



## Influence of Tactical Levels in School and Extracurricular Football

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### Cite this article

Barquero-Ruiz, C., Sánchez-De-San-Pedro, S., & Arias-Estero, J. L. (2022). Influence of Tactical Levels in School and Extracurricular Football. *Apunts Educación Física y Deportes*, 150, 67-73. [https://doi.org/10.5672/apunts.2014-0983.es.\(2022/4\).150.08](https://doi.org/10.5672/apunts.2014-0983.es.(2022/4).150.08)

### Abstract

Recently, an instrument has been proposed to evaluate tactics in school and extracurricular football based on three levels (team, small groups and individual). The aim of the study was to find out to what extent each tactical level contributed to the successful completion of the attack and defence phases in introductory football. 88 children participated (age:  $M = 10.38$ ,  $SD = 0.77$  years) from eight male football teams (9-12 years old). 1,516 ball possessions from four official matches of the season were analysed. The observational methodology was used through an idiographic, timely and multidimensional design. Two observers viewed the videos of the matches and individually recorded four teams. The observation instrument was *Tactical Assessment Instrument for Soccer*. It was made up of 11 criteria divided into the three tactical levels, differentiated into attack and defence. Spearman's Rho test and logistic regression were used for data analysis. The individual and team level actions were the ones that explained the success in the attack and defence phases at a higher percentage. However, the correlations showed the relationship between the three tactical levels and success in the attack and defence phases. Consequently, tactical training in introductory football is suggested, based on the inclusion of the three tactical levels analysed in this study (team, small groups and individual).

**Keywords:** evaluation, introductory sports, Physical Education, sports teaching, tactical learning, teaching-learning processes.

### Publisher:

© Generalitat de Catalunya  
Departament de la Presidència  
Institut Nacional d'Educació  
Física de Catalunya (INEFC)

ISSN: 2014-0983

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### Section:

Sports education

### Original language:

Spanish

### Received:

January 10, 2022

### Accepted:

May 16, 2022

### Published:

October 1, 2022

### Cover:

INEFC Lleida Gymnasium  
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## Introduction

The tactical teaching of sports games has been valued in recent years thanks to the positive results of work carried out with pedagogical approaches and models such as the Teaching Games for Understanding (e.g. Barquero-Ruiz et al., 2021). This orientation towards tactical teaching requires an evaluation aligned to the teaching-learning process (Kirk, 2017). However, the instruments used to evaluate the tactic to date do not provide full and valid information, since they evaluate it as a sum of actions taken by individuals (Barquero-Ruiz et al., 2020). Considering that actions carried out by individuals represent only a third of the total actions performed in collective sports games, the fact that the evaluation is based only on this level of action makes it difficult to improve the knowledge of tactical learning and to properly plan the teaching-learning process (Gréhaigne & Godbout, 1995).

In collective sports games where the game and mobile spaces are shared, there are three tactical levels based on the number of players involved in the actions carried out (Gréhaigne et al., 2005). According to Gréhaigne et al. (2005), at the team level all or most of the players are involved. At the small group level, a subgroup of players participates, between two and four approximately, with a common aim. Finally, the individual level includes just one player (Godbout & Gréhaigne, 2022). The uncertainty generated by the actions carried out at these three levels demands skills determined not only by each player's personality but also by the game in small groups and together with the whole team (Gréhaigne & Godbout, 1995; Pill & Hyndman, 2018). In other words, it is the interactions within and between the various levels that define the tactics to be developed during the game (Ashford et al., 2020).

Recently, Barquero-Ruiz et al. (2022) have proposed the Tactical Assessment Instrument for Soccer (TAIS), as a tool to enable the more comprehensive evaluation of tactics in school and extracurricular football. Specifically, the novelty of the instrument lies in five advantages. First, it enables the evaluation of the three tactical levels, defined above, within the same observation unit. Second, it enables the evaluation of players in attack and defence, whether in possession of the ball or not. Third, it avoids the use of indices when presenting the results. Fourth, it includes contextual criteria, which help to situate learning within the context of play. Finally, it is a valid instrument for use in various contexts (school, extracurricular and federated).

