3.1 Group elements

Introduction

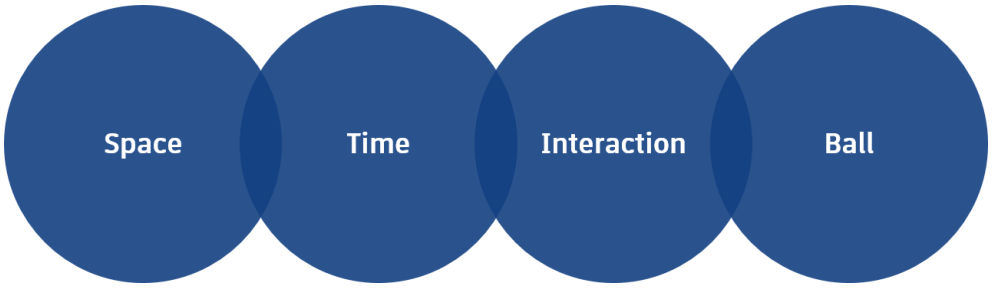
Discovering the internal functioning of soccer is to discover its identity, which enables coaches and trainers to carry out exercises and decision-making (Parlebas, 2001).

When referring to decision-making, an unbreakable unity is formed between the player (team), the environment and all of the exercises. As was mentioned throughout the program, these must be contextualized and related to practicing sports. Improved decision-making by the players is directly proportional to the specificity of the exercises.

Players practice to optimize their motor skills, so training should aim to include all of the elements that condition the activities (specificity) and their respective structures. The trainer will then modify some of these elements so that opportunities for optimization arise in the exercise.

Following the principle of specificity, the exercises must respect the internal functioning of soccer. Parlebas (2001) argues that training in the same domain as the motor actions in soccer leads to a greater transfer of learning.

Figure 1. The internal functioning of soccer



Source: Casamichana, Quintana, Gonzales and Paulis, 2015.

Continuing with the analysis of Parlebas (2001), the author uses the term **network of practical connections**, which entails a series of actions, reactions and preliminary actions by the players, where individual creativeness gains meaning in relation to these.

We will begin to study several elements that are part of the objective of understanding the internal dynamics of soccer. We will begin by approaching important theoretical and practical topics, based on the

paradigm of training, from the perspective of FC Barcelona and making reference to the club's signature style. These involve superiority, organization, occupation of spaces and relative distances.

Superiority - types

In certain situations, it is crucial to take advantage of the numerical superiority obtained, as long as they keep a certain distance and players are marked. If these two aspects are not properly carried out, with only one player, then the opponent can control two players from the same team.

Superiority with 2 players:

In this type of superiority, it is important to strategically keep a distance between the 2 offensive players, in order to prevent the opponent from obstructing an attempt at play with his/her movement to recover the ball. If the recovering player chooses to block the goal, the correct decision would be to pass it to his/her teammate so that he/she can finish the play. If that same player chooses to cover the pass line, the next step would be to change the pace to try to finish without being marked.

- If a wide enough distance is kept between teammates, the opponent will not be able to anticipate all of the possible actions that can be taken by the possessors, thereby giving up any opportunity for ball recovery.
- On the other hand, if the recovering player is very close, he/she might be able to take control of the situation, and may even have an opportunity for recovery.

Superiority with 3 players:

In this case, it must be modified into a 2:1 or by marking one of the opponents, so that the ball can be passed to one of the teammates who is unmarked. As mentioned in the first case, it is important to keep a distance between the possessor and the receivers, thus preventing a player from blocking a teammate who has the ball.

In this type of superiority, if one of the players moves to wing, it will provide numerical superiority but not positional. A player should avoid moving to wing, since he/she will no longer be able to intervene in the game.

