

Designing facilitated task constraints for different age groups in soccer: The impact of floaters' rules

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International Journal of Sports Science

& Coaching

0(0) 1–8

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DOI: 10.1177/17479541211017448

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Abstract

This study compared the influence of changing floaters' rules on player positioning in small-sided games (SSG) played by different age groups. A total of 48 youth soccer players (24 U-13 and 24 U-14) took part in the study, playing three different SSGs: regular 3vs3, 1-floater condition (one floater playing for both teams), and 2-floater condition (one floater per team, with alternate participation). Positional data were collected by 5 Hz GPS devices, generating individual (spatial exploration index) and collective (team's length, width, length per width ratio, and stretching index) positional variables. The results revealed that the 2-floater format significantly reduced the length ($p = 0.001$), and both formats with floaters increased the width ($p < 0.001$). Also, the 1-floater format presented the lowest stretching index ($p < 0.001$). Concerning age-group differences, older players presented higher values of length ($p < 0.001$), length per width ratio ($p < 0.001$), and spatial exploration index ($p < 0.001$) than their younger counterparts. The 2-floater SSG format is a more facilitated and simplified version of numerically unbalanced SSGs, which might be considered by coaches when designing tasks adjusted to the level of the athletes.

Keywords

Association football, constraints-led approach, ecological dynamics, global positioning system, small-sided games

Introduction

In youth football the manipulation and adjustment of training tasks according to the players' age, characteristics and capabilities are key to promote functional exploration of individual and collective tactical behaviours.¹ For example, providing players with an adequate small-sided game (SSG) to their action capabilities allows the exploration of successful actions and the sustained improvement of tactical behaviours.^{2–4} For this reason, a growing interest in SSG has been observed with the literature focused on analysing the effect of changing task constraints on players' behaviour.⁵ However, as a wide range of variations in each SSG is plausible, improving knowledge on the effects of different tasks manipulations on players' tactical, technical and physical responses, across different age groups, is still necessary. Previous research has revealed that the use of similar contexts of practice with players of different ages promoted variations on players' and teams' tactical actions.^{6,7} For example, older players present higher values of area per team

and stretching index⁸ as well as higher distances between teams' centroids in SSGs⁹ during SSGs in comparison with youngsters.

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The effects of the manipulation of floaters in SSGs is one of the most commonly investigated task constraints.^{10–12} Floaters momentarily increase the numerical advantage of the team in ball possession and, consequently, the number of passing possibilities to the ball carrier, which represents a less complex context for keeping ball possession longer.^{11,13} Therefore, the ability of the floater to offer additional passing opportunities is relevant for the optimisation of such constraints. However, when floaters are adopted inside the pitch (1-floater format), as has been extensively seen in previous studies,^{10,11} they usually play for both teams and, hence, their position at the moment a team recovers ball possession is quite unpredictable. For example, if the floater is effectively participating in the build-up attack near her/his own goal, and the team loses ball possession, he/she is in an advanced position on the pitch, sometimes far from the player with the ball. Hence, in the 1-floater format, the floater is likely to not effectively provide additional passing opportunities to the player with the ball, mainly during the offensive transition, failing to fulfil one of their main functions in the game (supporting the player with the ball) and promoting higher variability in players' exploratory behaviour. Another interesting strategy that coaches could adopt is including one floater per team (the 2-floater format), who is obliged to return to his/her own goal every time the team loses possession. This rule might be able to create a numerical advantage for the offensive team (four attacking players against three defending ones) but keeps the floater in a position near the own goal at the moment the ball is recovered. Consequently, the floater would always be in a support position, behind the ball when it is recovered, highlighting more passing opportunities to the ball carrier in opposition to the regular floater condition. Representing this issue, which is evident in offensive transitions in official soccer matches, might indicate an interesting pedagogical strategy to nurture players' ability to safely keep the ball possession when it is recovered, not fully addressed in the traditional 1-floater format. Although previous studies addressed how numerically unbalanced situations might constrain players' behaviour in SSGs,^{12–15} no previous studies investigated how this alternated 2-floater format might impact players' positional responses, which indicates the need to further research.

