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Ability to create goal opportunities: influence of playing either at home or away, dimensions of the field and number of passes per attack cycle in an under-19 elite football team ability

Capacidad de creación de ocasiones de gol: influencia de jugar en casa o fuera, dimensiones del campo y número de pases por ciclo de ataque en un equipo de fútbol de élite sub-19

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Abstract. The aim of this study was to analyse how, when playing either at home or away, the dimensions of the field (length and width), and number of passes per attack cycle influenced the ability to create goal opportunities for an under-19 football team. The total number of cycles in which a goal-scoring opportunity occurred, differentiated by the starting zone of the cycle, the number of contacts necessary to develop the attack cycle, and the effective match time, were analyzed in each different contexts. In games played at home, records of variables analyzed are greater than in games played away. The use of a smaller number of contacts in attacks initiated in the opposite field, and a greater number of contacts in attacks initiated in one's own field, favors the creation of goal opportunities. Playing fields with dimensions similar to the most familiar one favor a greater number of contacts with the ball and increased effective time of play. The efficiency of a team's style of play in creating goal opportunities changes depending on whether they play at home or away, the size of the field, and the number of passes per attack cycle.
Keywords: Match analysis, Soccer, Success, Performance, Indicator.

Resumen. El objetivo de este estudio fue analizar cómo, jugando en casa o fuera, las dimensiones del campo (largo y ancho) y el número de pases por ciclo de ataque influían en la capacidad de crear ocasiones de gol de un equipo de fútbol sub-19. . Se analizó en cada contexto el número total de ciclos en los que se produjo una oportunidad de gol, diferenciados por la zona de inicio del ciclo, el número de contactos necesarios para desarrollar el ciclo de ataque y el tiempo efectivo de partido. En los partidos jugados en casa los registros de las variables analizadas son mayores que en los partidos jugados fuera. La utilización de un menor número de contactos en los ataques iniciados en campo contrario, y de un mayor número de contactos en los ataques iniciados en campo propio, favorece la creación de ocasiones de gol. Los campos de juego de dimensiones similares al más familiar favorecen un mayor número de contactos con el balón y un mayor tiempo efectivo de juego. La eficiencia del estilo de juego de un equipo para crear oportunidades de gol cambia dependiendo de si juega en casa o fuera, el tamaño del campo y la cantidad de pases por ciclo de ataque.
Palabras clave: análisis de partidos, fútbol, éxito, rendimiento, indicador.

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Introduction

Football is the most popular sport in the world, with more than 265 million participants (Lazarus, 2013), and is possibly the most studied sports modality (Filetti et al., 2017). Despite its popularity and the number of scientific studies, analyzing football's success factors remains a challenge. To identify the factors that lead to success in football it is necessary to find performance indicators that significantly discriminate between winners and losers (Lepschy et al., 2018). Performance indicators are defined as a selection and combination of variables that explain some aspect of performance and help to achieve success (Hughes & Bartlett, 2002). These indicators provide an ideal profile that must be present in sports activity to achieve success, and can be used to predict future behaviors (O'Donoghue, 2006).

The existence of the previosy mentioned indicators, does not mean than football does not have elements of chance. This appreciation does not indicate that successful teams are luckier than others (Reilly & Mark Williams, 2003). Success or failure depends, to a large extent, on the number of victories achieved, so the final result is a determining factor of the game (Amatria et al., 2019). This means that goal-scoring is one of the most decisive performance indicators in establishing the success of a team (Amatria et al., 2019). However, the continuously interactive nature of football, coupled with the relatively low number of played cycles and goals, does not facilitate the brakdown, recording and measurement of this indicator (Lago-Peñas et al., 2011). Silva et al., (2023) based his study on the team "Brasileirão" whose average of goals in the competition was 2.18 – 2.68 goals per match during the period covered in this work (2011-2021) considered as a qualified and representative soccer champpionship for the accomplishment of his study. However, these data differ from other team sports such as futsal, where the number of goals per game is normally between 4.5 and 8 (Álvarez-Medina, Ramírez-SanJose & Murillo, 2019). For this reason, the final score of the match does not provide a clear picture of the technical and physical performance of a team; nor would it be feasible to use goals scored as an outcome variable due to the low probability of scoring in football (goals are achieved in approximately 1% of a team's possessions of the ball) (Tenga, Holme, et al., 2010a).

To understand success factors in football, performance indicators other than goals should be considered (Lepschy et al., 2018). Lepschy et al. (2018) presented that most of the studies did not consider the influence of contextual (e.g., home advantage, quality of opponent) and interactional variables (e.g., first goal scored by time of goal scoring). This support the idea that although goals scored is the main indicator of offensive success in football, it may not really represent the underlying tactical strategies of a team; that is, those related to the development of goal