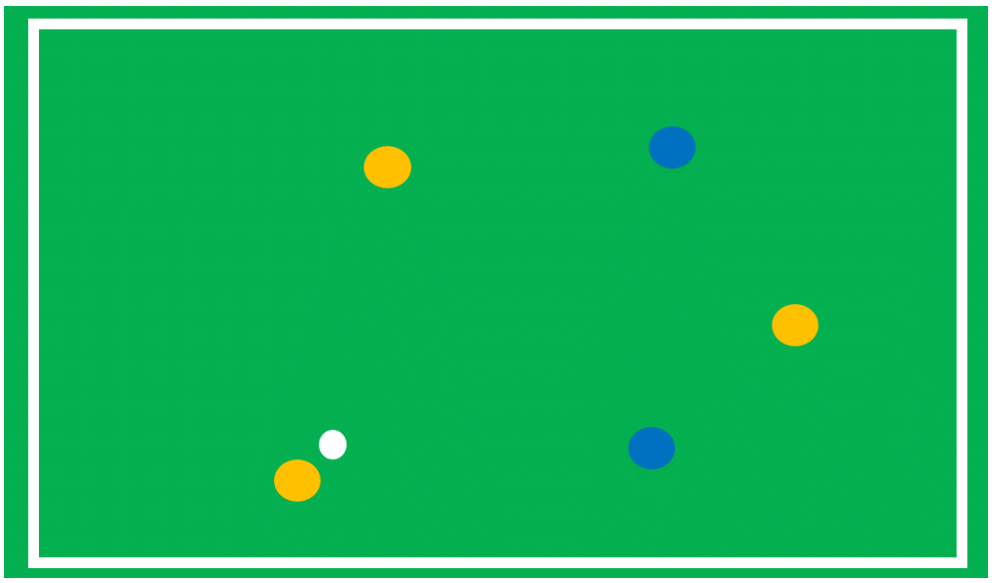
Superiority with 4 players:

In this case, the situation is only slightly different from those mentioned above. The type of superiority is what determines positioning. The remaining free teammates will be in charge of playing offense, with the

intention of leaving the passer behind and increasing offense if the spaces are covered.

We have just described the types of **numerical** superiority: two players who can immediately participate in the move outnumber the opponents.

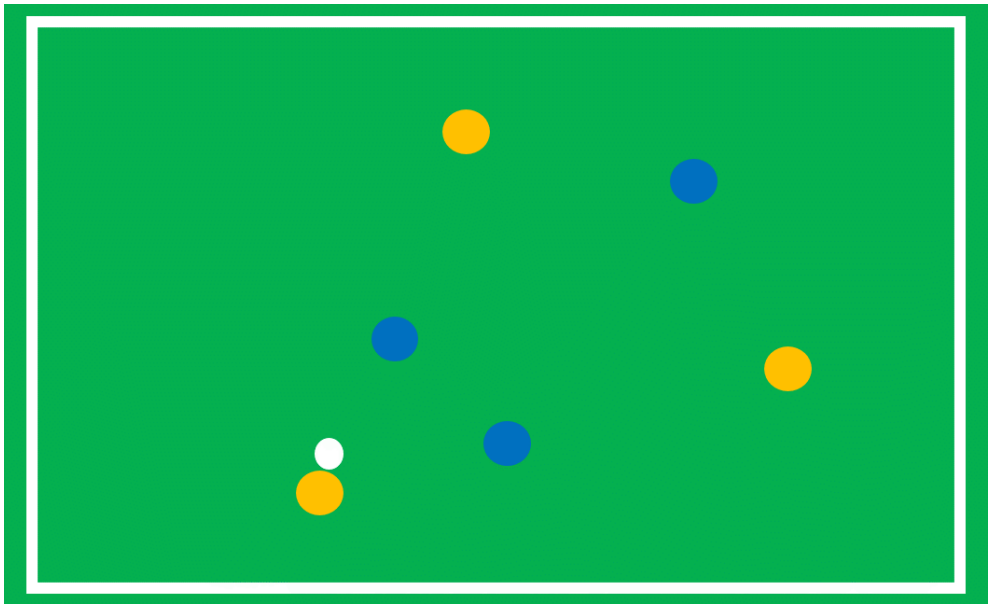
Figure 2. Example of numerical superiority. There are more of us



Source: Prepared by the authors.

As was mentioned, we can also discuss **positional** superiority. In this context, players are positioned to disrupt the opponents' participation.

