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## ORIGINAL

# GAMEPLAY CLUES FOR MOTOR INTERACTIONS IN A TRIAD GAME

## INDICIOS DE JUGABILIDAD EN LAS INTERACCIONES MOTRICES DE UN JUEGO DE TRÍADA

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## ABSTRACT

Gameplay keys were investigated in a triad chase motor game without a connection in their graph between two of their three teams. This was made through the interactions of roles, subroles, emissions and receptions (positive and negative, intra-group and inter-groups). 21 secondary school players took part in the initiative ( $M = 12.5$ ;  $SD = 1$ ) and an observational methodology was applied. Regularities were analyzed descriptively and through Theme v.6 ( $p < .005$ ), indicating the strategic solutions within an internal logic of the system, particularly with respect to the incidence of rebalancing in the strategy of the game. The reduction of the triadic complexity when players playing indicates signs of gameplay, since the decision making is adapted to criticality, finding a solution for the lack of structural connection of the studied triad. The systemic emergency stated affected asymmetrically, allying two weak teams against the strongest one, hence prolonging the game.

**KEY WORDS:** gameplay, motor game, complexity, physical education

## RESUMEN

Se investigaron las claves de jugabilidad en un juego de persecución de tríada carente de una conexión en su grafo entre dos de los tres equipos. Todo ello, a través de las interacciones de roles, subroles, emisiones y recepciones (positivas y negativas; intragrupo e intergrupos). Participaron 21 jugadores de enseñanza secundaria ( $M = 12.5$ ;  $DT = 1$ ) y se aplicó una metodología observacional. Se analizaron regularidades, descriptivamente y a través de Theme v.6 ( $p < .005$ ), que señalaron las soluciones estratégicas dentro de una lógica interna del sistema, particularmente respecto a la incidencia del reequilibrio en la estrategia del juego. La reducción de la complejidad triádica al jugar señala indicios de jugabilidad, al adecuarse las decisiones a la criticalidad afrontando la carencia de conexión estructural de la tríada estudiada. Los estados de emergencia sistémicos afectaron de forma asimétrica, coaligando dos equipos débiles frente a un bando fuerte, y prolongando así el juego.

**PALABRAS CLAVE:** jugabilidad, juego motor, complejidad, educación física

## INTRODUCTION

The feasibility of a motor game in practice means addressing its gameplay. This statement concerns the game structure and the relationships it triggers; at the same time, gameplay refers to the paradigm of complexity (Morin, 1990), because it obeys an order and some uncertainties. 'Gameplay' is a concept born in the field of video game design and development (Bjork & Holopainen, 2004; Crawford, 1984; González, 2010; González, Gutiérrez, Montero & Padilla-Zea, 2012) but more prone to value the experience of the player and less the elements and interactions of the game (core mechanics) (González, 2010; Rollings & Adams, 2003). This last approach is closely paralleled with the design of motor games at the service of physical education and recreation. Gameplay expresses the effect produced by a certain quality of the game proposal, and can be observed through indicators with which we can approach its objective aspects.

This work is directed to the motor games with three teams confrontation ('sportive game', Parlebas 1981, 1988), where winning through a strategy is the main achievement. Keep in mind that a team game, where victory is feasible, implies with it strategic coherence that indicates the consistencies and inconsistencies of game design. The triad is taken as a motor game model with significance for social relations, since it contains antagonism between adversaries as well as solidarity between peers and respect to adversaries (paradox) (Parlebas, 1981, 1988, 2005, 2011, 2016; Pic & Navarro, 2017, 2018; Zamorano-García, Gil-Madrona, Prieto-Ayuso, and Zamorano-García, 2018; Muñoz-Arroyave, Lavega-Burgués, Costes, Damian, & Serna, 2020).

Many times, in the playground and in a recreational or teaching context, a modification of a game with rules is introduced, or a game design is proposed that has specific functional consequences (Navarro, 2002); however, these approaches have not been dedicated enough, particularly with gameplay. As a general consensus, we can say that the gameplay follows the premise that every game can be optimized; in this optimizing procedure, without a doubt, there are also gameplay keys.

It is suggestive to study the gameplay through a game that has some challenge for communication and for strategic outcomes. Navarro (2002, p. 300) proposed a structural-functional and systemic model with which to respond to the design of motor games and understand the functional consequences that changes in games bring. Pic & Navarro (2019) place gameplay of the motor triad games, and provide a key idea: that gameplay is related to the rebalancing of the game in games with completion. That is, a game is more playable if, in its development, it does not end or hardly concludes, despite having completion.

To understand the gameplay, you have to see it from the complexity and, therefore, as a bigger problem. From the systemic and developmental approach to a logic of situations, the gameplay is a part of the complexity of the games involved; that is, the keys to the gameplay are part of the keys to the

complexity. Morin (1990) says that the social system is open, justified by imbalance, but on a closed behavior, which is justified by balance (p. 43). This is in line with Niklas Luhmann's (1984) vision of the open-closed system. The rules of the game represent the gear of social relations that leads to an expected behavior scenario, with a tendency to be closed with respect to compliance. In addition, the structure of the game connects with other forms of open social relationship, which not only occur in the game (in our case, the triad structure and its ambivalence). It is now proposed to reduce complexity through the gameplay of the game, because in the development of the game there are randomities and regularities, as Morin (1990, p. 60) alluded to for his concept of complexity, and which requires the transfer to the stage of the motor game (Storey, & Butler, 2013).