opportunities (Jones et al., 2004). We can therefore deduce that goal-based approaches do not result in a better performance or game model for the analyzed teams (Goddard, 2005). On this basis, Mitrotasios et al. (2019) showed clear tactical differences in the four main European leagues in terms of goal opportunities as a performance parameter. Spain La Liga was more combinative, English Premier League showed a high degree of verticality, German Bundesliga had a greater number of counter-attacks, and Italian Serie A reported very short offensive sequences. According to Hughes & Bartlett, (2002). Goal opportunities as a parameter of football performance, presented in isolation, can generate a distorted analysis of the performance of an individual player or a team, by ignoring other equally important variables (Hughes & Bartlett, 2002). Home advantage in team sports plays an important role in determining the outcome of a game (Lago-Peñas & Lago-Ballesteros, 2011; Pollard & Gomez, 2014; Anon et al., 2019; Marek & Vávra, 2020; Peeters & van Ours, 2020). Cortés et al., (2022) indicate that teams that played at home managed to score first goal won 76.6%, drew 16.3% and lost 7.1% of the matches. In constrast, teams that played away managed to score the first goal won 62.7%, drew 20% and lost 17.2% of matches. The dimensions of the field (Armatas & Pollard, 2014) can influence tactics and strategies (Pollard, 2006); and numerous studies confirm that the number of passes made in each attack cycle is a determining factor for levels of success such as goals or goal opportunities (Jones et al., 2004; Hughes & Franks, 2005; Amatria et al., 2019; Casal et al., 2019). Vasilis Armatas & Pollard, (2014) compare the performance of forty different teams. They found that game outcome was most influenced by the difference between the home and away team in kicked shots from inside the penalty area, while other types of shots were not important, supporting a previous finding that suggested that the value of long-range shooting may be over-estimated. In summary, it has been shown that there are many variables that can influence performance of teams.

The main objective of this study was therefore to analyze how, when playing at home or away, the size of the field (length and width), and the number of passes per attack cycle influenced the creation of goal opportunities for an under-19 football team. We hypothesized that there are different efficient ways to create goal opportunities depending on whether the games are played at home or away, the dimensions of the pitch, and the areas of the pitch in which the different attack cycles begin.

Methods

Sample

A total of 30 matches (n=30; 15 at home and 15 away) and completed cycles for goal opportunities (n=522) were analyzed. One match was removed from the analysis due to technical incidents during recording (so the final number of matches analyzed was n=29). In these matches, 2646 attack cycles and 522 completed cycles for goal opportunities were recorded. The registered matches and attack cycles correspond to a complete season for an under-19 team belonging to a professional football club in the Spanish professional league, which competes in the highest national category for its age group.

Study Design

This study was conducted with MO through the organized recording of events with an ad hoc instrument specifically developed (Anguera & Mendo, 2013b). The specific design selected for the study is located in quadrant II (Anguera & Hernández Mendo, 2013) as it is ideographic (because it is only one unit -team- analyzed), punctual (the recording is carried out during a single season) and multidimensional (because there are different levels of response due to the interde pendence between the performance variables in soccer) (Aguado-Méndez et al., 2020).

Procedure

Matches were recorded with a Canon Legria Hf R806 video recording camera, with full HD 1080p recording (25 frames per second) and a Velbon Videomate 538 tripod, from the highest point available in the football pitch stands, guaranteeing the visualization of the whole field at all times. The events were then recorded and coded with Nacsport software applying the instrument observational. For registration and subsequent statistical analysis of the observed data, the statistical package was used SPSS 19.0 statistical package (SPSS Inc., Illinois USA) for Windows. Therefore, it did not require the approval of the customary appropriate ethics committee (Winter & Maughan, 2009) and confidentiality was guaranteed to the team and players; therefore the study followed the Code of Ethics of the World Medical Association and the recommendations of the Declaration of Helsinki. Finally, the recordings of each event were encoded in a database for use as performance indicators or variables in our study.

Observation and Recording Instrument

Continuing the line of previous research (Pic Aguilar & Castellano Paulís, 2016; Castellano-Paulis et al., 2007; González-Ródenas et al., 2020; Robles, 2012) we proceeded to design a tool designed by five national coaches and experts in football research and following the format of the one designed by Sarmento et al., (2010) for the observation of offensive actions in soccer.

The "ad hoc" instrument used in this research for observational analysis and event coding is validated and is characterized by a combination of field format and category systems. The validated instrument was used to encode all 29 matches using Nacsport software (Kraak et al., 2019) (version: BasicPlus, Spain, 2020). The software allowed control of the speed at which each activity could be viewed. In addition, it enabled us to collect important information for understanding the offensive process in soccer, how the analyzed team attacks and consequently its goal opportunities as a performance parameter.

Variables and categories

Four performance factors and thirteen dependent variables were analyzed. These variables and performance factors were selected as the most relevant for five researchers contrasted within the observational field of football game and their opinions have been taken into account. Performance factors were grouped according to the criteria of matches played at home or away, dimensions of the field, and number of passes per attack cycle (table 1). Home matches were all played on the same field: 67.90m wide and 97.43m long. In away matches, the measurements of the pitch were recorded in width and length before the start of the match, classifying them as longer, equal length or shorter than the home field (+LENGTHHOME, =LENGTHHOME, -LENGTHHOME) and as wider than the home field, equal in width to, or less wide than the home field (+WIDTHHOME, =WIDTHHOME, -WIDTHHOME). All pitches used in the treatments were calibrated with the coordinates of four GPS devices stationed in each corner of the pitch for about 2 min. The absolute coordinates of each corner were calculated as the median of the recorded time series, providing measurements that were robust to the typical fluctuations of the GPS signals. Therefore, the studied variables were divided into three groups. These are the two group of variables used in this study (table 1):

1st variable group:

- One variable that groups goal opportunities (G.Oppt_tot).
- Four variables related to the goal opportunities start (G.OpptSZ1, G.OpptSZ2, G.OpptSZ3 and G.OpptSZ4).
- One variables related to individual participations by players (Contacts_tot).