The tactical evaluation proposal arising from TAIS opens new lines of research on tactical levels and their usefulness. Specifically, the instrument allows one to know what children do during the game in a more ecological way (Kirk, 2017). In this sense, the starting point could

be the exploration of the impact that each tactical level has on success in the game phases (attack and defence). Until now, the development of the team's game phase could only be tactically evaluated based on the players' individual behaviour. With TAIS, however, it is possible to find the influence that the three tactical levels have on the game phases, both independently, considering the influence of the actions carried out at each level, and jointly, considering the influence of the actions included in all three levels. Knowing the influence of tactical levels on the successful construction of game phases is key to optimising the teaching-learning process in introductory football, since football is a sport with a high tactical component (Fardilha & Allen, 2020) and because abstract thought starts to develop between the ages of 9 and 12 (Piaget, 1977). In this sense, the analysis could provide information on the tactical level or levels on which to focus the teaching-learning process for children. Consequently, this study aimed to find out to what extent each tactical level contributed to the successful completion of the attack and defence phases in introductory football.

## Methodology

### Participants

The participants were 88 children (age:  $M = 10.38$ ;  $SD = 0.77$ ) of eight male junior and federated football teams (9-12 years), in an autonomous community located in the southeast of Spain. The players had played football in a federated form for at least two years. Each week, they practised 3 hours over 2 days and played a 40-minute game on the weekends. All teams were federated and played at the regional level. 1,516 ball possessions from four official matches in the season, which took place over the November-February period, of the federated league in which the teams participated, were analysed. The selection of the teams and players was deliberate based on the inclusion criteria: (a) two coaches selected the eight teams with the greatest homogeneity in terms of level and previous experience, in order not to select very disparate teams in terms of sporting performance, (b) the teams had to play each other once, and (c) the participants agreed to be recorded to participate in this study. The selection of ball possessions was through a total sampling (Anguera, 2003). The parents and/or legal guardians of the participants and the coaches provided informed consent for participation in this study. The Research Ethics Committee of the first author's university approved the study (CE091908), which was conducted in accordance with the Declaration of Helsinki.

**Table 1**

*Criteria that make up the Tactical Assessment Instrument for Soccer (TAIS, Barquero-Ruiz et al., 2022).*

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<b>Contextual level</b>
Successful completion of attack
Goal, out of play over goal line, action prior to corner kick or goalkeeper save
Successful completion of defence
Ball put out of play, steal, player interception or goalkeeper block
<b>Team level</b>
Attack type (attack phase)
Appropriate positional
Inappropriate positional
Appropriate counter-attack
Inappropriate counter-attack
Defence type (defence phase)
Defence in appropriate area
Defence in inappropriate area
Appropriate man defence
Inappropriate man defence
Appropriate depth (attack phase)
Inappropriate depth (attack phase)
Appropriate amplitude (attack phase)
Inappropriate amplitude (attack phase)
<b>Small group level</b>
Appropriate pass (attack phase)
Inappropriate pass (attack phase)
Support (attack phase)
Appropriate defensive help (defence phase)
Inappropriate defensive help (defence phase)
<b>Individual level</b>
Appropriate control (attack phase)
Inappropriate control (attack phase)
Appropriate shot (attack phase)
Inappropriate shot (attack phase)
Appropriate interception (defence phase)
Inappropriate interception (defence phase)
Appropriate entry or charge (defence phase)
Inappropriate entry or charge (defence phase)

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## Design

The observational methodology (Anguera & Hernández-Mendo, 2014) was used through an idiographic, timely and multidimensional design (Anguera et al., 2011). The design was idiographic because the participants were analysed as a single unit. Timely, since there was no follow-up of the players and the participants were evaluated in a single match. That is, each team was evaluated only once in a matchup against another of the eight teams, so four matchups were

explored. The confrontations were random, according to the protocol of the sponsoring federation. The design was also multidimensional, since various levels of response were considered within the observation instrument (Table 1). The same rules were followed in all matches to enable inter-session consistency requirements, among which the following stand out: (a) the participants played all matches on identical fields (65 x 45 m), (b) the goals had the same dimensions (2 x 6 m), and (c) matches were 7-a-side.

## Process

The participants were recorded playing the four football games with a video camera (Everio Full HD-GZ-HD7, JVC, Japan), which was placed five metres above the ground and two metres from the field line, next to the touchline, near the corner kick area. The recording allowed the observation of the entire field at all times, so that the behaviour of all the players with and without the ball could be observed throughout the match.

