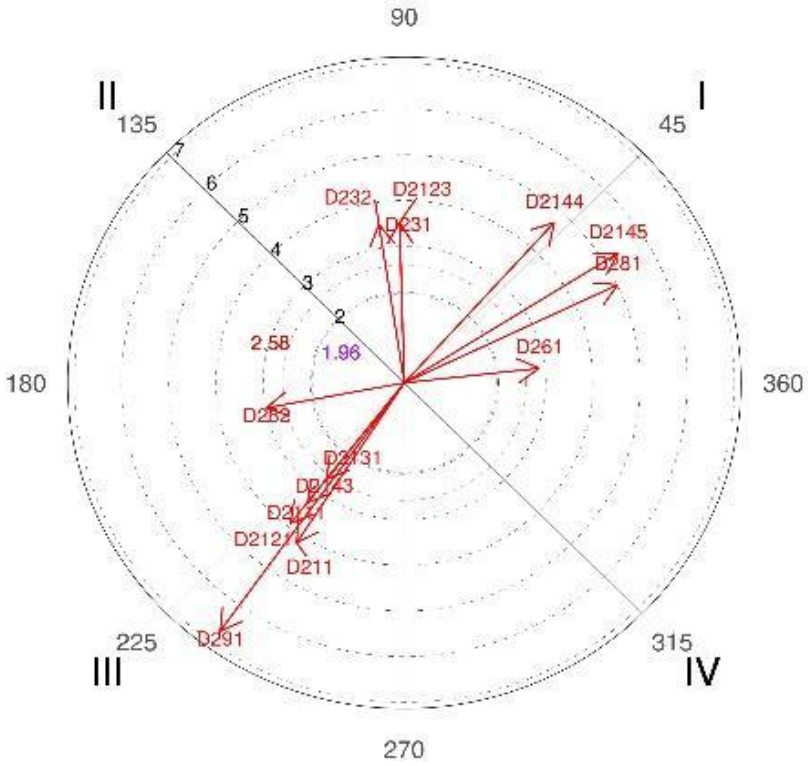

Figure 5. Polar coordinate corresponding to the analysis of question 15 of the in-depth interviews, taking the "favorable evaluation" as focal behavior

Table 8 and Figure 6 show the relationship of conditioned behaviors that present a significant relationship with the focal behavior "favorable evaluation" analyzing question 16 of the in-depth interviews.

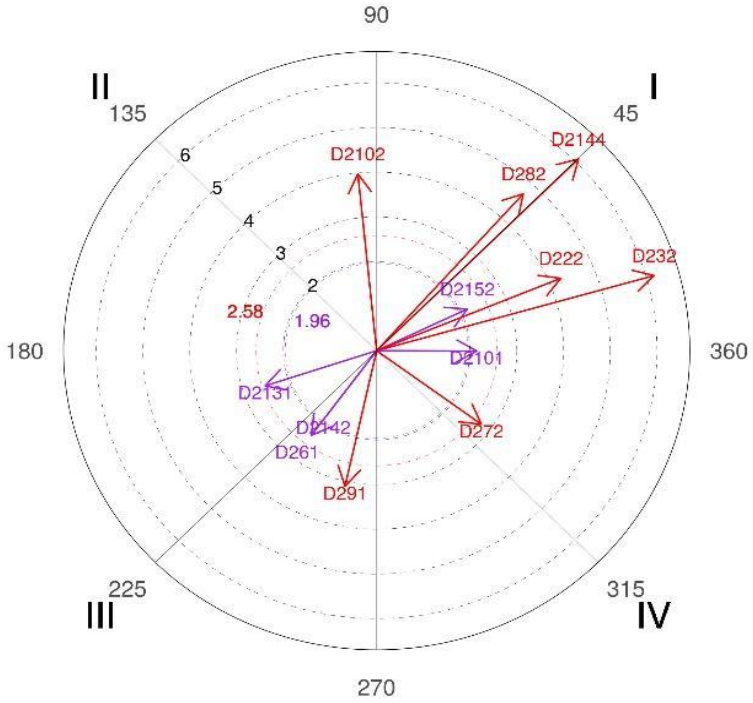

Figure 6. Polar coordinate corresponding to the analysis of question 16 of the in-depth interviews, taking the "favorable evaluation" as focal behavior

Table 8.