2nd variable group:

- Two variables related to individual participations by players and field zones (OFContacts and RFContacts).
- Two variables related to match time; one to total attack time (AttackTime) and the other one to total match time (GameTime).

Table 1.
Definition and measurement of performance factors and variables in attack and defense

Nº	PERFORMANCE FACTORS	DEFINITION AND MEASUREMENT
1	HOME – AWAY	Refers to whether the analyzed team is playing as a local (HOME) or visitor team (AWAY).
2.1	DIMENSIONS OF THE FIELD LENGTH (+LENGTHHOME)	Refers to fields with length dimensions greater than the length of field played at home.
2.2	DIMENSIONS OF THE FIELD LENGTH (=LENGTHHOME)	Refers to fields with length dimensions equal to the length of field played at home.
2.3	DIMENSIONS OF THE FIELD LENGTH (-LENGTHHOME)	Refers to fields with length dimensions shorter than the length of field played at home.
3	DIMENSIONS OF THE FIELD WIDTH	Refers to fields with width dimensions greater, less than or equal to the width of field played at home.
4.1	NUMBER OF PASSES / ATTACK CYCLES (C-3P)	Number of game cycles where there are less than 3 passes (we consider a pass as an interaction between two different players in the same team).
4.2	NUMBER OF PASSES / ATTACK CYCLES (C3-6P)	Number of game cycles where there are between 3 and 6 passes (we consider a pass as an interaction between two different players in the same team).
4.3	NUMBER OF PASSES / ATTACK CYCLES (C+6P)	Number of game cycles where there are more than 6 passes (we consider a pass as an interaction between two different players in the same team).
Nº	DEPENDENT VARIABLES	DEFINICIÓN Y MEDICIÓN
1	G.Oppt_tot	Number of total cycles in which a goal opportunity occurs.
2	AtCycl_tot	Refers to the total number of attack cycles in a match. An attack cycle is a game cycle where a team has ball possession.
3	LAtCycl_tot	Number of total attacks cycles that end in ball loss. Ball loss occurs when ball possession passes to the opposing team.
4	NLAtCycl_tot	Number of total attack cycles that do not end in ball loss. We include here all those cycles in which there is an opponent interruption but the team analyzed retains ball possession.
5	G.OpptSZ1	Refers to those attack cycles in which there is a goal opportunity starting in zone 1 (Figure 1, left image).
6	G.OpptSZ2	Refers to those attack cycles in which there is a goal opportunity starting in zone 2 (Figure 1, left image).
7	G.OpptSZ3	Refers to those attack cycles in which there is a goal opportunity starting in zone 3 (Figure 1, left image).
8	G.OpptSZ4	Refers to those attack cycles in which there is a goal opportunity starting in zone 4 (Figure 1, left image).
9	OFContacts	Refers to individual participations by players whose interaction with the ball occurs in the half field where the defended goal is located (Figure 1, right image).
10	RFContacts	Refers to individual participations by players whose interaction with ball occurs in the half field where the attacked goal is located (Figure 1, right image).
11	Contacts_tot	Sum of the individual participations of all players from the team analyzed, regardless of the action zone.
12	AttackTime	Refers to total time (expressed in minutes) for all game cycles for the analyzed team.
13	GameTime	Refers to effective match time expressed in minutes; that is, the sum of attack and defense cycle durations.

Team possession was used as a basic unit of analysis and was defined according to Pollard and Reep (1997): Possession by a team begins when a player obtains possession of the ball by any means other than from a player from the same team. The player must have sufficient control over the ball to be able to have a deliberate influence over its next direction. Possession by the team may continue with a series of passes between players on the same team, but ends immediately when one of the following events occurs: a) The ball is out of play; b) The ball contacts a player of the opposing team (for example, through a tackle, an intercepted pass or a shot that is saved; c) A momentary contact that does not significantly change the direction of the ball is excluded; d) A violation of the rules occurs (for example, a player is offside or a foul is committed). On the other hand, goal opportunity was defined as a game cycle in which an attacking player with ball possession has a clear positional and/or numerical advantage to create chances (possibility of scoring).

In addition, field were divided in differents areas for some variables. On the one hand, for variables related to individual participations by players and field zones (OFContacts and RFContacts) fields were divided into two large areas separated by the midfield center line: a) Own half field:

refers to the half of the field where the goal defended by the analyzed team is located; and b) Rival half field: the half of the field where the goal attacked by the analyzed team is located (Figure 1, right image). On the other hand, for variables related to the goal opportunities start (G.OpptSZ1, G.OpptSZ2, G.OpptSZ3 and G.OpptSZ4), these areas were also divided into two other zones separated by an imaginary line parallel to the halfway line, passing through the semicircle of the penalty area: a) Own half Field: Zone 1: closer to own goal (SZ1) and Zone 2: further away from own goal (SZ2); and b) Rival half Field: Zone 3 further away from rival goal (SZ3) and Zone 4: closer to rival goal (SZ4) (Figure 1, left image).