The observers were two research assistants aged 25 and 27, respectively, graduates in Physical Activity and Sports Sciences, with an average experience of 4 years ( $SD = 1.4$ ) in observation of football matches in introductory stages. Both were introductory soccer coaches with a minimum experience of 5 years. They were trained for 30 hours in the specific observation instrument, following the training phase suggested by Anguera (2003). Observer reliability was obtained by intra-observer assessment at the end of the training process. In this assessment, the observers viewed 90 ball possessions from a game not part of the investigation, but of the same category and level as those analysed. Later, the observers observed the same fragment again after seven days of non-observation. Observer reliability was suitable (% agreement = 99.60%, Kappa coefficient = .99). Reliability of the observation was obtained through a final inter-observer assessment. For this assessment, 15% of the ball possessions of the study's matches were used, which meant five randomly selected game periods. Reliability of observation was also suitable (% agreement = 98.51%, Kappa coefficient = .98).

Each observer individually observed and recorded four teams, in both offence and defence. The observation instrument used was TAIS (Aiken's  $V = .92$ ,  $ICC = .70$ , % agreement = 95%, Barquero-Ruiz et al., 2022). This instrument is made up of 11 criteria divided into the three tactical levels (team, small groups and individual). Each tactical level contains criteria from both the attack phase and the defence phase (Table 1). The criteria are categorised into appropriate and inappropriate, except in the case of the "support" criterion at the small group level, which by definition will be considered appropriate whenever it appears. The instrument includes a total of 11 contextual criteria. For this work, all the criteria of all the tactical levels, in attack and defence, and the contextual criteria related to the type of completion in attack and defence were selected. Specifically, successful completion of the attack and successful completion of the defence (Table 1).

To carry out the observation and recording of the matches, the instructions indicated by Barquero-Ruiz et al. (2022) were used. The observation unit was the game phase. The observers had to watch and analyse the game phase at real-time speed, at least three times, and then they could watch the game phase at reduced speed (25 frames per second). The observers had to repeat this process for each criterion, until all criteria of the game phase were completed, in order to proceed to the next phase.

## Analysis of data

The data was treated statistically using the SPSS statistical package v. 17.0 for Windows (SPSS, Inc. USA). The Kolmogorov-Smirnov test was used to analyse the normality of the data. Consequently, Spearman's Rho ( $\rho$ ) was used to analyse the correlations between the actions of the three tactical levels and successful completion. Finally, a logistic regression was performed to explore to what extent each tactical level explained the successful completion of the game phase, in both attack and defence. For this purpose, for the attack completion type of contextual criterion, the attack was considered successful when it ended in a goal, went over the goal line, a corner kick was awarded or the goalkeeper made a saved (Table 1). For the defensive completion type of contextual criterion, the defence was considered successful when it ended by stealing the ball, interception by a player, blocking by the goalkeeper or sending the ball out of play (Table 1).

## Results

Results showed statistically significant correlations between successful completion of the attack and appropriate actions at the team ( $p = .38, p < 0$ ), individual ( $p = .36, p < 0$ ) and small group levels ( $p = .09, p < .013$ , Table 2). However, a correlation was also found between the successful completion of the attack and inappropriate actions at the individual level ( $p = .21, p < 0$ , Table 2).

In the defence phase, the results showed statistically significant correlations between successful completion and appropriate actions at the individual level ( $p = .25, p < 0$ , Table 3). However, statistically significant and negative correlations were also found between successful completion of defence and inappropriate actions at the team, individual, and small group levels ( $p = -.22, p < 0$ ;  $p = -.12, p < .002$ ;  $p = -.09, p < .008$ , respectively, Table 3).

**Table 2**

Descriptive statistics and correlations ( $\rho$ ) between the appropriate and inappropriate actions at the three tactical levels and the successful completion of the attack.