From a systemic point of view, gameplay implies a game structure on which it is developed a dynamism that is an expression of the functionality of the system. The game structure must be viewed from an already established game or from the design of a new game; we focus the functionality of the game on the interactions between the elements of the game structure and the consequences derived from them (roles, dynamism, conditions of the action,...). Consequently, the systemic interpretation is carried out by means of properties that are common to the structure and functionality of the game, such as circulation, reciprocity and transitivity for triads. Accordingly, we define 'gameplay' as the quality and capacity of the playable to make the game viable. Consequently, quality and capacity are objective aspects of gameplay; the player's experience can be added, but bearing in mind that it is a perception and, therefore, a subjective character. In this work, the focus is placed on the analysis of the motor interactions seen from the roles and on the regularities in the strategic decisions of the game, analyzed from the T-Patterns (temporal patterns), and all this contextualized from the triadic ambivalence.

Gameplay of each game structure and its interactivity are interesting (in video games: game mechanic), since the internal logic of the activity is the evidence of the game as a system (Parlebas, 1988, p. 65, 107). To study the gameplay, you can dispense with the experience of the player if you have a pertinent theory, capable of interpreting the behavior expectations of the player due to the effect of the motor action in a context of situations, as well as transferring the forecast of its internal logic to the design of the motor game. In our case, we rely on the motor praxiology of Parlebas (1981, 1988).

Gameplay shows systemic aspects of the chase games, so it is interesting to know the regularities of the behaviors of roles and subroles (Pic & Navarro-Adelantado, 2017, 2019; Pic, Navarro-Adelantado & Jonsson, 2020). In the same way, it is worth weighing what role triadic ambivalence plays in maintaining gameplay. Lastly, the search for T-Patterns (temporal patterns, Magnusson, 2000) is a clarifying way to verify the opening to greater playability in a game (Pic, Navarro-Adelantado & Jonsson, 2018).

Therefore, this work is addressed with the following objectives:

- 1) Recognizing how gameplay is shaped in a chasing game.
  - 1.1. Knowing and analyzing, in an aprioristic and procedural way, the interactions through roles, subroles, emissions and receptions (positive and negative; intragroup and intergroups of a motor triad game ('the infiltrators', type 8 of the motor triad census, Pic & Navarro, 2017).
  - 1.2. Revealing gameplay clues, derived from the observational record, of the strategic subroles and their contrast with the procedural and a priori moment.

## **MATERIAL AND METHODS**

### **Study design and participants**

Mixed methods were used for this study (Anguera, Camerino, Castañer, Sánchez-Algarra, & Onwuegbuzie, 2017; Anguera & Hernández-Mendo, 2016) belonging to quadrant III (Anguera, Blanco, Hernández, & Losada, 2011) justified by the study of different players (nomothetic), the recording being made at a precise moment, without follow-up (punctual) and with criterial variety (multidimensional). An intentional selection of participants was used (Amatria, Lapresa, Arana, Anguera, & Garzón 2016). The players belonged to a natural group of 1º ESO. The number of participants was 21, made up of 11 (52.3%) girls and 10 (47.6%) boys between 12 and 13 ( $M = 12.5$ ;  $DT = 1$ ) studying secondary education in a center in Fuerteventura (Canary Islands, Spain). Express authorizations were collected from parents or legal guardians, together with the consent of the students to be recorded on video; the recordings were made at a distance that did not harm the attention of the players, and at an angle that facilitated the monitoring of game actions. The action protocols and recommendations of the ethics committee of the University of La Laguna were followed.

### **Materials**

An original triadic motor game, called 'the infiltrators' (type 8;  $A \leftrightarrow B$ ,  $A \leftrightarrow C$ ), was used. This game was designed to make viable a playful structure with the absence of a connection between two of the three teams (Burt, 2004), within the census proposed by Pic & Navarro (2017). The game shows an even balance of emissions and receptions, but with an asymmetry of forces, and it offers the challenge of making a non-transitive relationship playable (Table 1).

It is a game of simultaneous pursuit between three teams; their communication network is ambivalent stable (Parlebas, 1988, p. 215). It is played in a space of approximately 20x20 meters, and the players try to capture enemy players (prisoners) while promoting cooperation between partners. Each prisoner must remain motionless on the space in which he was captured by a touch on the back; a prisoner can be saved by a free player. Players never change sides. The last team to keep a free player is considered the winning team. The teams

had an asymmetry of forces in the number of players; so that team A had 11 players, and teams B and C had 5 on each side.

