

Can psychological competencies be diagnosed in football matches? Relations between match indicators and Resilience Scale

FRANCISCO LUÍS FRADIQUE PIRES¹, SANDRA FERREIRA², ANTÓNIO VICENTE¹

Abstract

Introduction. Human behavior reflects a complex interaction of multiple factors, and players' observable actions during football matches can be understood as manifestations of psychological competencies that may be linked to measurable indicators. **Aim of Study.** This study aimed to operationalize a diagnostic approach capable of capturing the complexity of sporting performance phenomena by integrating heterogeneous data sources. Such an approach seeks to enable novel interpretations and support the deduction of underlying causes of individual behaviors in match contexts. **Material and Methods.** In this exploratory correlational study, the relationship between data from a specific match moment – the attack–defense transition (ADT) – and a psychological competence (resilience) was examined. Resilience was assessed using the Portuguese version of the Resilience Scale (RS). Data were collected from three matches of an under-14 masculine team ($n = 20$) participating in a national tournament (Portugal). **Results.** The analysis showed that players stopped or slowed recovery actions in 22% of ADT moments but no robust evidence was found to suggest that a player's resilience level is related to their success in ADT moments within this sample. **Conclusions.** These findings indicate that although psychological resilience may be associated with behavioral tendencies during ADT moments, other variables should be analyzed and further investigation is needed to strengthen this conclusion. This study provides preliminary evidence that the diagnosis of psychological competencies can be strengthened through specific match analyses, representing an important step towards a holistic understanding of players' performance.

KEYWORDS: psychological resilience, sport, football, diagnose, match analysis.

Received: 30 December 2024

Accepted: 14 November 2025

Published: 30 June 2026

Corresponding author: Francisco Luís Fradique Pires,
franciscolfpires@gmail.com

¹ *Sports Sciences Department, Beira Interior University, Portugal*

² *Mathematics Department, Beira Interior University, Portugal*

Introduction

When discussing sport, the reference is to human behavior as a whole. This seemingly trivial assertion carries significant implications, as it marks a departure from fragmented perspectives. In sports contexts, such reductionist viewpoints lead to an incomplete and inaccurate understanding of performance as a holistic trait. In particular, with regard to human behavior – even though it may be expressed through motor actions – it becomes evident that focusing solely on physiological, biological, or biomechanical factors is insufficient [1].

Addressing this issue highlights the need for coherence, legitimizing the intention to understand the problem in its entirety. This involves examining how particular elements influence the whole (human behavior) within a specific context (sporting activity), which may provide relevant and in-depth knowledge about human characteristics, skills, and potential. Exploring this knowledge can contribute to a renewed understanding

of human behavior in sport and, above all, to a more comprehensive, appropriate, and effective intervention – one consistent with the knowledge and tools already available [2], while also enabling the development of new instruments aimed at progress.

Thus, sport – understood as a tool for human training and education [3] – was regarded as a means to better understand and intervene in individual development. This contributes to the construction of perspectives on practice and its design, increasingly supported by available scientific evidence. Accordingly, it was assumed that the behavior under discussion – observable in various forms that may serve as indicators (and which, therefore, can be quantified and qualified) – is merely the “visible” consequence of a set of processes and variables interacting under the constraints and particularities of a given context [3, 4]. This implies that understanding the interactions underlying a motor output requires disentangling the constraints involved and examining the extent of their variation and influence on the perceived results [5]. With this aim, the present work seeks to identify relationships between data regarding attack–defense transition (ADT) moments in football and results obtained through the Resilience Scale (RS) questionnaire [6, 7].

The proposed thesis raises several questions for debate, such as: By observing technical–tactical behaviors (actions in practice/match), is it possible to infer associated psychological competencies? To what extent do football training tasks contribute to the development of psychological competencies? Given the limited capacity of current science to provide clear answers to these questions, searching for solid evidence that justifies a new approach is urgent. These first steps are therefore particularly important. Considering that expert coaches’ assessments can be valid indicators of a player’s current performance and future potential [8], improving the quality of such assessments regarding psychological competencies requires objectivity, reliability, and validity [8], especially if based on the analysis of performance in practice/match contexts.

In high-performance sport, several studies indicate that psychological factors are decisive for performance [9]. This has led to increased interest in understanding their role in the development of psychological competencies and skills, such as resilience-related behaviors [9]. In team sports, elite practitioners often differ in certain personality traits when examined through the Big Five framework. They tend to show lower levels of neuroticism and higher levels of extraversion and openness to experience. This highlights the importance

of psychological training strategies that promote emotional balance, team communication, and tactical thinking skills [10]. Other studies report greater kindness, vitality, emotional stability, and reasoning, along with lower neuroticism, among successful sport practitioners. Such findings suggest that sports administrators, scouts, and coaches should consider these characteristics when identifying individuals for sustainable high-performance teams [11].