Criteria	Median	Range	M	SD	1	2	3	4	5	6	7
1. Successful completion of attack	0	1	.24	.43	-	-	-	-	-	-	-
2. Appropriate team-level actions	0	1	.10	.22	.38**	-	-	-	-	-	-
3. Inappropriate team-level actions	.33	1	.28	.15	-.35	-.91*	-	-	-	-	-
4. Appropriate small group level actions	.50	7	.74	.92	.09*	.27*	-.19*	-	-	-	-
5. Inappropriate small group level actions	1	4	.98	.78	-.25	-.19*	.23*	-.23*	-	-	-
6. Appropriate individual level actions	0	1.50	.16	.30	.36**	.41*	-.04	.30*	-.19*	-	-
7. Inappropriate individual level actions	0	1	.11	.22	.21**	.17*	-.18*	.14*	-.24	.02	-

Note. M: mean, SD: standard deviation,  $\rho$ : Spearman's Rho correlations, \* $p < .05$ , \*\* $p < .001$ .

**Table 3**

Descriptive statistics and correlations ( $\rho$ ) between the appropriate and inappropriate actions at the three tactical levels and the successful completion of the defence.

Criteria	Median	Range	M	SD	1	2	3	4	5	6	7
1. Successful completion of defence	1	1	.82	.39	-	-	-	-	-	-	-
2. Appropriate team-level actions	0	1	.01	.05	.02	-	-	-	-	-	-
3. Inappropriate team-level actions	1	1	.57	.49	-.22**	-.06	-	-	-	-	-
4. Appropriate small group level actions	0	3	.13	.41	.03	-.02	-.01	-	-	-	-
5. Inappropriate small group level actions	0	3	.13	.38	-.09*	.06	.14*	-.02*	-	-	-
6. Appropriate individual level actions	0	4	.27	.35	.25**	.02	-.07	.20*	.03	-	-
7. Inappropriate individual level actions	.50	2.50	.49	.54	-.12*	.05	.22*	.05	.16*	-.05	-

Note. M: mean, SD: standard deviation,  $\rho$ : Spearman's Rho correlations, \* $p < .05$ , \*\* $p < .001$ .

**Table 4**

Logistic regression of the actions at the three tactical levels with the successful completion of the attack.

Criteria	Odds ratio	Lower confidence interval	Upper confidence interval
Team level	7.03	4.77	10.34
Small group level	1.47	1.04	2.08
Individual level	5.50	3.84	7.88

For the logistic regression analysis for the attacking phase, the adjustment criterion for the final model resulted in a value of 379.32, giving the likelihood ratio tests a chi-square value of 170.91 ( $gl = 6$  and  $p = 0$ ). The value of McFadden's Pseudo  $R^2$  was .20 (Cox and Snell = .19; Nagelkerke = .29). The analysis indicated that successful completion was explained

by both the team level and the individual level (Table 4). Specifically, appropriate actions at the team level explained 57.20% of successful completions. Appropriate actions at the individual level explained 50.50% of successful completions, while inappropriate actions at the individual level explained 89.90% of unsuccessful completions.

**Table 5***Logistic regression of the actions at the three tactical levels with the successful completion in defence.*

Criteria	Odds ratio	Lower confidence interval	Upper confidence interval
Team	1.22	1.18	1.26
Small groups	1.31	.69	2.50
Individual	5.20	3.25	8.32

For the logistic regression analysis for the defence phase, the adjustment criterion for the final model resulted in a value of 208.14, giving the likelihood ratio tests a chi-square value of 73.50 ( $gl = 6$  and  $p = 0$ ). The value of the Pseudo  $R^2$  McFadden's was .10 (Cox & Snell = .09; Nagelkerke = .15). The analysis indicated that successful defence was explained by the individual level (Table 4). Specifically, appropriate actions at the individual level explained 93% of successful defences.

## Discussion

The objective of this study was to find out to what extent each tactical level contributed to the successful completion of the attack and defence phases in introductory football. In general, the results showed that individual and team level actions were the ones that explained a greater percentage of success in the attack and defence phases. However, the correlations showed the relationships between the three tactical levels and success in the attack and defence phases. These results are in line with what the literature suggests, given that tactics are not just the sum of individual actions, but rather the product of the combination of interactions present at the three tactical levels (Godbout & Gréhaigne, 2022; Gréhaigne et al., 2005).

Despite the positive correlations found between successful attack and appropriate actions at the team, small group and individual level, the positive correlation with inappropriate actions at the individual level stood out. This result could be due to the fact that the act of shooting in TAIS is inappropriate if it does not reach the goal. However, in introductory football, children managing to progress with the ball to the vicinity of the opposing goal, despite not scoring a goal, is recognised as an indicator of success in attack (Wunderlich et al., 2021).