**Table 1.** Emissions and receptions at the team level in the type 8 triad

<p>Type 8</p>	<p>A=B=C No transitive</p>	<table border="1"> <tr> <td></td> <td>E</td> <td>R</td> <td>E-R</td> </tr> <tr> <td>A</td> <td>2</td> <td>2</td> <td>0</td> </tr> <tr> <td>B</td> <td>1</td> <td>1</td> <td>0</td> </tr> <tr> <td>C</td> <td>1</td> <td>1</td> <td>0</td> </tr> </table>		E	R	E-R	A	2	2	0	B	1	1	0	C	1	1	0
	E	R	E-R															
A	2	2	0															
B	1	1	0															
C	1	1	0															

**Table 2.** Interactions in 'the infiltrators' game. The game is more inclined to rivalry than to solidarity. Cap = grabber ; Esq = dogder; Pris = prisoner; Sal = liberators.

		Type 8	Intragrup				Intergrup				
			Emissions		Receptions		Emissions		Receptions		
			+	-	+	-	+	-	+	-	
Game	Teams	Rol									
<b>Infiltrators</b>	<i>Infiltrators (A)</i>	Cap	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	6,0,0	0,0,0	2,0,0	
		Esq	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	2,0,0	
		Pris	0,0,0	0,0,0	1,0,0	0,0,0	0,0,0	0,0,0	2,0,0	0,0,0	
		Sal	1,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	2,0,0
	<i>Officers (B)</i>	Cap	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,3,0	0,0,0	0,1,0	
		Esq	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,1,0	
		Pris	0,0,0	0,0,0	0,1,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	
		Sal	0,1,0	0,0,0	0,0,0	0,0,0	0,1,0	0,0,0	0,0,0	0,1,0	
	<i>Thieves (C)</i>	Cap	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,1	
		Esq	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,3	0,0,0	0,0,1	
		Prisi	0,0,0	0,0,0	0,0,1	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	
		Sal	0,0,1	0,0,0	0,0,0	0,0,0	0,0,1	0,0,0	0,0,0	0,0,1	
	<b>Total</b>			<b>1,1,1</b>	<b>0,0,0</b>	<b>1,1,1</b>	<b>0,0,0</b>	<b>0,1,1</b>	<b>6,3,3</b>	<b>2,0,0</b>	<b>6,3,3</b>
				6 intragroup interactions (6 positive, 0 negative) In total (A, B, C = 3 positive emissions and 3 positive receptions)				28 intergroup interactions (4 positive and 24 negative) In total (A, B, C = 12 negative emissions and 12 negative receptions; 2 positive emissions and 2 positive receptions)			
Total: 34 motor interactions (10 positive and 24 negative: 1 to 2.5 in favor of rivalry versus solidarity)											

Table 2 shows the interactions involved in the game according to each team belonging and at the level of their roles. In the columns, intragroup relations, that is to say, between colleagues, and intergroup relations, that is, between adversaries, are described. The relationship between teams, a priori confronted, is understood through positive (cooperative) or negative (antagonistic) emissions, when the initiative rests on a specific role or team being the issuer of the action; or, through positive or negative receptions, when the protagonist is

the recipient of the action. The three numbers that appear separated by a comma in the cells correspond to the order of teams A, B, C; that is, if the 'A' team is attended to, it is evident that, at the intragroup level, the liberators or rescuers (Sal) emit positive behavior, also being received as positive by the prisoners of the same team. At the bottom of the table, the sum of the use of roles is shown (1,1,1), which corresponds to the homogeneity existing intragroup among the game teams. The same procedure was followed with rival teams. The negative emissions of the players of team A reached the number of 6 because they would be able to capture two catchers from sides B and C, two dodgers from sides B and C and finally, two liberators from B and C. At the same time, it was possible to verify that the negative receptions were reflected in the remaining teams but in a receptive sense. The positive intergroup emissions of sides B and C, directed towards prisoners A, are explained when the game is in a phase close to its completion and in an emergency situation that leads to a team winning the game, which is the same as saying that two teams lose it. The antagonism is a priority to play, because it gives meaning to the actions, but the differences between the teams materialize intergroup (in the positive case, it is a paradox). Being a simultaneous acting and common space game, the result of the game (valued in the number of prisoners on one side) is in full view. The positive (+) intergroup valences (paradoxical cooperation between adversaries) show the solution of Burt's ('structural hole'), as well as a beautiful 'transitive clousure', which becomes feasible despite the fact that there is no connection in the graph between teams B and C.

To record the decisions of the players, a mixed system of 'ad hoc' registration previously utilized was used (Pic et al., 2018). The categories were broken down from 4 game roles, specified in 11 subroles. These were (Table 3):

Table 3. Roles and categories with observational registration.

Roles	subroles
Catcher	Capture achieved: CA; pursuit of an opponent: PA; alliance of persecution between adversaries: ALZAAC
Dogder	dodges an opponent: EA; Escape from rival: HA; displacement towards safety zones or without rivals: DLL; does not recognize the capture: NR
Prisoner	prisoner in attention: A; [prisoner's] posture change to facilitate release: CE
Liberator	releases a partner: TUFC; releases an adversary: TUFA

## Procedure

The motor game was put into practice by the physical education teacher, well known by the students, with the participation of the researchers merely as assistance. At first, the game was explained to the teacher in charge of the group. Before the final registration session, the game was put into practice to solve doubts or problems with the recording. Thus, on the day of the final recording, the game was filmed, using rules already known to the students.