Values resulting from the analysis of polar coordinate of the data matrix of question 16 of the in-depth interviews, taking the category "favorable assessment" as focal behavior

Category	Quadrant	Prospective Z_{sum}	Retrospective Z_{sum}	Radius	Angle
D2144	I	4.32	4.29	6,09 (**)	44.81
D2152	I	1.93	0.93	2,15 (*)	25.71
D222	I	3.94	1.62	4,26 (**)	22.37
D232	I	5.93	1.68	6,17 (**)	15.82
D282	I	3.14	3.51	4,71 (**)	48.23
D2102	II	-0.4	3.96	3,98 (**)	95.79
D2131	III	-2.38	-0.78	2,51 (*)	198.26
D2142	III	-1.39	-1.89	2,35 (*)	233.62
D261	III	-1.39	-1.89	2,35 (*)	233.62
D291	III	-0.68	-3.03	3,11 (**)	257.44
D2101	IV	2.14	-0.01	2,14 (*)	359.84
D272	IV	2.24	-1.65	2,78 (**)	323.68

(*) Means that vector is significative (>1.96)

(**) Means that vector is very significative (>2.58)

Table 9 and Figure 7 highlight the relationship of conditioned behaviors that present a significant relationship with the focal behavior "unfavorable evaluation" analyzing question 16 of the in-depth interviews.