Going deeper into the regressions, it was expected that the children would develop successful attack phases mainly through individual and team level actions, for the following reasons. First, according to Nunes et al. (2021) the predominance of individual actions is common in the age range between 9 and 12 years, due to the tendency to use the playing space inefficiently and due to a random and static dispersion of the players on the playing field. Second, at a

practical level, the results seem to suggest that the players were able to position themselves in the playing space, but lacked the initiative to interact with their teammates, as was also found by Barnabé et al. (2016). This lack of interaction at the small group level is often related to a lack of tactical training (Ashford et al., 2020).

In defence, although the success of the phase was correlated with appropriate actions at the individual level, the negative correlation between success and inappropriate actions at the team, small group and individual level stands out. This negative correlation could be due to the fact that, in defence, it was more important not to perform inappropriate actions at the three levels than to perform appropriate actions. Related to that, the coaches prioritise work on offensive actions, limiting the learning of defensive actions to that arising from the understanding and improvement of attacks, without specifically taking into account the work of the defensive phase (Peterson & Bruton, 2020; Pizarro et al., 2020). In fact, the results of the regressions confirmed a higher prevalence of appropriate actions at the individual level (Table 5).

Going deeper into the regressions and into the literature, it seems logical that the successful defence phases were developed through appropriate actions carried out at the individual level (Pizarro et al., 2020). According to Pizarro et al. (2020), when coaches suggest tasks with offensive aims, the participants only learn defensive actions at the individual level. Thus, it is consistent with the results indicating the predominance of individual actions over those of the other two tactical levels when defending. In this regard, it is not possible to learn interactions in small groups and at the team level without being trained specifically in the defensive phase (Pizarro et al., 2020).

In short, this study is relevant insofar as it is the first research work in which the three tactical levels are analysed in a practical way in introductory football. Its fundamental contribution lies in justifying and demonstrating that the play, in both attack and defence, was determined by actions at the three tactical levels: team, small groups and individual. However, the regression analysis for each tactical level seemed to show a predominance of team and individual actions. This result could be due to the fact that introductory football training focuses on positional work and individual

player initiative, not covering the interactive approach between players, which requires tactical learning (Ashford et al., 2020; Fardilha & Allen, 2020).

## Conclusions

In conclusion, the joint analysis of the individual, small group and team levels allowed a more complete explanation of what happened in attack and defence. However, the results reflected a lack of actions at the small group level. Nevertheless, the findings should be taken with caution because they are the result of data from four matches between eight teams, exclusively male, and are only transferable to teams with similar characteristics to those analysed. So, in future research, it would be interesting to corroborate the results from the analysis of the three tactical levels.

As a result of what was observed, the training of tactics in introductory football is suggested, based on the inclusion of the three tactical levels analysed in this study. To encourage tactical learning, teaching approaches that favour understanding of the game would be a fundamental tool (González-Víllora et al., 2020). Across these approaches, three aspects are key. First, the determination of tactical learning objectives, considering each of the three levels. Second, the approach of short plays, as a simulation of real game problems, which enable interactions between players. Lastly, favouring player understanding through feedback queries. Future studies should analyse the effects of this form of teaching on tactical learning at all three levels.

