The influence of small-sided conditioned games (SSCG) and interaction patterns on tactical actions during football attacks
La influencia de los juegos condicionados de lados pequeños (SSCG) y los patrones de interacción en las acciones tácticas durante los ataques de fútbol

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Abstract. Objective; (1) testing the effect of SSCG training with elaboration, (2) testing the effect of SSCG training with elaboration using interaction patterns, and (3) testing the difference in influence between the two, on increasing tactical action performance. Methods; using True Experimental with pretest-posttest control group design, the sample was football academy students aged 14-17 years, totaling 36 students divided into 3 groups; SSCG practice with elaboration (G1), SSCG practice with elaboration using interaction patterns (G2), and control group (G3). Using a test instrument (FUT-SAT), using only Action Outcome (AO) for the Offensive sub-category. Results; (1) There is a significant effect after SSCG training treatment with elaboration, as evidenced by the t-$_{count}$ of -11.118>t-$_{table}$ is 1.795, p0.000<α0.05. (2) There is a significant effect after SSCG training treatment with elaboration using interaction patterns, as evidenced by the t-$_{count}$ of -11.988>t-$_{table}$ is 1.795, p0.000<α0.05. (3) There is a significant difference in influence, as evidenced by the value of $F(35) = 65.445; p<0.000$. Tukey HSD Test Results with 95% Confident Index (CI); G1 and G2 (95%CI;[-11.51,-4.32],p<0.001), G1 and G3 (95%CI;[5.23,12.42],p<0.001), G2 and G3 (95%CI;[13.15,20.34],p<0.001), This means that G2 is better than G1 and G3, and G1 is better than G3. We predict that the effect of SSCG with work situation elaboration is able to improve existing deficiencies if SSCG is implemented separately. The interaction pattern provides the effect of ordering direction, setting dimensions, and determining tasks during the attack, so that it is more dynamic, directed, and structured. We conclude that both are worth considering and then implementing in efforts to improve tactical action performance.
Keywords: Small-sided conditioned games, Interaction Patterns, Tactical Actions, Football.

Resumen. Objetivo: (1) Probar el efecto del entrenamiento SSCG con elaboración, (2) probar el efecto del entrenamiento SSCG con elaboración utilizando patrones de interacción y (3) probar la diferencia de influencia entre los dos en el aumento del rendimiento de la acción táctica. Métodos: Utilizando un Verdadero Experimento con un diseño de grupo de control pretest-postest, la muestra estuvo formada por estudiantes de la academia de fútbol de 14 a 17 años, con un total de 36 estudiantes divididos en tres grupos: práctica de SSCG con elaboración (G1), práctica de SSCG con elaboración utilizando patrones de interacción (G2) y un grupo de control (G3). Usando un instrumento de prueba (FUT-SAT), usamos solo Resultado de Acción (AO) para la subcategoría ofensiva. Resultados: (1) Hubo un efecto significativo después del tratamiento de entrenamiento con SSCG con elaboración, como lo demuestra el recuento de t de -11.118, la tabla de t de 1.795 y p0.000<α0.05. (2) Hay un efecto significativo después del tratamiento de entrenamiento con SSCG con elaboración utilizando patrones de interacción, como lo demuestra el recuento t de -11.988. La tabla t es 1.795, p0.000<α0.05. (3) Hubo una diferencia significativa en la influencia, como lo demuestra el valor de $F(35) = 65.445; p<0.000$. Los resultados de la prueba Tukey HSD con índice de confianza (IC) del 95%; G1 y G2 (IC del 95%; [-11,51,-4,32],p<0,001), G1 y G3 (IC del 95%; [5,23,12,42],p<0,001), y G2 y G3 (IC del 95%; [13,15,20,34],p<0,001), indicaron que G2 era mejor que G1 y G3, y G1 fue mejor que G3. Predecimos que el efecto de la SSCG en la elaboración de la situación laboral puede mejorar las deficiencias existentes si la SSCG se implementa por separado. El patrón de interacción proporciona el efecto de ordenar la dirección, establecer dimensiones y determinar tareas durante el ataque para que sea más dinámico, dirigido y estructurado. Concluimos que vale la pena considerar e implementar esfuerzos para mejorar el desempeño de la acción táctica.
Palabras clave: Juegos condicionados de lados pequeños, Patrones de Interacción, Acciones Tácticas, Fútbol.

