

Effect of outside floaters on soccer players' tactical behaviour in small-sided conditioned games

Efecto de los comodines exteriores en el comportamiento táctico de los jugadores de fútbol en los juegos reducidos y condicionados

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Abstract: The aim of this study was to verify the effect of outside floaters on soccer players' tactical behaviour in small-sided and conditioned games (SSCGs). The sample comprised 54 Brazilian top-level academy players. The instrument used to assess players' tactical behaviour was the System of Tactical Assessment in Soccer (FUT-SAT). Tactical behaviour was quantified by the number of tactical actions and percentage of successful actions of the core tactical principles of soccer. Wilcoxon's and Paired t tests were used to compare tactical behaviour in SSCGs with and without outside floaters. Effect sizes were calculated through Pearson's *r*. In SSCGs with outside floaters there was a significant decrease in the number of actions of the tactical principles of penetration (40.12%; $r = .492$), offensive coverage (22.19%; $r = .296$), concentration (25.49%; $r = .326$), and a significant increase in actions of defensive unity (13.81%; $r = .145$). Also, SSCGs with outside floaters displayed significantly less correct actions of all tactical principles, except penetration and depth mobility. From a practical perspective, using outside floaters along the goal line may limit movements with the ball and inside the centre of play, as well as increase the number of actions aimed at reducing the opponents' effective play-space. Players with high tactical performance should be included in SSCGs with outside floaters, once findings allowed to conclude that task constraints posed new problems that induced them to find different solutions.

Key words: Football, Task Constraints, Core Tactical Principles, Training.

Resumen: El objetivo de este estudio fue verificar el efecto de los comodines externos en el comportamiento táctico de los jugadores de fútbol en los juegos reducidos y condicionados (JRC). La muestra comprendía 54 jugadores brasileños de alto nivel de las categorías de base. El instrumento utilizado para evaluar el comportamiento táctico de los jugadores fue el Sistema de Evaluación Táctica en el Fútbol (FUT-SAT). Se analizó el comportamiento táctico a través de la frecuencia de las acciones tácticas y el porcentaje de acciones correctas de los principios tácticos fundamentales del fútbol. Se utilizó la prueba de Wilcoxon y la prueba de la *t* emparejada para comparar el comportamiento táctico entre los JRC con y sin comodines externos. Se utilizó la prueba *r* de Pearson para verificar el tamaño del efecto. En los JRC con comodines externos se observó significativamente menos acciones de los principios tácticos de penetración (40.12%; $r = .492$), cobertura ofensiva (22.19%; $r = .296$), concentración (25.49%; $r = .326$), y significativamente más acciones de unidad defensiva (13.81%; $r = .145$). En los JRC con comodines externos se observó significativamente menos acciones correctas de todos los principios tácticos, excepto los de penetración y movilidad de profundidad. El uso de comodines externos en la línea de meta cambió y dificultó la realización de las acciones tácticas ofensivas y defensivas. Desde un punto de vista práctico, se puede utilizar los comodines externos en la línea de meta para reducir los movimientos con el balón y en el interior del centro de juego, además de aumentar los movimientos para reducir el espacio de juego efectivo de los adversarios.

Palabras claves: Fútbol, Constreñimientos de la tarea, Principios tácticos, Entrenamiento.

Introduction

Skill-based games, such as small-sided and conditioned games (SSCGs), provide players with activities focused on game-related situations. (Ford, Yates, & Williams, 2010). These activities performed in limited spaces with fewer players, which include some characteristics of the

game of soccer, such as high variability and contextual dependence (Stratton, Reilly, Williams, & Richardson, 2004; Williams & Hodges, 2005). Using SSCGs in training sessions enables coaches to replicate, through task constraints, unpredictable and variable game scenarios similar to those found in competitive settings (Davids, Button, & Bennett, 2008; Vilar, Araújo, Davids, & Bar-Yam, 2013). Training activities based on SSCGs helps developing players' tactical skills, once their main contribution is to help improving perception for specific

tactical problems (Sarmiento et al., 2018; Ward, Hodges, Starkes, & Williams, 2007).