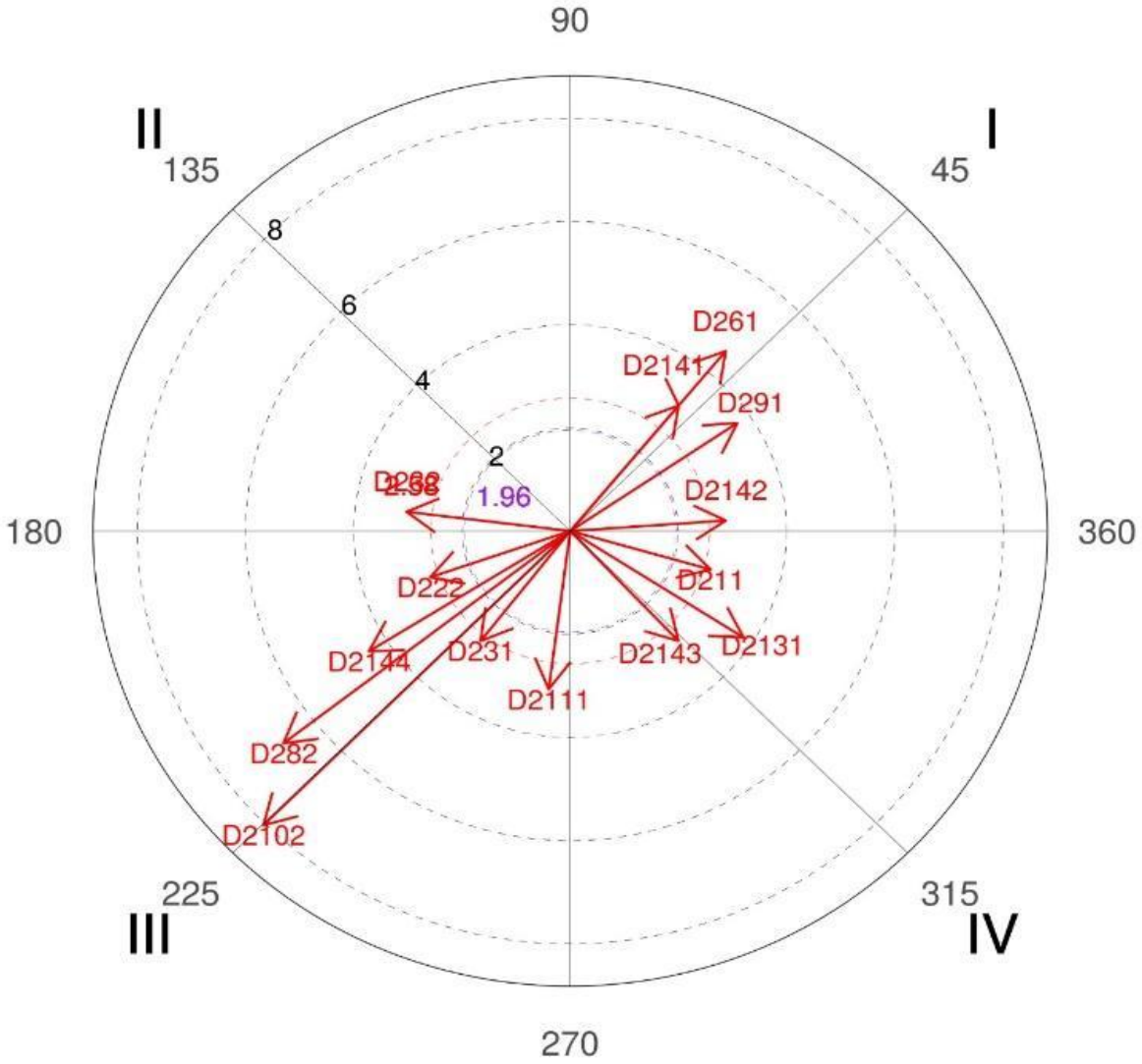

Figure 7. Polar coordinate corresponding to the analysis of question 16 of the in-depth interviews, taking the "unfavorable evaluation" as focal behavior

Table 9.

Values resulting from the analysis of polar coordinate of the data matrix of question 16 of the in-depth interviews, taking the category "unfavorable assessment" as focal behavior

Category	Quadrant	Prospective Z_{sum}	Retrospective Z_{sum}	Radius	Angle
D2141	I	2	2.43	3,15 (**)	50.5
D2142	I	2.88	0.2	2,88 (**)	4.05
D261	I	2.88	3.49	4,52 (**)	50.5
D291	I	3.09	2.09	3,73 (**)	34.13
D232	II	-3.03	0.37	3,05 (**)	172.97
D2102	III	-5.67	-5.7	8,04 (**)	225.14
D2111	III	-0.4	-3.06	3,09 (**)	262.6
D2144	III	-3.72	-2.33	4,39 (**)	212.06
D222	III	-2.59	-0.89	2,74 (**)	199.08
D231	III	-1.66	-2.13	2,7 (**)	232.12
D282	III	-5.3	-4.11	6,71 (**)	217.81
D211	IV	2.6	-0.75	2,7 (**)	343.96
D2131	IV	3.2	-2.06	3,81 (**)	327.21
D2143	IV	2	-2.13	2,92 (**)	313.2

(*) Means that vector is significative (>1.96),

(**) Means that vector is very significative (>2.58)

Table 7.

Values resulting from the analysis of polar coordinate of the data matrix of question 15 of the in-depth interviews, taking the category "favorable assessment" as focal behavior