A systematic review on talent identification and development in futsal found that psychological factors play a critical role in achieving high performance. The most successful futsal players tend to excel in decision-making, creativity, concentration, and reaction time. However, the review also emphasized the scarcity of research specifically addressing psychological aspects in futsal [12]. A similar review on football, analyzing 70 articles, showed that the most successful players demonstrate technical, tactical, anthropometric, physiological, and psychological advantages, which vary nonlinearly according to age, maturation status, and playing position. Nonetheless, it concluded that further research is needed on the psychological aspects of talent identification and development in football [13]. Supporting these findings, the Portugal Football Observatory of the Portuguese Football Federation studied the relationship between youth players’ birth semesters and their playing opportunities. After consulting 376 coaches, 42% identified psychological skills as the most important criterion in player selection – surpassing technical (32%) and tactical (3%) skills. Similar results emerged when coaches were asked which factors influenced decisions about playing time, again highlighting psychological skills (39%) alongside tactical performance [14].

Despite these references and the valuable information they provide – allowing better sample characterization and deeper study while emphasizing the preponderance of psychological factors – there is little discussion of the precise impact that traits, competencies, and skills have on players’ performance, or how these manifest in practice/match contexts [15]. Moreover, the study of this performance factor, and interventions targeting it, often rely on instruments developed exclusively within psychology [16]. This contradicts a systemic and ecological perspective, which appears more appropriate for addressing such complex issues.

Thus, although the development of psychological characteristics, competencies, and skills is crucial, no validated and reliable tool currently exists for assessing specific behaviors in football practice/match contexts

that could be applied by coaches in talent identification systems [17, 18]. Nevertheless, initial investigations suggest that football-specific tasks incorporating tactical principles (e.g., sport aggressiveness) and psychological components (e.g., resilience, sacrifice, attention, concentration, and anxiety management in stressful or adverse situations) may foster the development of these psychological variables [18].

Based on sporting performance (and what can be inferred from it), the proposal to structure a methodology for diagnosing psychological competencies, identifying trends and causes, represents a necessary challenge. Emphasizing that players' behaviors manifest in clearly identifiable contexts (practice/match situations), it is proposed that any intervention should be operationalized within this same context, ensuring functionality. Therefore, the practice/match context can be regarded as the most appropriate environment for collecting information and knowledge to support players' development. This assumption raises several apparently simple but essential questions: How can evaluation be conducted? How should interventions be designed? How can they be monitored?

Given the vast spectrum of psychological competencies, limiting the scope of this research to one competency already recognized as important in sport – and for which some studies exist – appears to be an effective approach for testing the formulated hypotheses. In this sense, the concept of psychological resilience emerges as central in this work, along with its potential operationalization in sports practice. A brief review of existing definitions is required. For instance, the authors of the RS define resilience as a “positive personality characteristic that enhances individual adaptation” [7]. Other definitions include: “a person's ability to evaluate what they think, feel, and do when faced with adversity, allowing them to maintain their previous level of functioning and successfully adapt” [9]; “a constellation of personal qualities that enable high achievers to excel in demanding contexts” [19]; “demonstration of positive behavioral responses to pressures or setbacks” [20]; and “a dynamic process encompassing positive adaptation within the context of significant adversity” [21], among others.

Despite the lack of a single, consensual definition within psychology, resilience can be broadly understood as the ability to overcome adverse or stressful situations and emerge stronger, a construct that has gained significant relevance in sport in recent years [22]. It is precisely this applicability within sporting activity – more specifically in football practice/match contexts – that this study aims

to test, assessing whether it is possible to identify and, to some extent, evaluate this psychological competency through match analysis.

Aim of Study

Based on the above, this study aims to pursue the following objectives: (i) to test the capacity of the match analysis matrix to identify trends in individual behaviors during ADT moments; (ii) to examine possible associations between match data from ADT moments and RS results; (iii) to highlight the potential of targeted match analysis for improving the diagnosis of psychological competencies, thereby offering new perspectives for understanding players' performance.

Material and Methods

Study design

In methodological terms, this work can be classified as a correlational study [23], aiming to examine how data from two different sources (match performance analysis and RS) may be related. Although this design does not allow for the establishment of causal relationships – possible only through experimental approaches – it represents an initial step towards that direction, contributing to a more accurate characterization of the relationships among the variables under consideration.

Sample

The study sample consisted of 20 male under-14 (U14) football players from the same team, who participated in the 2023/2024 Torneio Interassociações Lopes da Silva organized by the Portuguese Football Federation. Participants had a mean age of 14.00 years (SD = 0.51).

Tools

Match data analysis matrix

The proposed match data analysis matrix was structured around the simplified categorization of two sets of actions: one referring to defense-to-attack transition (DAT) moments and the other to attack-to-defense transition (ADT) moments. These were interpreted as relevant to resolving issues emerging from football match transitions. The matrix allowed for the measurement not only of the frequency of these actions but also their associated success, as well as the possibility of translating their occurrence into different temporal dimensions.

Within the scope of this study, the focus was placed exclusively on data related to ADT. This choice was based on the assumption that ADT may represent

a stressor for players (linked to the resilience process), with the consequence that behavioral manifestations could become visible, identifiable, and measurable. Such a restriction was necessary to ensure the implementation of a robust experimental protocol and to allow for the management of a reduced but more coherent dataset, permitting well-founded conclusions within the available timeframe. This decision stemmed from the understanding that many observable actions during ADT situations may be associated with behaviors previously identified as related to specific psychological competencies/skills – particularly those connected to the concept of sporting resilience [20].