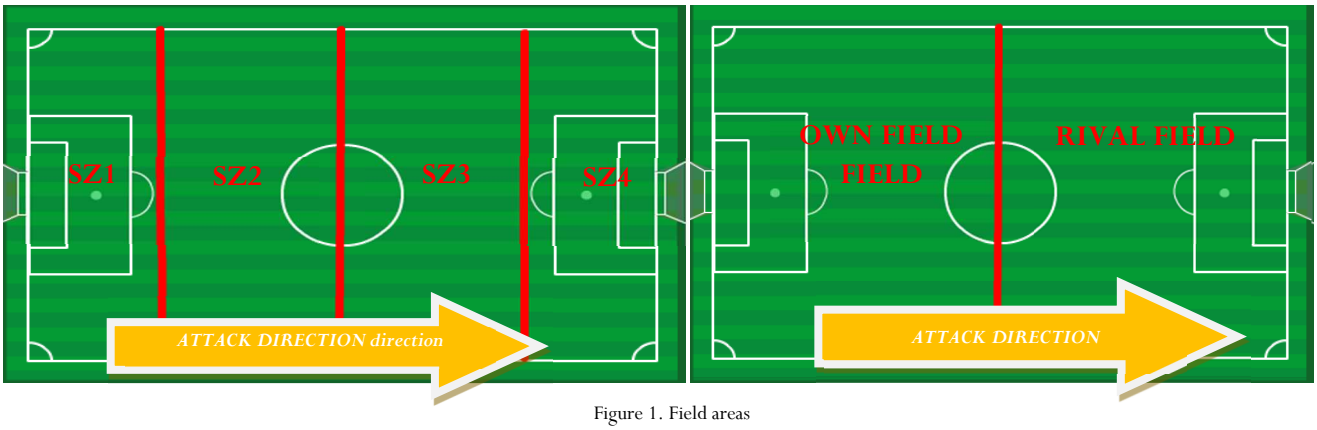

Figure 1. Field areas

Data Quality Control

To try to ensure data reliability, all matches were registered and analyzed by two differents observers, both with high experience in technical-tactical analysis in football performance, formed by the brand and analysts of an elite club in Spanish League. In addition, the following training process was carried out: First, 10 observing sessions during 3 weeks were conducted on teaching the observers following the Losada and Manolov (2014) criteria and applying the criterion of consensual agreement (Anguera, 1990) among observers, so that recording was only done when agreement was produced (Casal et al. 2017). To ensure inter-reliability consistency of the data (Mitchell, 1979) the Kappa coefficient was calculated for each criterion, it revealed a strong agreement between observers (>0.80 in each variable). It means high reliability, taking Fleiss (1981) as a reference, who establishes a classification for the Kappa values where it characterizes as regular values found between 0.40 and 0.60, good between 0.60 to 0.75, and excellent above 0.75. Moreover, the procedure was repeated after 2 weeks (to exclude any learning effects) to check intraobserver reliability (Mitchell, 1979; Casal et al. 2017).

Statistical analysis

Data is shown as mean ± SD. The assumption of normality and homogeneity of variance were verified using the Kolmogorov-Smirnov and Hartley's Fmax test, respectively. To determine significant interaction differences between dependent and independent variables we conducted a one-way repeated-measures analysis of variance (ANOVA). In the case of a significant interaction, a post-hoc test was performed using the Bonferroni correction. For all the analyses, a significance level of $p<0.05$ was used. Threshold values for assessing magnitudes of the Cohen's effect size (ES) were <0.20 (trivial),>0.20 (small), >0.60 (moderate), >1.2 (large). Finally, correlations were established for all global data without distinction of the aforementioned factors, using Pearson's r. Correlations were considered significant at level 0.05 (*) and at level 0.01 (**), both bilaterally.

Results

In the HOME-AWAY comparative analysis, significantly higher values were obtained in matches played at home for G.Oppt_tot[1] ($p<0.01$; ES small 0.287), G.OpptSZ1 ($p<0.01$; ES small 0.298), G.OpptSZ3 ($p<0.01$; ES small 0.247), OFContacts ($p<0.01$; ES large 1.627), RFContacts ($p<0.01$; ES large 1.210), Contacts_tot ($p<0.01$; ES large 1.824), AttackTime ($p<0.01$; ES large 2.072), GameTime ($p<0.01$; ES large 1.607) and G.Oppt_tot[2] ($p=0.021$; ES moderate 0.913) variables in comparison to matches played away. However, this was not the case for the NLAtCycl_tot and G.OpptSZ4 variables.

For DIMENSIONS OF THE FIELD WIDTH context, all away matches (played as visitors) were less wide than the home field, so the results are extrapolated to that context.

In the DIMENSIONS OF THE FIELD LENGTH comparative analysis, during matches played on +LENGTHHOME, and GameTime variables ($p=0.01$; ES small -0.292; $p<0.01$; ES large -2,137; respectively), and during matches played on -LENGTHHOME OFContacts ($p=0.01$; ES large 1.339), Contacts_tot ($p=0.005$; ES large 1.400), AttackTime ($p=0.001$; ES large 1.723) and GameTime ($p=0.012$; ES large 1.232) variables, showed significantly lower averages than matches played on =LENGTHHOME.

