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How the Number of Players and Floaters' Positioning Changes the Opportunities for Play during Futsal Small-Sided Games?

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Abstract: This study aims to analyse the effects of floater positioning within futsal Gk + 3vs3 + Gk and Gk + 2vs2 + Gk SSGs on youth players technical-tactical performance. An independent measure approach under three experimental conditions was carried out: Floaters Off (FO), Final Line Floaters (FLF) and Lateral Floaters full court sidelines (LFffsl). Thirty male futsal players (U19 age category) participated in the study. Offensive performance based on "action per minute per player" was analysed through indirect and external systematic observation. Results showed significant differences between both SSG (2vs2 and 3vs3). Specifically, higher values of passing actions were observed in 3vs3 SSG and dribbling and shooting actions in 2vs2 SSG. In this regard, 2vs2 seems to create more opportunities for 1vs1, while the 3vs3 highlights more relational actions and collective tactical behaviours. Moreover, according to the game principle analysed, 3vs3 is associated with passing and dribbling action to progress towards the goal without beating a defence line, while 2vs2 is associated with passing and dribbling actions that beating a defence line. Thus, it seems that the number of player influence in the tactical behaviour of the team. These findings should be considered for the design of futsal training tasks, according to the main objective of the training session.

Keywords: ecological dynamics; training tasks; technical-tactical training; game principles

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1. Introduction

In team sports such as futsal, in which predominate open motor skills, it is required that players continuously coadapt their actions to the movements of opponents, teammates and the surrounding environment leading to the emergence of opportunities for action (1–3) and to ensure functional collective behaviour (4–6). In the last few decades, based on the ecological dynamics approach, non-linear pedagogy has emerged highlighting the need to maintain the perception-action couple on the design of practice tasks (5). For example, through the manipulation of small-sided games (SSG) coaches can highlight not only the actions but also the information that will support players' performance. SSG are modified games that optimize the physical and physiological aspects and, secondly, the technical and tactical demands of sports instead of replicating the real match (7). However, the advantages of playing SSG are dependent on the definition of task goals and design (8) that guides players to explore the functional behaviours of each task according to the coaches' primary purposes (9).

The manipulation of task constraints in SSG seems to be an effective approach to skill acquisition (1,10) that allows coaches to optimize specific offensive behaviours of players by breaking the game into specific game subunits, i.e., Gk + 1 vs 1 + Gk until Gk + 3 vs 3 + Gk (11) instead of replicating the technical and tactical demands of sports (7). In line with this, coaches should go from simplified units with a low number of players to highlight the informational constraints that promote the development of offensive foundations of players, to more complex units until the numerical relation of the game to develop the game principles and strategic requirements that support collective behaviour of teams according to the perceptual and action demands of competition.

Previous studies attempted to provide a broader comprehension of the impact of altering SSG characteristics (task constraints), such as the number of players per team (12,13), the court size (1), number of targets (14) or even the manipulation of the numerical relation between teams through the use of floaters (jokers in other studies) (15–21). Interestingly, one of the task constraints that have been studied recently is the accomplishment of tactical principles of attack to perform (22). These are refereed as to keep the ball possession, to progress towards the goal (without or beating a defence line) or to shoot at goal with the lowest level of opposition (23). In this sense, coaches have to manipulate the relevant task constraints for each goal to guide players to explore the environment of play, improving their tactical and creative behaviour (24).

It is important that coaches understand the effects of such manipulations to design the appropriate learning environments that help the players develop more adaptative technical-tactical behaviours according to changes in the game environment (8), specifically in futsal. This perspective justifies the interest of researchers and practitioners in this topic and the growing number of studies in the past few years (7,25,26). However, any information exists regarding the technical-tactical changes promoted by the use of floaters in teams with less or more players. Thus, the main purpose of this study was to analyse the effects of floater positioning within futsal Gk + 3 vs 3 + Gk and Gk + 2 vs 2 + Gk SSG on youth players technical-tactical behaviour.