To define possible interpretations that could be used to detect transition moments, the following criterion was established: *In duel/dispute situations, possession is considered to change (DAT/ADT) when the result benefits the team that initially did not have the ball. A two-second interval following the dispute was adopted as the temporal reference, and one successful pass after the dispute was considered the reference action. Situations in which the ball goes out of play were excluded.*

This operational definition aimed to provide easily observable indicators for distinguishing the moments to be included in the analysis, even if the criteria may be open to discussion. The outcome was an analysis matrix with two clearly defined sets of actions.

To begin analyzing ADT-related data, the variable *Time* was decomposed into observable player actions during these moments. The player's *Action Beginning* was identified as the first reference point, with three categories: *No action initiated*, *Less than 1 second after the last touch* and *More than 1 second after the last touch*. These indicators, structured around the embodiment of the *Time* variable (knowing that $Space = Velocity \times Time$), made it possible to differentiate players' tendencies during this critical match moment, in which the temporal constraints highlight the urgency of rapid responses.

Although *Velocity* – naturally associated with players' *Action Beginning* – is a critical factor in this moment, it may not provide sufficient information to adequately characterize either the match or the players. While velocity could be tested in isolation to clarify its influence, it is necessary to cross-reference it with indicators of success or failure in subsequent actions.

Accordingly, the categorization of predominantly used actions (related to individual technical–tactical behaviors), their outcomes, and even their underlying intentions is crucial. Considering that recovering ball possession represents the primary collective and

individual objective during ADT, the variable *Result* was defined, with four possible outcomes: (1) *Did not intercept*: The player who lost possession failed to intercept or recover the ball; (2) *Intercepted/recovered the ball (gained possession) within three opponent touches*: The player regained possession before the opposing team made three touches; (3) *Intercepted/recovered the ball (gained possession) after three opponent touches*: The player regained possession after the opposing team made three touches; (4) *Foul*: The player who lost possession committed a foul.

Beyond evaluating success or failure, these indicators also allow the estimation of the temporal variation in players' reactions, based on defined thresholds (e.g., number of opponent touches). Furthermore, to extend the analysis beyond the initial three opponent touches and to better capture player attitudes throughout the interaction following ADT, the variable *Intention* was introduced with two categories: (1) *Maintained intention to recover*: The player remained committed to defensive tasks after three opponent touches; (2) *Slowed down or cancelled intention to recover*: The player reduced or ceased efforts to carry out defensive tasks after three opponent touches.

Therefore, this analysis matrix was developed with coherence and consistency, enabling the simplified (yet non-reductive) collection of data. With appropriate treatment and interpretation, these data can be used to define collective and individual behavioral trends. Such trends allow the formulation of hypotheses and the initiation of diagnostic processes that do not reduce the search for causes to a single factor or to a set of factors considered in isolation, but instead account for the dialectical relationships established among them.

Based on the visible and embodied actions of players during matches, and supported by the necessary conceptual framework for contextual interpretation, diagnosis can be conducted while acknowledging the inherent complexity of sporting practice. This approach, grounded in identified trends, highlights the importance of a simple, coherent, and functional analysis tool. Ultimately, it supports a logic of conjecture and refutation that does not exclude alternative hypotheses and, most importantly, enables the establishment of causal links across the different domains that influence performance [24].

Resilience Scale

The RS is an instrument designed to assess individual resilience, conceptualized as a positive personality characteristic that facilitates adaptation [7]. It comprises

25 positively worded items rated on a seven-point Likert scale, ranging from 1 ('totally disagree') to 7 ('totally agree'). Total scores can range from 25 to 175, with higher scores indicating greater resilience. Scores equal to or above 147 are classified as high resilience [7].

Based on a component analysis using the oblimin oblique rotation method with Kaiser normalization, two factors were identified by the authors of the scale: *Personal Competence* and *Acceptance of Self and Life*. *Factor I (Personal Competence*; 17 items: 1, 2, 3, 4, 5, 6, 9, 10, 13, 14, 15, 17, 18, 19, 20, 23, and 24) reflects self-confidence, independence, determination, invincibility, control, resourcefulness, and perseverance. *Factor II (Acceptance of Self and Life*; 8 items: 7, 8, 11, 12, 16, 21, 22, and 25) reflects adaptability, balance, flexibility, and a balanced life perspective [25].

For the present study, a validated Portuguese version of the RS was applied [6]. The RS has been shown to be a reliable and valid psychological measure, with reported internal consistency coefficients of $\alpha = 0.83$ for the overall scale and $\alpha = 0.75$ for the *Acceptance of Self and Life* subscale [26].

Procedures

Data from ADT moments in all three football matches (first phase) of the Torneio Interassociações Lopes da Silva were collected and analyzed using a specifically designed matrix, in which all 20 players participated (although with varying playing times). In addition, all players completed the RS [6] during the competition. Prior to data collection, an explanatory document outlining the objectives of the study and an informed consent form authorizing players' participation were distributed to their legal guardians.

All procedures complied with the principles of the Declaration of Helsinki and were approved by the Ethics Committee of the University of Beira Interior (process no. CE-UBI-Pj-2024-039).

Data were compiled into databases using Google Sheets, and statistical analyses were conducted with IBM SPSS Statistics (Version 29).