Category	Quadrant	Prospective Z_{sum}	Retrospective Z_{sum}	Radius	Angle
D2144	I	3.18	3.51	4,74 (**)	47.86
D2145	I	4.53	2.84	5,35 (**)	32.09
D261	I	2.86	0.32	2,88 (**)	6.39
D281	I	4.53	2.15	5,01 (**)	25.41
D2123	II	-0.1	3.51	3,52 (**)	91.66
D231	II	-0.1	3.51	3,52 (**)	91.66
D232	II	-0.54	3.47	3,51 (**)	98.82
D211	III	-2.28	-3.5	4,18 (**)	236.89
D2111	III	-2.05	-2.62	3,33 (**)	231.93
D2121	III	-2.41	-3.08	3,91 (**)	231.92
D2131	III	-1.65	-2.11	2,68 (**)	231.91
D2143	III	-1.65	-2.11	2,68 (**)	231.91
D282	III	-2.93	-0.55	2,98 (**)	190.63
D291	III	-3.91	-5.44	6,7 (**)	234.31

(*) Means that vector is significative (>1.96)

(**) Means that vector is very significative (>2.58)

Discussion

In the context of basketball, there is specific literature where the observational methodology has been used (Bardavío, Arroyave, González, Leri, & de Ocáriz Granja, 2017; Echevarría, Ajamil, Argilaga, & Idiakez, 2011; Ibáñez, Sampaio, Sáenz-López, Giménez, & Janeira, 2003; Palomo & Martın–Mateos; Ruano, Calvo, Toro, Sampaio, & Godoy, 2007; Sampaio, Godoy, & Feu, 2004; Sautu, Garay, & Hernández, 2009), or studies on decision-making with authors such as Araujo, Davids, and Hristovski (2006), on efficacy (Arroyave, Bardavio, Sobrino, & González, 2015; Ionescu, 2015; Koutsouridis, Karamousalidis, & Galazoulas, 2018; Marmarinos, Apostolidis, Kostopoulos, & Apostolidis, 2016; Vaquera, García-Tormo, Gómez Ruano, & Morante, 2016), or even research using in-depth interviews (Domínguez Romero & Refoyo Román, 2008; Sánchez, Calvo, Buñuel, & Godoy, 2009).

These observational studies express the multitude of dimensions that allow to deepen the interpretation and understanding of the reality of the game. Therefore, the use of this methodology is appropriate, in addition to being verified by different experts for use in our research.

We did not find a study where a team is observed throughout a sports season of the ACB League and the data obtained is contrasted with in-depth interviews with coaches. Most studies on *pick and roll* focus on the offensive phase of the action and there are few that affect the defensive response (Battaglia, Sanchez, Borrás, & Jiménez, 2009; Pachecho, Polo, & Calvo, 2005).

In this way we will discuss the defensive data obtained by contrasting with other investigations and consolidating with the results of the polar coordinate.

Defensive Effectiveness on Ball Screens

When determining the defensive efficiency (ED), a tendency of the ACB League teams to not be effective in their actions to defend the pick and roll (57.1%) can be appreciated.

These data are difficult to compare with other studies because the vast majority focus on offensive aspects. However, we even thought that, of the values registered in the 2224 screens, the defensive efficiency would be lower, considering the great use of this offensive strategy in today's basketball.

When delving into the defensive effectiveness of the pick and roll, the study observes that of the 744 maximum effectiveness screens, in 236 (31.7%) the defender is unable to continue with his defensive work, being unable to pass the screen and becoming trapped.

Most of the elite coaches interviewed think that it is a bad

defensive result, and this data clearly explains "why pick and roll is still such a used and effective action" (Scariolo). This result has had several readings since offensively Chus affirms that "if the man with the ball does not lead his defender to the screen, there is no effective screen, or if the big one does not place the right screening angle and at the right height, then even the defender will be able to escape the screen". On the other hand, there is also the merit of the defender since "when a ball screen occurs seven meters from the basket, a player normally defends a little far away, but to pass the screen and to escape, you have to stick to the ball handler, and it is a cause-effect reaction" (Scariolo). This data is confirmed by the polar coordinate (Figure 4: question 8, quadrant I, category D281; D282; D232).

Ociepka (2004) reinforces the idea that this defensive style largely depends on communication between defenders (warning that the attack is making the decision to pick and roll). Coach Paco confirms the same, that is, to optimize this percentage "the first thing is to improve the communication signals with teammates to be on notice because if they are on notice it is easier".