The utilization of outside floaters as task constraints in SSCGs has received considerable attention in literature, (Hill-Haas, Coutts, Dawson, & Rowsell, 2010), as they provide more passing lanes and encourage exploration of playing space by the players with the ball (Padilha, Guilherme, Serra-Olivares, Roca, & Teoldo, 2017). Also, outside floaters support the team in possession by controlling the ball and making passes without opposition (Hill-Haas et al., 2010; Mallo & Navarro, 2008). This support generates numerical advantage for the attacking team and disadvantage for the defending team (Clemente, Martins, Mendes, & Campos, 2015). Outside floaters may play along the side lines, with the purpose of enabling teams to circulate the ball through wide passes. In SSCGs with outside floaters along the side lines, youth players displayed lower % heart rate during 3 vs. 3+1 and 3 vs. 4 with mini goals game formats, played in a 37m x 28m area, for 24 minutes (Hill-Haas et al., 2010). On the other hand, in a 3 vs. 3+2 game format, played in 3 bouts of 4 minutes without goalkeepers, male amateur soccer players displayed higher average heart rate and %HRres, when compared to a 3 vs. 3+2 game format with mini goals (Clemente et al., 2015; Clemente, Wong, Martins, & Mendes, 2014). Besides, in 7-a-side game with goalkeepers and two floaters along the side lines played in 6-minute bouts in a 40 m x 25m field, undergraduate sports science students had more possession of the ball and increased their distance in width from the opposition than in a 7-a-side game without floaters (Castellano, Silva, Usabiaga, & Barreira, 2016). Finally, in a 3 vs. 3+2 game with outside floaters and no goalposts or goalkeepers, played in a 25m x 30m field, professional players performed more passes than in a 2 vs. 2+2 game format (Owen, Twist, & Ford, 2004), while male elite U-19 soccer players had fewer errors in short distance passes in 3-a-side with goalkeepers + 2 outside floaters when compared to a 3-a-side game in a 33m x 20m field during 5 minutes (Mallo & Navarro, 2008).

Despite the relevance of the utilization outside floaters along the side lines for players' performance, floaters can also play along the goal lines (Clemente et al., 2015). Positioning outside floaters along the goal lines enables players to perform in-depth passes with the purpose of progressing toward the opponent's half (Teoldo, Guilherme, & Garganta, 2015). Outside floaters along the goal lines also serve as a reference to guide the tactical behaviour of players during either the

offensive or defensive phase, without the need for interventions by the coach (Araújo, 2009).

Players' tactical behaviour is based on the tactical actions related to the core tactical principles, which allow to achieve tactical solutions for the problems that emerge from the game (Teoldo, Garganta, Greco, & Mesquita, 2009). Thus, the assessment of soccer players' tactical behaviour in SSCGs with outside floaters along the goal lines may help uncovering which core tactical principles are being performed according to the problems faced during defensive phase and the possibilities available during attacking moves (Davids, Araújo, Correia, & Vilar, 2013; Serra-Olivares, Clemente, & González-Villora, 2016).

Despite the importance of analysing the influence of floaters on players' tactical behaviours, there is a lack of evidence of that, to the best of our knowledge. Therefore, the aim of this study is to verify the effect of the utilization of SSCGs with outside floaters on soccer players' tactical behaviour. We hypothesized that the utilization of outside floaters would result in fewer individual tactical actions with the ball, as well as in more individual tactical actions aimed to protect the goal (Padilha et al., 2017).

Methods

Participants

Fifty-four male top-level academy soccer players (eighteen defenders, eighteen midfielders and eighteen forwards) from a first division Brazilian club (age: 15.49 ± 2.79 years old; time of practice 1268.70 ± 736.17 hours; years of practice 7.83 ± 2.32) participated in this study. As sample inclusion criteria, players should participate in soccer tournaments at regional and national levels. Players not competing in tournaments at regional and national levels were excluded from the sample. The present study was approved by the Research Ethics Committee and complies to the standards of the Declaration of Helsinki (2013) and of the National Health Council (CNS 466/2012). The club's representatives and players' tutors signed an Informed Consent, acknowledging their participation in the study.