Results

According to the matrix possibilities for data collection from ADT moments, and considering the key variables of this study, it is first necessary to understand the total number of players' ball losses across the three matches. Despite the variation in this indicator, and acknowledging the risk of not defining a minimum observation threshold for inclusion, no exclusion criteria were established due to the limited sample size. The observed variation can be explained by several factors: primarily, differences in players' playing time across the three matches, and secondarily, the roles typically performed by each player. These influences are not negligible, and future studies should incorporate more rigorous controls of external variables. Importantly, this must be done without compromising ecological validity, ensuring that the real impact of such variables is properly integrated into the analysis.

With respect to the more specific indicators of actions during ADT moments (Table 1), it is also important to account for uncontrolled variables such as the area of the field where possession was lost or the number of teammates positioned behind the ball line at the moment of loss. These factors may influence players' perceptions of whether recovery intentions should be maintained.

Table 1. Percentages of intentions revealed by players in relation to the total number of losses

| Player | Total losses | % Maintained Intention | % Slowed Down/ Canceled Intention | % Not Initiated | % Less 1 sec | % More 1 sec |
|--------|--------------|------------------------|--------------------------------------|-----------------|--------------|--------------|
| 1 | 4 | 75.00 | 25.00 | 0.00 | 50.00 | 50.00 |
| 2 | 6 | 83.33 | 16.67 | 0.00 | 87.50 | 12.50 |
| 3 | 3 | 100.00 | 0.00 | 0.00 | 75.00 | 25.00 |
| 4 | 2 | 100.00 | 0.00 | 0.00 | 0.00 | 100.00 |
| 5 | 4 | 100.00 | 0.00 | 0.00 | 100.00 | 0.00 |
| 6 | 11 | 81.82 | 18.18 | 9.52 | 71.43 | 19.05 |
| 7 | 21 | 71.43 | 28.57 | 10.34 | 62.07 | 27.59 |
| 8 | 7 | 85.71 | 14.29 | 7.69 | 84.62 | 7.69 |
| 9 | 9 | 11.11 | 88.89 | 27.78 | 50.00 | 22.22 |

| | | | | | | |
|--------------|----|--------------------|--------------------|--------------------|--------------------|--------------------|
| 10 | 5 | 100.00 | 0.00 | 7.69 | 69.23 | 23.08 |
| 11 | 12 | 33.33 | 66.67 | 20.00 | 45.00 | 35.00 |
| 12 | 3 | 33.33 | 66.67 | 42.86 | 42.86 | 14.29 |
| 13 | 11 | 72.73 | 27.27 | 9.09 | 27.27 | 63.64 |
| 14 | 1 | 100.00 | 0.00 | 30.00 | 60.00 | 10.00 |
| 15 | 3 | 100.00 | 0.00 | 0.00 | 83.33 | 16.67 |
| 16 | 7 | 42.86 | 57.14 | 0.00 | 75.00 | 25.00 |
| 17 | 8 | 25.00 | 75.00 | 55.56 | 33.33 | 11.11 |
| 18 | 5 | 40.00 | 60.00 | 14.29 | 42.86 | 42.86 |
| 19 | 6 | 66.67 | 33.33 | 0.00 | 100.00 | 0.00 |
| 20 | 7 | 85.71 | 14.29 | 11.11 | 77.78 | 11.11 |
| Average | | Average | Average | Average | Average | Average |
| 6 (SD = 4.6) | | 70.40 (SD = 29.08) | 29.59 (SD = 29.08) | 12.30 (SD = 15.72) | 60.57 (SD = 30.92) | 27.68 (SD = 25.29) |

Note: % Maintained Intention – percentage of occasions that players maintain their intentions to recover ball possession; % Slowed Down/ Canceled Intention – percentage of occasions that players slow down or cancel their intentions to recover ball possession; % Not Initiated – percentage of occasions that players not initiate any action to recover ball possession; % Less 1 sec – percentage of occasions that players initiate actions to recover ball possession less than 1 second after the loss; % More 1 sec – percentage of occasions that players initiate actions to recover ball possession more than 1 second after the loss

The median percentage for maintaining recovery intentions (*% Maintained Intention*) was 78.41%, with a high standard deviation (SD = 29.1%), suggesting considerable variability among players. The median percentage for slowing down or cancelling recovery intentions (*% Slowed Down/ Cancelled Intention*) was 21.59%, with the same standard deviation, further indicating heterogeneous behaviors. Some players (e.g., Players 3, 4, and 5) consistently maintained intentions (100%), whereas others, such as Player 9 (11.11%) or Player 17 (25%), showed much lower rates.

To test whether differences between maintaining and slowing down/cancelling intentions were statistically significant across the dataset, both a paired-samples *t*-test and a Wilcoxon signed-rank test (non-parametric) were performed. The hypotheses were: H₀: No difference exists between *% Maintained Intention* and *% Slowed Down/ Cancelled Intention*; H₁: A significant difference exists between *% Maintained Intention* and *% Slowed Down/ Cancelled Intention*.

The *p*-value (*p* = 0.007) was below the conventional threshold of $\alpha = 0.10$. Thus, the null hypothesis was rejected, indicating a statistically significant difference between the two variables. Fourteen negative ranks were observed, meaning 14 cases where *% Slowed Down/ Cancelled Intention* was lower than *% Maintained Intention*, with a mean rank of 12.61. Conversely, six

cases presented the opposite pattern, with a mean rank of 5.58. The higher number of negative ranks (14 vs. 6), and the higher mean rank for negative cases, suggest that most players displayed significantly lower “slowed/ cancelled intentions to recover the ball” compared to “maintained intentions to recover the ball” in ADT contexts. These results indicate that the majority of players tend to sustain recovery intentions during ADT moments, likely influenced by contextual factors such as field position or team dynamics.