The mixed registration system was developed by two observers who are experts in motor games and observational methodology, carrying out tests prior



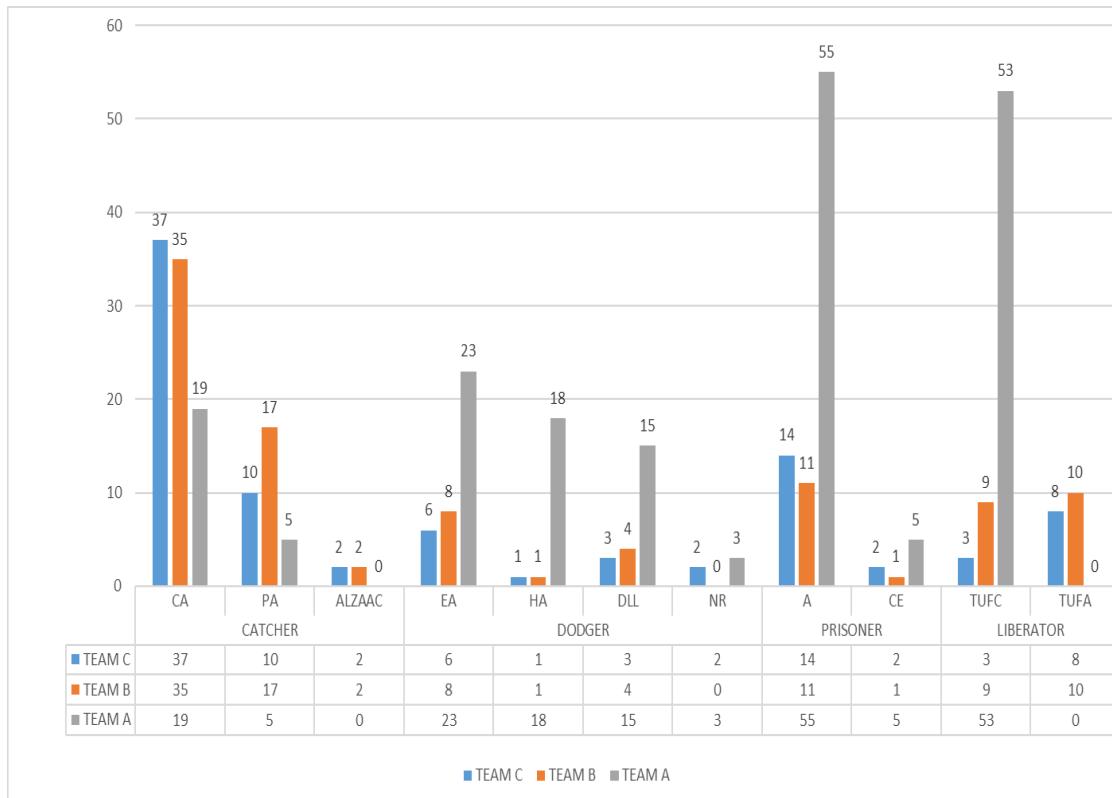
to the final registration. This record consisted of three minutes with individualized monitoring of each player, from start to finish, in order to obtain real strategic sequences. All records were made using the Lince tool (Gabín, Camerino, Anguera & Castañer, 2012) at two times and by two observers, in order to ensure the quality of the inter and intraobserver data. The generalizability theory was used (Blanco-Villaseñor, 2014), obtaining percentages of less than 1% difference between inter and intra observers. At the same time, the Pearson and Spearman coefficients revealed agreements greater than 0.95 inter or intra-observer, thus ensuring the quality of the observational records.

### **Data analysis**

Descriptive analyzes were performed to find out the playful behavior of the roles and subroles. Subsequently, Theme v.6 was applied, this being a particularly suitable technique when having the temporal dimension. The search criteria used were levels of statistical significance ( $p < .005$ ), while the minimum number of occurrences was 3. Specific searches focused on the achievement of the catch (CA) and release (TUFC, TUFA) subroles, since they involved gameplay keys by rebalancing activation of the teams.