Experimental Approach

All small-sided and conditioned games (SSCGs) were played in the same type of surface (natural grass) and at the same time of day (morning), in order to avoid effects of circadian cycle (Drust, Waterhouse, Atkinson, Edwards, & Reilly, 2005). The teams were picked by

the coaching staff (with the purpose of avoiding competitive imbalances) and were organized according to players positional roles (defender, midfielder and forward). Players were instructed to play according to the official rules of soccer, except for the offside rule. During the game there was no verbal interference from the coaches nor from the researchers. The SSCGs were played in a 36-meter long x 27-meter wide area. Before the start of the 4-minute game, players were provided with a thirty-second task familiarization, as recommended by the test protocol (Teoldo, Garganta, Greco, Mesquita, & Maia, 2011). Each team played the same opponents once per day, during two different days. In the first day, SSCGs without floater condition were played with the following format: «goalkeeper + 3 vs. 3 + goalkeeper» (Gk+3 vs. 3+Gk). The use of this format (Gk+3 vs. 3+Gk) is justified by the fact that this is the smallest structure that ensures the occurrence of all the offensive and defensive core tactical principles of soccer (Teoldo et al., 2011). A total of nine games were played in this format. In the second day, SSCGs with outside floaters along the goal lines were played by the same teams, lined up following the same positional arrangement (one defender, one midfielder and one forward). This time players were informed about the presence of the four outside floaters along the goal lines (Gk+3 vs. 3+Gk)+4. Nine games were also played under this format. The outside floaters wore a vest of a different colour from the ones worn by the teams. All questions raised by the players regarding the use of the outside floaters were addressed. All participants were aware that the floaters were only allowed to aid the attacking team (the team in possession of the ball). The four outside floaters played three games before being replaced by other participants. In total, twelve different participants played as outside floaters. All outside floaters were midfielder players.

Instrument

The instrument used to assess players' tactical behaviour was the System of Tactical Assessment in Soccer - «FUT-SAT» (Teoldo et al., 2011). Recent studies using this system reliability values over 0.81 for analysis of tactical actions (Gonçalves et al., 2017; Gonzaga, Albuquerque, Malloy-Diniz, Greco, & Teoldo, 2014; Moniz, Scaglia, Sarmiento, Garcia-Calvo, & Teoldo, 2020; Padilha et al., 2017). The FUT-SAT comprises two macro-categories, seven categories and seventy-six variables according to the kind of information provided by the system (see Figure 1). The macro-category

«observation» has three categories 1) tactical principle (ten variables) 2) place of action in the game field (four variables) and 3) action outcome (ten variables). The macro-category «outcome» includes four categories: 1) tactical performance index, 2) tactical actions, 3) percentage of errors (or percentage of correct actions), 4) place of action related to the principle (PARP), all comprise the same thirteen variables. The macro-category «outcome» allows to evaluate soccer players' tactical behaviour through players' tactical actions, with and without the ball, based on the ten core tactical principles of soccer: five for the offensive phase: 1) Penetration, 2) Offensive Coverage, 3) Width and Length, 4) Depth Mobility, 5) Offensive Unity; and five for the defensive phase: 1) Delay, 2) Defensive Coverage, 3) Balance, 4) Concentration, 5) Defensive Unity (see Chart 1) (Teoldo et al., 2011). The FUT-SAT's protocol comprises three procedures. The first consists in the analysis of actions performed by the players during a game, whereas ball possession is considered as a unit of analysis to distinguish the defensive and offensive phases. The second procedure refers to the assessment,

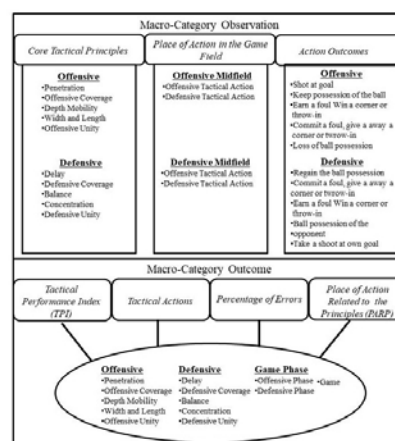


Figure 1. Macro-categories, categories and variables of the System of Tactical Assessment in Soccer (Teoldo et al., 2011)

Chart 1. Definitions, categories and subcategories of variables assessed by FUT-SAT (Teoldo et al. 2011)

Categories	Sub-Categories	Variables	Definitions	
Tactical Principles	Offensive	Penetration	Movement of player with the ball towards the goal line.	
		Offensive Coverage	Offensive supports to the player with the ball.	
		Depth Mobility	Movement of players between the last defender and goal line.	
		Width and Length	Movement of players to extend and use the effective play-space.	
		Offensive Unity	Movement of the last line of defenders towards the offensive midfield, in order to support offensive actions of the teammates.	
	Defensive	Delay	Actions to slow down the opponent's attempt to move forward with the ball.	
		Defensive Coverage	Penetration	Positioning of off-ball defenders behind the "delay" player, providing defensive support.
			Delay	Positioning of off-ball defenders in reaction to movements of attackers, trying to achieve the numerical stability or superiority in the opposition relationship.
		Balance	Positioning of off-ball defenders to occupy vital spaces and protect the scoring area.	
		Defensive Unity	Positioning of off-ball defenders to reduce the effective play-space of the opponents.	

classification and recording of tactical actions based on spatial references of the field. The third and last procedure refers to the calculation of variables within the categories «Tactical Actions» and «Percentage of Correct Actions».