The important thing is the will that is put into carrying out a defensive action and the study by Christmann, Akamphuber, Müllenbach, and Güllich (2018) supports the idea that in 65.7% of the screens analyzed, it is verified that the defensive interveners of the screen have expressed a type of moderate or no defensive pressure in said situation.

Also, the polar coordinate of the interviews expresses the idea that, if the defenders bet on an intense defensive attitude, aggressive in their gestures and with the psychological harshness of wanting to defend, then these are very valid and simple arguments to make the action of screening more difficult (Figure 4: question 8, quadrant I, category D2111).

Defensive Aid of The Defender of The Ball Handler

Ratgeber affirms that over the top is the best way to pass the pick and roll. When defended in this way, it becomes ineffective, and the attack must seek another possibility.

For Harris (2007) in any type of pick and roll defense, the defender of the ball handler must go behind the pick, and this decision is made while taking into account two aspects: the distance at which the screen is being made and the ball handler's ability to shoot compared to his ability to penetrate. It is preferable to go behind the pick on screens away from the basket and with ineffective pitchers; and over the top, when these happen close to the basket and with good pitchers.

M.-Á. Gómez et al. (2015) highlight that the action influence of the ball handler's defender has increased defensive effectiveness when he has denied the screen and has decreased when it goes behind the pick or under the screen. Battaglia et al. (2009) state that in most of the screens, the defender pursues his attacker, however, it is more efficient to pass under the screen. These authors confirm that, when observing the significance of the results, the action of going over the top is hardly significant.

In the interview with Quim, he points out that the choice to chase "is normal because it is a more aggressive action". In his teams, Aíto recalls that decision-making "depended on the distance at which the ball screen is being played. If it is at a very far distance, it would be possible to go under it more times. If it is closer to the basket and where the shot is more dangerous, then it is better to have an aid, or a 2x1, or to chase".

Paco points out that the type of defense made to the attacker with the ball in the screen depends on the player he is facing. "To a player who is a very good penetrator it is absurd to pass over the screen and more if he does not shoot even once. It is much better to go behind the pick and avoid that risk".

For Chus, the basis for making a good decision is found in the "scouting and during the match". In the "pick and roll in transition we passed behind, that is, behind the pick or under the screen and in the latter case the screener's defender made a push. And in the final moments of the game, we never let go behind, preferring to *chase* or the defensive change".

Scariolo defends that "going under the pick frankly is not seen very much, I see it more as an exception". The national coach prefers to make the option of going over the top "when the screening is very early, even in the double high". However, this choice does not inhibit all the offensive options of the pick and roll since "going over the top obviously removes the shot option but favors the penetration option".

The Italian coach exposes in his interview the defensive decisions that are currently made, both, in the senior team of Spain and in the NBA. The coach argues that "I am seeing here in the NBA that everyone almost by magic does the same thing that we have done with the (Spanish) national team for a long time precisely because we have big centers, I like to send the ball towards the band denying a little when the ball is outside the projection of the rectangle of the zone and, if a scouting rule does not exist, send to the weak hand if it is in the center and then passing over the top". A defensive strategy that helps to understand that for the interviewed coaches, the time and space of the action, in which the polar coordinate corroborate, can

condition certain ways of defending the ball handler (Figure 5: question 15, quadrant II, category D232).

Defensive Aid of The Defender of The Screener

Observing the action of the screener's defenders, Battaglia et al. (2009) verify that in most situations, the hedge is used to defend the screen, followed by the show and open, coinciding with the studies presented by Remmert (2003) and Kelly (1996). Already in the study of Mattheos, Evangelos, Georgios, and Georgios (2010) it is highlighted that the show (16.9%), the hedge (14.8%) and the open (10.5%) are also the most common decision making. In the research on the ACB League carried out by Refoyo, Domínguez, Sampedro, and Del Campo (2009) argue that the show has been the most common and effective defensive option.