Regarding RS results (Table 2), as well as their distribution across the two factors, 30% of participants scored equal or above 147 points, indicating high resilience. However, overall scores tended to be lower. This was confirmed through a *t*-test with the following hypotheses: H₀: Mean = 147; H₁: Mean < 147. The *p*-value (*p* = 0.013) was below $\alpha = 0.10$, leading to the rejection of H₀. This indicates statistically significant evidence that mean resilience scores in the sample are lower than 147.

An initial association analysis was conducted using Spearman’s rank correlation coefficient (ρ) to explore the potential relationship between players’ total resilience scores (*RS Total Score*) and the percentage of maintained defensive intentions (*% Maintained Intention*). The analysis revealed a weak, non-significant positive correlation between the two variables: $\rho = 0.26$,

Table 2. Total score and factor scores achieved on the Resilience Scale by each player

| Player | Total score | Factor I | Factor II |
|--------|-------------|----------|-----------|
| 1 | 141 | 100 | 41 |
| 2 | 131 | 98 | 32 |
| 3 | 148 | 106 | 42 |
| 4 | 143 | 104 | 39 |
| 5 | 139 | 110 | 29 |
| 6 | 121 | 85 | 36 |
| 7 | 147 | 106 | 41 |
| 8 | 133 | 92 | 41 |
| 9 | 131 | 92 | 39 |
| 10 | 145 | 101 | 44 |
| 11 | 165 | 112 | 53 |
| 12 | 138 | 98 | 40 |
| 13 | 116 | 81 | 35 |
| 14 | 155 | 111 | 44 |
| 15 | 148 | 105 | 43 |
| 16 | 144 | 97 | 47 |
| 17 | 146 | 105 | 41 |
| 18 | 138 | 101 | 37 |
| 19 | 124 | 84 | 40 |
| 20 | 156 | 101 | 55 |

Note: Factor I – sum of the obtained scores on Resilience Scale Factor I items; Factor II – sum of the obtained scores on Resilience Scale Factor II items

$p = 0.28$. Using the same analytical approach, correlations were also calculated for RS subscales. *Factor I (Personal Competence)* was positively correlated with *% Maintained Intention* ($\rho = 0.311$, $p = 0.183$).

To better explore the potential relationship between psychological resilience and ADT variables, a new variable (*New_Resil*) was created, dividing *RS Total Score* into two categories: 0 = low/moderate resilience (25-146 points) and 1 = high resilience (147-175 points). Similarly, a new variable (*New_ADTSuccess*) was created to represent success in ADT moments, combining *% Maintained Intention* and *% Less Than 1 Second*. The result was a trichotomous variable measuring ADT success (0: low [0-33]; 1: moderate [34-66]; 2: high [867-100]), adding the variables *% Maintained Intention*

(percentage of occasions that players maintain their intentions to recover ball possession) and *% Less 1 sec* (percentage of occasions that players initiate actions to recover ball possession less than 1 second after the loss) and dividing the sum by two.

In summary, two derived variables were analyzed: *New_Resil*: A binary variable (0 = low/moderate resilience [25-146]; 1 = high resilience [147-175]); *New_ADTSuccess*: A trichotomous variable (0 = low [0-33]; 1 = moderate [34-66]; 2 = high [67-100]).

A chi-square test of independence was conducted to examine the relationship between *New_Resil* and *New_ADTSuccess*. The likelihood ratio test yielded $\chi^2(2) = 2.93$, $p = 0.23$, and revealed no statistically significant association between the two derived variables at the $\alpha = 0.10$ level. Therefore, no evidence was found to suggest that a player’s level of psychological resilience (as defined by this binary classification) is related to their success in attack-defense transition moments within this sample.

Figure 1 illustrates this relationship, presenting a bar chart comparing *New_ADTSuccess* categories by resilience levels. Blue bars represent individuals with low/moderate resilience (25-146), and green bars represent those with high resilience (147-175). Results show: Low success (0-33): Only low/moderate-resilience individuals (2); Moderate success (34-66): Most cases are low/moderate-resilience individuals (6) and only 1 of the 5 high-resilience individuals is in this category; High success (67-100): More low/moderate-resilience

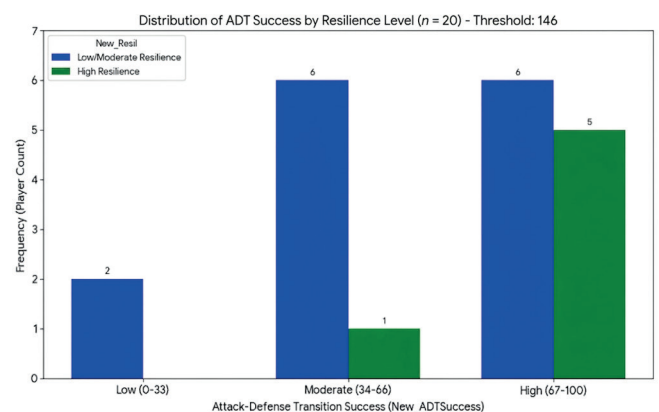


Figure 1. Bar chart of distribution of the variables *New_Resil* and *New_ADTSuccess*. *New_Resil*: A binary variable based on the Resilience Scale Total Scores (0: scores 25-146 [low/moderate resilience]; 1: scores 147-175 [high resilience]); *New_ADTSuccess*: A trichotomous variable measuring Attack-Defense Transition success (0: low [0-33]; 1: moderate [34-66]; 2: high [67-100])

individuals (6) than high-resilience ones (5), though the gap narrows. The majority of high-resilience individuals (5) are in this category.