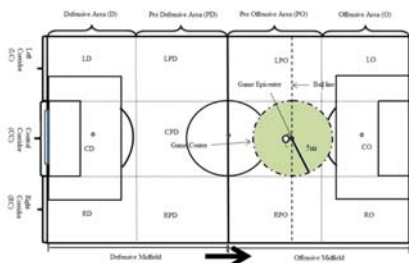


Figure 2: Spatial references used for tactical assessment through FUT-SAT's (Teoldo et al., 2011)

Materials

The SSCGs were recorded by a SONY video camera (model HDR-XR100). The video material obtained was transferred in digital format to a laptop computer (DELL Inspiron N4030, processor Intel Core™ i3) via USB cable, and converted to «avi» files through the software Format Factory Video Converter 3.3.5. The software Soccer Analyser was used to insert the spatial references into the video, which allow the rigorous assessment of players' positioning and movement throughout the field.

Statistical Analysis

Descriptive analysis (means and standard deviation) was performed for tactical actions and percentage of successful actions. Data distribution was tested through the Kolmogorov-Smirnov test. In order to compare the mean frequency of tactical actions, as well as the percentage of correct actions between SSCGs with and without outside floaters, the paired *t* test and Wilcoxon test were used. The significance level was set at $p < 0.05$. Values of effect sizes were obtained for the comparisons of both parametric and non-parametric data and classified as follows: low (0.1-0.29), medium (0.3-0.49) and large (> 0.5) (Cohen, 1992; Field, 2009; Fritz, Morris, & Richler, 2012). Effect sizes were calculated based on the following equations:

$$r = \sqrt{\frac{t^2}{t^2 + gl}} \quad r = \frac{Z}{\sqrt{n}}$$

Reliability analysis was performed using the test-retest method. Sessions to determine reliability were carried out after an interval of three weeks, so as to avoid task familiarity issues (Robinson & O'Donoghue, 2007). Reliability values were obtained through the Cohen's Kappa index, and 820 tactical actions were reassessed, which represents 11.39% of the sample, a greater amount than that suggested by literature (10%). Three trained observers participated in this procedure. Values of intra-observer reliability for the SSCGs without floaters (Gk+3 vs. 3+Gk) ranged between 0.811 ($ep=0.057$) and 1.000 ($ep=0.000$), and between 0.815 ($ep=0.070$) and 1.000 ($ep=0.000$) for the SSCGs with outside floaters (Gk+3 vs. 3+Gk)+4. Inter-observer reliability values in the SSCGs without floaters (Gk+3vs3+Gk) ranged between 0.831 ($ep=0.033$) and 1.000 ($ep=0.000$), and between 0.815 ($ep=0.070$) and 1.000 ($ep=0.000$) in the SSCGs with outside floaters (Gk+3 vs. 3+Gk)+4. All statistical procedures were performed using SPSS (Statistical Package for Social Sciences) for Windows®, version 22.0.

Results

Players performed 1,754 offensive tactical actions and 1,887 defensive tactical actions in games without outside floaters, and 1,668 offensive tactical actions and 1,823 defensive tactical actions in games with outside floaters.

Table 1 displays the means and standard deviation of the number of tactical actions and percentage of successful actions in the SSCGs without floater (Gk+3 vs. 3+Gk) and with outside floaters (Gk+3 vs. 3+Gk)+4.