2. Materials and Methods

2.1. Participants

The participants were 30 male futsal players from the under-19 (U19) category (age, M = 17.714 and SD = 0.713) of four Spanish clubs. All the participants had the same level of expertise (i.e., average skill level) and participated in the same competition (the first regional league). All teams had the same amount of training (i.e., players perform two training sessions of 60 minutes per week with an official match played during the weekend). Participants were treated according to the American Psychological Association's ethical guidelines concerning participant assent, parent/guardian consent, confidentiality, and anonymity.

2.2. Design and Procedures

The study designed consisted of an independent measure approach under four experimental conditions (three SSGs) that manipulated the floater positioning. These SSGs (Gk + 3vs3 + Gk; Gk + 2vs2 + Gk) were designed using the presence and absence of "Floaters" (2 Floaters; one per team) as key task constraints: a) "Floaters Off" (FO); b) "Final Line Floaters" (FLF) and c) "Lateral Floaters" (LF). In 3 vs 3 situations, tests were conducted on a field of 30 metres long by 15 metres wide (see Figure 1). In 2 vs 2 situations, tests were conducted on a field of 20 metres long by 10 metres wide (see Figure 2). These measures respected the player-space ratio used by futsal players according to the maximum length and width dimensions (40 m × 20 m) of the real game (for each team player, 10m large and 5m regular, without goalkeepers).

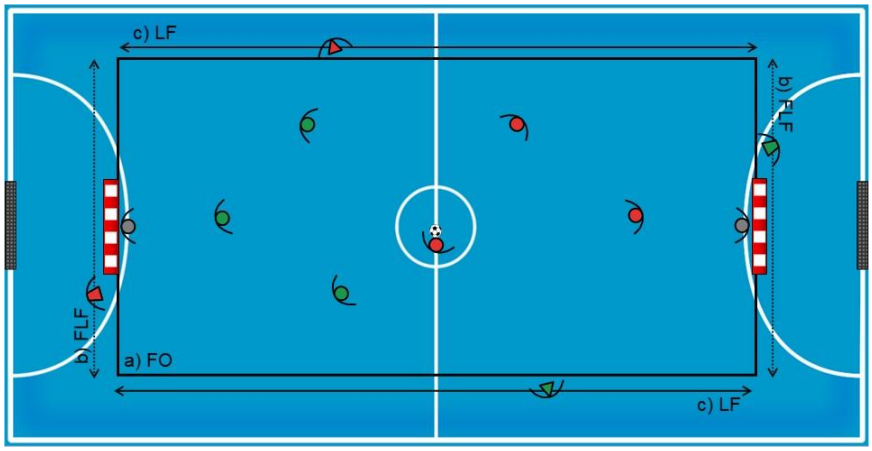

Figure 1. 3 vs 3 experimental conditions. Note. FO: Floaters Off; FLF: Final Line Floaters; LF: Lateral Floaters.