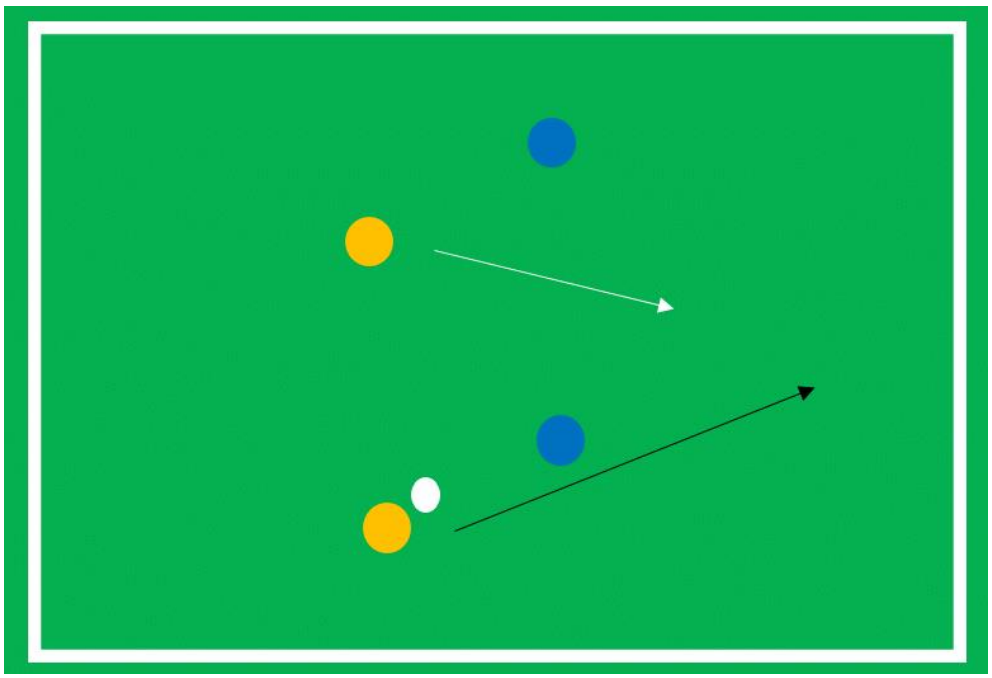
Figure 3. Example of positional superiority. We are better positioned



Source: Prepared by the authors.

Seirul·lo (2017) suggests a type of superiority known as **Socio-affective**, where players who can immediately participate interact better than the opponents.

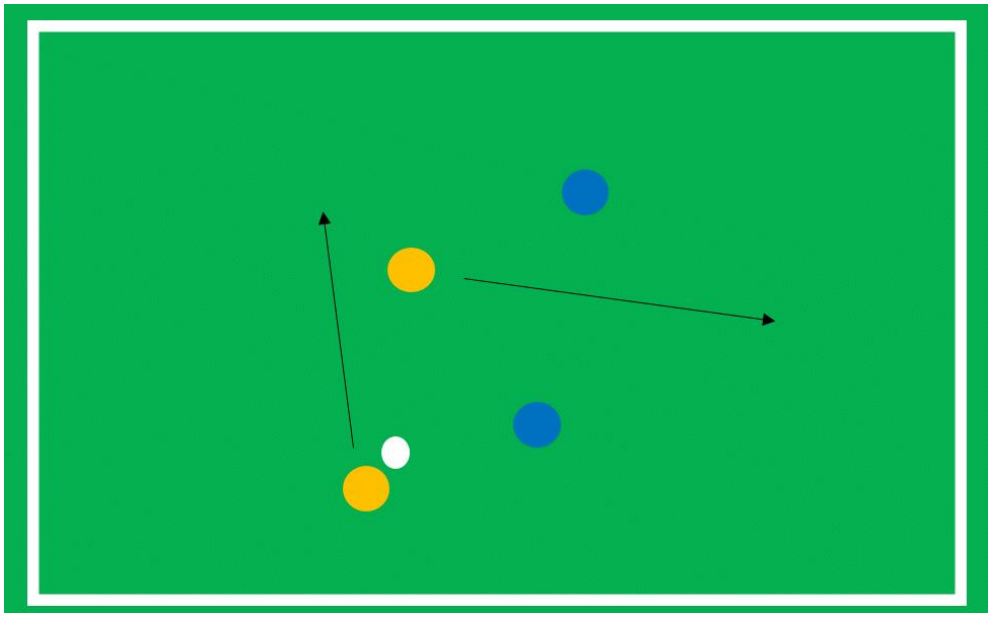
Figure 4. Example of socio-affective superiority. We interact better



Source: Prepared by the authors.

Continuing with Seirul·lo (2017), another type of superiority, which he refers to as **qualitative,** argues that players use their tactical-technical capacities more effectively than the opponents.

Figure 5. Examples of qualitative superiority. We play better



Source: Prepared by the authors.