«Insert Table 1 here»

Tactical Actions

Table 1.
Means and standard deviation of the number of tactical actions and percentage of correct actions in SSCGs (Gk+3vs.3+Gk) and SSCGs with outside floaters (Gk+3vs.3+Gk)+4

Tactical principles	Number of tactical actions				Percentage of correct actions					
	(Gk+3vs.3+Gk)	(Gk+3vs.3+Gk)+4	% Difference	p	r	Gk+3vs.3+Gk	(Gk+3vs.3+Gk)+4	% Difference	p	r
Offensive										
Penetration	4.33 ± 2.07	3.09 ± 1.69	40.12	<.001*	.492	86.48 ± 19.97	86.08 ± 19.75	-	.811	-
Offensive coverage	8.48 ± 3.71	6.94 ± 3.2	22.19	.028*	.296	97.26 ± 6.14	76.72 ± 20.86	26.77	<.001*	.521
Depth Mobility	2.18 ± 1.07	2.33 ± 1.51	-	.000	-	94.64 ± 15.15	73.29 ± 31.29	-	.526	-
Width and Length	12.27 ± 5.54	12.7 ± 4.38	-	.687	-	96.58 ± 4.92	75.9 ± 18.82	27.24	<.001*	.552
Offensive unity	5.86 ± 3.15	7.41 ± 4.13	-	.108	-	98.33 ± 4.78	79.38 ± 20.16	23.87	<.001*	.483
Defensive										
Delay	7.42 ± 3.23	6.37 ± 2.87	-	.066	-	71.86 ± 21.65	52.84 ± 21.76	38.16	<.001*	.550
Defensive coverage	2.69 ± 1.68	2.66 ± 2	-	.802	-	86.38 ± 19.54	80.78 ± 21.56	6.93	.044	.231
Balance	7.37 ± 3.03	6.79 ± 3.43	-	.459	-	79.82 ± 17.66	69.73 ± 19.06	14.47	.008	.254
Concentration	5.07 ± 2.73	4.04 ± 1.94	25.49	.022*	.326	97 ± 8.79	80.22 ± 19.29	20.91	<.001*	.404
Defensive Unity	13.05 ± 4	14.77 ± 5.53	13.18	.041*	.145	86.43 ± 14.24	72.15 ± 19.83	19.79	<.001*	.357

$p < .005$.

In SSCGs with outside floaters, the number of offensive tactical actions performed by the player in possession when progressing towards the opponents' goal decreased by 40.12% [penetration ($t_{(52)} = 4.078$), $r = .492$], as well as actions of support to the player in possession, which decreased by 22.19% [offensive coverage ($t_{(53)} = 2.259$), $r = .296$], when compared to SSCGs without floaters. Also, the number of defensive tactical actions aimed at increasing goal protection performed outside centre of play decreased by 25.49% [concentration ($z_{(48)} = -2.224$), $r = .326$]. However, the number of tactical actions of marking, performed between the subsequent sector of the centre of play and the defender's goal significantly decreased by 13.18% [defensive unity ($t_{(53)} = -2.094$), $r = .145$], compared to SSCGs without outside floaters.

Percentage of correct actions

In SSCGs with outside floaters the mean values of percentage of offensive successful actions performed inside the centre of play, aimed at supporting the player with the ball decreased by 26.77% [offensive coverage ($z_{(53)} = -5.399$, $r = .521$)], in comparison to SSCGs without floaters. Also, defensive actions of slowing down the opponent's attempts of progressing with the ball decreased by 38.17% [delay ($z_{(52)} = -4.021$, $r = .550$)], while support to the player performing delay actions decreased by 6.93% [defensive coverage ($t_{(36)} = -5.399$), $r = .231$], in relation to SSCGs without outside floaters.

Moreover, the number of correct offensive tactical actions of increasing and using the effective play-space performed outside centre of play displayed significantly lower mean values, which decreased by 27.24% [width and length ($z_{(54)} = -5.740$, $r = .552$)], whereas correct movements by the last line of defenders towards the offensive midfield, aimed at supporting teammates' offensive actions, decreased by 23.87% [offensive unity ($z_{(47)} = -4.864$, $r = .483$)], when compared to SSCGs without outside floaters. Also, correct tactical actions by off-ball defenders aimed at occupying vital spaces and protecting the scoring area decreased by 20.91% [concentration ($z_{(46)} = -4.082$), $r = .404$], while correct positioning by off-ball defenders in response to attackers' moves, aimed at achieving numerical stability or superiority decreased by 14.47% [balance ($z_{(46)} = -2.632$), $r = .254$], and correct positioning of off-ball defenders to reduce the opponents' effective play-space decreased by 19.79% [defensive unity ($z_{(54)} = -3.716$), $r = .357$], in relation to SSCGs without outside floaters.