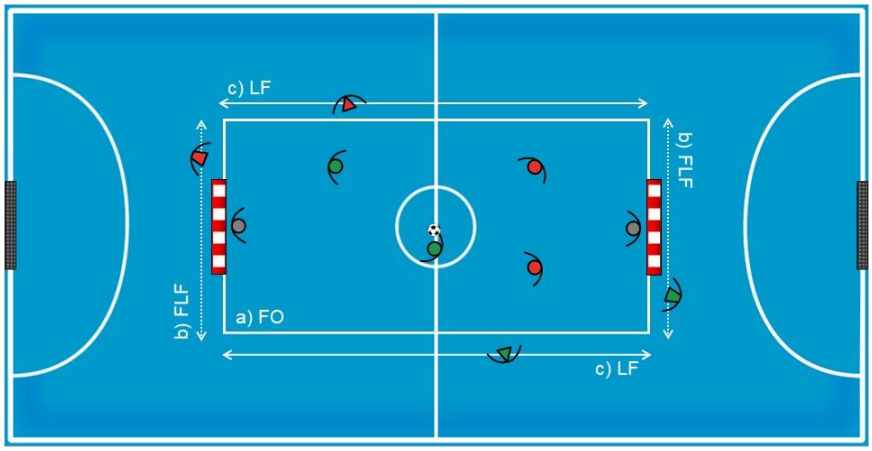

Figure 2. 2 vs 2 experimental conditions. Note. FO: Floaters Off; FLF: Final Line Floaters; LF: Lateral Floaters.

Players were distributed into five groups of six individuals for 3 vs 3 SSG (G1 to G5) and seven groups of four individuals for 2 vs 2 SSG (G1 to G7; goalkeepers and floaters were not considered as participants in this study). All participants played once to each situation in random order and on a different day.

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Game situations were explained, and participants were asked to play at their best level to succeed in SSGs (score in the opposite goal). Coaches and experimenters did not provide any verbal feedback during the SSG. As for rules, floater players were only allowed to perform offensive actions, with a maximum of two touches, their actions were limited to space between two marks, parallel to each line (side or final), and could not score a goal. Also, goalkeepers could not get out of the finish line. A throw-in was granted after the ball crosses the lines delimited by the floaters' area. During the test, players were asked not to go inside floaters' area. Extra balls were placed around the field to allow a

quick restart of the game if the ball went out of bounds and during the rest intervals between bouts, players were allowed to drink water.

2.3. Data Collection

It was defined as the number of actions of one player developed in each SSG per minute. This measure was observed through the hand notation analysis systems. All the game actions were recorded in SSGs described using a video camera, recording angle conversion lens (×0.75): VCL-HGA07B and a Hama Gamma tripod Series. The camera was placed in the corner of the playing field, at the height of 4 m, guaranteeing an optimal view of all the game actions (see Figure 3). Videos were transferred to a computer (Acer Aspire E15). Subsequently, data were recorded on a Microsoft Office Excel 2010 sheet and exported to the SPSS Inc., Released 2009 (PASW Statistics for Windows, Version 18.0, Chicago: SPSS Inc.). Offensive performance based on "action per minute per player" was analysed through indirect and external systematic observation, a methodology used in previous studies to measure players' behaviour in real game situations (27).

The observation was developed by two external researchers. As a preparatory stage to the observations, the expert met with the observer to clarify possible doubts about the observation instrument and the coding criteria of dependent variable on the actions mentioned. Then, the observations were carried out, using a sample higher than 10% of the total (28). Interobserver reliability was calculated using the following formula: agreements/(agreements + disagreements) × 100 measure. Once this value was calculated, the Cohen kappa index was used. Values above 0.90 were obtained for all training sessions, surpassing the value of 0.81 from which adequate concordance is considered (29), thus achieving the necessary reliability for the subsequent coding of the dependent variables. To guarantee the time reliability of the measurement, the same coding was developed at two different moments, with a time difference of 10 days. Cohen kappa values were found to be higher than 0.92, which reflected a reliable concordance.

All the passing, dribbling and shooting actions of each player in the team were analysed according to the following game principles: 1st principle—to keep the ball possession (BP); 2nd A principle—to progress towards the goal without beating a defence line (P); 2nd B principle—to progress towards the goal beating a defence line (PDL); 3rd principle—to shoot at goal with the lowest level of opposition (S). For 3vs3 SSG, a total of 1352 passing (1st principle, n = 573; 2nd A principle = 548, 2nd B principle, n = 127; 3rd principle, n = 104); 920 dribbling (1st principle, n = 256; 2nd A principle = 371, 2nd B principle, n = 215; 3rd principle, n = 78); and 342 shooting (3rd principle, n = 342). For 2vs2 SSG, a total of 1087 passing (1st principle, n = 418; 2nd A principle = 155, 2nd B principle, n = 396; 3rd principle, n = 55); 1044 dribbling (1st principle, n = 318; 2nd A principle = 235, 2nd B principle, n = 277; 3rd principle, n = 214); and 421 shooting (3rd principle, n = 421).