Overall, in this sample it is possible to note that high-resilience individuals tend to show higher ADT success. However, the association between these two main variables does not reach statistical significance.

Discussion

Given that this study represents an initial attempt to explore the potential associations between the considered variables, and in accordance with both the number of available observations and the sample size, the Spearman's rank correlation test was applied. This non-parametric test is generally recommended for small samples, as it provides an indicator of both the direction and the strength of a correlation, regardless of whether the variables are linearly related.

While other analytical methods could strengthen the conclusions presented here, their application requires larger samples and a greater number of observations. Future studies, therefore, should adopt alternative methodological approaches that can provide answers to more specific questions regarding this topic.

In this study, a Spearman's coefficient of $\rho = 0.26$ was obtained for the relationship between *RS Total Score* and the percentage of times players maintained their recovery intentions after three opponent touches in an ADT moment (*% Maintained Intention*). This indicates a weak positive correlation between the two variables. Although the association was not statistically significant ($p = 0.279$), the positive direction of the relationship suggests that higher resilience scores may be linked to different behaviors in these match moments, specifically greater persistence in attempting to recover the ball. These preliminary findings justify further investigation using larger samples and more robust experimental designs, in line with the notion that resilience must be operationalized through the measurement of its behavioral manifestations in sport [27].

The direction of this correlation aligns with evidence from other studies reporting that high-level sport practitioners demonstrate a set of personality traits contributing to superior performance, including sacrifice, professionalism, maturity, mental toughness, perfectionism ("striving for perfection"), and optimism [9, 28]. Such attributes, often conceptualized within the broader construct of resilience, are expressed in sporting behavior and may influence performance outcomes. In the football context, these results suggest that persistence in recovery actions during ADT may

represent a behavioral indicator relevant to diagnosing resilience-related competencies.

It is important to note, however, that resilience scores in youth footballers may differ from those in other populations. Some studies report higher resilience in football players compared to students [29], yet in adolescent populations certain RS items may not fully capture resilience at this developmental stage [6]. Therefore, conclusions must be drawn with caution.

Using the same analytical approach, correlations were also calculated for RS subscales. *Factor I (Personal Competence)* was positively correlated with *% Maintained Intention* ($\rho = 0.311$, $p = 0.183$). Although slightly higher than the correlation with *RS Total Score* ($\rho = 0.255$), the association remained statistically non-significant. Nonetheless, it is noteworthy that *Factor I* includes dimensions such as determination and perseverance, which are conceptually aligned with the behaviors observed during ADT. This reinforces the potential utility of RS subdimensions for exploring specific psychological competencies in practice.

When considering the categorical variables *New_Resil* and *New_ADTSuccess*, the likelihood ratio test yielded a value of $\chi^2(2) = 2.93$, $p = 0.23$. This result suggests no statistically significant association between the two derived variables. Nevertheless, the bar chart distribution, for this particular sample, gives the possibility to perceive that individuals with higher resilience scores tended to achieve greater success in ADT situations.

These findings support the growing evidence that excellence in sport is a complex phenomenon and results from the interplay of multiple factors, not only personality-related or psychological attributes. Notwithstanding, the use of diverse coping strategies, alongside the influence of training and practice processes, appears to play an important role in sporting performance [30]. Consequently, assessing psychological competencies and their associated skills becomes essential. The use of tools that capture these phenomena within their ecological context is a fundamental step towards providing coaches, scouts, and practitioners with actionable information for applied interventions.

The interpretation of match behaviors, the identification of their causes, and the inferences derived from them require further empirical reinforcement. The present study aimed to contribute to this line of inquiry, acknowledging that more robust methodologies are needed. Future research could employ: regression analysis – linear or multiple regression could test whether resilience scores predict football behaviors or

performance outcomes, allowing for the development of predictive models while controlling for factors such as age or playing position; cluster analysis – grouping players based on behavioral patterns may help identify profiles requiring different resilience levels, informing training strategies and playing styles; predictive modelling – machine learning approaches could forecast players' future performances based on resilience or related psychological attributes. With caution – acknowledging the complexity of sport contexts – such models could assist decision-making in coaching, scouting, or management.

These methodological advances, combined with the exploration of additional competencies such as self-confidence, motivation, emotional regulation, stress management, concentration, and visualization, could deepen our understanding of psychological contributions to sport performance. Understanding how these competencies/skills are effectively revealed in practitioners' behaviors is a huge challenge but, therefore, with an equal impact.

Despite the value of the present findings, several limitations must be acknowledged. The sample size ($n = 20$) is small, which constrains generalizability. Although these results should not be viewed as definitive, they provide preliminary evidence of the relationship between resilience and individual behaviors of football transition moments. Access to larger samples, particularly in high-level football, remains a challenge but would increase statistical power and reliability.