Discussion and conclusion

The aim of this study was to verify the effect of the utilization of SSCGs with outside floaters on soccer players' tactical behaviour. Findings confirmed our hypothesis that SSCGs with outside floaters decrease tactical actions of principles that enable players to progress with the ball toward the opponent's half (penetration), provide support for teammates against opposing defenders (offensive coverage), as well as to increase the number of tactical actions of marking, performed between the subsequent sector of the centre of play and the defender's own goal (defensive unity).

Concerning the defensive variables, outside floaters in goal lines enabled attacking players to play in-depth and to easily reach the opposing goal. These demands forced the defending team to protect deep field spaces, which justifies the increase of tactical actions of positioning of off-ball defenders to reduce the opponents' effective play-space of the opponents (Defensive Unity). In SSCGs with outside floaters in side lines, Padilha et al. (2017) observed an increase of actions of defensive unity. In a study on collective tactical behaviour, Castellano et al. (2016) observed greater team width during the defensive phase in 7-a-side game with outside floaters in side lines, than in regular format games without outside floaters. The authors associated these results with those of other research that used 5-a-side games with inside floaters, in which different collective behaviours were observed. Thus, regardless of the location of the outside floaters, it seems that players performed individual tactical actions aiming at creating defensive balance and maintaining team cohesion of team. However, increasing the number of players in SSCGs with outside floaters could lead to different changes in tactical behaviour in relation to 3-a-side games, once each SSCG format has its own characteristics (Pinder, Davids, Renshaw, & Araújo, 2011).

As for the offensive variables, results showed a decrease of actions of penetration and offensive coverage in SSCGs with outside floaters. In general, it is expected that the presence of floaters, who are often available to receive passes, requires lower efforts by teammates in providing support to the player with the ball, which has been confirmed by our findings. This is in line with the literature, since a reduction of the cooperation among teammates (represented by network density) was observed in SSCGs with inside floaters, thus indicating decreased support to the player with the ball by on-field teammates (Praça, Clemente, Andrade, Morales,

& Greco, 2017). Besides, since the outside floaters are in a deep position, their actions are not characterized as penetration but rather as width and length – with the ball – which also justifies the present results. This is also in line with the literature since a reduction in actions of penetration (Moniz et al., 2020; Padilha et al., 2017) has been reported in SSCGs with inside and outside floaters along the side lines.

Finally, in the SSCGs with outside floaters, a decrease was observed on players' tactical performance in both offensive and defensive phases of play. According to the literature, better tactical performance is expected in SSCGs more representative of full-sized matches. For example, Coutinho et al., (2019) have reported higher lateral and longitudinal synchronization in full-sized field dimensions than in non-official field sizes. Also, Olthof et al. (2019) reported that in SSCGs a match-derived relative player area facilitates tactical correspondence with competitive matches. Thereupon, SSCGs with outside floaters along the goal lines as proposed in the current study is considerably different from competitive contexts, in relation to the tactical options players are provided with. As a result, players are less able to apply their acquired experience to make suitable decisions (Almeida, Ferreira, & Volossovitch, 2013), thus resulting in a decrease of tactical performance.

In order to develop their tactical skills, especially those related to the core tactical principles, soccer players need to experience different SSCG formats, as they provide great variability of stimuli, which requires players to perform tactical behaviours similar to those demanded in actual competition (Teoldo et al., 2009). Based on the relative positioning of the outside floaters along the goal lines, players were able to change their own tactical behaviour, which could be considered an important aspect to be applied to contexts in which teams are constrained to play through deep passes (Echavarría, Arango, Arango, Valencia Sánchez, & Echeverri Ramos, 2021; Williams & Hodges, 2005).

Despite its important findings and relevant implications, this study has limitations. Outside floaters can be used under different SSCG formats, such as (Gk+4 vs. 4+Gk)+4 and (Gk+5 vs. 5+Gk)+4. However, it is not possible to confirm if changes in tactical behaviour observed in the Gk+3 vs. 3+Gk SSCG are also likely to occur in others game formats with more players. Therefore, we suggest that studies increase the number of players in both teams in SSCGs with outside floaters, since some studies reported variations in players' tactical behaviour under different game

formats (Castelao, Garganta, Santos, & Teoldo, 2014; Silva, Garganta, Santos, & Teoldo, 2014).