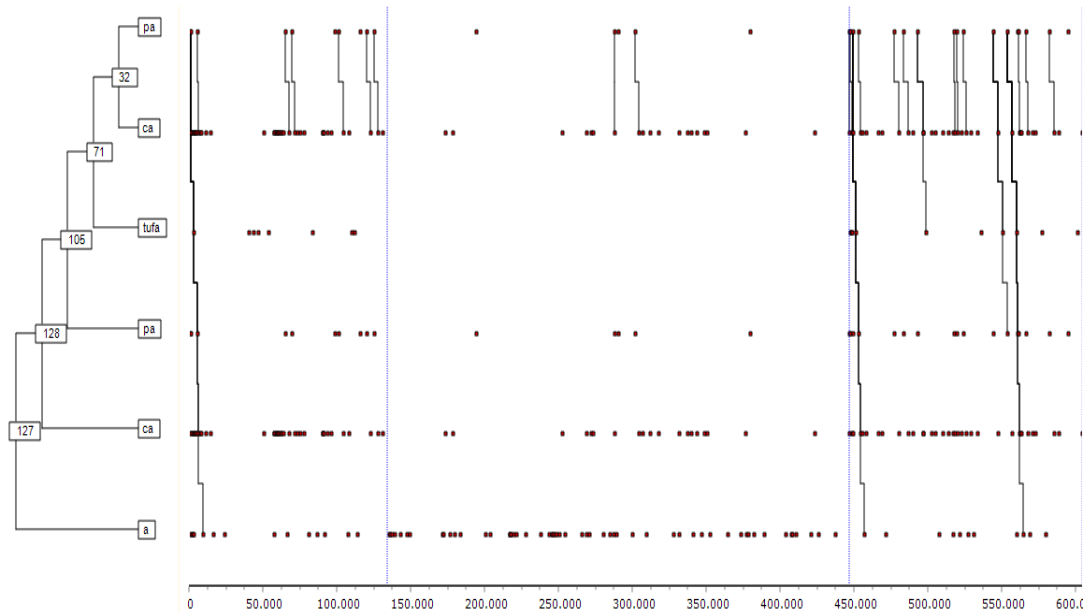
### **RESULTS**

The greatest differences were established between Team A and Team B and C, obtaining these frequencies in parallel with the first side (Figures 1 and 3). Team A was especially active in actions related to the 'dodger' (36), 'liberator' (53) and 'prisoner' (60) roles; teams B and C outperformed team A in the role of 'atcher', obtaining 103 frequencies compared to 24 in side A. For each team, in the subrole of 'catch achieved' actions (subrole CA: A: 19; B : 35; C: 37) and chase (sub PA: A: 5; B: 17; C: 10) differences were evident, as were expressed in the avoidance (subrole EA: A: 23; B: 8 ; C: 6), (escaped subrol HA: A: 18; B: 1; C: 1) or subrole 'go to the safe zone or without rivals' (DLL subrole: A: 15; B: 4; C: 3 ), extendable to the 'prisoner in attention' subrole (subrole A: A: 55; B: 11; C: 14) and in the subrole 'releases a partner' (subrole TUFC: A: 53, B: 9; C: 3) or the subrol 'releases an adversary' (subrole TUFA: A: 0; B: 10; C: 8).



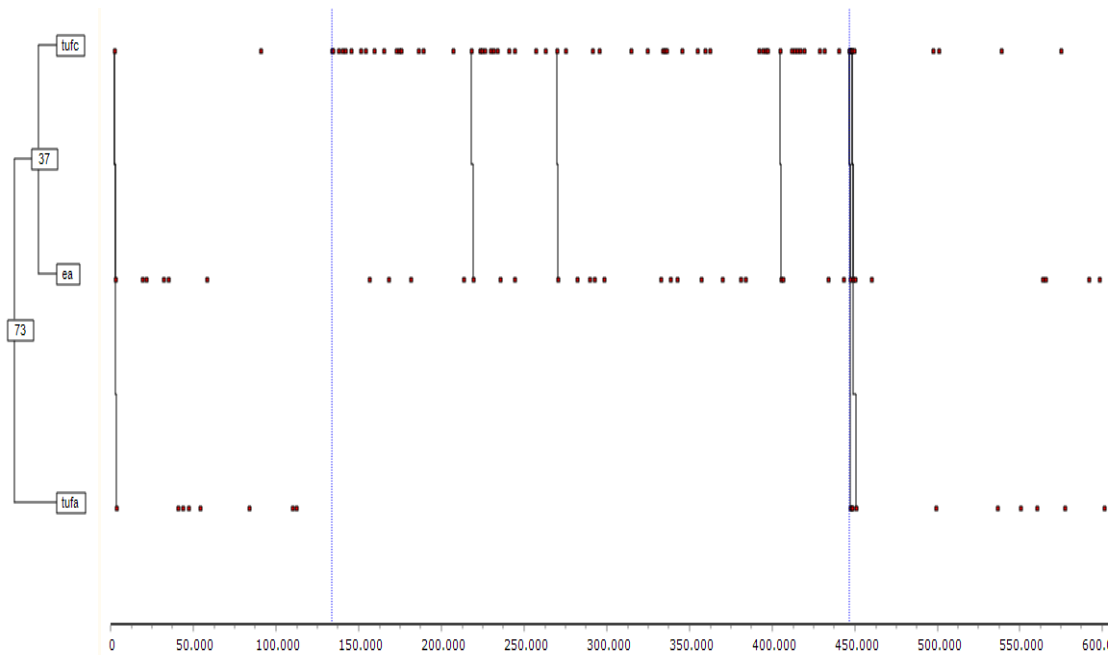
**Figure 1:** Count of the subroles used by the players when playing ‘infiltrators’, according to each team (A, B, C). Team A is more active, especially in the role of "prisoner" and the subrole "releases a teammate" The activity shown in the release of adversaries (TUFA) in teams B and C, of paradoxical nature, is relevant. When looking at the graph from the behavior of the three teams, it can be seen that the reciprocity of teams B and C works in parallel against side A, these teams responding with intensification of subroles to counteract the actions they receive.

The temporal itinerary was more complex (figure 2) and affected the teams unevenly. In teams C and B there is a similar behavior, when the link between chasing (PA) and capturing (CA) was verified, and from this previous pairing with saving the rival (TUFA), while in team A this previous link was not identified with TUFA. There were also persecution actions (PA) and capture achieved (CA) with the role ‘prisoner’ (subrole ‘prisoner in attention’, A) in teams C and B, not specified in team A.