In the NUMBER OF PASSES / ATTACK CYCLES analysis, C-3P showed significantly higher values than the rest of the cycles for all variables analyzed; except for

G.OpptSZ1, which showed higher values as the number of passes per attack cycle increased, and for G.OpptSZ2, which showed a greater value for C+6P and a lower value for C3-6P. Significant differences were found in C-3P with respect to C3-6P and C+6P for the variables G.Oppt_tot ($p<0.01$; ES small 0.465; $p<0.01$; ES small 0.419, respectively), AtCycl_tot ($p<0.01$; ES large 1,580; $p<0.01$; ES large 1,741, respectively), LAtCycl_tot ($p<0.01$; ES large 1,428; $p<0.01$; ES large 1.609, respectively), G.OpptSZ3 ($p<0.01$; ES small 0.365; $p<0.01$; ES moderate 0.601, respectively), and G.OpptSZ4 ($p<0.01$; ES moderate 0.660; $p<0.01$; ES moderate 0.775, respectively. For the G.OpptSZ1 variable, significant differences were observed in C+6P with respect to C-3P ($p<0.01$; ES small -0.341) and C3-6P ($p=0.020$; ES small -0.280). For the NLAtCycl_tot variable, statistically significant differences were found in the three types of pass cycles (C-3 with respect to C3-6P: $p<0.01$; ES moderate 1,019; C3-6P with respect to C+6P: $p=0.012$; ES small 0.469; and C-3P with respect to C+6P: $p<0.01$; ES large 1.366). Finally, for the G.OpptSZ2 variable, no significant differences were found for any of the variables analyzed.

The correlations analyzed using global data (n=522) depending on the G.Oppt_tots variable are shown in Table 3. G.Oppt_tots and AtCycl_tot variables were positively correlated with each other (the higher the value of one, the higher the value of the other), and with the rest of the analyzed variables (<0.01). The NLAtCycl_tot variable correlated positively with the LAtCycl_tot, G.OpptSZ3 and G.OpptSZ4 variables (<0.01). The LAtCycl_tot variable correlated positively with the G.OpptSZ2 (<0.05), G.OpptSZ3 and G.OpptSZ4 variables (<0.01). The G.OpptSZ1 variable correlated positively with the G.OpptSZ2 variable (<0.01); and the G.OpptSZ2 and G.OpptSZ3 variables were positively correlated with the G.OpptSZ4 variable (<0.05).

The results corresponding to correlations analyzed with global data (n=29), relating to the G.Oppt_tots variable are shown in Table 4. OFContacts, Contacts_tot and AttackTime variables were positively correlated with each other (the higher the value of one, the higher the value of the other), and with the rest of the analyzed variables (all variables were significant at level 0.01; except OFContacts with RFContacts and Contacts_tot with Game time, which were significant at level 0.05). The RFContacts and G.Oppt_tot variables were positively correlated with each other and with the rest of the analyzed variables (all variables were significant at level 0.01 except with OFContacts variable which were significant at level 0.05), with the exception of GameTime, which correlated positively with the OFContacts (<0.01), Contacts_tot (<0.05), and AttackTime (<0.01) variables.

Table 2.
Comparative analysis of goal opportunities and different types of cycles according to the factors: home and away; dimensions of the pitch; and number of passes per attack cycle. Data expressed as Mean ± SD

1st variable group	Size	Home (n=270)	Away (n=252)	Dimensions of the field (n=522) +Length (n=144)	=Length (n=270)	-Length (n=108)	Number of passes (n=522) C–3P (n=174)	C3–6P (n=174)	C+6P (n=174)
G.Oppt_tot[1]		1,54 ± 1,4*	1,12 ± 1,51*	1,13 ± 1,55	1,49 ± 1,42	1,21 ± 1,45	1,78 ± 1,73[bc]	1,09 ± 1,18[a]	1,13 ± 1,34[a]
AtCycl_tot		5,21 ± 3,19	4,92 ± 4,92	5 ± 5,17	5,2 ± 3,22	4,83 ± 4,52	8,88 ± 4,3[bc]	3,51 ± 2,13[a]	2,82 ± 2,39[a]
NLAtCycl_tot		1,17 ± 1,29	1,3 ± 1,69	1,19 ± 1,58	1,2 ± 1,31	1,35 ± 1,81	2,36 ± 1,83[bc]	0,86 ± 0,97[ac]	0,47 ± 0,67[ab]
LAtCycl_tot		2,51 ± 2,16	2,50 ± 2,88	2,67 ± 3,19	2,51 ± 2,14	2,27 ± 2,45	4,74 ± 2,8[bc]	1,56 ± 1,43[a]	1,21 ± 1,31[a]
G.OpptSZ1		0,38 ± 0,68*	0,2 ± 0,48*	0,19 ± 0,49‡	0,37 ± 0,67†	0,25 ± 0,5	0,21 ± 0,53[c]	0,25 ± 0,55[c]	0,42 ± 0,67[ab]
G.OpptSZ2		0,44 ± 0,79	0,35 ± 0,65	0,37 ± 0,7	0,43 ± 0,78	0,35 ± 0,63	0,41 ± 0,81	0,36 ± 0,6	0,43 ± 0,75
G.OpptSZ3		0,53 ± 0,78*	0,35 ± 0,68*	0,37 ± 0,68	0,51 ± 0,8	0,36 ± 0,63	0,68 ± 0,92[bc]	0,39 ± 0,67[a]	0,24 ± 0,49[c]
G.OpptSZ4		0,19 ± 0,5	0,22 ± 0,56	0,2 ± 0,45	0,19 ± 0,51	0,25 ± 0,66	0,48 ± 0,76[bc]	0,09 ± 0,33[a]	0,05 ± 0,21[c]