## Referencias

- Anguera, M. T. (2003). Observational methods (General). En R. Fernández-Ballesteros (ed.), *Encyclopedia of psychological assessment*. Sage, 632–637.
- Anguera, M. T., & Hernández-Mendo, A. (2014). Metodología observacional y psicología del deporte: Estado de la cuestión. *Revista de Psicología del Deporte*, 23(1), 103-109.
- Anguera, M. T., Blanco-Villaseñor, A., Hernández-Mendo, A., & Losada, J. L. (2011). Diseños observacionales: Ajuste y aplicación en psicología del deporte. *Cuadernos de Psicología del Deporte*, 11(2), 63-76.
- Ashford, M., Abraham, A., & Poolton, J. (2020). A communal language for decision making in team invasion sports. *International Sport Coaching Journal*, 8(1), 122-129. <https://doi.org/10.1123/iscj.2019-0062>
- Barnabé, L., Volossovitch, A., Duarte, R., Ferreira, A. P., & Davids, K. (2016). Age-related effects of practice experience on collective behaviours of football players in small-sided games. *Human Movement Science*, 48, 74-81. <https://doi.org/10.1016/j.humov.2016.04.007>
- Barquero-Ruiz, C., Arias-Estero, J. L., & Kirk, D. (2020). Assessment for tactical learning in games: A systematic review. *European Physical Education Review*, 26(4), 827-847. <https://doi.org/10.1177/1356336X19889649>
- Barquero-Ruiz, C., Kirk, D., & Arias-Estero, J. L. (2022). Design and validation of the Tactical Assessment Instrument in football (TAIS). *Research Quarterly for Exercise and Sport*, 93(3), 615-632. <https://doi.org/10.1080/02701367.2021.1889457>
- Barquero-Ruiz, C., Morales-Belando, M. T., & Arias-Estero, J. L. (2021). A teaching games for understanding program to deal with reasons for dropout in under-11 football. *Research Quarterly for Exercise and Sport*, 92(4), 618-629. <https://doi.org/10.1080/02701367.2020.1759767>
- Fardilha, F. D. S., & Allen, J. B. (2020). Defining, assessing, and developing creativity in sport: A systematic narrative review. *International Review of Sport and Exercise Psychology*, 13(1), 104-127. <https://doi.org/10.1080/1750984X.2019.1616315>
- Godbout, P., & Gréhaigine, J. F. (2022). Regulation of tactical learning in team sports – the case of the tactical-decision learning model. *Physical Education and Sport Pedagogy*, 27(3), 215-230. <https://doi.org/10.1080/17408989.2020.1861232>
- González-Víllora, S., Fernández-Rio, J., Guijarro, E., & Sierra-Díaz, M. J. (2020). *The game-centred approach to sport literacy*. Routledge.
- Gréhaigine, J. F., & Godbout, P. (1995). Tactical knowledge in team sports from a constructivist and cognitivist perspective. *Quest*, 47(4), 490-505. <https://doi.org/10.1080/00336297.1995.10484171>
- Gréhaigine, J. F., Richard, J. F., & Griffin, L. (2005). *Teaching and learning team sports and games*. Taylor & Francis.
- Kirk, D. (2017). Teaching games in physical education: Towards a pedagogical model. *Revista Portuguesa de Ciências do Desporto*, 17, 17-26. <https://doi.org/10.5628/rpcd.17.S1A.17>
- Nunes, N. A., Gonçalves, B., Roca, A., & Travassos, B. (2021). Effects of numerical unbalance constraints on workload and tactical individual actions during ball possession small-sided soccer games across different age groups. *International Journal of Performance Analysis in Sport*, 21(3), 396-408. <https://doi.org/10.1080/24748668.2021.1903249>
- Peterson, S. W., & Bruton, M. R. (2020). A review of the interaction between the striker and the goalkeeper at the individual tactical level in football. *International Journal of Sports Science & Coaching*, 15(3), 452-464. <https://doi.org/10.1177/1747954120915193>
- Piaget, J. (1977). The role of action in the development of thinking. In W. F. Overton, & J. M. Gallagher (ed.), *Knowledge and development*. Springer, 17-42. [https://doi.org/10.1007/978-1-4684-2547-5\\_2](https://doi.org/10.1007/978-1-4684-2547-5_2)
- Pill, S., & Hyndman, B. (2018). Gestalt psychological principles in developing meaningful understanding of games and sport in physical education. *Journal of Teaching in Physical Education*, 37(4), 322-329. <https://doi.org/10.1123/jtpe.2018-0033>
- Pizarro, D., Práxedes, A., Travassos, B., & Moreno, A. (2020). Development of defensive actions in small-sided and conditioned games with offensive purposes in futsal. *Frontiers in Psychology*, 11, 28-79. <https://doi.org/10.3389/fpsyg.2020.591572>
- Wunderlich, F., Seck, A., & Memmert, D. (2021). The influence of randomness on goals in football decreases over time. An empirical analysis of randomness involved in goal scoring in the English Premier League. *Journal of Sports Sciences*, 39(20), 2322-2337. <https://doi.org/10.1080/02640414.2021.1930685>

**Conflict of Interests:** No conflict of interest was reported by the authors.



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