It is important to understand that, based on a systemic approach to the game, these superiorities do not appear in an isolated manner in the game or even one at a time, but are based on the interaction between the environment where the athletes play, as well as the characteristics and conditions of the athletes. Opportunities for action will appear at certain times and must be identified as superiorities.

In order for the player to optimize these actions, it is necessary to undergo training that simulates a real game, as was discussed in the introduction. The coach, using the rules of the exercise, knows how to create and replicate this context without losing too much specificity of the game, and by keeping the same rule or adhering to others, he/she uses his/her judgment in guiding the player towards the actions to perform in such situations.

Organization - order

When we discuss spatial organization, this means knowing how to perceive the combinations that can exist in the different locations during a soccer game.

A soccer player must always interpret his/her own situation, along with that of his/her teammates and opponents, and act accordingly. This situation will consist of distance, trajectory and direction stimuli all at once. This organization becomes more evident when we consider that a

player has to understand the organization of an entire team; for example, the opponents. In order to be able to interpret everything involving the opponent, he/she will have to perceive the distances between the players themselves, between the players and the boundaries of the playing field, the opponents' trajectories of movement and the directions taken by each player. Only by doing it this way, by interpreting all of the stimuli received simultaneously, and not separately, will he/she be able to understand the spatial organization of the opposing team. Each of the locations affects the others. For example, as a result of interlinear distances, a player may think that there is not enough space for a teammate to safely receive the ball there; however, the direction of the players who define the interlinear distances provides information that can be interpreted by the observer, thus understanding that there is enough space to pass to the teammate so that he/she can safely receive it. Organization is the interaction of different locations.

The greater the number of times and varying situations that we have practiced with our system-team, the better perception capacities we will have; allowing us to perceive the spatial organization at a higher level. Decision-making, and as a consequence, effectiveness, depend on this ability to ensure optimal training.

Relative Distances

As we have previously discussed stage spaces, in this section we will introduce relational distances. Understood as: intervention, mutual assistance and cooperation.

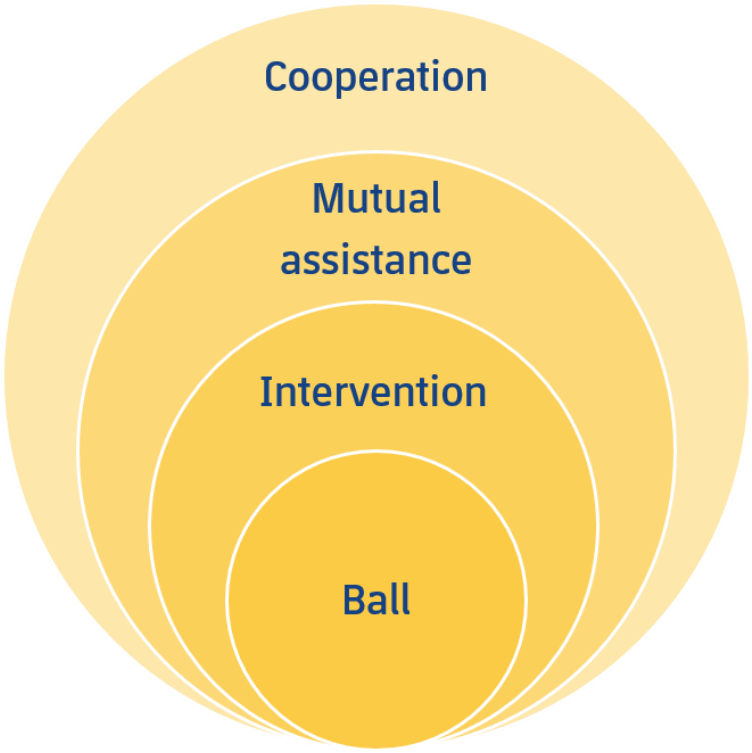
The socio-affective stage spaces

This is the interaction of the player with the rest of the elements of the system, based on the affective relationship that emerges.

- It captures the set of socio-affective spaces where the purpose, the elements and the events that emerge all interact.
- It is susceptible to variation with any change that occurs.
- What happens here will determine the players' behaviors, which in turn will alter their condition.

From the perspective of FC Barcelona, the spaces do not refer to physical places, as they are not specific zones of the playing field that depend on the position of the players of both teams.

Figure 6. Socio-affective stage spaces



Source: Prepared by the authors.