* The difference in the means is significant in the HOME-AWAY factor.
For NUMBER OF PASSES BY ATTACK CYCLES factor:
(a): Significant differences with respect to C-3P;
(b): Significant differences with respect to C3-6P;
(c): Significant differences with respect to C+6P.
For DIMENSIONS OF THE FIELD LENGTH factor:
(†): Significant differences with respect to +LENGTHHOME;
(‡): Significant differences with respect to =LENGTHHOME.
(**Ω**): Significant differences with respect to –LENGTHHOME.

Table 2.
Comparative analysis of goal opportunities and different types of cycles according to the factors: home and away; dimensions of the pitch; and number of passes per attack cycle. Data expressed as Mean ± SD

2nd variable group	Size	Home (n=15)	Away (n=14)	Dimensions of the field (n=29) + Length (n=5)	= Length (n=14)	- Length (n=10)
G.Oppt_tot[2]		27,67 ± 7,93*	20,14 ± 8,57*	23,8 ± 12,5	27,71 ± 8,23	19 ± 5,72
OFContacts		286,667 ± 62,41*	193,79 ± 50,75*	209 ± 61,99	283,79 ± 63,72[Ω]	199,5 ± 61,81‡
RFContacts		282,07 ± 68,53*	207,43 ± 53,35*	232 ± 57,29	277,14 ± 68,31	209,5 ± 67,84
Contacts_tot		568,73 ± 100,98*	401,21 ± 80,89*	441 ± 77,25	560,93 ± 99,98[Ω]	409 ± 119,85‡
AttackTime		41,88 ± 4,63*	31,81 ± 5,1*	34,79 ± 4,92	41,52 ± 4,57[Ω]	31,82 ± 6,86‡
GameTime		66,71 ± 5,48*	57,43 ± 6,07*	55,62 ± 3,5‡	66,82 ± 5,67†[Ω]	59,11 ± 7,03‡

* The difference in the means is significant in the HOME-AWAY factor.
For NUMBER OF PASSES BY ATTACK CYCLES factor:
(a): Significant differences with respect to C-3P;
(b): Significant differences with respect to C3-6P;
(c): Significant differences with respect to C+6P.
For DIMENSIONS OF THE FIELD LENGTH factor:
(†): Significant differences with respect to +LENGTHHOME;
(‡): Significant differences with respect to =LENGTHHOME.
(**Ω**): Significant differences with respect to –LENGTHHOME.

Table 3.
Correlations analyzed using global data (n=522); for G.Oppt_tots variable

(n=522)		G.Oppt_tot	AtCycl_tot	AtCyclNL_tot	AtCyclL_tot	G.Oppt SZ1	G.Oppt SZ2	G.Oppt SZ3	G.Oppt SZ4
G.Oppt _tot	Pearson C.	1	,587**	,181**	,267**	,531**	,630**	,605**	,473**
	Sig. (bilateral)		0,000	0,000	0,000	0,000	0,000	0,000	0,000
AtCycl _tot	Pearson C.	,587**	1	,699**	,871**	,202**	,302**	,392**	,445**
	Sig. (bilateral)	0,000		0,000	0,000	0,000	0,000	0,000	0,000
AtCycl NL_tot	Pearson C.	,181**	,699**	1	,440**	-0,037	0,048	,177**	,232**
	Sig. (bilateral)	0,000	0,000		0,000	0,398	0,274	0,000	0,000
AtCycl L_tot	Pearson C.	,267**	,871**	,440**	1	0,042	,097*	,181**	,311**
	Sig. (bilateral)	0,000	0,000	0,000		0,338	0,026	0,000	0,000
G.Oppt SZ1	Pearson C.	,531**	,202**	-0,037	0,042	1	,147**	0,083	0,034
	Sig. (bilateral)	0,000	0,000	0,398	0,338		0,001	0,059	0,432
G.Oppt SZ2	Pearson C.	,630**	,302**	0,048	,097*	,147**	1	0,074	,107*
	Sig. (bilateral)	0,000	0,000	0,274	0,026	0,001		0,089	0,015
G.Oppt SZ3	Pearson C.	,605**	,392**	,177**	,181**	0,083	0,074	1	,094*
	Sig. (bilateral)	0,000	0,000	0,000	0,000	0,059	0,089		0,032
G.Oppt SZ4	Pearson C.	,473**	,445**	,232**	,311**	0,034	,107*	,094*	1
	Sig. (bilateral)	0,000	0,000	0,000	0,000	0,432	0,015	0,032	

**. The correlation is significant at level 0.01 (bilateral).
*. The correlation is significant at level 0.05 (bilateral).