To improve the understanding of the manipulation of SSGs, the use of positional data to describe players' tactical and physical behaviours has been widely accepted in the literature.⁸ Based on players' position it is possible to calculate tactical variables that express for example the spatial occupation and exploration of teams. The main advantages of such data are ease of collection and the reliability of the information

provided by many GPS devices.^{8,16} For example, to capture the teams' occupation, the length, the width distance and the stretching index had been extensively used in the past to capture how the players manage the space to obtain positional advantages within the game.¹⁷ Besides, the players' displacements are likely to be evaluated by the spatial exploration index (SEI), which measures how the player explores the available space by calculating his average distance from the individual centroid. The use of such variables allows, for instance, to capture that the exploration of the offside rule reduces in-length spatial exploration during SSGs,¹⁸ and even the coach's instructions can constrain player actions and shape their behaviour during an SSG.¹⁹

In line with previous assumptions, to improve the process of learning of youth players in football, there is a need to understand how the manipulation of the floaters' positioning constraint the tactical behaviour of players from different age groups may present different behaviours when playing the same SSG. Considering the above, we aimed to compare the positional tactical responses of youth soccer players from different age groups when playing the regular, the 1-floater and the 2-floater SSGs conditions. We hypothesize that the 2-floater format will provide a less exploratory tactical scenario for the players irrespective of the age group, leading to lower spatial exploration index (SEI) values and reduced in-length exploration. We also expect that older players will be more able to explore the available space, both in the width and length axes, while younger players will present a more concentrated and ball-driven pitch positioning.

Methods

Participants

Forty-eight young soccer players, belonging to two different age groups (U-13: twenty-four players, 13.1 ± 0.6 years; U-14: twenty-four players, 14.3 ± 0.7 years), took part in the study. Players were selected based on their current club affiliation (national-level youth academy) and have a training regimen composed of five weekly training sessions plus an official match. All players compete regularly (regional and national levels). This study was approved by the local ethics committee (Universidade Federal de Minas Gerais–CAAE 64639417.0.0000.5149) and followed all procedures of the Declaration of Helsinki.

Procedures

Team composition criteria impact players' performance during SSGs.²⁰ To provide players with the

most adequate representative scenario, we composed teams balanced according to the tactical skills.²⁰ To conduct the team composition procedure, players were initially split into groups of eight within the same position and age category (e. g., eight U-14 defenders). These groups performed the System of Tactical Assessment in Soccer (FUT-SAT) field test,²¹ which was used to rank the players from first to eighth within each position. The FUT-SAT field test was used only to rank the players, not in the main data collection. This rank was based on the percentage of successful tactical actions, as previously demonstrated in the literature.²² The two best players in each position were selected to form teams A and B, while the two worst players in each position formed teams C and D. Midfielders not selected for the teams were selected to play as floaters during the data collection. The floaters were kept constant over the data collection and matches. This procedure was required to reduce the bias related to the level of the players on the reported responses, as a previous study showed that the tactical level of the players might influence their behaviour during small-sided games.²³ Therefore, even if the floaters have a different tactical level in comparison to the regular players, this effect has been standardized over the data collection by keeping the same floaters in the SSGs. Finally, the remaining players were excluded from the next steps. Teams played only against opponents at a similar level to reduce the level's influence on observed responses. All team composition-related procedures are described in Figure 1.

Next, players began the familiarisation with the SSG formats. The familiarisation was conducted using real

games, equal to those adopted later in the main data collection, to allow the players to experience the rules and get used to the pitch size and materials. During this session, they were allowed to ask questions and experiment with all the rules of each format. When no remaining doubts appeared, players were considered familiarised with the formats.

Finally, the main phase of data collection was started. Each data collection period started with a 10-minute standardised warm-up composed of displacements, with and without the ball. Thereafter, the SSG started immediately. All SSGs comprised four bouts of four minutes, with four minutes of passive recovery in-between. All SSGs were played in a 36×27 meter field with all the rules of the formal game. The pitch boundaries were delimited using dashes, while the corners and the central line were pointed with cones facilitating players' identification of the spatial references. Extra balls were placed around the field to allow quick restart when the ball went out of bounds. Seven-a-side soccer goals (6×2m) were used. The researcher could provide verbal encouragement, but no technical or tactical instructions could be provided. The experimental design comprised three SSG formats (Figure 2): a 1-floater SSG, in which the floater played for both teams (always supporting the team in the attack); a 2-floater SSG (Figure 2), in which each team had its floater and were required to return next to their own goal every time the ball was lost by the team. In this format, the floater did not act as a joker. Each team has its own floater, acting as a support player not allowed to score goals and always started the offensive process from their own goal.; and a 3vs3 format, with