Key methodological considerations include: (1) Number of observations per individual: While no minimum threshold was applied in this study to preserve ecological validity, the lack of such a criterion risks producing datasets with too few observations to establish reliable trends. Future studies should carefully balance ecological fidelity with methodological rigor; (2) Playing time and player roles: Variations in match time and tactical roles influenced the number and type of observations. Considering positional responsibilities in the analysis may refine conclusions without undermining ecological validity; (3) Field zones and team positioning: The location of ball losses and the number of teammates behind the ball line may influence players' recovery intentions. Incorporating spatial variables into analyses could reveal contextual differences in behavior; (4) RS measurement limitations: While players often score higher than non-players, adolescent populations may interpret RS items differently, potentially biasing results. Extending research to adult samples could help address this limitation.

Resilience, a complex psychological competence with applicability across human activity, may influence youth football players' embodied actions on the field. By situating resilience at the micro-level of observable match behaviors, this study offers a preliminary step towards diagnosing psychological competencies through ecological performance analysis.

Although statistical support remains non-significant and preliminary, the results highlight important avenues for exploration. Future research should extend the analysis to include contextual variables (e.g., playing position, field area of ball loss, team numerical balance) and assess the impact of structured interventions designed to enhance resilience. Such approaches may reveal not only the extent to which resilience can be developed through football practice but also the principles and tasks most effective in fostering this competence.

Conclusions

In this study, it was observed that higher RS scores may be positively associated with players' tendency to maintain recovery intentions during ADT moments over a longer period of time. Although it is neither possible nor desirable to assume a consistent relationship, extrapolate or generalize these findings, the formulation of this hypothesis alone justifies the relevance of continuing research in this area and opens a promising line of investigation.

The outcomes also demonstrate that the aims initially defined were achieved, confirming that: the match analysis matrix can be applied to identify players' behavioral trends during ADT moments; associations between football match data from ADT moments and RS results can be tested; this methodological pathway holds potential to enhance the diagnosis of psychological competencies through an ecological perspective, providing new avenues for understanding players' performance.

The implications are wide-ranging, extending from the design of training interventions (e.g., practice tasks with clearly defined objectives and measurable psychological impact) to the assessment of sporting performance, with practical applications in areas such as scouting and talent identification.

Grounded in a conceptual framework of complexity – an essential lens for understanding human phenomena – and guided by an ecological approach that contextualizes the issues under study, this initial research provides a foundation upon which future work may build to expand and deepen knowledge in this domain. The richness of these opportunities underscores the

developmental potential of this line of inquiry, shedding light on the relationships between players' psychological competencies/skills and their behaviors during sport performance.

Funding

No external funding.

Conflict of Interest

The authors declare no conflict of interest.

References

- Almada F, Fernando C, Vicente A. A perspective: knowledge – a tool. *J Phy Fit Treatment & Sports*. 2022;9(4):555766.
- Gascón A, Marco Á, Buldain D, Alfaro-Santafé J, Alfaro-Santafé V, Gómez-Bernal A, et al. A diagnostic and performance system for soccer: technical design and development. *Sports*. 2025;13(10). <https://doi.org/10.3390/sports13010010>
- Vicente A, Fernando A, Lopes H. A multidisciplinary approach to sport. *Am Int J Contemp Res*. 2014;4(1): 286-290.
- Vicente A, Fernando C, Lopes H. Towards a rupture in sport: using a functional model to understand and intervene in soccer. *Int J Humanit Soc Sci*. 2013;3(16):97-101.
- Araújo D, Chow JY, Davids KW, Button C, Shuttleworth R, Renshaw I. The role of nonlinear pedagogy in physical education. *Rev Educ Res*. 2007;77(3):251-278. <https://doi.org/10.3102/003465430305615>
- Vigário I. Talento desportivo, prática desportiva e resiliência: Um estudo com atletas adolescentes do sexo masculino no futebol (Sporting talent, sport participation, and resilience: a study of male adolescent soccer players). *Dissertação*. Cruz Quebrada: Faculdade de Motricidade Humana; 2009.
- Wagnild G, Young H. Development and psychometric evaluation of the Resilience Scale. *J Nurs Meas*. 1993;1(2):165-178.
- Musculus L, Lobinger B. Psychological characteristics in talented soccer players – recommendations on how to improve coaches' assessment. *Front Psychol*. 2018;9:41. <https://doi.org/10.3389/fpsyg.2018.00041>
- Martín-Rodríguez A, Gostian-Ropotin LA, Beltrán-Velasco AI, Belando-Pedreño N, Simón JA, López-Mora C, et al. Sporting mind: the interplay of physical activity and psychological health. *Sports*. 2024;12(37). <https://doi.org/10.3390/sports12010037>
- Piepiora P. Assessment of personality traits influencing the performance of men in team sports in terms of the Big Five. *Front Psychol*. 2021;12:10648. <https://doi.org/10.3389/fpsyg.2021.679724>
- Klatt S, Ruckel LM, Wagener S, Noel B. Personality traits and emotion regulation styles of elite beach volleyball dyads: examination of intra-team differences, performance and satisfaction levels. *Front Psychol*. 2021;12. <https://doi.org/10.3389/fpsyg.2021.719572>
- Mendes D, Travassos B, Carmo JM, Cardoso F, Costa I, Sarmento H. Talent identification and development in male futsal: a systematic review. *Int J Environ Res Public Health*. 2022;19:10648. <https://doi.org/10.3390/ijerph191710648>
- Sarmento H, Anguera MT, Pereira A, Araújo D. Talent identification and development in male football: a systematic review. *Sports Med*. 2018;48:907-931. <https://doi.org/10.1007/s40279-017-0851-7>
- Portugal Football Observatory. A altura do ano em que se nasce condiciona a oportunidade de ser atleta de formação? (Does birth month influence opportunities in youth sports?) Lisboa: Portugal Football School – FPF; 2021.
- McManama O'Brien KH, Rowan M, Willoughby K, Griffith K, Christino MA. Psychological resilience in young female athletes. *Int J Environ Res Public Health*. 2021;18:8668. <https://doi.org/10.3390/ijerph18168668>
- Cruz JF, Viana MF. O Treino das Competências Psicológicas e a Preparação Mental para a Competição (Psychological skills training and mental preparation for competition). In: *Manual de Psicologia do Desporto (Handbook of Sport Psychology)*. Braga: S.H.O. – Sistemas Humanos e Organizacionais; 1996. pp. 533-566.
- Robinson J, Cumming S, Salter J, Toner J, Towlson C. A new method to identify key match-play behaviors of young soccer players: development of the Hull Soccer Behavioral Scoring Tool. *PLOS ONE*. 2024;19(3):e0295953. <https://doi.org/10.1371/journal.pone.0295953>
- Tassi JM, Díaz-García J, López-Gajardo MÁ, Rubio-Morales A, García-Calvo T. Effect of a four-week soccer training program using stressful constraints on team resilience and precompetitive anxiety. *Int J Environ Res Public Health*. 2023;20:1620. <https://doi.org/10.3390/ijerph20021620>
- Sarkar M, Fletcher D. Ordinary magic, extraordinary performance: psychological resilience and thriving in high achievers. *Sport Exerc Perform Psychol*. 2014;3(1):46-60. <https://doi.org/10.1037/spy0000003>
- Ashdown B, Sarkar M, Seward C, Johnston J. Exploring the behavioral indicators of resilience in professional academy youth soccer. *J Appl Sport Psychol*. 2025;37(1): 96-120. <https://doi.org/10.1080/10413200.2024.2361701>