Table 4.
Correlations analyzed with global data (n=29); for G.Oppt_tots variable

(n=29)		G.Oppt_tot	ContactsOF	ContactsRF	Contacts_tot	Attack Time	Game Time
G.Oppt_tot	Pearson C.	1	,393*	,773**	,677**	,627**	0,187
	Sig. (bilateral)		0,035	0,000	0,000	0,000	0,331
OFContacts	Pearson C.	,393*	1	,468*	,861**	,863**	,626**
	Sig. (bilateral)	0,035		0,010	0,000	0,000	0,000
RFContacts	Pearson C.	,773**	,468*	1	,853**	,681**	0,170
	Sig. (bilateral)	0,000	0,010		0,000	0,000	0,378
Contacts_tot	Pearson C.	,677**	,861**	,853**	1	,902**	,468*
	Sig. (bilateral)	0,000	0,000	0,000		0,000	0,011
AttackTime	Pearson C.	,627**	,863**	,681**	,902**	1	,600**
	Sig. (bilateral)	0,000	0,000	0,000	0,000		0,001
GameTime	Pearson C.	0,187	,626**	0,170	,468*	,600**	1
	Sig. (bilateral)	0,331	0,000	0,378	0,011	0,001	

**. The correlation is significant at level 0.01 (bilateral).
*. The correlation is significant at level 0.05 (bilateral).

Discussion

The main objective of this study was to determine and discern efficient contexts for creating goal-scoring opportunities for an under-19 team belonging to a professional football club in the Spanish professional league. Our main findings were: a) In matches played at home there were more records of analyzed variables than for away matches, except for attack cycles that did not end in loss and for scoring opportunities initiated in zone 4; b) The use of a lower number of contacts in attacks initiated and generated in the rival's half field favors the creation of goal opportunities; c) When the attack starts in the team's own half field, the creation of goal opportunities is favored with the use of a greater number of contacts in the attack cycles; and d) Dimensions of the field that are similar or equal to those for games played at home favor a greater number of total contacts and own field contacts, as well as effective game time and attack time in comparison with fields that have smaller dimensions.

Finding the highest average for all technical-tactical variables analyzed in the home context, except for attack cycles that did not end in loss and goal opportunities initiated in areas closer to the team's own goal, indicates a greater dominance and leading role for the home team (more attack cycles and total goal opportunities). This, linked to significant correlations between goal opportunities created and analyzed variables that support this dominance (OFContacts, RFContacts, Contacts_tot, AttackTime, AtCycl _tot and NLAtCycl_tot), suggests that models of games of dominant teams that have a leading role in terms of contacts or ball possession and possession times, favor contexts that enhance performance in football. Some previous studies support these conclusions by showing that a team has a better chance of winning or showing a stronger performance (higher number of goals, shots or goal opportunities) (Castellano, 2018) the longer it is in possession of the ball (greater number of attack cycles and greater number of contacts) (Lago-Peñas et al., 2010; Lago-Peñas et al., 2011; Collet, 2013; Moura et al., 2014; Liu et al., 2015; Wright et al., 2011). Lago-Peñas et al. (2016), analyzed all matches of the major Europa leagues (France, Italy, Spain, England and Germany) during the 2014/15 season, and found a clear advantage for teams that played at home in comparison to away teams. However, multiple other studies (Poulter, 2009, Tenga, Holme, et al., 2010b and Tenga, Ronglan, et al., 2010), showed that counterattacks (characterized by creating goal opportunities with fewer contacts and shorter duration) are more effective than elaborate attacks in producing goals, although it was not specified whether the teams were in at home or away context. Our study shows a lower average in variables that refer to times (AttackTime and GameTime) and number of contacts (OFContacts, RFContacts, Contacts_tot). This suggests a greater efficiency in the game, avoiding unnecessary touches and superfluous movements that can slow down the game. These findings support the earlier studies, in that to create goal opportunities a lower number of contacts is needed; however, these findings were found in away matches, where the duration of effective match time was shorter.

Armatas and Pollard (2014) strengthened the idea of the need to consider specific characteristics of the playing team's home stadium to extract more significant and contextualized parameters. This assessment thus coincides with authors who argue that game location influences the tactics and game strategies needed to achieve maximum performance, as reflected in different tactics and discriminatory strategies (Pollard, 2006; Pollard, 2008; Carmichael & Thomas, 2005). In addition, Martínez Martínez & González García (2018), analyzed the advantage of scoring first and the place where the game is played, finding significant differences in favor of those who play at home.

It should be notice that dominant team, or the team with a higher chance of winning, tends to take greater risks. This is evident in the higher frequency of ball losses and the lower number of cycles that do not result in a loss, particularly in their home context. This pattern suggests that teams with a stronger position in the game are more willing to take offensive actions and engage in riskier attack cycles, which can result in both higher ball losses and a higher number of cycles ending in loss. This behavior reflects their proactive approach to gameplay, aiming to maintain control and create scoring opportunities, even if it entails a higher chance of losing possession. Although in this research some variables (AtCycl_tot, LAtCycl_tot, NLAtCycl_tot and G.OpptSZ2 and G.OpptSZ4) were not statistically significant, the descriptive results coincide with multiple previous studies (Tucker et al., 2005; Carmichael & Thomas, 2005; Lago-Peñas & Lago-Ballesteros, 2011), according to which, teams playing at home have significantly higher performance indicators.