When the teacher training process was completed a data collection was conducted with all the students participating in the study (pre-test). This occurred in the week prior to the starting of the intervention. Students were required to answer the questionnaires provided by the researcher independently, without additional help to that provided on the instrument itself. The time required to complete the questionnaire was between 15 and 20 minutes. The teacher responsible for the intervention was not present during this period. After pre-test, students were exposed to the 16 learning sessions of the intervention program. All students experienced the same learning activities, although those in the control group did not have the application of questioning. The groups for these sessions were determined by the teacher based on the development and evolution of the activities. After the intervention, the ultimate data collection phase (post-test) was conducted following the same procedure as pre-test.

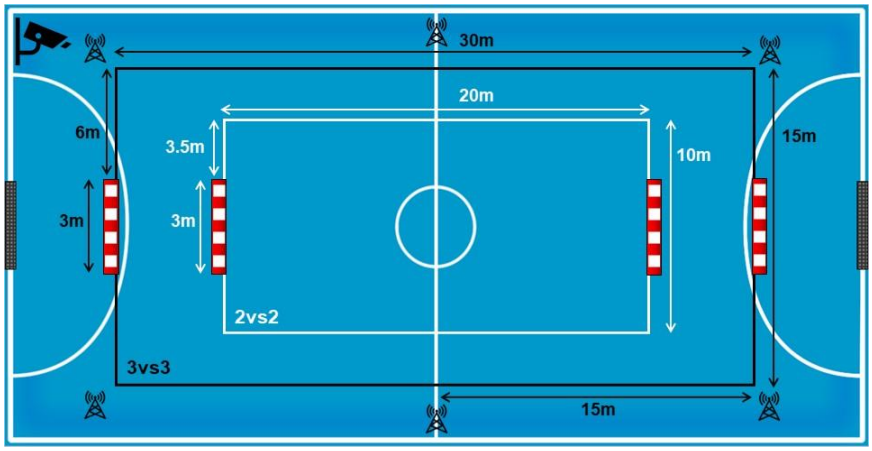


Figure 3. Pitch size and camera positioning.

2.4. Statistical Analysis

The statistical analysis was completed using The Jamovi Project (Jamovi). A descriptive analysis was presented on tables 3, with mean and standard deviation (Mean±SD). An independent sample t-test was performed to identify differences in considered variables between the game formats 2v2 vs 3vs3. Statistical significance was set at $p < 0.05$. Complementary, to overcome the shortcomings associated with traditional N-P null hypothesis significance testing, the standardized Cohen's d, with 95% confidence intervals as effect size (ES) of the differences (30–32). Thresholds for effect size statistics were: 0.0–0.19, trivial; 0.20–0.59, small; 0.6–1.19, moderate; 1.2–1.9, large; and ≥2.0, very large (32).

3. Results

The descriptive and inferential analysis between actions per minute per player developed in two Small-sided games (2vs2 – 3vs3) according to the floater positioning (task constraint) and the game principle (GP) are presented in Table 1. Complementary, Figure 4 shows the standardized (Cohen) differences for the pairwise comparations.

Non-significant differences were identified for passing and dribbling actions in the 1st principle (BP) for any task constraints between both SSG.

According to passing actions in 2nd A principle (P), results shown significant higher values in 3vs3 than in 2vs2 SSGs in FO (mean differences [95% confidence interval]; 3.1 [2.2, 4.1], $p < 0.01$, large ES), LFofsl (2.2 [1.1, 3.4], $p < 0.01$, moderate ES), LF (2.4 [1.1, 3.7], $p < 0.01$, moderate ES) and FLF (4.9 [3.8, 6.1], $p < 0.01$, large ES). Regarding to dribbling actions in 2nd A principle (P), results shown significant higher values in 3vs3 than in 2vs2 SSGs in LF (1.3 [0.2, 2.4], $p < 0.05$, moderate ES).