Aíto assumes in his interview that the option of hedge is the one that gives him the most confidence, "it is a much more aggressive action and the three players who do not intervene in the ball screen will put themselves in a helping position".

Moreover, Quim expresses his feeling that "the best option is the hedge and then the show, because our tendency was to try to provoke the error on the attack and take the initiative in defense, meaning that the hedge is the most aggressive option".

The technician Paco sums up Unicaja's defensive tactic, arguing that "the power forward players did hedge more and the center players did show more and the open we did it on the bands (Figure 8) and we called it green".

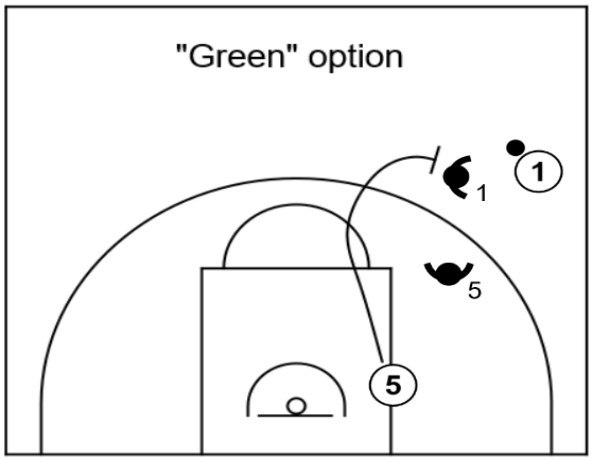

Figure 8. Figure presents the answers of the basketball experts (question 16 of the in-depth interview)

Chus indicates that the hedge is the best option for the screener's defender (DB2) to help slow down pick and roll actions and the open makes it easier to float, accompany and recover but it does not help as much in the defensive tasks of the defender of the ball handler. He even claims that now he doesn't like the show option so much because "I think it's a defense where you go too far to almost make a triangle at the time of recovery. I prefer to hedge, stop the ball and recover in the same line".

It is interesting to observe how elite coaches look for the best options for their teams, adapting to the characteristics of their roster, the style of play of the league, their rivals, but mainly to the trends of the moment (Figure 7: question 16, quadrant I, category D2141; D2142).

For the Spanish national coach, the defensive decision-making of the screener "is closely linked to the characteristics of the defensive center. If you have very agile and very athletic people, you can go out. Right now, even an athletic center tends to make a more or less high containment with an almost horizontal exit but lately the tendency is more to make the center protect the basket and for the small player to pass aggressively to get back in front".

Ángel defends that "the defending player of the screener has to be as close as possible to the screener at the moment the screen occurs". That is why he advocates for the defense with show or hedge. For the assistant coach of the Spanish team, the open option would be used in exceptional cases in which the defender cannot reach the ball screen action adequately and in time, or for purely tactical reasons designed for a certain situation.

Conclusions

Significant differences are detected in the distribution of the different types of defensive aid from the defender of the ball handler and the defender of the screener in relation to defensive effectiveness, with the option most used by both being chasing and show (n=396).

Significant differences are found between the defensive efficiency of the ACB League teams ($p<.001$).

33% (n=744) of the screens performed are found to be totally effective and of these, in 31.7% the defender is unable to continue with his defensive work. For the coaches it is a bad defensive result, but precisely for that reason the coaches reaffirm that they trust this offensive technical-tactical action.

The coaches conclude that the defensive response of the defender of the ball handler depends on the characteristics of the attacker, the moment of the game, the distance to the basket and the previous scouting. They corroborate their preference for the option to pursue because it is the most aggressive action.

For the defensive response of the screener player's defender, coaches prefer the flash, mainly the hedge, to provoke an error and take the initiative in defense. This decision will be defined by the agility and aggressiveness characteristics of the defender in question.

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