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Footballers' movement behaviour during 2-, 3-, 4- and 5-a-side small-sided games

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Abstract

The aim of this study was to compare footballers' movement behaviour during 2-, 3-, 4- and 5-a-side small-sided games. Ten young professional players (age = 18.0 ± 0.67 years) participated in 3 bouts of each small-sided games for 6 min with 1 min of active rest between bouts. Positional data were collected using GPS system units and used to calculate the following variables: team centroid, distance between each player and own and opponent team centroids and distance between centroids. Approximate entropy was used to identify the time series regularity for each variable. The distance to own team centroid increased with the number of players (effect sizes from moderate to perfect). The results from the distance to the opponent's centroid exhibited a similar trend. The distance between centroids decreased from 2- to the 4-a-side, but then increased in 5-a-side. A higher number of players were associated with lower approximate entropy values, suggesting higher positional organisation in small-sided games with more players. The highest movement regularity found in 4- and 5-a-side identified these formats as more adequate to promote team-related emergent and self-organised behaviours.

Keywords: *complex systems, dynamical systems, GPS, team behaviours, approximate entropy*

Introduction

Performance in team sports is the result of a long-term training process designed to prepare the players for the complex requirements of competition (Duclos, Burnet, Schmied, & Rossi-Durand, 2008; Sampaio & Maçãs, 2012), with special emphasis on self-organising properties and dynamic adaptive behaviour to environmental constraints (Dellal et al., 2008; Sampaio & Maçãs, 2012). In fact, a systematic view of team sports may be seen as fundamental to the emergence of a new understanding of games (Grehaigine, Godbout, & Zerai, 2011). One of the major challenges of this approach is the possibility to investigate interpersonal interactions, both within and between teams, with the goal to identify patterns of play (McGarry, Anderson, Wallace, Hughes, & Franks, 2002). This approach also allows describing the formation of emergent game patterns (Vilar, Araújo, Davids, & Button, 2012), while trying to preserve the sequential and situational character of game events.

The available literature presents interesting frameworks about this topic, for example, describing

the game of football as a game sport including sub-systems with intra- and inter-dynamic interactions. Thus, the dynamical structure of team sports could be investigated at different levels, from individual (Travassos, Araújo, Vilar, & McGarry, 2011) to collective interactions (Folgado, Lemmink, Frencken, & Sampaio, 2014; Frencken, De Poel, Visscher, & Lemmink, 2012; Frencken & Lemmink, 2008; Frencken, Lemmink, Delleman, & Visscher, 2011; Sampaio & Maçãs, 2012). The tactical performance indicators should reflect the importance of teamwork, pace, fitness and movement (Hughes & Bartlett, 2002). Since players' behaviour on the pitch has a higher degree of variability, being dependent of the interaction between players and teammates (Davids, Araújo, & Shuttleworth, 2005), a more holistic approach based on collective variables such as team centroid, covered area or geometric shape would constitute a step forward in research. From this perspective, player positioning can be a candidate for understanding tactical performance in football (Kannekens, Elferink-Gemser, & Visscher,

2011) in a way to capture collective decision-making and players' coordination within the team principles of the game (Sampaio & Maças, 2012). In this way, it is assumed that tactical performance in football depends upon how players are dynamically positioned according to the teams' overall space distribution and the dynamic functional constraints at the scale of the environment (Araújo, Davids, & Hristovski, 2006).

Searching for a collective variable that captures the dynamics of team sports, Frencken et al. (2011) examined the centroid position and the surface area of two teams during a 4-a-side small-sided game (SSG). The authors found a strong linear relation between the forward-backward motion of the centroids. They concluded that surface area and particularly centroid position might be collective variables that capture the team dynamics. A similar conclusion was suggested earlier after the identification that team centroids tend to move in the same direction, especially in forward-backward direction, over the course of an SSG game (Frencken & Lemmink, 2008). In another study, the teams' centroid position longitudinally and laterally was analysed during an international-standard football match (Frencken et al., 2012). The authors found that periods of high variability in inter-team distances were linked with collective defensive actions and team reorganisation in dead-ball moments rather than goal attempts. Folgado, Lemmink, et al. (2014) measured the teams' tactical performance in 3- and 4-a-sided SSG performed by youth football players using a new variable, the length per width ratio (*lpwratio*). They found that younger teams presented higher *lpwratio* and concluded that this variable could be a useful tool to measure tactical performance in youth football SSG.