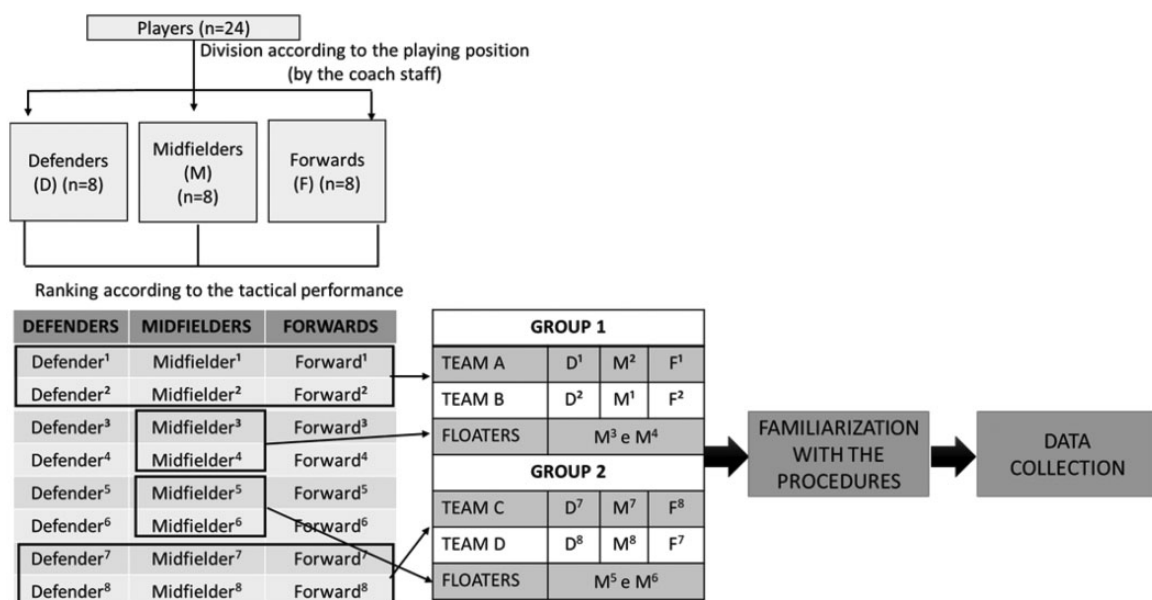


Figure 1. Representation of the procedures of data collection on each age group.

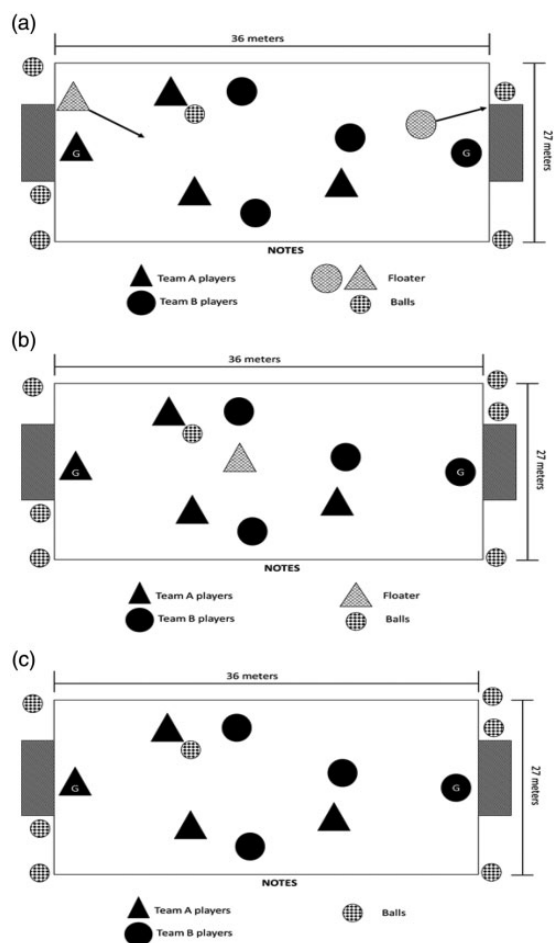


Figure 2. Representation of the task constraints.
A: 2-floaters format; B: 1-floater format; C: 3vs3 format.

no floater for any team. In the 2-floater format, floaters' participation in the game was alternated, so just one floater was inside the pitch (from the team in offence), while the other floater (from the team in defence) was not allowed to simultaneously participate.