21. Luthar SS, Cicchetti D, Becker B. The construct of resilience: a critical evaluation and guidelines for future work. *Child Dev.* 2000;71(3):543-562.
22. Ortega A, Montero F. Relación entre resiliencia y rendimiento en deportistas. Revisión sistemática (The relationship between resilience and performance in athletes: a systematic review). *Rev Psicol Apl Deporte Ejerc Físico.* 2021;6:e16:1-11.
23. Ato M, López-García JJ, Benavente A. Un sistema de clasificación de los diseños de investigación en psicología (A classification system for research designs in psychology). *An Psicol.* 2013;29(3):1038-1051. <https://doi.org/10.6018/analesps.29.3.178511>
24. Almada F, Fernando C, Lopes H, Vicente A. Compreender, Explicar e Gerir o Desporto Cuidar da Casa Comum: da Natureza, da Vida, da Humanidade (Understanding, explaining, and managing sport to safeguard the common home: nature, life, and humanity). *Oportunidades e Responsabilidades do Desporto e da Educação Física.* 2018;1:297-310.
25. Pesce RP, Assis SG, Avanci JQ, Santos NC, Malaquias JV, Carvalhães R. Adaptação transcultural, confiabilidade e validade da escala de resiliência (Cross-cultural adaptation, reliability, and validity of the resilience scale). *Cad Saúde Pública.* 2005;21(2):436-448.
26. Basım HN, Çetin F. The reliability and validity of the Resilience Scale for Adults-Turkish Version. *Turk Psikiyatri Derg.* 2011;22(2):104-114.
27. Gupta S, McCarthy PJ. The sporting resilience model: a systematic review of resilience in sport performers. *Front Psychol.* 2022;13:1003053. <https://doi.org/10.3389/fpsyg.2022.1003053>
28. Matos D. A excelência no desporto: Estudo da arquitetura psicológica de atletas de elite portugueses (Excellence in sport: a study of the psychological architecture of elite Portuguese athletes). Tese. Braga: Universidade do Minho, Escola de Psicologia; 2011.
29. Ruiz R, Vega R, Poveda J, Rosado A, Serpa S. Análisis psicométrico de la Escala de Resiliencia en el deporte del fútbol (Psychometric analysis of the resilience scale in soccer). *Rev Psicol Deporte.* 2012;21(1):143-151.
30. Matos D, Cruz J, Almeida L. Excelência no desporto: a importância de fatores pessoais e contextuais no percurso de campeões portugueses (Excellence in sport: the importance of personal and contextual factors in the career paths of Portuguese champions). *Rev Iberoam Psicol Ejerc Deporte.* 2016;12(2):287-295.

Copyright © Poznan University of Physical Education 2026

Creative Commons licenses: This is an Open Access article distributed under the terms of the Creative Commons 163 Attribution-NonCommercial-ShareAlike 4.0 International (CC BY-NC-SA 4.0). License (<http://creativecommons.org/licenses/by-nc-sa/4.0/>).