**Figure 2:** Dendrogram generated by Theme v.6 when searching for the CA subrol (capture achieved) ( $p < .005$ ). From left to right, itinerary of T-patterns identified in the game, and regularities detected in team C, A and B respectively. It is observed a greater decisional complexity used by weak teams (C and B) compared to the team with the largest number of players (A).

The dendrogram in figure 3 has less interactive complexity than in figure 2. The difference between the team with the most players (central in the dendrogram, team A) and teams C (on the left) and B (on the right). Thus, the need for teams B and C to release fellow players (TUFC) is justified, although for this they must experience some risk, since it is linked to dodging actions (EA). All this, when necessary, with actions of liberation of the rival (TUFA), by players of teams B and C, which supposes an emergency situation for weak teams due to the proximity to losing the game. On the other hand, team A, which is more numerous, establishes evasive actions (EA) and later release of companions (TUFC), which is a viable formula, strategically, due to the effect of a greater number of players.



**Figure 3:** Dendrogram generated by Theme v.6 by searching the TUFC subrole ( $p < .005$ ). From left to right, itinerary of T-patterns identified in the game, and regularities detected in team C, A and B, respectively. As in figure 2, we can see greater decisional complexity used by weak teams (C and B) compared to the team with more players (A).

Finally, the calculation of temporal occurrence was carried out depending on the and the subrole. The CA behavior ('catch achieved') was recorded in team A every 9.4 seconds, while in team C it appeared every 4.8 seconds or in side B every 5.14. There were also great differences in relation to the actions of releasing a partner, since TUFC was observed in this order: team C every 60 seconds, side B every 20 seconds and team A every 3.4 seconds. TUFA ('releases an opponent') also emerged every 22.5 seconds on side C and every 18 seconds on team B, being non-existent in team A.

## DISCUSSION

The study of the triad play system scenario is faithful to an emergency and situational context; this system is ordered by the properties of circulation, reciprocity and transitivity; and, in this system, the role assumes all the dynamism prominence. These three properties reduce complexity, but they develop it at the same time (Morin, 1990), facilitating each one to reveal the path of the gameplay. In the triad game studied, circulation has left its mark of concentration of forces of two teams on a third side and the absence of a connection between nodes; reciprocity has shown the operation of the system under the expression of the strategic logic of the subroles; and the transitivity has been established thanks to the fact that the players share the simultaneity of the actions, the game space, and they know in unison the result of the game, despite the fact that the game studied had a non-transitive structure, which nevertheless achieves becoming playable. The responses of these three properties are keys to the game's behavior to achieve gameplay. Together, they are references for a triadic stress test.

To assume this dynamic character of the triad is to prioritize the construction of responses to the challenges of putting roles and subroles into practice, when to adapt them and with which itineraries (T-Patterns), and how to activate the gameplay of a deficit structure in a connection (Burt's 'structural hole', 2004). This study presents advances in relation to: a) The feasibility of an offline formula in a relationship between three teams; b) A priori contributions through properties and decisional quantification with descriptive counting (tables 1 and 2); and c) Justification of the determining elements of the general leisure system (game) and the specific objectives (per team) through a descriptive-comparative approach and temporal analysis (Figures 1 and 2). The use of subroles (CA, TUFC, TUFA) helps to understand the gameplay as a reducible process with concrete indicators, which must be seen as reciprocal subsystems of interrelations in situations that rebalance the game.

The transitive closure or closing (Burt's 'structural hole') has confirmed that the absence of a connection between the nodes of a graph does not mean a deficit in the relationship options of the game studied. Thus, the strategic decisions of the players of teams B and C are reduce complexity (Storey, & Butler, 2013) and are aimed at maintaining the game, that is, gameplay. Through the specific decisions of the players, the decisional profiles of teams B and C both behave as antagonistic, against team A, since the three roles, and their corresponding subroles, with more frequencies found in teams C and B, with respect to side A, were CA ('catcher', 'capture achieved'), PA ('catcher', 'chase an opponent'); for its part, team A also obtained high values in the 'prisoner in attention'; in addition, team A shows a profile of solidarity in the subrole TUFC ('liberator', 'releases a teammate'), and in the antagonistic EA ('dodger', 'dodges a rival'). Thus, distributed antagonism has morphed into coalitional antagonism of weak teams against the, probably, stronger side (team A).

Particular mention should be made of the phenomenon of the 'liberator' role when a prisoner is released. This has happened both in the version of 'release a partner' (TUFC) or in solidarity way in its subrole version 'release an adversary' (TUFA). These two subroles constitute a trigger for the rebalancing of options, which means that the game moves away from its completion, hindering the progress to the victory of the team with the greatest advantage, and the reactivation of new options for disadvantaged teams. In order to make the TUFA subrole ('release an adversary'), two necessary conditions exist in the design of the game: that the rule does not prohibit it (triadic opening of the rule, Pic and Navarro, 2019), and that a strategic benefit is obtained derived from the action of releasing a prisoner. Despite the fact that there is no connection between teams B and C, the players of the weak teams in strength have perceived the result of the game's progress and have activated the strategy of saving opponents in the search for rebalancing the game. In this way, the transitive closure represents an activating phenomenon of the gameplay through saving an adversary prisoner; we are facing an intermediation and a functional closure, that is, before the solution of a Burt's 'structural hole'.