Instruments

System of tactical assessment in soccer. The FUT-SAT field test was used for team composition. The test consists of a 4-minute 3vs3 game with goalkeepers in a 36×27m playing field and using 6×2m goals.²¹ Multiple bouts were conducted until all the players took part in one bout, and only the first trial was evaluated for the team composition. Teams were composed within each position (only defenders, for example), for the FUT-SAT field test. Tactical behaviour was evaluated based on offensive (penetration, offensive coverage, depth mobility, width and length with and without the ball, and offensive unity) and defensive (delay, defensive coverage, balance, concentration, and defensive unity) tactical principles. The percentage of

successful tactical principles (ratio between the number of successful tactical principles and the total number of tactical principles performed) was used as a measure of tactical performance.²⁰

The SSGs were recorded with a digital camera (JVC, Kenwood, EUA), and two trained observers in FUT-SAT analysed the players' tactical behaviour using the software Soccer Analyser[®]. This software allows the insertion of a virtual grid on the field in the video, setting some parameters for the evaluation of tactical principles, namely, the offensive and defensive fields, the lateral and central corridors, the game centre, and the ball line. The data were tested for inter- and intra-observer agreement. For this, 12,5% of the SSGs were reassessed twenty-one days later, and Cohen's Kappa coefficient was calculated. The values of both inter- and intra-observer agreement were higher than 0.8, which is classified as a perfect agreement.²⁴

GPS devices. The players wore GPS units, embedded with a triaxial accelerometer (GPSports SPI HPU, GPSports, Canberra, Australia), placed between their shoulder blades, inside a pouch attached to a special vest provided by the manufacturer. Positional data were recorded at 5 Hz (interpolated to 15 Hz). The reliability of this device for measuring distances in field-based sports was found to be acceptable in a previous study.²⁵ Each player used the same equipment during the data collection sessions. The players' positional data were processed using MATLAB R2010a (The MathWorks Inc., Natick, MA, USA). Each player's latitude and longitude data were synchronized and converted into meters using the Universal Transverse Mercator (UTM) coordinate system and a MATLAB routine.²⁶ The data were smoothed using a second-order 5-Hz Butterworth low-pass filter. After converting the positional data into meters, a rotation matrix was calculated for each SSG with the positions of the field vertices, aligning the length of the playing field along the x-axis and the width along the y-axis. Then, the rotation matrix was applied to players' positional data for alignment with the playing field referential.²⁷ We calculated the following variables: width and length, determined by the distance between the furthest players in length and the rightmost and leftmost players in width,²⁸ the length-per-width (LPW) ratio;²⁷ stretch index;²⁸ and SEI, defined as the average difference between a player's average position and their actual position at each moment of the game.²⁸ From a practical perspective, the LPW ratio indicates the preferential displacement axis of a team; values higher than 1 indicate a more in-length positioning, while values lower than 1 indicate a more in-width positioning. The SEI indicates how exploratory the athlete's behaviour is. Higher SEI values indicate

more exploratory behaviour. The stretch index indicates the dispersion of the players from the geometrical centre, and higher values indicate higher dispersion.

As the purpose of the current study was to measure the impact of the floaters on the regular players, the positional data of the floaters were not collected either included in the data analysis.

Data analysis

The data were first checked for assumptions of normality (Shapiro-Wilk's) and heterogeneity of the variances (Levene's). As no significant deviations were reported, we compared the data using a mixed two-way ANOVA (SSG format \times age group). Pairwise comparisons were performed using Bonferroni's correction. The partial eta squared was calculated and classified as small effect ($0.02 \leq \eta_p^2 < 0.13$), medium effect ($0.13 < \eta_p^2 < 0.26$) or large effect ($\eta_p^2 < 0.26$).²⁹ Also, the observed power has been provided by the ANOVA analysis in the statistical software. Inferential analysis was conducted using SPSS software (Version 19.0 for Windows, SPSS Inc., Chicago, IL, USA).

Results

Table 1 shows the descriptive values of the analysed variables. For the variables width ($p=0.636$), length ($p=0.412$), LPW ratio ($p=0.962$), and stretching index ($p=0.243$) there were only main effects since no interactions were observed. However, there was a significant interaction between age and task for the SEI ($p=0.007$).