The players' dynamic behaviour can be analysed by measuring the team centroid (mean values of all field players position in each moment), complemented with the analysis of approximate entropy (ApEn). The ApEn (Pincus, 1991) is an adequate statistical procedure to analyse nonlinear time series data that holds both deterministic chaotic and stochastic process. For this case, the ApEn of the positional variables allows identifying the regularity in player's movement patterns, as used previously in football performance analysis research (Couceiro, Clemente, Martins, & Machado, 2014; Gonçalves, Figueira, Maças, & Sampaio, 2013; Vilar, Araújo, Davids, & Bar-Yam, 2013).

Several of the available studies identify the SSG as representative training forms for improving fitness, technical and decision-making skills (Brito, Krstrup, & Rebelo, 2012). In addition, they represent coherent sub-phases of full-sized football matches (Frencken et al., 2011), and the game flow can be described by using variables such as the centroid position or the surface area of a team (Frencken & Lemmink, 2008). A recent study

showed that positional data can be used to monitor players' expertise during SSG and, therefore, can be important performance indicators (Sampaio & Maças, 2012). A further advance in research would be to identify the effects from the number of players on tactical behaviour during the SSG. In fact, describing high-level players' movement behaviour when playing SSG would help to better understand game dynamics and players' adaptive responses to these changes in teams' configurations. Thus, the aim of this study was to compare footballers' movement behaviour during 2-, 3-, 4- and 5-a-side SSG by measuring the players' distance to team and opponent team centroid and distance between team's centroids.

Methods

Participants

Ten under-19 male professional young football players (age = 18.0 ± 0.67 years, mean $\pm$ s) with 10.20 ± 1.81 years of experience (range between 7 and 12 years) participated in this study. All players were members of the same team and performed 5 training sessions (90 min) per week and played an official game during the weekend in the Portuguese under 19 1st Division. Five of these players have already represented the Portuguese National team. Furthermore, all players practised regularly with the elite professional team that competed in the Portuguese 1st League and in the Europa League.

All players, parents or legal guardians, and team supervisors were informed about the research procedures, requirements, benefits and risks, and signed a written consent before the start. The study followed the guidelines from the Declaration of Helsinki and was approved by the local Ethics Committee.

Procedures

The SSG were played in the last eight weeks of the 2011–2012 competitive season. The coach selected the best 10 players based on their tactical skills. Thereafter, he divided the players into two balanced teams taking into account playing positions, tactical/technical levels, physical capacities and participation in competitive matches, as suggested earlier (Casamichana & Castellano, 2010).

The SSG formats (2-, 3-, 4- and 5-a-side) were played twice by the same teams in different sessions, for a total of 6 bouts, with a week interval during 8 consecutive weeks (example, 1st and 2nd week, the 2-a-side SSG was played, 3rd and 4th week 3-a-side, ...). The SSG were played at the beginning of each training session, following a standardised 20-min warming-up consisting of running, static stretching and a ball

possession game (e.g., 3-a-side and 5-a-side without goals) with moderate intensity. In each session, players performed one SSG with 20-min duration (3 bouts of 6 min with 1 min of active recovery in between). After each 6-minutes period, the teams changed the playing direction. SSG were played with formal goals with randomly assigned goalkeepers per game. When the ball was kicked outside of the pitch, the corresponding goalkeeper made the replacement as fast as possible, using extra balls placed in the goals. The offside rule was not applied during the game and coach encouragement or feedback was not allowed. The area for each player was kept to 150 m² (Hill-Haas, Dawson, Coutts, & Rowsell, 2009) (pitch dimensions: 2-a-side, 28 × 21 m; 3-a-side, 35 × 26 m; 4-a-side, 40 × 30 m; 5-a-side, 44 × 34 m).

Players' positions during SSG were measured using portable 5 Hz global positioning system units (SPI-PRO, GPSports, Canberra, ACT, Australia). These units were placed into a harness positioned between the player's shoulder blades (Hill-Haas et al., 2009). Independent verifications of the commercially available GPS validity have already been established and described in football, allowing the increase of the accuracy of game-related conditioning activities (Akubat, Barrett, & Abt, 2014; Portas, Harley, Barnes, & Rush, 2010). Johnston and colleagues (Johnston, Watsford, Kelly, Pine, & Spurrs, 2013) showed that 5 Hz GPS units have for total distance covered a 5% below typical error of measurement and 5–10% in peak speed. Also, the players wear the same GPS unit for each game session aimed to reduce measurement error (Jennings, Cormack, Coutts, Boyd, & Aughey, 2010).