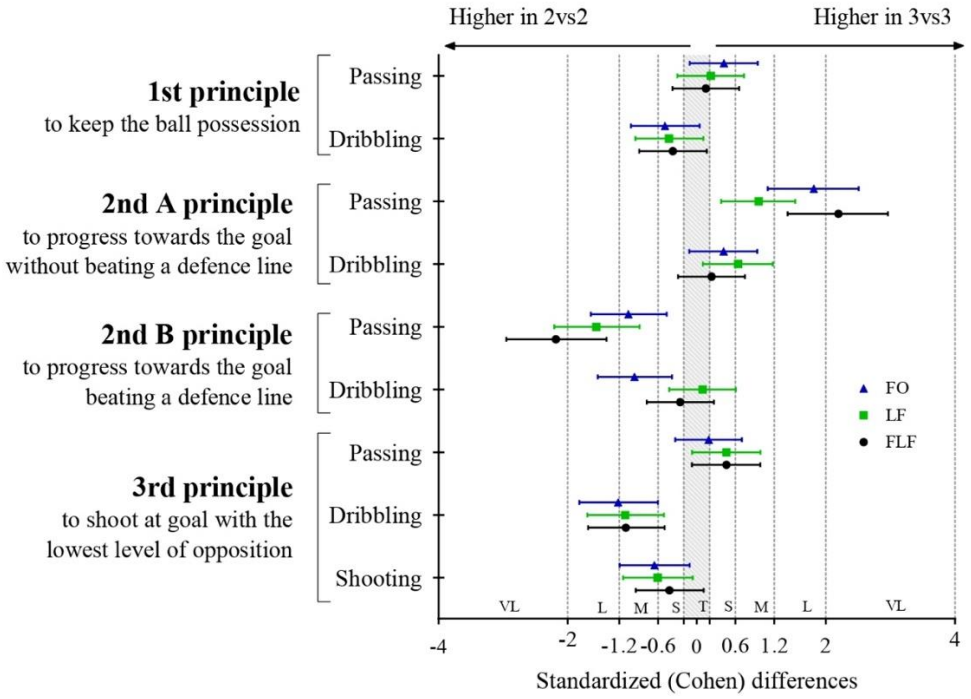
When considering the passing actions in 2nd B principle (PDL), results shown significant higher values in 2vs2 than in 3vs3 SSGs in FO (-1.5 [-2.2, -0.7], $p < 0.01$, moderate ES), LF (-3.3 [-4.4, -2.2], $p < 0.01$, large ES) and FLF (-3.5 [-4.4, -2.7], $p < 0.01$, very large ES). Regarding to dribbling actions in 2nd B principle (PDL), results shown significant higher values in 2vs2 than in 3vs3 SSGs in FO SSG (-1.6 [-2.5, -0.7], $p < 0.01$, moderate ES).

For passing actions in the 3rd principle (S), any significant difference was identified. For dribbling actions performed in 3rd principle (S), results shown significant higher values in 2vs2 than in 3vs3 SSGs in FO (-1.4 [-2.0, -0.8], $p < 0.01$, large ES), LF (-1.4 [-2.1, -0.7], $p < 0.01$, moderate ES) and FLF (-0.8 [-1.2, -0.4], $p < 0.01$, moderate ES). Finally, for the shooting actions in 3rd principle (S), results shown significant higher values in 2vs2 than in 3vs3 SSGs in FO (-1.2 [-2.2, -0.2], $p < 0.05$, moderate ES) and LF (-1.1 [-2.1, -0.1], $p < 0.05$, moderate ES).