Introduction

Tactical behavior emerges through interactions between players on a team and their opponents (Olthof et al., 2015, Bach Padilha et al., 2017). Using an ecological approach, individual and team tactical behavior represents the exchange of information that occurs between players based on their abilities (physical, technical, and tactical) (Folgado et al., 2018). In competitive sports, players' tactical behavior arises from recognizing potential opportunities, known as affordances (Silva et al., 2013). Efforts to perform dribbling, passing, shooting, and other technical abilities by a football player occur when affordances are available, which are always related to sufficient space and time due to the movements of teammates and opponents (Laakso et al., 2022). his means that tactical behavior consistently appears

based on information obtained from game situations. The implementation of tactical behavior is then referred to as tactical actions.

To improve the performance of tactical behavior/actions, training that provides players and teams with experience in interacting through game simulations is needed, fostering information exchange and interaction between players on one team and the opposing team. Researchers generally use small-sided conditioned games (SSCG) for this training. SSCG encourages playing creativity (Aguiar et al., 2017). SSCG fosters playing crea- tivity (Santos et al., 2016, Caso & van der Kamp, 2020). Additionally, changes in characteristics (task manipulation) in SSCG can affect players' physical performance and physiological responses (Custódio et al., 2022). SSCG is also used to develop players' performance in decision

making, technical skills, and physical condition (Gonçalves et al., 2017, Clemente, 2018).

According to researchers, SSCG (small-sided conditioned games) can improve the tactical behavior/actions of players and teams through various manipulations of situations and conditions, such as the number of touches allowed, field size, player roles, and player composition. Limiting the number of touches in SSCG positively influences a player's actions, as it forces them to make decisions based on available opportunities, reducing careless actions (Brito E Sousa et al., 2019, Coutinho et al., 2022). Altering the size of the playing area, either by increasing or decreasing it, or a combination of both, can impact players' tactical performance and the level of interaction between the teams in different ways (Moreira et al., 2020, Custódio et al., 2022, Nunes et al., 2020, Frencken et al., 2013). The different roles of players on the team (defender, midfielder, attacker) require distinct technical, tactical, and physical performance demands, which should be considered and incorporated during training and matches (Laakso et al., 2022). In situations where a team is outnumbered, players tend to organize defensively, whereas, in situations where they have the advantage, they are better at coordinating their collective efforts (Correia da Silva et al., 2021, Nunes et al., 2020, Guard et al., 2022). Based on these findings, SSCG training could be innovatively enhanced by elaborating on situation manipulation—such as the number of touches, field size, player roles, and player composition—providing players with experiences that mimic the complexity of real match situations.

The next study, which also aims to describe the mechanism of tactical behavior/actions of football players and teams, utilizes network science by measuring metrics such as the clustering coefficient, path length and shortest path, maximum eigenvalue of the adjacency matrix, algebraic connectivity, and centrality distribution. This approach provides a robust quantification of tactical behavior/actions and team dynamics (Boying et al., 2020). raditional methods, like naked-eye observation, have proven limited in analyzing the tactics and interaction patterns of both opponents and their own teams. With advancements in sports, researchers increasingly use network science through various software tools (Custódio et al., 2022). Given that football relies on structured interaction patterns (Laakso et al., 2022). network science has been employed by (Buldú et al., 2019) to identify team organization and performance. This method was applied to FC Barcelona during Guardiola's tenure (2009-2012), a period during which the team was considered one of the best in football history.

In the description, it can be seen that four players are organized around a fifth player who is in control of the ball, the concentric circles around the ball determine the assistance zone (radius d1) and the cooperation zone (radius d2). In this way, the FC Barcelona organization during "attacking phases" has created a dynamic working concept so that opponents will always try to adapt, as well as increasing their chances of producing goals, players who guard their defense can also move dynamically (lengthening and shortening), the side areas of the field are also utilized (Buldú et al., 2019).

Regarding the results of this research, it could be something new if interaction patterns were included in SSCG training and then given to football players in the form of treatment to then test their effect on the players' tactical performance when carrying out attacks. In this research, the researchersterm the FC Barcelona organization during "attacking phases" interaction patterns because they are always repeatedly used and/or occur, involving interactions between players in one team and the opposing team.Interaction patterns generally appear in team sports such as rugby, basketball and football (Frencken et al., 2013). Champion teams have more initiative interaction patterns (Correia da Silva et al., 2019). The implementation of interaction patterns results in the division of roles in the team (Laakso et al., 2022).