The socio-affective space in which the nearby player is located must be determined.

- Intervention: if he/she is in possession of the ball or can recover it quickly (recovering player).
- Mutual assistance: if he/she can directly interact with the possessor or recovering player.
- Cooperation: if neither of the latter spaces apply. No direct communication channels.

An ideal situation for the possessor would be to have a large number of teammates in the space of mutual assistance, organized around him/her to provide different playing possibilities, as well as other players in cooperation who, although they cannot help the possessor, can cooperate with other teammates to create spaces and restrain opponents, etc. The succession of playing situations is constant, because the players - both teammates and opponents - change their particular situation, thus modifying the context and the opportunities for the possessor.

In relation to this, we can define playing situations as the reality that a player experiences and interacts with in any socio-affective space, and at any time during the game, competition or training.

The motor communications practiced in training are more likely to be identified by the player during the game and will appear again. By means of the perception-action cycle, this coordination with teammates becomes apparent, and must be executed in a matter of moments. It cannot be thought through, but may appear later in a conscious state.

This is a situation that is characterized by a high level of uncertainty, where the coach's participation is minimal. The less time a player has to make a decision means less opportunities for the coach to intervene. This explains why the coach has a greater influence on what happens in the cooperation space.

The intervention spaces are full of playing situations that happen simultaneously during the game.

Mutual assistance and cooperation are ways to optimize team self-management

The role of the coach is to create an opportunity for his/her team to manage all kinds of situations. To this end, he/she provides the resources for the development of all of the necessary structures. The terms **mutual assistance** and **cooperation** are used in the culture of team sports, with the aim of emphasizing the value of teamwork. These concepts are interconnected in each **game situation** or **play**.

In a certain play, mutual assistance is essential and is carried out between the teammates closest to one another. The player intends to carry out a play against an opponent, and the players closest to him/her will participate in that action, collaborating with said player in order to successfully execute the play. This play can be executed with or without the ball. Interpersonal affective interventions are highly valued in this case.

Training on the socio-affective structure can help the players to better interpret the intentions of their teammates. The empathic knowledge that he/she has of a teammate (cognitive structure), will allow the player to act with certain motor skills (coordination structure) and with a certain resolute intention (volitional-emotional structure); showing commitment and displaying elements of execution (conditional structure). Mutual assistance helps ensure what the teammate wants to accomplish.

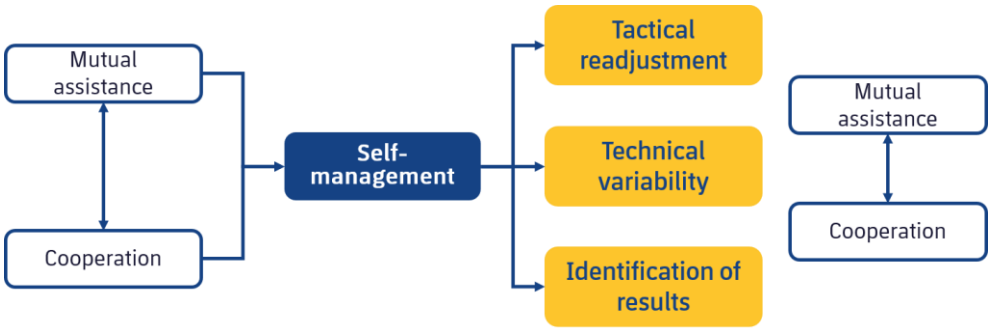
These events take place in a certain space on the field of play. The entire field must be occupied in a certain way by the rest of the players, who must cooperate with those in the area of mutual assistance. All of the players who cooperate are spatially located with respect to the intervention space, and especially in relation to the ball. They understand the objectives of the model that the coach has proposed for a particular game.

Cooperation in collective sports is related to the distribution of individual responsibilities in each space of the field of play. It is also accompanied by common interests and objectives. The coaches have the responsibility of defining the stage spaces where each player will be located, their ability, the speed at which the ball moves, their motor skills, etc.

As was previously mentioned, if a team is trained in this manner, it will be closer to achieving self-management. Through mutual assistance and cooperation, interpersonal information about the players can be provided, which the opponents cannot perceive.

We must not lose sight of the fact that this happens with both teams. The system is immersed in highly complex feedback loops, where the team that manages to identify the formal structure of the opponent will be the victor.

Figure 7. Self-management



Source: Prepared by the authors.