The interaction between task and age for SEI indicates that players' response is not similar across the age groups. Therefore players' adaptation to the constraints might be considered age-dependent. Specifically, U-14 players showed a higher SEI than U-13 players in the 2-floater and 3vs3 formats

($p < 0.001$; $\eta_p^2 = 0.040$; observed power: 0.928), with no differences in the 1-floater format. This indicates that the older players were more able to use the 2-floaters format to achieve less spatial exploration than younger players.

Regarding the main effect of age group, there were significant differences in two dependent variables. The U-13 players showed higher values of length ($p < 0.001$; $\eta_p^2 = 0.195$; observed power: 0.997) and LPW ratio ($p < 0.001$; $\eta_p^2 = 0.166$; observed power: 0.990) than U-14 players irrespective to the task. Also, we found an interaction effect in the SEI. There were no age-group differences in the width ($p=0.080$; $\eta_p^2 = 0.032$; observed power: 0.417) and stretching index ($p=0.179$; $\eta_p^2 = 0.019$; observed power: 0.268).

Concerning the main effect of the task, significant differences were reported in all the dependent variables. The 2-floaters SSG showed lower values of length ($p=0.001$; $\eta_p^2 = 0.114$; observed power: 0.871) and LPW ratio ($p < 0.001$; $\eta_p^2 = 0.129$; observed power: 0.914) than the other two formats. The regular format presented lower values of width ($p=0.027$; $\eta_p^2 = 0.073$; observed power: 0.662) than the other two tasks. Also, the 1-floater format showed lower stretching index values than the other two SSGs ($p < 0.001$; $\eta_p^2 = 0.167$).

Discussion

This study aims to compare the influence of changing floaters' rules on player positioning on the pitch in SSGs played by different age groups. Specifically, we sought to examine the differences in players' positioning between three SSG formats: the usual 3vs3, the 1-floater condition (3vs3+1) and the 2-floater format (3vs3+2) in U-13 and U-14 soccer players. The most innovative aspect of the current study is the 2-floater format proposed. We proposed this task based on the rationale that the floater's role in a regular floater

Table 1. Means (standard deviation) of the dependent variables observed in each SSG format and age group.

Age group	U-13			U-14		
	2-Floaters	3vs3	1-Floater	2-Floaters	3vs3	1-Floater
Length ^a	7.03 (0.75) ^{d,e}	7.85 (0.76)	7.88 (1.73)	5.87 (0.76) ^{d,e}	7.03 (0.67)	6.55 (1.29)
Width	12.08 (1.11)	10.93 (1.01) ^{c,d}	11.97 (1.36)	12.41 (1.58)	11.88 (1.16) ^{c,d}	12.11 (1.32)
LPW ^a	0.58 (0.09) ^{d,e}	0.72 (0.10)	0.67 (0.208)	0.47 (0.07) ^{d,e}	0.59 (0.08)	0.55 (0.14)
Stretching index	6.81 (0.54)	6.70 (0.61)	6.18 (0.45) ^{c,e}	6.94 (0.41)	6.65 (0.47)	6.54 (0.32) ^{c,e}
SEI ^b	7.54 (1.13)	7.94 (0.88)	8.20 (0.97)	9.04 (3.12)	9.63 (0.92)	7.96 (1.05)

^aU13 > U14.

^bU14 > U13 only in 2-floater and 3vs3 formats.

^cDifferent from the 2-floater format.

^dDifferent from the 1-floater format.

^eDifferent from the 3vs3 format.

SSG: small-sided games; LPW: length-per-width; SEI: spatial exploration index.

format could not allow the players to achieve a facilitated environment to keep ball possession and safely progress into the pitch because the floater's position could be unpredictable when the team recovers the ball. The main results indicated that older players were able to adopt a more stable exploratory behaviour using the 2-floaters and 3 vs. 3 formats. Thus, the 2-floaters format has been considered better to develop a collective exploration of possibilities for action, increasing the support to the ball carrier to maintain ball possession and progress on the field, while the 1-floater format increases the unpredictability of team tactical behaviour on the exploration of possibilities for action. With the higher support to the ball carrier, using the 1-floater format, the individual age-group differences emerged.