The urgency of this research is; i) Knowing the effect of SSCG training with the elaboration of situation manipulation; number of touches, size of the field, role of players in the team, composition of players. ii) Knowing the effect of SSCG training with the elaboration of situation manipulation; the number of touches, the size of the field, the role of the players in the team, the composition of the players which are strengthened by the application of interaction patterns. iii) Find out whether there are differences between the two exercises. For this reason, the researcherspropose three hypotheses; i) SSCG training with elaboration on manipulation of work situations (number of touches, field size, player roles, player composition) is able to improve the tactical actions performance of a football player during an attack. ii) SSCG training with elaboration on manipulation of work situations (number of touches, field size, player roles, player composition) using interaction patterns is able to improve the tactical actions performance of a football player during an attack. iii) There is a difference in the influence on the performance of a player's tactical actions during an attack between SSCG training and elaboration of work situation manipulation using interaction patterns and not.
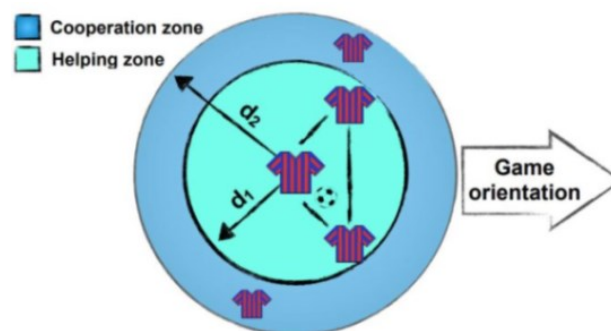

Figure 1. FC Barcelona organization during "attacking phase". Source:(Buldú et al., 2019)

Materials & Methods

Study design

This research used True Experimental with a pretest-posttest control group design. This research received approval from the Ethics Committee of the Muhammadiyah University of Palopo, Indonesia (01/KEP/III.3.AU/F/2023).

Participants

The sample was academy students aged 14-17 who came from three football academies in Palopo City, Indonesia. Clubs and parents signed research consent forms. 36 students (average; age 16.7 years, training age 9.10 years, height 166.3 and weight 61.5) were divided into 3 training groups using stratified random sampling, with considerations; i) the role of the players in the team (defender, midfield, forward) influences the team's tactical performance (Guard et al., 2022). ii) more playing experience (regular and non-regular players) will have an effect on the performance, motivation and desire to compete in football players (Slimani et al., 2016).

The SSCG training group with elaboration on work situation manipulation (G1) consisted of 12 students. The SSCG training group with elaboration on work situation manipulation using interaction patterns (G2) consisted of 12 students. The control group (G3) consisted of 12 students. With an estimate of 4 defenders, 4 midfielders, 4 forwards. To be fair, the 4 defenders, 4 midfielders, 4 forwards in each training group are 2 students who usually play regularly and 2 non-regulars (reserves). During the training process (treatment), pre-test and post-test were provided by 2 goalkeepers each for each group but were not included in the analysis.

Procedures

In this SSCG exercise, the largest field dimensions are 36x27m, recommended by the International Football Association Board regarding calculating the ratio of space usage by players(Costa et al., 2011). The longest duration for each game/session is 6 minutes, 4-8 minutes is enough for all players to carry out tactical actions(Costa et al., 2011). Recovery 4 minutes between games/sessions, passive recovery can take 4 minutes between SSCG matches(Brito E Sousa et al., 2019). The treatment (SSCG training) can be seen in table 1. The treatment (SSCG training) with elaboration on work situation manipulation can be seen in table 2. The training program for G1 and G2 can be seen in table 3.