Positional data allowed calculating the following variables (Figure 1): team centroid, as measured by the mean *x* and *y* positions of all team players, with exception of the goalkeeper; (a) distance to centroid, as measured by the absolute distance of each player to the geometric centre of the team, plotted against time; (b) distance to opponents centroid, as

measured by the absolute distance of each player from the geometric centre of the opposite team, plotted against time; and, (c) distance between teams' centroids, as measured by the absolute distance between the geometric centres of the two teams plotted against time.

Data processing

The data recorded by GPS were exported to MATLAB (The Mathworks Inc., Natick, MA) for processing and analysis. Latitude and longitude data collected from each individual outfield player were synchronised. Missing data gaps were re-sampled using an interpolation method to guarantee the same length of the time series. Latitude and longitude data were transposed to meters, using the universal transverse mercator (UTM) coordinate system by means of a MATLAB routine (Folgado, Duarte, Fernandes, & Sampaio, 2014). The ApEn was calculated to identify the regularity in player's movement patterns. The ApEn algorithm quantifies regularity in a time series by measuring the logarithmic likelihood that runs from patterns that are close (within *r*) to "*m*" contiguous observations and remain close (with the same tolerance wide *r*) on subsequent incremental comparisons (Duclos et al., 2008; Pincus, 1991). Imputed values of a vectors' length (*m*) was 2 and the tolerance (*r*) was 0.2 standard deviations (Stergiou, Buzzi, Kurz, & Heidel, 2004). The obtained values are unit-less real numbers ranging from 0 to 2, with lower values corresponding to more repeatable sequences of data points (Pincus, 1991).

Statistical analysis

The descriptive data analysis was reported as means ± standard deviations. The magnitudes of the identified effects according to the game formats were classified to overcome the shortcomings associated with traditional N-P null hypothesis significance testing (Wilkinson, 2014). These magnitudes were expressed as standardised effect sizes with 95% confidence intervals based on the following criteria: <0.20 = trivial; 0.20 to 0.59 = small; 0.60 to 1.19 = moderate, 1.20 to 2.0 = large, 2.0 to 4.0 = very large, and >4 nearly perfect (Hopkins, Marshall, Batterham, & Hanin, 2009). The statistical computations were performed in RStudio® (version 0.98.977) using the Package *compute.es* (version 0.2–3) (Cooper, Hedges, & Valentine, 2009).

Results

The absolute distance to both team and opponent team centroid increased significantly with the players' number. The variability among the three

Figure 1. Representation of the variables: (a) distance to own team centroid; (b) distance to opponent team centroid; (c) distance between centroids.

Figure 2. Absolute distance (m) from each player to both (a) team and (b) opponent team centroid in bout 1, 2, 3 and (c) between teams' centroids. Values are mean $\pm$ standard deviation.

bouts within each SSG game format was very small (see Figure 2).

The ApEn values suggested that in the SSG formats with more players, the distance to team centroid was more regular than in the formats with less players (see Figure 3). This evidence was particularly noticed in the distance to both team and opponents' centroid (see Figure 3a and b).

The absolute distance to the opponent team centroid decreased with the players' number (see Figure 2). Also, the ApEn values identified for the absolute distance to opponent team centroid suggested that this distance was less regular in SSG formats with fewer players.

Figure 3. Approximate entropy (a.u.) from each player to both (a) team and (b) opponent team centroid in bout 1, 2, 3 and (c) between teams' centroids. Values are mean $\pm$ standard deviation.

The distance between centroids presented a small decrease from 2- to 4-a-side SSG and a moderate to nearly perfect increase to 5-a-side SSG (see Table I and Figure 2c). Moreover, the distance between centroids presented higher stability between bouts. Also a decrease was identified in ApEn values with the increase of the number of players (see Figure 3).

The obtained effect sizes between SSG formats increased with the number of players from small to perfect differences (see Table I). The 5-a-side format showed from moderate to perfect differences compared to the other SSG across all distance values and from trivial to small in ApEn values.

Table I. Comparative results from positioning variables across the small-sided game formats. Results are presented as mean of the effect size with 95% confidence intervals.