It is interesting to determine the area where attack cycles that create goal opportunities begin. This research indicated that the use of a lower number of contacts in attack cycles initiated and generated in the opposite field favors the creation of goal opportunities. Likewise, as play moved away from the rival goal, there were higher averages in relation to goal opportunities initiated in the team's own field, and a greater number of passes. These findings lead us to believe that initiating attack cycles in areas near the opposing goal, along with shorter durations, are parameters that lead the team to generate scoring opportunities. Multiple studies correlate fewer contacts with higher numbers of goal opportunities (Poulter 2009, Tenga, Holme, et al. 2010b, and Tenga, Ronglan, et al. 2010). In contrast, many other studies relate greater efficacy to attack cycles with a greater number of contacts (Bloomfield et al. 2005, Jones et al. 2004, Collet, 2013 and Casal et al. 2017). However, in none of these investigations was the possible relationship between these performance parameters and the starting zone for goal opportunities taken into account. Our study has shown how the starting zones for goal opportunities constitute a determining factor that influences efficient game models to create goal opportunities. It would also be interesting to determine efficiency parameters in relation to the number of shots needed to score, and to create goal opportunities with regard to the starting zone. Reep and Benjamin, in Lepschy et al. (2018), found that about 80 percent of all goals are scored after three or fewer passes and about 10 shots are needed for a goal. In contrast, Hughes and Franks, (2005), add that for ball possessions with more than eight passes, although there is a significantly higher chance that successful teams will create a goal opportunity ($p<0.05$), the number of shots needed to make a goal increase. However, none of these authors address the starting zone for these goals or goal opportunities, a parameter shown in this research to be a determinant of performance or of the most effective cycle models to generate improved performance.

Matches played on a field of similar dimensions to the home field favored the number of total contacts in the game, own half field contacts, and effective time with respect to smaller-sized fields. Silva et al. (2014) found that effective play space and team separation increased significantly with field size regardless of the skill level of the participants. Similarly, Hill-Haas et al. (2011) noted that a greater relative play area per player increased the intensity of exercise and influenced player movement patterns. We understand that varying the dimensions of the playing field offers a different context for generating performance in football. In this case, playing on fields of similar dimensions to the home field led to an increase in attacking time; the possessing team then has more chances to create goal opportunities compared to games played on smaller fields. Hoppe et al. (2015) found correlations between greater ball possession and points obtained by the best ranked teams at the end of a championship season.

On the other hand, G.OpptSZ1 increased compared to fields with larger dimensions. This emphasizes the idea that when field dimensions change, the ways of creating goal opportunities must also change. Frencken et al. (2013) showed how manipulations of field size affected players' spatiotemporal movement patterns, and thus the styles of games that were efficient in creating goal opportunities. As Olthof et al. (2018) comment, field size determines tactical team performance and the characteristics of the game. Field size manipulation leads to different physical demands and allows teams to increase distances within the team, resulting in larger surface areas and stretch rates, and more tactical variability (Olthof et al. 2018). In a similar vein, Clemente et al. (2018) concluded that it is the full size of the field that promotes adjustment by the team to extend towards bands and alignment with the tactical principle of mobility.

The results of this study cannot be generalized to all matches and competitions, because only one youth team from an elite academy was analyzed. Some studies suggest that the type of competition influences team possession, and therefore, the ability to create goal opportunities (Bloomfield et al., 2005; Collet, 2013; Jones et al., 2004; Lago-Peñas et al., 2010; Lago, 2007; Tucker et al., 2005). To try to reduce the influence of this limitation, we used the same competition and analyzed all games from the same season.

However, in this study we did not analyze data from the opposing team, which may have influenced the results (Castellano & Casamichana, 2015; Hughes & Bartlett, 2002; Low et al., 2020). To address this limitation we analyzed one of the teams that had won the most games both at home and away so that the influence of the opposing team was similar in all analyses. Therefore, limitations to this study are related to team´s size considered (only one yoth team from an eite academy) and that it does not analyzed data from the opposing team. On the other hand, it can be displayed as strengths attack cicles´s size (n=2646) and the team target analized, an under-19 team belonging to a professional football club in the Spanish professional league. For future research it would be interesting to include the possible interrelationships between the different contexts proposed, increase the spectrum of categories analyzed, and add a contextualization based on the level of the opposing team to establish possible changes in the efficiency of creating goal opportunities.

Conclusion

The efficiency of the style of play of this team in creating goal opportunities changed depending on whether the team played at home or away. When playing at home there was significantly more data for performance indicators in attack than when playing away. The team showed that the use of a lower number of contacts per attack cycle was more efficient when the cycle started closer to the opposing goal. With increasing distance from that goal, attack cycles were more efficient with a greater number of contacts. The style of play was also modified when the dimensions of the pitch varied when the team played away. When this team played on fields of similar dimensions to those at home, this favored a greater predominance of performance indicators such as number of total contacts, own half field contacts and effective playing time, which provided more chances to create goal opportunities.

Declaration of interes statement

The authors report no conflict of interest.

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