Table 1.
SSCG exercises with work situation manipulation

SSCG manipulation	Number of touches (M1)	Field size (M2)	Player position (M3)	Player composition (M4)
Regulations	Gk+6 vs 6+Gk 2 defenders (D), 2 midfielders (M), 2 forwards(F)/team 6 minutes/session Field 36x27m Pause between sessions 4 minutes)	Gk+6 vs 6+Gk 2 D, 2 M, 2 F/team 6 minutes/session Pause between sessions 4 minutes)	Gk+4 vs 4+Gk 6 minutes/session Field 36x27m Pause between sessions 4 minutes	Gk+Winning Number vs Losing Number+Gk Player positions in 1 team are drawn 6 minutes/session Field 36x27m Pause between sessions 4 minutes
Sessions	Session 1; 2 touches Session 2; 2 touches vs free touch (alternating after the ball goes out)	Session 1; pitches 18x13.5m Session 2; pitches 9x6.75m	Session 1; Gk+4(D) vs 4(M)+Gk Session 2; Gk+4(M) vs 4(F)+Gk Session 3; Gk+4(D) vs 4(F)+Gk	Session 1; Gk+6 vs 3+Gk Session 2; Gk+5 vs 3+Gk Session 3; Gk+4 vs 3+Gk.

Table 2.
SSCG exercises with elaboration on work situation manipulation

Elaboration of SSCG manipulation	Sessions
M1+M	Session 1; 2 touches with a pitch of 18x13.5m Session 2; 2 touches with a pitch of 9x6.75m Session 3; 2 touches vs free touch (alternating after the ball goes out) on an 18x13.5m pitch Session 4; 2 touches vs touches (alternating after the ball goes out) freely on a 9x6.75m field
M1+M3	Session 1; 2 touches with Gk+4(D) vs 4(M)+Gk Session 2; 2 touches with Gk+4(M) vs 4(F)+Gk Session 3; 2 touches with Gk+4(D) vs 4(F)+Gk Session 4; 2 touches vs free touches (alternating after the ball goes out) with Gk+4(D) vs 4(M)+Gk Session 5; 2 touches vs free touches (alternating after the ball goes out) with Gk+4 (M) vs 4(F)+Gk Session 6; 2 touches vs free touches Gk+4(D) vs 4(F)+Gk
M1+M4	Session 1; 2 touches with Gk+6 vs 3+Gk Session 2; 2 touches with Gk+5 vs 3+Gk Session 3; 2 touches with Gk+4 vs 3+Gk Session 4; 2 touches vs free touches (alternating after the ball goes out) with Gk+6 vs 3+Gk Session 5; 2 touches vs free touches (alternating after the ball goes out) with Gk+5 vs 3+Gk Session 6; 2 touches vs free touches (alternating after the ball goes out) with Gk+4 vs 3+Gk
M2+M3	Session 1; 18x13.5m field with Gk+4(D) vs 4(M)+Gk Session 2; 18x13.5m field with Gk+4(M) vs 4(M)+Gk Session 3; 18x13.5m field with Gk+4(D) vs 4(F)+Gk Session 4; 9x6.75m field with Gk+4(D) vs 4(M)+Gk Session 5; 9x6.75m field with Gk+4(M) vs 4(F)+Gk Session 6; 9x6.75m field with Gk+4(D) vs 4(F)+Gk
M2+M4	Session 1; 18x13.5m field with Gk+6 vs 3+Gk Session 2; 18x13.5m field with Gk+5 vs 3+Gk

	Session 3; 18x13.5m field with Gk+4 vs 3+Gk
	Session 4; 9x6.75m field with Gk+6 vs 3+Gk
	Session 5; 9x6.75m field with Gk+5 vs 3+Gk
	Session 6; 9x6.75m field with Gk+4 vs 3+Gk
M3+M4	Session 1; Gk+4(D) vs 3(M)+Gk
	Session 2; Gk+4(D) vs 3(F)+Gk
	Session 3; Gk+4(M) vs 3(D)+Gk
	Session 4; Gk+4(M) vs 3(F)+Gk
	Session 5; Gk+4(F) vs 3(D)+Gk
	Session 6; Gk+4(F) vs 3(M)+Gk

Table 3.
Training program for G1 and G2

Week	Day	Exercise (Traetment)	
		G1 and G2	Information
1	1	M1	
	2	M2	
	3	M3	
	4	M4	
2	5	M1+M2 (sessions 1 and 2)	Especially for G2, in carrying out all the treatments as in table 1 and table 2, you are required to learn and use interaction patterns
	6	M1+M2 (sessions 3 and 4)	
	7	M1+M3 (sessions 1, 2 and 3)	
	8	M1+M3 (sessions 4, 5 and 6)	
3	9	M1+M4 (sessions 1, 2 and 3)	
	10	M1+M4 (sessions 4, 5 and 6)	
	11	M2+M3 (sessions 1, 2 and 3)	
	12	M2+M3 (sessions 4, 5 and 6)	
4	13	M2+M4 (sessions 1, 2 and 3)	
	14	M2+M4 (sessions 4, 5 and 6)	
	15	M3+M4 (sessions 1, 2 and 3)	
	16	M3+M4 (sessions 4, 5 and 6)	