SSG		3-a-side mean (95% CIs)	4-a-side mean (95% CIs)	5-a-side mean (95% CIs)
Team centroid				
Distance (m)	2-a-side	B1: -3.18 [-4.58, -1.78] ⁺⁺	B1: -3.34 [-4.66, -2.01] ⁺⁺	B1: -3.49 [-4.76, -2.22] ⁺⁺
		B2: -2.24 [-3.42, -1.06] ⁺⁺	B2: -4.16 [-5.68, -2.64] ⁺⁺⁺	B2: -2.73 [-3.86, -1.61] ⁺⁺
		B3: -2.13 [-3.29, -0.97] ⁺⁺	B3: -3.17 [-4.46, -1.88] ⁺⁺	B3: -2.29 [-3.33, -1.24] ⁺⁺
	3-a-side	-	B1: -0.99 [-1.8, -0.18] ^{ooo}	B1: -2.10 [-3, -1.19] ⁺⁺
			B2: -1.5 [-2.37, -0.63] ⁺	B2: -1.64 [-2.48, -0.8] ⁺
			B3: -1.31 [-2.15, -0.46] ⁺	B3: -1.44 [-2.26, -0.63] ⁺
ApEn (a.u)	2-a-side			B1: -1.4 [-2.15, -0.65] ⁺
				B2: -0.84 [-1.54, -0.14] ^{ooo}
				B3: -0.73 [-1.42, -0.04] ^{ooo}
	3-a-side			B1: 3.09 [1.9, 4.28] ⁺⁺
				B2: 3.40 [2.14, 4.65] ⁺⁺
				B3: 2.05 [1.04, 3.06] ⁺⁺
Opponent team centroid	2-a-side	B1: 0.43 [-0.5, 1.36] ^{oo}	B1: 1.74 [0.73, 2.75] ⁺	B1: 2.27 [1.34, 3.2] ⁺⁺
		B2: 0.69 [-0.25, 1.64] ^{ooo}	B2: 0.96 [0.04, 1.87] ⁺	B2: 3.31 [2.19, 4.42] ⁺⁺
		B3: -0.07 [-0.99, 0.85] ^o	B3: 0.46 [-0.42, 1.33] ^{oo}	B3: 2.45 [1.49, 3.4] ⁺⁺
	3-a-side	-	B1: 0.90 [0.1, 1.7] ^{ooo}	B1: 1.92 [1.11, 2.73] ⁺
			B2: 0.40 [-0.37, 1.17] ^{oo}	B2: 1.53 [0.77, 2.29] ⁺
			B3: 0.62 [-0.16, 1.4] ^{ooo}	B3: 1.75 [0.96, 2.54] ⁺
Distance (m)	2-a-side			
	3-a-side			
ApEn (a.u)	2-a-side	B1: -1.73 [-2.81, -0.65] ⁺	B1: -1.32 [-2.28, -0.37] ⁺	B1: -2.04 [-3.05, -1.04] ⁺⁺
		B2: -1.55 [-2.6, -0.5] ⁺	B2: -1.55 [-2.54, -0.57] ⁺	B2: -1.94 [-2.93, -0.95] ⁺
		B3: -1.04 [-2.02, -0.06] ^{ooo}	B3: -1.07 [-1.99, -0.14] ^{ooo}	B3: -1.74 [-2.7, -0.78] ⁺
	3-a-side	-	B1: -0.32 [-1.09, 0.44] ^{oo}	B1: -1.59 [-2.42, -0.75] ⁺
			B2: -0.51 [-1.28, 0.27] ^{oo}	B2: -1.46 [-2.28, -0.64] ⁺
			B3: -0.53 [-1.3, 0.25] ^{oo}	B3: -1.42 [-2.24, -0.61] ⁺
Distance (m)	2-a-side			B1: -1.38 [-2.13, -0.64] ⁺
				B2: -1.18 [-1.9, -0.45] ^{ooo}
				B3: -0.97 [-1.67, -0.26] ^{ooo}
	3-a-side			B1: 4.29 [2.85, 5.74] ⁺⁺⁺
				B2: 3.41 [2.16, 4.67] ⁺⁺
				B3: 3.07 [1.88, 4.26] ⁺⁺
Distance (m)	2-a-side	B1: 0.95 [-0.02, 1.92] ^{ooo}	B1: 3.51 [2.15, 4.87] ⁺⁺	B1: 3.39 [2.26, 4.52] ⁺⁺
		B2: 1.1 [0.11, 2.09] ^{ooo}	B2: 1.07 [0.15, 1.99] ^{ooo}	B2: 2.74 [1.73, 3.74] ⁺⁺
		B3: 0.16 [-0.76, 1.08] ^o	B3: 1.24 [0.29, 2.18] ⁺	B3: 3.07 [2, 4.14] ⁺⁺
	3-a-side	-	B1: 1.74 [0.84, 2.64] ⁺	B1: 2.61 [1.69, 3.52] ⁺⁺
			B2: 0.54 [-0.24, 1.32] ^{oo}	B2: 1.15 [0.42, 1.87] ^{ooo}
			B3: 1.13 [0.3, 1.95] ^{ooo}	B3: 2.2 [1.35, 3.05] ⁺⁺
Distance (m)	2-a-side			
	3-a-side			
Distance (m)	2-a-side	B1: 0.06 [0.01, 0.1] ^o	B1: 0.28 [0.24, 0.33] ^{oo}	B1: -0.95 [-0.99, -0.9] ^{ooo}
		B2: -0.04 [-0.08, 0.01] ^o	B2: 0.17 [0.12, 0.21] ^o	B2: -0.71 [-0.76, -0.66] ^{ooo}
		B3: 0.11 [0.06, 0.16] ^o	B3: 0.21 [0.16, 0.26] ^{oo}	B3: -0.46 [-0.51, -0.41] ^{oo}
	3-a-side	-	B1: 0.22 [0.18, 0.27] ^{oo}	B1: -0.98 [-1.03, -0.93] ^{ooo}
			B2: 0.20 [0.15, 0.25] ^{oo}	B2: -0.67 [-0.71, -0.62] ^{ooo}
			B3: 0.11 [0.07, 0.16] ^o	B3: -0.62 [-0.67, -0.57] ^{ooo}
Distance (m)	2-a-side			B1: -1.17 [-1.22, -1.12] ^{ooo}
				B2: -0.89 [-0.94, -0.84] ^{ooo}
				B3: -0.73 [-0.78, -0.69] ^{ooo}
	3-a-side			