Table 1. Descriptive (Mean ± SD) and inferential analysis of the considered variables according to the SSG formats.

Game Principle	Actions	Constraints	Small-sided Games		Mean Difference with 95% CI	Effect Size
			2vs2	3vs3		
1st	Passing	Floaters Off	4.0±2.5	5.1±2.7	1.1 [-0.3, 2.5]	-
		Lateral Floaters	4.3±3.4	4.9±2.2	0.6 [-0.9, 2.1]	-
		Final Lines Floaters	3.0±1.6	3.2±1.7	0.2 [-0.6, 1.1]	-
	Dribbling	Floaters Off	3.6±2.0	2.6±2	-1.0 [-2.0, 0.1]	-
		Lateral Floaters	2.6±1.7	2.0±1.5	-0.7 [-1.6, 0.2]	-
		Final Lines Floaters	3.1±2.0	2.2±2.3	-0.8 [-1.9, 0.3]	-
2nd A	Passing	Floaters Off	0.8±0.8	4.0±2.3	3.1 [2.2, 4.1] *	Large
		Lateral Floaters	2.2±2.0	4.7±2.9	2.4 [1.1, 3.7] *	Moderate
		Final Lines Floaters	0.8±0.9	5.9±2.9	4.9 [3.8, 6.1] *	Very Large
	Dribbling	Floaters Off	2.9±1.6	3.9±2.9	1.0 [-0.3, 2.2]	-
		Lateral Floaters	1.7±1.4	3.1±2.5	1.3 [0.2, 2.4] *	Moderate
		Final Lines Floaters	2.1±1.3	2.5±2.3	0.4 [-0.5, 1.4]	-
2nd B	Passing	Floaters Off	2.7±1.6	1.1±1.1	-1.5 [-2.2, -0.7] *	Moderate
		Lateral Floaters	4.3±2.8	1.1±1.0	-3.3 [-4.4, -2.2] *	Large
		Final Lines Floaters	4.7±2.0	1.2±1.2	-3.5 [-4.4, -2.7] *	Very Large
	Dribbling	Floaters Off	3.5±1.8	1.9±1.5	-1.6 [-2.5, -0.7] *	Moderate
		Lateral Floaters	1.8±1.5	1.9±1.7	0.1 [-0.7, 1.0]	-
		Final Lines Floaters	2.2±2.1	1.8±1.3	-0.4 [-1.4, 0.5]	-
3rd	Passing	Floaters Off	0.7±0.9	0.9±1.1	0.2 [-0.3, 0.7]	-
		Lateral Floaters	0.6±0.8	1.0±0.9	0.4 [-0.1, 0.8]	-
		Final Lines Floaters	0.3±0.5	0.6±0.9	0.4 [-0.1, 0.8]	-
	Dribbling	Floaters Off	2.1±1.4	0.6±0.8	-1.4 [-2.0, -0.8] *	Large
		Lateral Floaters	2.2±1.5	0.8±1.0	-1.4 [-2.1, -0.7] *	Moderate
		Final Lines Floaters	1.3±0.9	0.4±0.6	-0.8 [-1.2, -0.4] *	Moderate
	Shooting	Floaters Off	4.0±1.9	2.7±1.8	-1.2 [-2.2, -0.2] *	Moderate
		Lateral Floaters	3.8±1.5	2.8±1.9	-1.1 [-2.1, -0.1] *	Moderate
		Final Lines Floaters	3.7±1.6	2.9±1.7	-0.7 [-1.6, 0.2]	-

* $p < 0.05$. Abbreviations: 1st = to keep the ball possession; 2nd A = to progress towards the goal without beating a defence line; 2nd B = to progress towards the goal beating a defence line; 3rd = to shoot at goal with the lowest level of opposition.