Instruments

Before G1 and G2 underwent treatment, a pre-test was applied to measure the players' tactical actions using the System of Tactical Assessment in Soccer (FUT-SAT) test instrument(Costa et al., 2011), and after the treatment a post-test was applied. In this case the researchersdo not use the entire FUT-SAT assessment category, the researcherssimply use Action Outcome (AO) for the Offensive sub-category, the interpretation of which can be seen in Table 4.

Table 4.
Action Outcome (AO) category and Offensive sub-category in FUT-SAT

Components	Definitions	Values
Shoot at goal	When a player shoots at goal, and (a) scores a goal, (b) the goalkeeper makes a save, (c) the ball touches one of the goalposts or the crossbar.	5
Keep possession of the ball	When team players execute passes to each other and keep up with the ball.	4
Earn a foul, win a corner or throw-in	When the match is stopped due to a foul, corner or throw-in; the team that was attacking KEEPS possession of the ball.	3
Commit a foul, give away a corner or throw in	When the match is stopped due to a foul, corner or throw-in; the possession of the ball CHANGES to the team that was in defense.	2
Loss of ball possession	When the attacking team loses the ball possession.	1

This instrument uses the format "GK+3 vs 3+GK", for 4 minutes on a field measuring 36 meters long and 27 meters wide (Figure 2), all football regulations are used except offside. Each player is given a back and chest number 1 to 3 for one team and 4 to 6 for the other team, to make it easier to identify the players in the video. The images were recorded by a video camera (SONY HDR-XR100, Tokyo, Japan) positioned from top to bottom so as to cover all player activities. Tracker video analysis® software (Open Source Physics (OSP), National Science Foundation and Davidson College, US) researchers used to identify player performance in videos. Tracker video analysis® is suitable to be used to analyze students' movement skills in physical education (Artiningsih & Nurohman, 2020), (Muliyati et al., 2020). With work capabilities that are able to determine objects, slow down videos, analyze the movement of objects in videos (distance, time and speed), it makes it easier for us to analyze and calculate the number of values achieved by each player.
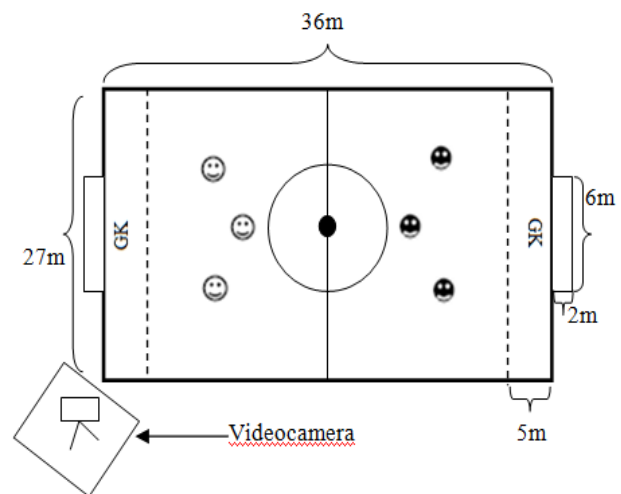

Figure 2. Representation of the physical structure of the "GK+3 vs. 3+GK" Test

The competition format in this field test (pre-test and post-test) is; i) the players in each group (G1 and G2) are divided into 4 field test teams, 1 team consisting of 1 defender, 1 midfield, 1 forward, and 1Gk (chosen at random). ii) FUT-SAT applies to all matches. iii) field test match scheme (table 5).

Table 5.
Field Test Match Scheme (pre-test and post-test)

Team Experimental Group G1 vs G2
Team 1 G1 vs Team 1 G2
Team 2 G1 vs Team 2 G2
Team 3 G1 vs Team 3 G2
Team 4 G1 vs Team 4 G2

Statistical analysis

Testing the first and second hypotheses uses Paired-samples t tests. Testing the third hypothesis uses one-way ANOVA, and further testing uses the Tukey HSD test. The

prerequisite tests are the normality test using the Shapiro–Wilk Test and the homogeneity test using Levene statistics. Overall statistical analysis using SPSS 22.