Players who constantly perform tactical actions with ball possession and directly marking players in possession may be more frequently included in Gk+3 vs. 3+Gk with outside floaters, so as to stimulate the occurrence of offensive tactical actions without the ball, as well as of defensive tactical actions that enable the occupation of spaces outside the centre of play. Moreover, players that display high tactical performance must be included in SSCGs with outside floaters, once the task constraints could induce them to make mistakes and consequently encourage them to find different solutions to the problems posed by the game.

We verified the influence of outside floaters in SSCGs on soccer players' tactical behaviour. As the purpose of SSCGs is to improve tactical skills, our results showed the importance of including outside floaters along the goal line during training activities. These activities can provide further possibilities of developing players' tactical behaviour in relation to the core tactical principles, which are key aspects for improving performance.

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References

- Almeida, C. H., Ferreira, A. P., & Volossovitch, A. (2013). Offensive Sequences in Youth Soccer: Effects of Experience and Small-Sided Games. *Journal of Human Kinetics*, 36(March), 97–106.
- Araújo, D. (2009). O desenvolvimento da competência tática no desporto: o papel dos constrangimentos no comportamento decisional. *Revista Motriz*, 15(3), 537–540.

- Castelao, D., Garganta, J., Santos, R., & Teoldo, I. (2014). Comparison of tactical behaviour and performance of youth soccer players in 3v3 and 5v5 small-sided games. *International Journal of Performance Analysis in Sport*, 14(3), 801–813.
- Castellano, J., Silva, P., Usabiaga, O., & Barreira, D. (2016). The influence of scoring targets and outer-floaters on attacking and defending team dispersion, shape and creation of space during small-sided soccer games. *Journal of Human Kinetics*, 50(2), 153–163.
- Clemente, F. M., Martins, F. M. L., Mendes, R. S., & Campos, F. (2015). Inspecting the performance of neutral players in different small-sided games. *Motriz. Revista de Educacao Fisica*, 21(1), 45–53.
- Clemente, F. M., Wong, D. P., Martins, F. M. L., & Mendes, R. S. (2014). Acute Effects of the Number of Players and Scoring Method on Physiological, Physical, and Technical Performance in Small-sided Soccer Games. *Research in Sports Medicine*, 22(4), 380–397.
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112(1), 155–159.
- Coutinho, D., Gonçalves, B., Santos, S., Travassos, B., Wong, D. P., & Sampaio, J. (2019). Effects of the pitch configuration design on players' physical performance and movement behaviour during soccer small-sided games. *Research in Sports Medicine*, 27(3), 298–313.
- Davids, K., Araújo, D., Correia, V., & Vilar, L. (2013). How small-sided and conditioned games enhance acquisition of movement and decision-making skills. *Exercise and Sport Sciences Reviews*, 41(3), 154–161.
- Davids, K., Button, C., & Bennett, S. J. (2008). *Dynamics of Skill Acquisition. Production*.
- Drust, B., Waterhouse, J., Atkinson, G., Edwards, B., & Reilly, T. (2005). Circadian Rhythms in Sports Performance—an Update. *Chronobiology International*, 22(1), 21–44.
- Echavarría, S. G., Arango, M. S., Arango, S. S., Valencia Sánchez, W. G., & Echeverri Ramos, J. A. (2021). Level of adaptation to the tactical context in youth football players. *Retos*, 2041(41), 237–246.
- Field, A. (2009). *Discovering statistics using SPSS* (3rd ed.). London.
- Ford, P. R., Yates, I., & Williams, A. M. (2010). An analysis of practice activities and instructional behaviours used by youth soccer coaches during practice: exploring the link between science and application. *Journal of Sports Sciences*, 28(5), 483–495.
- Fritz, C. O., Morris, P. E., & Richler, J. J. (2012). Effect size estimates: Current use, calculations, and interpretation. *Journal of Experimental Psychology: General*, 141(1), 2–18.
- Gonçalves, E., Noce, F., Barbosa, M. A. M., Figueiredo, A. J., Hackfort, D., & Teoldo, I. (2017). Correlation of the peripheral perception with the maturation and the effect of the peripheral perception on the tactical behaviour of soccer players. *International Journal of Sport and Exercise Psychology*, (July), 1–13.