4. Discussion

This study aimed to analyse the effects of floater positioning within futsal Gk + 3vs3 + Gk and Gk + 2 vs 2 + Gk SSG on youth players technical-tactical performance, measured as the number of actions per minute per player. Higher values of passing actions were observed in 3 vs 3 SSG and dribbling and shooting actions in 2 vs 2 SSG. In this regard, these results seem to indicate that number of players per team as a task constraint would influence players and teams' possibilities for action and consequently their tactical behaviour. That is, one of the first constraint that coaches need to account when are designing the practice tasks are the number of players that will be involved in the practice (33). When the goal is the creation of passing lines and the occurrence of higher number of passes for maintenance of ball possession the 3 vs 3 SSG should be used while when the focus is on the dribbling and on shooting, the 2vs2 should be used. Furthermore, the manipulation of the number of players' constraint not only the actions per se but the emergence of each action in relation to the game principles that support different purposes of the teams (34).

4.1. First Game Principle (1st = to keep the ball possession)

Concerning the first game principle (BP), any significant difference was observed between the 2 vs 2 and the 3 vs 3 SSGs nor even with the addition of floaters in the side or final line of the field. That is, in opposition to previous research (15), for the maintenance of ball possession the use of different number of players or floaters seems to not influence the number of passing or dribbling actions by players. Thus, a link between the goal and the manipulations promoted should be always considered to understand the impacts of such manipulations in players and teams' tactical behaviour (35).

4.2. Second Game Principle (2nd = to progress towards the goal)

Concerning the second game principle, two different categories were considered: 2nd A principle - to progress towards the goal without beating a defence line (P) and 2nd B principle - to progress towards the goal beating a defence line (PDL).

Regarding the 2nd A principle (P), results revealed significant higher values of passing in favour of 3 vs 3 when players try to progress towards the goal without beating a defence line in all experimental conditions (FO, FLF and LF). Thus, it means that the number of players per team is more determining for the emergence of passing actions to progress without beating a defence line, than the presence or absence of the floaters. In line with previous research, the use of 3 vs 3 could be considered a more balanced defensive structure of play, defined by two defensive lines, not allowing an easy effective progression. As Gonçalves et al. (2016) and Vilar et al. (2014) pointed out, manipulating the number of players per team stimulates the emergence of new patterns of play that supports the emergence of different individual action possibilities for both attacking and defending players. Thus, it could be that in the 2 vs 2, and due to the number of passing possibilities of the attacking team is limited (specifically, only one), the defending team increased the pressure on the attacker players and the possibilities to do successful rupture passing actions (i.e., beating a defence line) increases too. On the contrary, in the 3 vs 3 the defending team could retreat its position on the field by attempts to decreasing the distance between teammates and their own goal. As Pizarro et al. (2021) pointed out, when the defending team retreats its position, the distance between attacking and defending players increases and consequently, the probability of developing passing actions without beating the line increases. In addition, in 2 vs 2 teams, only have one defensive line, affording more advantage to progress, while in 3 vs 3 defensive teams has two defensive lines, allowing a better space equilibrium to avoid progression on the field. In this sense, when a team has more players, the game was more positional and less variable, increasing the balance between teams (35).

No significant differences were observed for dribbling with exception for the condition LF, that revealed higher number of dribbling actions in favour of 3 vs 3. Where it

seems that the introduction of the floater in the side-line allow the creation of more opportunities for dribbling in 2 vs 2 than in the other conditions. In line with previous research, probably the addition of the floater promoted a retreat of defenders on the field in order to guarantee the protection of space near the goal. Usually when playing against numerical unfavorable relationships the defender tends to decrease the space for action (26), maintaining the space equilibrium between defensive lines, not allowing passing actions, but inviting more 1 vs 1 dribbling situations (20,36). Due to the 3 vs 3 structure allowing the existence of more than one defensive line, usually such dribbling actions also do not afford the possibility to beat defensive lines.