Results

Based on Table 6, it shows the overall descriptive analysis of the pretest and posttest G1, G2 and G3.

Table 6.
Descriptive analysis of tactical actions of players G1, G2 and G3

Group	Test	Statistics				
		N	Mean	Min	Max	Std	Sum
G1	Pretest	12	27	21	31	2,662	324
	Posttest	12	47.17	35	44	3,137	471
G2	Pretest	12	27.41	23	31	2,644	329
	Posttest	12	47.16	42	57	4,108	566
G3	Pretest	12	28.58	23	34	3,502	343
	Posttest	12	30.41	24	37	3,449	365

The normality test results in table 6 show that the pretest and posttest are G1, G2 and G3. Overall normal distribution.

Table 7.
Normality Test

Groups	Test	p	Sig	Information
G1	Pretest	,200	0.05	Normality
	Posttest	,195	0.05	Normality
G2	Pretest	,937	0.05	Normality
	Posttest	,200	0.05	Normality
G3	Pretest	,195	0.05	Normality
	Posttest	,937	0.05	Normality

The homogeneity test results in table 8 show that the pretest and posttest are G1, G2 and G3. Overall, all groups have the same variance (homogeneity).

Table 8.
Homogeneity Test

Groups	F	df1	df2	Sig	Information
PosttestG1, G2 and G3	0.099	2	33	0.906	Homogeneous

Based on table 9, it shows that in G1 there is a significant effect after undergoing treatment between the pretest and posttest as evidenced by the t_{count} of -11.118 > t_{table} is 1.795, while the p value is $0,000 < α$ 0.05. Thus, for the first hypothesis, H0 is rejected and H1 is accepted. G2 has a significant effect after undergoing treatment between pretest and posttest as evidenced by the t_{count} of -11.988 > t_{table} is 1.795, while the p value is $0,000 < α$ 0.05. Thus, for the second hypothesis, H0 is rejected and H1 is accepted.

Table 9.
Summary of Paired-samples t tests pretest and posttest G1, G2 and G3

Groups	Variables	t-table	t-count	df	p	α
G1	Pretest Posttest	1,795	-11.118	11	,000	0.05
G2	Pretest Posttest	1,795	-11,988	11	,000	0.05

Figure 3, in this case, can strengthen the results of the first hypothesis which shows that after treatment the values

Shoot at goal and the values Keep possession of the ball increased, and the values Loss of ball possession decreased. As for Earning a foul, winning a corner or throw-in there is no change, and Earning a foul, winning a corner or throw-in has minimal change.
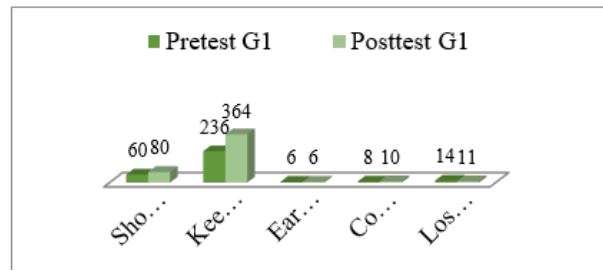

Figure 3. Frequencies values of tactical actions pre-test and post-test G1

Figure 4, in this case, can strengthen the results of the second hypothesis which shows that the Shoot at goal values and Keep possession of the ball values have increased, and the Loss of ball possession values have decreased. Earn a foul, win a corner or throw-in also increased, and Earn a foul, win a corner or throw-in decreased.
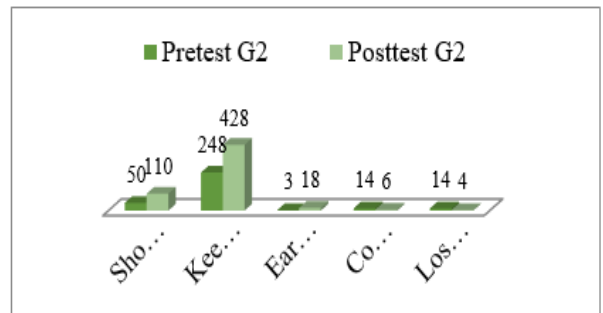

Figure 4. Frequency values of tactical actions pre-test and post-test G2

Based on table 10, it can be concluded that there are significant differences between G1, G2, and G3. Proven by the value of F (35) = 65.445; p < 0.000. To confirm these differences based on the effect size of the relationship between each group (G1, G2, and G3) using the Post Hoc Multiple Comparisons Tukey HSD test.