Notes: Differences are defined as ^otrivial; ^{oo}small; ^{ooo}moderate, ⁺large, ⁺⁺very large, ⁺⁺⁺nearly perfect. B1, B2 and B3 are the three bouts.

Discussion

The footballers' movement behaviour during 2-, 3-, 4- and 5-a-side SSG was compared by measuring the players' distance to team and opponent team centroid and distance between team's centroids. The absolute distance from the players to both their own team and the opponents' team centroid increased from 2-a-side to 5-a-side SSG

formats, the regularity has also increased across the SSG formats. The increase in players' positional regularity suggests that training tactical performance requires using a higher number of players. Moreover, these findings suggest that the addition of players to the team might benefit the individual understanding of how to behave collectively. According to Frencken et al. (2012), task constraints (e.g., interpersonal distance, location

of opponents, teammates and the ball position and possession) can influence the functional interpersonal distances between them. This in turn affects the dynamic inter-player coordination that influences the decision-making process (Davids et al., 2005). During the game, players continuously search for stable attractors, e.g. team centroid, that best represent collaborative work and inter-players coordination during the game (Vilar et al., 2012). The current results suggest that lower inter-player distance in SSG formats with less players require additional short-distance movements, which probably leads to a decrease in regularity. As the number of players increases, there is more regularity, probably because larger inter-player distances allow increasing decision time and, thus, allowing the players to perceive more information. Therefore, the centroid seems a strong dynamical attractor once the players are aware of the information sources that specify goal achievement, and the selected option can be an opportunity for action (Frencken et al., 2012; Sampaio & Maças, 2012). In essence, the low variability between bouts in players' absolute distance (m) to team centroid suggests a higher commitment with team strategy and a higher coordination between players. The low variability found between the different SSG bouts is also relevant because the contribution of the individual positioning of each player to the location of the team centroid is higher in SSG with fewer players. The high level of expertise of the players can be an additional explanation to this fact because an enhanced collective approach to the game can lead to a more balanced pitch distribution. This finding is in accordance with previous research (Frencken et al., 2011), concluding that team centroids moves in the same direction over the course of game and is influenced by the ball position. Concomitantly, it might be hypothesised that players further away from the team centroid probably had a lower chance to receive a pass from a teammate since the execution is more difficult and also because his teammate had a lower probability of seeing him. Therefore, by knowing and understanding the absolute distance between players, coaches may plan and monitor the training drills more accurately. Further studies can explore the relation between the distance to the centroid with the distances and angles between players, aiming to understand better how to manipulate the environment in practice for passing opportunities to emerge.