- Gonzaga, A. D. S., Albuquerque, M. R., Malloy-Diniz, L. F., Greco, P. J., & Teoldo, I. (2014). Affective decision-making and tactical behavior of under-15 soccer players. *PLoS ONE*, 9(6), 1–6.
- Hill-Haas, S. V., Coutts, A. J., Dawson, B. T., & Rowsell, G. J. (2010). Time-motion characteristics and physiological responses of small-sided games in elite youth players: the influence of player number and rule changes. *Journal of Strength and Conditioning Research*, 24(8), 2149–2156.
- Mallo, J., & Navarro, E. (2008). Physical load imposed on soccer players during small-sided training games. *Journal of Sports Medicine and Physical Fitness*, 48(2), 166–171.
- Moniz, F., Scaglia, A., Sarmento, H., Garcia-Calvo, T., & Teoldo, I. (2020). Effect of an inside floater on soccer players tactical behaviour in small sided and conditioned games. *Journal of Human Kinetics*, 71, 167–177.
- Olthof, S. B. H., Frencken, W. G. P., & Lemmink, K. A. P. (2019). A match-derived relative pitch area facilitates the tactical representativeness of small-sided games of small-sided games for the official soccer match. *Journal of Strength & Conditioning Research*, 33(1), 523–530.
- Owen, A., Twist, C., & Ford, P. (2004). Small-Sided Games/ : the Physiological and Technical Effect of Altering Pitch Size and Player Numbers. *Insight*, 7(2), 50–53.
- Padilha, M. B., Guilherme, J., Serra-Olivares, J., Roca, A., & Teoldo, I. (2017). The influence of floaters on players' tactical behaviour in small-sided and conditioned soccer games. *International Journal of Performance Analysis in Sport*, 17(5), 721–736.
- Pinder, R. A., Davids, K., Renshaw, I., & Araújo, D. (2011). Representative Learning Design and Functionality of Research and Practice in Sport. *Journal of Sport and Exercise Psychology Journal of Sport & Exercise Psychology*, 33(33), 146–155.
- Praça, G. M., Clemente, F. M., Andrade, A. G. P. De, Morales, J. C. P., & Greco, P. J. (2017). Network Analysis in Small-Sided and Conditioned Soccer Games/ : the Influence of Additional Players and Playing Position. *Kinesiology: International Journal of Fundamental and Applied Kinesiology*, 49(2), 185–197.
- Robinson, G., & O'Donoghue, P. (2007). A weighted kappa statistic for reliability testing in performance analysis of sport. *International Journal of Performance Analysis in Sport*, 7(1), 12–19.
- Sarmiento, H., Clemente, F. M., Harper, L. D., Costa, I. T. da, Owen, A., & Figueiredo, A. J. (2018). Small sided games in soccer—a systematic review. *International Journal of Performance Analysis in Sport*, 18(5), 693–749.
- Serra-Olivares, J., Clemente, F. M., & González-Víllora, S. (2016). Tactical expertise assessment in youth football using representative tasks. *Springer Plus*, 5(1), 1301.
- Silva, B., Garganta, J., Santos, R., & Teoldo, I. (2014). Comparing Tactical Behaviour of Soccer Players in 3 vs. 3 and 6 vs. 6 Small-Sided Games. *Journal of Human Kinetics*, 41(1), 191–202.
- Stratton, G., Reilly, T., Williams, A. M., & Richardson, D. (2004). *Youth soccer: From Science to Performance. Youth Soccer: From Science to Performance*.
- Teoldo, I., Garganta, J., Greco, P. J., & Mesquita, I. (2009). Tactical Principles of Soccer Game: concepts and application. *Motriz-Revista De Educacao Fisica*, 15(3), 657–668.
- Teoldo, I., Garganta, J., Greco, P. J., Mesquita, I., & Maia, J. (2011). System of tactical assessment in Soccer (FUT-SAT): Development and preliminary validation. *Motricidade*, 7, 69–84.
- Teoldo, I., Guilherme, J., & Garganta, J. (2015). *Training football for smart playing: On tactical performance of teams and players* (1st ed.). Curitiba: Appris.
- Vilar, L., Araújo, D., Davids, K., & Bar-Yam, Y. (2013). Science of winning soccer: Emergent pattern-forming dynamics in association football. *Journal of Systems Science and Complexity*, 26(1), 73–84.
- Ward, P., Hodges, N. J., Starkes, J. L., & Williams, M. A. (2007). The road to excellence: deliberate practice and the development of expertise. *High Ability Studies*, 18(2), 119–153.
- Williams, A. M., & Hodges, N. J. (2005). Practice, instruction and skill acquisition in soccer: Challenging tradition. *Journal of Sports Sciences*, 23(6), 637–650.