Gameplay has been shown on two levels: the game design and the strategic outcome. Being both considered at the same time, the greater number of

players in team A can explain their ability to withstand an intensification of catches, as well as being a receiver of 'two (teams) against one' strategies, as Caplow (1968) pointed out (but always triadic and under an internal logic, Parlebas, 1981, 1988). As a consequence for the gameplay, the liberation between teammates is the strategic solution to extend the game, which allows to have a greater margin of action in team A, having been a very reduced option in sides B and C. In this sense, perhaps the players from the latter teams perceived this limitation in real practice, choosing to play in unison, mostly, with the role of catcher, which is more direct towards victory. So, the asymmetry in the number of players from team A, against sides B and C, and the viability of a triadic strategic solution of alliance of the weak with the strong, has marked the path of gameplay.

Consequently, it seems that the design of the game makes the effect of the structure that supports it flow. All this seems to govern the character of proactive, recessive or reactive behavior in teams and their players. The reactive strategy is proper to the 'dodger' role and does not lead to success in this game, and proactive action is required, particularly for coalitions. Organizing the strategy of a triad is complex. It is a proactive-recessive behavior when a free player from one of the weak starting teams (B or C) approaches one or more free players on side A to attract their attention and thus make the antagonistic actions of coalition support. Therefore, it is convenient to include motor metacommunication behaviors (Parlebas, 1981, p. 158) in the observation record.

The strategic outcome fulfills the mutual correspondence between the teams with a deep sense of reciprocity. The role and subrole system has been aimed at the regular activation of weak teams against the strong one (initially, valued in emissions and receptions, and in the number of players). It is a subsequent and rebalancing reciprocity, which has to be seen in terms of consequences for a third team. Thus, the itineraries described by Theme helped to know that the decisional complexity rested on teams C and B (less numerous in players) while team A (large) was more random. On the other hand, by means of the frequencies it is verified that team A focused its performance on non-priority subroles to win the game: EA, HA. Also, the activation of the CA subrole, which was moderate in team A, has indicated less effectiveness than its opponents (teams B and C) in this subrol, but at the same time a part of what was obtained in this subrole by sides B and C may be due, as noted, to actions caused with the intention of attracting players from team A. Because the capture has behaved, in some key moments, as a decoy subrole or strategic attractor to the attention of an adversary captor, since it is about facilitating the action of saving a third team. Ultimately, this masked part of the strategic intent is veiled after 9.4 seconds of the subrole CA (catch achieved), for team A, and 5.14 seconds and 4.8 seconds, respectively for sides B and C. That is, teams B and C are more efficient on subrole CA than side A. To this it must also be added that the weak teams have used reciprocity in a corresponding way with the opponents (subrol TUFA). This strategic decision-making activity is perfectly embedded in the gameplay, because the available and recurring decision options constitute the overcoming of the triadic stress test, which is none other

than its validation and extension capacity as a system, according to the conditions of the rules, which channel social behavior.

Thus, the conditions of the rules constrain the behavior of the players, expressing themselves within the adaptive margins (Storey, & Butler, 2013) of roles and subroles, through the motor task (Parlebas, 1981, p. 270). Dissociating the task of motor interaction, in the face of the triad situation problem, would be an excessive reduction with respect to motor synchronization (Araújo, Silva, & Ramos, 2014; Duarte et al., 2013). This synchronization refers to a temporal parameter, indicator of the strategy resolution process, revealed, in our case, by the emerging T-Patterns that have overcome the random decision. The emergence of strategic complexity in teams B and C (especially in their coalitions) is an organizing mechanism for processes of the 'ludosystem' of interaction (Parlebas, 1981, p. 149), as occurs with the action process in creative behavior found in free play from a complexity and system approach (Torrents, Ensenyat, Ric, Mateu, & Hristovski, 2018). Without leaving this line of complex systems (Balagué, Torrents, Hristovski, Davids, & Araújo, 2013), but seen from a non-linear perspective (e.g., in pedagogy: Chow et al., 2006; Cantos, and Moreno, 2019), it would be worth pointing out that the emergence of alliances between opponents meant a need for the system to prolong the game; this increase of the alliance has been due to the opening of the rule, without which the emergency process of interaction between adversaries would have been impossible. The rule deserves a linear study of its consequences for the motor interactions of games in different communication networks. On a non-linear level, both the registration and the Theme analysis technique have been shown to be effective for the pertinent study of the outcomes of the gaming coalitions and the rebalancing process of strategic solutions.