From the perspective of FC Barcelona, it is understood that the concept of team is directly related to any group of players who have perfected the ability to self-manage. Such self-management allows each player to offer his/her talent and creativity for the benefit of the team. In addition, it strengthens socio-affective ties, especially in intervention spaces, where everything that happens cannot be controlled by the coach.

Without losing the systemic focus that characterizes team sports, it can be interpreted that the methodological approaches, where 1c0 or 1c1 is sought as an objective to enhance individual tactics, will fall short of the expected progress. From a systemic point of view, these proposals are not compatible, since 1c0 or 1c1 are the result of a specific situation in the intervention space. In turn, this depends on, and is a consequence of, what happens in the stage space as per the coach's instructions, which are interpreted or modified as a result of the self-management of the group. They are not validated from a systemic perspective, since the socio-affective aspect is not involved. This is why a certain degree of

specificity in the exercise is necessary, in order to optimize empathic communication among teammates. If we simply add the number of players in the exercise, but without a playing context, these players will optimize their socio-affective structure in relation to their teammates. However, highly-valued socio-effective coordination will not appear in the game, because they have not been able to understand and recognize the needs of their teammates, nor how to use motor communication with one another.

Pursuit of spatial and temporal efficiency

Creating a space for players is a concept that involves two or more teammates when taking possession of the ball (connecting tactically). Two main types of actors are present: a dummy and one or more receivers (collective synergy). A dummy is a player who moves into a certain space while attracting the attention of opponents during the process. This behavior frees up space that was previously occupied by the opponent. When the opponent is close to one or more teammates, we say that those players are receiving space generated by the player who attracts them.

We attribute spatial gain to a player when a recovering player leaves his/her mark and moves towards a teammate, depending on if the recovering player was close to the player and ended up closer to the teammate during a short period of play.

Space, time and opportunity are three variables that are closely related. One variable cannot be understood without the others.

The playing space can be modified by the behavior of the team, and this can increase or decrease depending on the proposed game model. If, for example, a defensive player is close to his/her own goal or the lines of defense have advanced halfway through the field, the playing space is reduced; even though both strategies have a specific defensive objective. In the case of being in possession of the ball and with surrounded by a large number of players, along with lacking breadth and depth, he/she will be shrinking the playing space as well as slowing down ball circulation. These variables must be taken into account by the coaches. The coach must work on motivating the team to dominate the playing space.

As was mentioned, time and space are interrelated variables. In this case, time is determined by space and vice versa. The time allotted for a given intervention by the players will be reduced if they are closer to the opponent's goal. In the vast majority of playing situations, there is little time for intervention (Moreno, 2013).

According to Moreno (2013), the reasons for this are due to two factors:

- The opponent's intention to recover the ball.
- The attempt to prevent the opponent from occupying free spaces near the goal area.

With this, the time it takes to carry out these actions can determine the correct execution and success. In a sport like soccer, speed does not lead to success.

Opportunity is the exact moment when one must intervene with a certain action. The goal is not to act quickly, but to act at the right moment. The best example of this scenario would be Lionel Messi, the player who best interprets the space-time-opportunity variables. Where everyone sees a quiet player, with few movements, he is actually observing the playing situations in order to intervene at the right time. In this regard, it is the most effective and efficient way of playing in the world. In countless games, Messi may not be the fastest, nor the one who covers more ground, but he does possess the best sense of decision-making at the individual and collective levels. No one dominates space-time better than him.

To this end, Johan Cruyff states:

> It is statistically proven that the players are actually in possession of the ball for 3 minutes, on average. So, the most important question is: what do you do during those 87 minutes when you don't have the ball? This determines the talent of the player. (Cruyff, n.d., https://barcainnovationhub.com/es/espacios-futbol-perspectiva-cuantitativa/).

In recent years, most teams have attempted to lead the game through the possession stage, carrying out different actions, such as: creating superiority (numerical, qualitative, socio-affective, positional, or a combination of these), disorienting the opponent, the goalkeeper initiating the play, and generating passes to switch to offense mode, etc. However, the most important action for ball possession is the creation and occupation of spaces.

When explaining space occupation, we refer to the player's self-management in the search for relevant areas within the playing field. The importance of understanding if an area of the playing field is correctly occupied is connected to the relative position of the ball, anticipating the opponent's next move, and the number of opponents within a given area (numerical density).