Results revealed that both formats with floaters increased the in-width positioning, while the 2-floater format also significantly reduced the in-length positioning. The higher values of in-width positioning in SSGs formats with floaters is in line with the literature.^{10,30} To better explore the numerical advantage created by the floaters, teams tend to circulate the ball more frequently, which demands a more in-width positioning. Besides, the 1-floater format was the only one in which no age-group differences were observed in SEI values. As age-group differences in positioning are expected,⁹ the existence of differences in the SEI only in the 2-floaters and 3 vs. 3 formats indicate that these SSGs allowed the players to better explore their knowledge about the game, therefore these formats are likely to be more predictable. On the other hand, in the 1-floater format, the position of the floater is quite unpredictable, so the possible age-group differences were harmed by the high variability inherent to the game. For these reasons, when comparing the unbalanced SSG formats, we consider the 2-floater format a more stable task condition, which facilitates players' positioning by allowing a more predictable action in offensive/defensive transitions since the floater position is predictable and is able to effectively offer a safe passing opportunity when the team recovers the possession. Therefore, the predictability of the floaters' position should be considered by coaches when choosing between these formats.

Regarding the stretching index, the lowest values were reported in the 1-floater format. This variable indicates how distant the team is from its centroid and can be used as a measure of compactness.²⁸ Therefore, the current results indicated that the players were more concentrated near the team's centroid in the 1-floater format than in the other formats. According to the literature, the more experienced are the players, the higher is the stretching index.^{8,31} Therefore, the higher values of the stretching index might indicate

that the players were able to explore different spaces on the field instead of concentrating near the ball and, which indicates the difficulty of the task. Therefore, we argue that the lower value of stretching index observed in the 1-floater format indicates a higher difficulty imposed on the players in this format in comparison to the other ones, reinforcing that the unpredictable position of the floater might constrain players' positional behaviour during SSGs, as has been previously discussed regarding the SEI differences.

Concerning the age-group differences, our results confirmed that player behaviour in SSGs is age-dependent. Specifically, older players presented higher values of length, width, and SEI than their younger counterparts. As a result of deliberate practise, older players tend to exhibit better tactical behaviour in game-based contexts.³² Olthof, Frencken, & Lemmink³³ reported higher LPWratio values in older players, which is contrary to the current results. Similarly, a higher stretching index was reported in older players in 4vs4 (numerically balanced context) SSGs,⁸ while we found no age-group differences in this variable. Finally, younger players presented higher SEI values than older players in official simulated matches, in numerically balanced contexts,³⁴ which is also contrary to the current results. The divergence between previous studies and the current one is justifiable based on the characteristics of the tasks. All the previous studies adopted numerically balanced game-based tasks (i.e., tasks with an equal number of players on each team, such as 4vs4), while in this study we analysed numerically unbalanced SSGs. The literature suggests that for young soccer players, using numerical equality during training is not effective in improving decision-making or skill execution.³⁵ Conversely, players who experienced numerically unbalanced situations (which is the case in SSGs with floaters) improved their decision-making skills after a training period.³⁵ Thus, we might affirm that the age-group differences are shaped by task constraints in which these differences are measured. On the one hand, when facilitated tasks are adopted older players are more able to explore the space than younger players (which is the case in the current study). On the other hand, when the tasks themselves are less focused on players' exploratory behaviour, older players are more capable of reducing their variability by adopting more stable behavioural patterns,^{33,34} indicating, in line with the literature, that more skilled players adopt a better exploratory behaviour.³² In summary, when choosing the most appropriate SSG format, both the task constraint and players' characteristics and level of expertise must be considered.

This study is innovative in its approach to the design of representative task constraints in soccer training.

However, we acknowledge that the data collected have limitations, and further investigation is required. Specifically, we were not able to split the positional data into offensive and defensive phases, which could provide us with more detailed information. Splitting GPS positional data into game phases remains an operational challenge for future research. Also, we intentionally collected data from close-age groups (U-13 and U-14), therefore age differences would be more prominent if groups with a higher age difference were investigated (e.g., U-13 and U-17). This choice was justified as even if the differences in players' age is not too remarkable, players might experience significant maturational changes within this 12-14 years-old period, which requires the coaches to consider the specificities of each age group when planning training sessions. However, future studies should enlarge the current population by investigating players from different age groups in youth soccer.