Table 10.
One-Way Anova Analysis of Variance Test Results

ANOVA					
Performance of players' tactical actions during attacks					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1685,056	2	842,528	65,445	,000
Within Groups	424,833	33	12,874		
Total	2109,889	35			

Based on table 11, it can be concluded that these two types of testing have results that are not much different, so the researcherspresent a description of the effect size based on the Tukey HSD Test with 95% Confident Index (CI). All three group comparisons showed significant effect sizes, including G1 and G2 (95%CI; [-11.51, -4.32], p < 0.001), G1 and G3 (95%CI; [5.23, 12.42], p < 0.001), G2 and G3 (95%CI; [13.15, 20.34], p < 0.001). This effect size also

shows that G2 is better than G1 and G3, and G1 is better than G3.

Table 11.
Post Hoc Multiple Comparisons Advanced Test Results

					Multiple Comparisons	
Dependent Variable:Performance of players' tactical actions during attacks						
			Tukey HSD			
(I) Groups	(J) Group	Mean Difference (IJ)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
G1	G2	-7.91*	1,464	,000	-11.51	-4.32
	G3	8.83*	1,464	,000	5.23	12.42
G2	G1	7.91*	1,464	,000	4.32	11.51
	G3	16.75*	1,464	,000	13.15	20.34
G3	G1	-8.83*	1,464	,000	-12.42	-5.23
	G2	-16.7*	1,464	,000	-20.34	-13.15

Figure 3, in this case, can strengthen the results of the third hypothesis which shows that the Shoot at goal and Keep possession of the ball values maintained by G2 are better than G1. with Earn a foul, win a corner or throw-in where the values of G2 are also better than G1. As well as the values Loss of ball possession and Commit a foul, give away a corner or throw in obtained by G2 are less than G1. Meanwhile, when compared between the three groups for all indicators, G1 and G3 are better than G3.
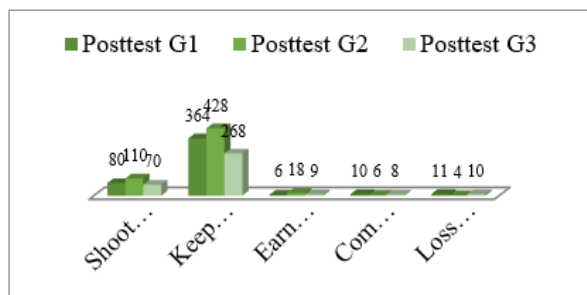

Figure 4. Frequency values of tactical actions post-test G1, G2 and G3

Discussion

The aim of this research is to determine the effect of SSCG training by elaborating on the manipulation of work situations to improve players' attacking tactical performance. Knowing the influence of SSCG training with the elaboration of manipulation of work situations which is strengthened by the application of interaction patterns. And find out whether there are differences between the two exercises. The results of our research show that there is a significant influence on improving the tactical actions performance of a football player during an attack after undergoing SSCG training with elaborate work situation manipulation.

Our research results are in line with previous research which also used SSCG training with work situation manipulation; SSCG with restrictions on the number of touches (Sarmento et al., 2018, Brito E Sousa et al., 2019, Coutinho et al., 2022). SSCG by increasing and/or reducing the team's playing area and the opposing team's playing area, or a combination of both (Frencken et al., 2013, Moreira et al., 2020, Custódio et al., 2022, Nunes et al., 2020). SSCG format with player positions/roles in different teams

(Laakso et al., 2022). SSCG with an unbalanced player format/composition between teams (Correia da Silva et al., 2021, Guard, McMillan, & MacFarlane, 2022, Nunes et al., 2020). As for by (Nunes et al., 2020) it is enough to elaborate on two work situation manipulations, namely SSCG by adding and/or reducing the playing area and the format/composition of players that is not balanced between teams. However, of the many studies that apply SSCG training with work situation manipulation to improve taxi performance, there has not been a single study that has tried to elaborate on work situation manipulation; the number of touches, the size of the field, the role of the players in the team, the composition of the players, all together. SSCG is proven to be able to improve tactical performance, by configuring various work situations; different field sizes, number of players, certain rules, or even stimulating certain behaviors to achieve certain goals (de Paula Amorim Borges et al., 2022).