Depending on the player's speed, there are two types of space occupation:

- Active: The player moves in fast sprints to occupy spaces.
- Passive: when the player moves slowly or walks.

The value of space on the playing field

The control of space is an essential variable for the occupation and creation of space. As mentioned earlier, when the player moves to find an opportunity to pass the ball, this gives him/her an advantage. That is, not all spaces have the same value. For example, one possibility of interpreting the value of space is to take the distance from the opponent's goal as a reference. It is clear that the spaces near the opponent's goal are of a greater value, given the degree of danger that this can create. The interesting thing about the analysis is its complexity, since the value of the space changes constantly, in accordance with the position of the ball and the players.

Given the dynamic nature of soccer, the players are involved in a continuous process of gaining and losing space (in a state of permanent self-organization). A small amount of space gained may happen when nearby recovering players follow the ball as it moves away from the player, leaving the player with more control of the space. However, the same can happen in a high speed sprint situation between the offensive player and recovering player, where the offensive player moves a little faster (breaking the symmetry). Otherwise, when the player moves into a free space, he/she may gain a substantial amount of space. Therefore, it is necessary to define a level of spatial gain, from which space earned can be considered a real advantage, rather than a consequence of the contextual effects of slower movement in a given situation.

In a sport where a player's average possession time is 3 minutes out of 90, the analysis of the team's collective dynamics, through movements without the ball, becomes a critical element in understanding performance. It has been demonstrated that through spatial-temporal data, it is possible to extract significant information concerning the occupation of valuable spaces and the creation of spaces for teammates. By understanding the frequencies (oscillations), quality, position and effectiveness of the occupation and creation of such space, a coach can build specific tools that guide a player towards team collaboration, apart from what he/she can do with the ball.

As an example, and to summarize what we have analyzed up until now, we will share a fragment of one of the many analyses conducted on the first team during a game:

Official game between FC Barcelona and Villareal FC in January, 2017. Specifically, an analysis was conducted on the concepts of spatial occupation and space creation, using optical tracking data from *Metrica Sports*. This game ended with a score of 1-1, where the first goal was scored by Villareal FC at minute 49 (second half). The tie with FC Barcelona was made during the 90th minute by Lionel Messi. This presents a game where, in a certain situation, FC Barcelona needed to score during the final minutes of the game, having to occupy and create as many spaces as possible to find scoring opportunities. In order to identify the moments of occupation and creation of space, we calculated all of the instances where FC Barcelona possessed the ball, where a player had kept possession of the ball by dribbling. Based on each of these situations, and together with expert soccer analysts of FC Barcelona, we established a window of three seconds after each of these moments, reaching a total of 845 different situations. The proximity factor is set at 5 meters, depending on the minimum distance an opponent has on average compared a player in possession of the ball. We also set the minimum attraction distance for the creation of space at 3 meters.

Iniesta, Sergio Busquets and Lionel Messi achieved more than 41% of the space occupation. Most notably, these three players play in different positions and have different roles within the team. Busquets is a midfielder who has a specific role in helping to handle the ball with controlled possession when building up to a play, and to help create a play during the possession stage. Iniesta is a midfielder with excellent ball control and special abilities to move and find spaces between lines. Messi is a forward, but is not tied to a specific position, and is allowed to cover large areas of the field of play to find space and go after the ball. However, the three players share a long tradition throughout their careers of movements centered on ball possession and the quality of their movements in the recovery stage. Suarez and Neymar, two very mobile players, have a lower record of situations where space was gained. This can be associated with the high level of close marking that these players experienced during the game.

It is interesting to note that, for most players, the active occupation of space is more frequent than passive occupation. This is particularly noticeable with the left and right wings, who need to cover wider spaces and keep a large average distance to the ball; a characteristic shared by the center backs. A notable case is that of Lionel Messi, where he displays more passive characteristics rather than active. This passive feature does not mean that the player does not intentionally occupy space, but that he does not move at a running sprint, just slower. Much has been discussed in recent years about various moments during games in which Messi runs through areas of the field. However, walking does not mean that one

is detached from the game, but is instead a conscious action to move through valuable spaces that are empty and claim control of such space, and finally, the ball. Messi does this quite effectively, and makes him one of the top players in terms of space gained throughout the game, despite the lack of active gain. A relevant fact is that 71% of the time, the space gained is in front of the ball, rather than behind it.

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