In opposition, regarding the 2nd B principle (PDL), results revealed significant higher values of passing in favour of 2 vs 2 when players try to progress towards the goal beating a defence line in all experimental conditions (FO, FLF and LF). Interestingly, the effect tends to increase with the addition of floaters. That is, with the increase of the floaters, the number of passing actions that beat defensive lines in the 2 vs 2 conditions tend to increase in comparison with the 3 vs 3 conditions. In line with previous assumptions, the use of less defensive players decreased the number of defensive lines, increasing the need to each player mark the opponent to maintaining the spatial-temporal relations to not allow progression. It opens new possibilities to increase the mobility of attacking players to create passing lines for progression (37). The addition of floaters promoted a numerical unbalance between teams with advantage of attacking team to progress on the field, and consequently less pressure of defenders to ball carrier opening more passing lines to the floaters (37). Particularly the use of floaters in the final line, which increases the number of passing lines and the of defenders to the ball seems to promote higher spatial unbalance for the emergence of passing actions.

In terms of dribbling actions, higher values were obtained in favour of 2 vs 2 when players try to progress towards the goal beating a defence line without the presence of floaters. In line with previous research, the absence of floaters and the small number of players (2 vs 2) seems to promote the emergence of 1 vs 1 situation, thus enabling the attacking players to perform more dribbling actions towards the opposite goal and beating a defence line (20,36). As previously pointed, probably, the addition of floaters tends to decrease the pressure of defenders to ball carrier opening possibilities for passing actions instead of possibilities for dribbling (38).

4.3. Third Game Principle (3rd = to shoot at goal with the lowest level of opposition)

Concerning the third game principle, only the dribbling and shooting revealed significant differences between conditions. No significant differences were observed for passing actions. That is, the emergence of passing actions that support the shoot is quite similar for both conditions used, revealing the lower values of actions to support shooting.

The analysis of dribbling actions revealed significant differences in all the experimental conditions. Specifically, significantly higher values were obtained in favour 2 vs 2 in comparison with the 3 vs 3. Despite in both SSG defenders seek to maintain their position between the ball and the goal, not allowing a misalignment between the ball and the goal (39), variability in the attacking players relations with opponents and the ball is attributed to their constant explorative performances as they seek to break the symmetry with the defending players in view of creating opportunities for scoring goals (40). However, the explorative behaviours of the attacking team take place under the constraints imposed by the defending team. As noted, the defensive team tries to maintain spatiotemporal relations with the offensive team, whereas the offensive team attempts to disrupt the status quo at opportune times by advancing position in the field, reaching the free attacking player, and finding chances for goal-scoring possibilities (41). Therefore, the relevant issue is how players change the way to explore behaviours that disrupt the status quo: in 3vs3 through passing actions and in 2 vs 2 dribbling and shooting.

5. Conclusions and Practical Implications

This study has shown that the manipulation of task constraints such as the number of players and the level of opposition based on floaters positioning influence players´ technical-tactical behaviours in 3 vs 3 and 2 vs 2 SSG. In the 2 vs 2, players perform more dribbling and shooting actions than in the 3 vs 3, where players developed more passing actions. However, these results are different regarding the game principle analysed. Specifically, 3 vs 3 is associated with passing and dribbling action to progress towards the goal without beating a defence line, while 2 vs 2 is associated with passing and dribbling actions beating a defence line. It probably occurs because the defending team in 3 vs 3 form a zonal defence prioritizing avoid the creating of penetrative passing lines and shoots at goal than increase the pressure to the attacker players. Thus, in 2 vs 2 seems to create more opportunities for 1 vs 1. According to the steps of development, the overall results stress that the 2 vs 2 seems to highlight individual actions even with the presence of floaters, while the 3 vs 3 highlights more relational actions and collective tactical behaviours. However, as results have shown, there are differences between the individual actions developed according to the SSG and the game principle. According to the main objective of training sessions, such information may support coaches to design training tasks by manipulating task constraint (number of players and floaters that should be stress to each goal).

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