The results of our research further show that there is a significant influence on improving the tactical actions performance of a football player during an attack after undergoing SSCG training by elaborating on the manipulation of work situations using interaction patterns. As far as the researchershave read, there has been no research that has tried to incorporate interaction patterns (interaction patterns of professional football teams whose performance has been tested) into SSCG training and then given to football players in the form of treatment to then test its effect. In fact, conceptually, the existence of an interaction pattern that is first agreed upon and trained together is able to provide a clearer attack direction, a more focused attack dimension, as well as a more dynamic and structured task determination. Good tactical organization determines victory in football (Bartlett et al., 2012). Regularity certainly limits players from acting rashly, regularity also makes it easier for players to provide assistance to teammates when they need help. Quick anticipation in making decisions is one of the keys to success in the game of football (Yiannaki, Carling, & Collins, 2018). Regularity in play throughout the competition is a predictor for a team to become champion in football (Maleki et al., 2016, Correia da Silva et al., 2019).

The results of our research show that there is a significant difference between the two exercises, where the SSCG exercise with elaboration on manipulation of work situations using interaction patterns is better than the SSCG exercise with elaboration on manipulation of work situations, and both exercises are better than the control group. The first thing that can be interpreted from these results is that the existence of interaction patterns makes players' performance when carrying out attacks more focused, dynamic and structured, so that the complexity and complexity of work situations in football games can be resolved. Football is a very complex sport that requires all components of performance (Bahtra et al., 2024). The researchersalso predict that the effect of attacks becoming more targeted, dynamic and structured makes players quicker in

making decisions. Speed of decision making is a differentiator in performance between academy and professional players (Teoldo et al., 2023). These results strengthen the assumption that, the latest perspective for football training directs coaches and athletes to not only pay attention to technical aspects (tactical, technical, psychological and physical skills) (de Paula Amorim Borges et al., 2022), in this research the interaction pattern has shown this.

Theoretically, the results of our research further strengthen the usefulness of SSCG training in improving tactical and team performance, especially for young players. SSCG training by elaborating on the manipulation of work situations that contain complex work situations, further enriches the players' experience in using their tactical performance according to the situations and conditions they face. Teaching each player that there are many attack options that can be used in even the most difficult situations, while also teaching players not to act excessively and rashly in easier attack situations. The existence of interaction patterns is able to provide clearer attack directions, more targeted attack dimensions, and more dynamic and structured task determination.

It is highly recommended for coaches and all elements of the support team to adopt SSCG training by elaborating on the manipulation of work situations and interaction patterns to improve the tactical performance of football players when carrying out attacks. The complexity of the work situation that the researchersproposed in the two SSCG exercises in this study can be implemented directly by young players. The researcherssaw that the players in one or two training sessions were still groping and then were able to adapt quickly.

The weakness of this research is the small number of samples the researchersused. There are two problems related to this deficiency. Firstly, the researchershave minimal resources and at the same time the researchershave to try to strictly control the samples used. For this reason, it is recommended that future research use a larger sample size. Second, perhaps many will question the use of Tracker video analysis® software and not using the software provided by the FUT-SAT assessment analysis as in previous research, the researchersconsider this to be our limitation. However, the researchersalso speculate subjectively here, the researchersconsider the use of Tracker video analysis® to be easy to obtain and access. So that in the future it will be affordable for use by practitioners, academics, amateur clubs, teachers, coaches who have minimal resources in developing the tactical performance of their football players and teams in their respective institutions.

Conclusion

Our research results show that; (1) There is an influence of SSCG training with the elaboration of manipulation of work situations. (2) There is an influence of SSCG training by elaborating on the manipulation of work situations using interaction patterns. (3) There is a difference in influence between SSCG training and elaboration of work situation manipulation using interaction patterns and not using interaction patterns. The researchers predict that the elaboration effect further strengthens players' tactical performance and makes up for the lack of work situation effects when only applied in isolation. Providing richer experience to players, so that they are more careful in possession of the ball, and as effective as possible in carrying out attack attempts. The interaction pattern makes the attack have a direction of attack, the use of attack dimensions, and the determination of tasks that are very dynamic, directed, and structured.

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Conflict of interest

All authors have no conflict of interest regarding this article.

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