Practical recommendations to coaches might be proposed based on the current data. Firstly, if the coaches search for a more stable condition to nurture players' ability to collectively explore and safely keep the ball possession after recovering it, adopting the 2-floater is recommended. This is due to the fact the floaters' position in the 2-floater condition highlights the collective instead of an individual exploration of possibilities for action, which enhances players' possibility to keep the ball possession, namely in offensive transitions. This task will also enhance age-group differences allowing the more experienced players to adopt a more stable game pattern during the SSGs. On the other hand, the 1-floater and the 3vs3 formats could be adopted if the coaches aim to expose players to a more complex and unpredictable tactical scenario, which can foster original behaviours and increase the tactical repertoire, as recommended in the literature.³⁶ Also, we demonstrate that both formats with floaters increase in-width positioning. This might be considered by coaches when developing training contents focused on ball circulation patterns in youth soccer.

Conclusion

The 2-floater SSG format is a more facilitated and simplified version of numerically unbalanced SSGs than the 1-floater format. Also, older players tend to present more exploratory behaviour in SSGs with floaters, mainly on the length axis, which reinforces that playing SSGs with floaters provides players with higher variability on their positioning. That is, the introduction of floaters allows attackers to increase mobility on the field and to explore more possibilities for action over the SSGs.


Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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References

1. Olthof SBH, Frencken WGP and Lemmink KAPM. A match-derived relative pitch area facilitates the tactical representativeness of small-sided games for the official soccer match. *J Strength Cond Res* 2019; 33: 523–530.
2. Pizarro D, Praxedes A, Travassos B, et al. The effects of a nonlinear pedagogy training program in the technical-tactical behaviour of youth futsal players. *Int J Sports Sci Coach* 2019; 14: 15–23.
3. Praxedes A, Del Villar Álvarez F, Moreno A, et al. Effects of a nonlinear pedagogy intervention programme on the emergent tactical behaviours of youth footballers. *Phys Educ Sport Pedagog* 2019; 24: 332–343.
4. Moreira PED, Barbosa GF, Murta CDCF, et al. Network analysis and tactical behaviour in soccer small-sided and conditioned games: influence of absolute and relative playing areas on different age categories. *Int J Perform Anal Sport* 2020; 20: 64–77.
5. Clemente FM, Afonso J, Castillo D, et al. The effects of small-sided soccer games on tactical behavior and collective dynamics: a systematic review. *Chaos Solitons Fract* 2020; 134: 109710.
6. Nunes NA, Gonçalves B, Coutinho D, et al. How playing area dimension and number of players constrain football performance during unbalanced ball possession games. *Int J Sport Sci Coach*. DOI: 10.1177/1747954120966416.
7. Travassos B, Coutinho D, Goncalves B, et al. Effects of manipulating the number of targets in U9, U11, U15 and U17 futsal players' tactical behaviour. *Hum Mov Sci* 2018; 61: 19–26.
8. Clemente FM, Castillo D and Los Arcos A. Tactical analysis according to age-level groups during a 4 vs. 4 plus goalkeepers small-sided game. *Int J Environ Res Public Health* 2020; 17: 1667.
9. Folgado H, Lemmink KAPM, Frencken W, et al. Length, width and centroid distance as measures of teams tactical performance in youth football. *Eur J Sport Sci* 2014; 14: S487–S492.
10. Padilha MB, Guilherme J, Serra-Olivares J, et al. The influence of floaters on players' tactical behaviour in small-sided and conditioned soccer games. *Int J Perform Anal Sport* 2017; 17: 721–736.
11. Praça GM, Clemente FM, de Andrade AGP, et al. Network analysis in small-sided and conditioned soccer