To approximate the complexity of the specificity of the motor triad and its gameplay, it is more appropriate to analyze it descriptively and interpretively. The results have revealed two ways of capturing what happened. The frequency table describes a precise and, in a sense, predictable and finalist (accumulated) discourse; T-Patterns analysis triggers interpretative disagreements. This last pattern analysis is not defined as an accumulation of frequencies, but rather responds to a temporal regularity of the event that exceeds random. Consequently, a certain linearity break must be recognized when applying the Theme v.6 software. From this point of view, the argument that weak teams forged their strategies around the capture action (CA) finds solid ground. This idea was accentuated by the itineraries of figure 2, not evident in figure 1. More important, if possible, would be to compare the accumulation of frequencies of figures 1 and 3 in relation to the releases of fellow players; thus, team A accumulated up to 53 partner release frequencies (TUFC) while teams B and C obtained 3 and 9 respectively. The search for T-Patterns of this release action in the three teams revealed that the weak teams were more strategically complex, having to resort to the release of opposing players in order to maintain options to continue in the game. We must assume that the frequency, among others, is an indicator to study the gameplay and can also serve as a heuristic in the evaluation of a motor game design; however, the frequency of subroles represents a photograph of the strategic outcome, but



without the dynamic keys of this to understand the gameplay. Thus, in this study an aprioristic approach to roles and, in this sense, of linear counting is proposed, because we have to understand the scope of each game structure. On the other hand, the field study is its most direct, non-linear validation from the analysis perspective: by observing the actions of the players it is known how they make the game playable. Therefore, defining the complex gameplay of motor games lacking a connection between two of their teams requires multidimensional methods, interpretations and analyzes to know the systemic adaptations (Mennin, 2007) of the triad and its consequences on gameplay.

It has been satisfactory to apply a mixed method of analysis (Anguera et al., 2017), starting from the a priori study of the game, approached from its motor specificity and revealing the game patterns. In order to give more consistency and strength to gameplay studies, perhaps, it could be contrasted later with 'data' and, finally, structured or theoretically revised. Although both techniques would be complementary, it is worth highlighting the adequacy of the use of T-Patterns (Magnusson, 2000), with respect to applying polar coordinates (Rodríguez & Anguera, 2018), due to the precision of time. In this sense, T-Patterns provides precise itineraries on the game context itself, with greater consequence for interpretation, if there is also a theoretical framework that interprets the behavior of the internal logic of the game (Parlebas, 1981, 1988).

Two last questions: on the gameplay seen from the complexity, and the projection of the gameplay to the field of play in physical education. The complexity is difficult to unravel. However, when the game is approached under regulated conditions and with team confrontation, and it is conceived as a system of objective interrelationships that seeks to make it playable, the problem seems to be reduced. Therefore, we are convinced that the gameplay is part of the complexity, because it tells us how coalitions arise to prolong the game and under what patterns, and at the service of which teams. Regarding the field of physical education, the game is a good laboratory for design and modifications, where the teacher has to optimize situations and transfer them to the students as learning a procedure, because revealing the optimal organization for the coalitions to the students is a procedural teaching content (Coll, Pozo, Sarabia and Valls, 1992). In the same way, any proposal to modify the rule, requested by the teaching staff to the students, must be accompanied by an argument that fits into the internal logic of the game, and this is the same as continuing to make the game playable. In this work, you can see some keys to triadic gameplay that can be applied in teaching, such as how to ensure that the game does not end.

Regarding limitations, this study has addressed a single game, although linking its structure and function, as well as the game design after an a priori evaluation. Without a doubt, facing the behavior of the gameplay with homogeneous groups of motor games, and their categories and variables, would be contrasting heuristics with which to give quality to the evaluation of gameplay.



## CONCLUSIONS

It has been found that the gameplay is an interactive coupling of the dynamic and strategic needs of the players, contextualized under a systemic order of playful emergency, when responding to a triadic game design proposal, of a motor nature, lacking a connection in their communication. The indications of gameplay obtained have been achieved from the deficit game design, initially, in terms of communication, and as a result of its implementation.

From the methodology approach:

The analysis of the gameplay, in motor games of team confrontation (sporting games), requires an a priori study of the game, and the application of descriptive tests and T-Patterns, through a mixed methodology. In a relevant way, the systematic observation has allowed to preserve the ecological reality of the actions of the game, in relation to its internal logic, and the contextualized verification of the adaptation of the own system of the sports game. In both cases, the roles and subroles are the protagonists of the motor behavior and of the internal coherence of the results.

From the approach of what was found through fieldwork:

The interactive behavior of the teams was asymmetric depending on the subroles (frequencies) and their T-Patterns.

The highest frequencies in the less numerous teams in the triad (weak) were especially focused on the role of 'catcher' ('catches achieved'), in which they were more effective, while the team with more players (strong) scored preferentially in the role 'prisoner' and 'liberator'. Weak teams were responsible for rebalancing the game by acting paradoxically releasing opposing prisoners, unlike the strong side that saved their fellow prisoners.

The few strategic regularities detected by T-Patterns in the team with more players (strong), contrasted with the itineraries detected in the weak teams in relation to the behavior of capture and release of players, these sides being responsible for the gameplay or stability of the motor system. The tendency to the game's gameplay has overcome the absence of a communication connection between two of its three teams. These teams, absent communication with each other, acted paradoxically in front of the third side, establishing the transitive closure (Burt's 'structural hole'), and thus configuring a part of the gameplay that the game has shown.

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