Results in the current study are very similar between the three bouts, most likely as a result of the high level of expertise of the participating players (more than 10 years of experience). In fact, playing

football at this level requires sharing positioning and principles of play (Kannekens et al., 2011) that are key to develop inter-player coordination and, consequently, to develop organised and effective team play. In contrast to our findings, Folgado, Lemmink, et al. (2014) found higher distances between teams centroids in 3-a-side compared to 4-a-side SSG in amateur under-13 players, suggesting an effect of level of expertise.

The absolute distance from players to the opponents' centroid was higher than to their own team centroid. However, the tendency of increased distances with the increase of the number of players remained. The ApEn values were higher compared to those obtained for the distance to own team centroid. It was already suggested that dynamic inter-players' coordination tendencies in relation to the opponent team should present a higher level of irregularity to be unpredictable in attacking situations (Duarte et al., 2012). Concomitantly, the increase of absolute distance in relation to the opponent team centroid suggests that players react to the opponents' movements, in respect to the general rules of the game, searching for advantage in specific moments during the game. In addition, it is also suggested that players' behaviour is more dependent on their teammates positioning than on their opponents.

The absolute distances were higher in SSG formats with more players. This can be explained by the positioning principles of play that regulate team offensive and defensive organisations during the game. In the SSG formats with less players, the participants need to move continuously with the aim to support teammates to create opportunities to pass the ball. However, the SSG formats with more players require the players to perform differently, because they need to develop their activity in a larger area, their roles are more specific and they are not always involved in near-the-ball actions (Wade, 1996).

The ball position plays a crucial role for the inter-team distance (Folgado, Lemmink, et al., 2014). In this study, the distance between centroids was lower in 4-a-side, but higher and less random in 5-a-side. The 4-a-side SSG is the minimal format where all defensive (delay, concentration, balance and control/restraint) and offensive (penetration, width, mobility and improvisation) principles of the game are incorporated (Wade, 1996). Therefore, a lower distance between centroids can be the result of higher inter-team coordination. Accordingly, the 5-a-side game is the only format that represents an organisation with specific playing positions; otherwise, the team will not be able to cover the whole pitch. The higher regularity values in this SSG format confirm that positioning on the pitch is the result of intra and inter-team coordination.

Despite the presence of the same goals in the SSG formats with more players, the players seem to use a higher level of organisation and a more rational space occupation that in turn leads to a more stable behaviour of the players in these SSG formats.

In a practical point of view playing football requires a substantial amount of emergent and self-organised behaviours from players; thus, the coaches' decisions may have a strong influence in performance, particularly at the time of designing tasks to optimise team coordination. The SSGs with less number of players increase the game unpredictability. On the contrary, larger formats require a higher level of organisation and a more rational space occupation, leading to behaviours that are more predictable and higher inter-team coordination.

Understanding the dynamics from absolute and relative distances between players and their relation to team centroid in the different SSG formats allow coaches to monitor the training drills more accurately and provide training drills adequate to improve the collective positional adjustments, the specific technical actions and physiological demands. For example, in a 3-a side SSG, these distances should be around 5 to 6 m and, therefore, require the optimisation from the focus on environmental cues, passing performances and explosive strength and power within these limits.

The variability in the players distance to team centroid is a tactical performance indicator that describes the inter-player coordination levels during the SSG. Moreover, the distance between centroids allows understanding inter-team coordination.

Conclusions

The current study showed that positional data of the players across the different SSG formats can be a strong candidate to help explaining tactical behaviour, providing to coaches practical tools to optimise the daily training process. The results indicated that the 4- and 5-a-side formats are the preferred SSG formats to achieve team-related emergent and self-organised behaviour, as they showed higher predictability in positional inter-team coordination. The smaller formats (2- and 3-a-side) are more indicated to improve the game unpredictability once they presented higher irregularity on player positional behaviour.

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