- games: the influence of additional players and playing position. *Kinesiology* 2017; 49: 185–193.
12. Canton A, Torrents C, Ric A, et al. Effects of temporary numerical imbalances on collective exploratory behavior of young and professional football players. *Front Psychol* 2019; 10: 1968.
 13. Moniz F, Scaglia A, Sarmento H, et al. Effect of an inside floater on soccer players tactical behaviour in small sided and conditioned games. *J Hum Kinet* 2020; 71: 167–177.
 14. Pizarro D, Práxedes A, Travassos B, et al. Floaters as coach's joker? Effects of the floaters positioning in 3vs3 small-sided games in futsal. *Int J Perform Anal Sport* 2021; 21: 197–214.
 15. Sannicandro I, Cofano G, Raiola G, et al. Analysis of external load in different soccer small-sided games played with external wildcard players. *J Phys Educ Sport* 2020; 20: 672–679.
 16. Tessaro E and Williams J. Validity and reliability of a 15 Hz GPS device for court-based sports movements. *Sport Perform Sci Rep* 2018; 29: 1–4.
 17. Coito N, Davids K, Folgado H, et al. Capturing and quantifying tactical behaviors in small-sided and conditioned games in soccer: a systematic review. *Res Q Exerc Sport* 2020; 8: 1–15.
 18. Praça GM, Chagas MH, Bredt SGT, et al. The influence of the offside rule on players' positional dynamics in soccer small-sided games. *Sci Med Footb*. DOI: 10.1080/24733938.2020.1819559.
 19. Serra-Olivares J, Clemente FM, González-Víllora S, et al. The influence of coaches' instruction on technical actions, tactical behaviour, and external workload in football small-sided games. *J Strength Cond Res* 2019; 8: 171–180.
 20. Praça GM, Morales JCP, Moreira PED, et al. Tactical behavior in soccer small-sided games- influence of team composition criteria. *Rev Bras Cineantropom Desempenho Hum* 2017; 19: 354–363.
 21. Teoldo I, Garganta JM, Greco PJ, et al. System of tactical assessment in soccer (FUT-SAT): development and preliminary validation. *Motricidade* 2011; 7: 69–83.
 22. Brito E Sousa R, Bredt SDGT, Greco PJ, et al. Influence of limiting the number of ball touches on players' tactical behaviour and network properties during football small-sided games. *Int J Perform Anal Sport* 2019; 19: 999–1010.
 23. Silva DC, Lopes MC, González-Víllora S, et al. Tactical behaviour differences of high and low-performing youth soccer players in small-sided and conditioned games. *Int J Perform Anal Sport* 2021; 21: 33–50.
 24. Landis JR and Koch GGC. The measurement of observer agreement for categorical data. *Biometrics* 1977; 33: 159–174.
 25. Köklü Y, Arslan Y, Alemdaroğlu U, et al. Accuracy and reliability of SPI ProX global positioning system devices for measuring movement demands of team sports. *J Sport Med Phys Fit* 2015; 55: 471–477.
 26. Palacios R. deg2utm. MATLAB central file exchange, www.mathworks.com/matlabcentral/fileexchange/10915 (accessed 20 October 2012).
 27. Folgado H, Duarte R, Fernandes O, et al. Competing with lower level opponents decreases intra-team movement synchronization and time-motion demands during pre-season soccer matches. *PLoS One* 2014; 9: e97145.
 28. Clemente FM, Bernardo Sequeiros J, Correia AFPP, et al. *Computational metrics for soccer analysis: connecting the dots*. Cham: Springer, 2018.
 29. Pierce CA, Block CA and Aguinis H. Cautionary note on reporting eta-squared values from multifactor ANOVA designs. *Measurement* 2004; 64: 916–924.
 30. Praça GM, Folgado H, de Andrade AGP, et al. Influence of additional players on collective tactical behavior in small-sided soccer games. *Rev Bras Cineantropom Desempenho Hum* 2016; 18: 62–71.
 31. Olthof SBH, Frencken WGP and Lemmink KAPM. Match-derived relative pitch area changes the physical and team tactical performance of elite soccer players in small-sided soccer games. *J Sport Sci* 2018; 36: 1557–1563.
 32. Machado JC, Barreira D, Teoldo I, et al. How does the adjustment of training task difficulty level influence tactical behavior in soccer? *Res Q Exerc Sport* 2019; 90: 403–416.
 33. Olthof SBH, Frencken WGP and Lemmink K. The older, the wider: on-field tactical behavior of elite-standard youth soccer players in small-sided games. *Hum Mov Sci* 2015; 41: 92–102.
 34. Figueira B, Goncalves B, Masiulis N, et al. Exploring how playing football with different age groups affects tactical behaviour and physical performance. *Biol Sport* 2018; 35: 145–153.
 35. Práxedes A, Moreno A, Gil-Arias A, et al. The effect of small-sided games with different levels of opposition on the tactical behaviour of young footballers with different levels of sport expertise. *PLoS One* 2018; 13: e0190157.
 36. Canton A, Torrents C, Ric A, et al. Exploratory behavior and the temporal structure of soccer small-sided games to evaluate creativity in children. *Creat Res J* 2021; 33: 16–25.