The evolving role of performance analysis in football: Integrating the observation of psychological behaviours

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Abstract

Despite evidence that psychological factors are highly valued by those involved in player development and assessment, performance analysis in football remains largely confined to technical and tactical metrics. This conceptual paper argues for an evolved role of performance analysis that incorporates psychological aspects of the game. We review literature demonstrating that various psychological constructs, including resilience and mental toughness, can be operationalised through observable on-pitch actions. Next, a framework for integrating performance analysis methods with the observation of psychological behaviours is proposed, including: 1. Agreeing on the psychological components of performance to be targeted; 2. Defining context-specific behavioural indicators of these psychological components; 3. Agreeing on any developmental or position-specific differences in behavioural indicators; 4. Establishing video-based tagging protocols; 5. Training observers and ensuring inter-observer agreement; and 6. Embedding behavioural data into individual development plans. We discuss implementation challenges, including role delineation between analysts and psychologists, resource constraints, and the tension between short-term performance objectives and long-term psychological development. By positioning analysis alongside psychology, the framework promotes a shared structure that can encourage multidisciplinary input into the psychological development of football players. We conclude that video-based analysis of psychological behaviours represents a novel opportunity to evolve development practices in football, but call for further applied research that both validates observational analysis of psychological behaviours and assesses long-term developmental impact.

Historically, the role of performance analysis in football has been focused on the collection and dissemination of technical and tactical data,[1] with analysts collating evidence of "virtually all technical, tactical and physical parameters".[2] Consequently, in both training and match play contexts, video footage and statistics highlighting technical and tactical performance outputs are collated by analysts and made accessible to various support staff.[3] In youth football, video-based analysis is predominantly used for feedback purposes, aimed at supporting technical and tactical performance, encouraging reflection, and providing psychological impact (e.g., increased motivation to improve on highlighted errors).[4] Despite this emphasis on technical metrics, there is growing recognition of the value of performance analysis for examining psychosocial factors.[5]

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Yet, these "important wider holistic aspects of performance" are often overlooked.[2] With their expertise in observation and assessing video data, as well as their contextual knowledge of various facets of performance, analysts could contribute to the multidisciplinary assessment of psychological attributes by working alongside psychology specialists to identify *when* and *how* these play out on the pitch.[6,7] However, despite calls to improve the practical assessment of psychological components of football performance,[8] and emerging evidence that practitioners are using observational methods for psychological profiling,[9] the application of performance analysis principles and practices to football psychology remains limited.[10]

When observationally assessing psychological variables in practice, traditionally practitioners have relied on subjective observations based on "gut instinct".[11] For example, the talent identification literature uses the term "coach's eye" to describe the intuitive assessment of psychological factors in football, where observers place significant value on potentially ambiguous psychological qualities such as "attitude".[12,13] While these psychological components appear to have a significant influence on how player performance and potential are assessed in football, there are challenges in consistently and accurately operationalising such complex concepts.[14] To advance the assessment of these psychological factors, Jordet[15] suggests that "there is a need for more valid and reliable psychological data". This data includes behavioural outputs, where trained observers would assess and monitor validated indicators of psychological performance, in the same way that technical and tactical metrics are analysed.[8] While this is often done informally in football environments by sport psychologists and coaches due to the absence of established observational tools,[16] there is potential to integrate performance analysis methods to formalise this process, whereby "psychology meets game analytics".[15] Examples of this integration of psychology and analysis include providing video-based examples of psychological behaviours in action[7] and tracking behavioural data over time in different situations, much like technical behaviours are analysed based on match location and opposition quality.[17] In practice, Dixon and Jones[18] illustrate that video-based behavioural analysis, delivered by sport psychologists in feedback sessions, can both inform players and coaches about observed patterns of psychological behaviour (e.g., via body language) and support team-level reflections. This aligns with Jordet's[15] suggestion that a "major leap" in this area is the use of video-based observational analysis, "where players' psychological behaviours in games and practices will be analysed in the same way that physiologists [sport scientists] now analyse distance and intensity of running".

Alongside recent technological developments and wider access to data,[19] there have been examples of a diversification in the use of performance analysis in football by incorporating psychological variables. For example, Caso et al.[20] discussed the creation of a "video behaviour analyst" role at a professional football club which involved providing video evidence of behavioural patterns and data reflecting on-pitch psychological processes (e.g., frequency of communication behaviours between players). This was then used in multidisciplinary team (MDT) meetings to support player reflection, increasing their awareness of behavioural responses that they were otherwise unaware of. This use of notational techniques for analysing psychological behaviours represents an interesting avenue for future applications of performance analysis in football, with a range of potential functions. For example, behaviour tagging could provide improved insights on the psychological tendencies of players and their typical responses to on-pitch challenges, which can then inform psychologist-led, personalised interventions.[20,21] As an example, Lian et al.[22] demonstrated that certain non-verbal behaviours (primarily linked to observable arm movements and gestures) can be analysed through video footage to provide insights on the tactical and emotional responses of football players during play. Although, there are challenges in reliably observing psychological behaviours on the pitch, with few validated tools that adequately capture psychological concepts, and no guidelines on how practitioners can observationally assess these behaviours in practice. As such, we propose a framework for analysing psychological behaviours in football. This framework builds on the limited existing research that uses observational methods to assess psychological constructs in sport. The following section explores how this research serves as a model for using observational analysis in football to assess psychology in action.

Assessing psychological behaviours in football

The importance and impact of psychological factors in football is well established, with a breadth of research highlighting the role that psychology plays in football performance, player development, and talent identification.[23,24] In practice, sport psychologists are a key part of the multidisciplinary sport science teams that support player development in various football contexts.[25] These psychologists operate with a broad remit, covering on-pitch "psychological performance" (i.e., supporting how players manage setbacks, employ self-regulatory strategies, and navigate interpersonal dynamics with teammates[26]), and off-pitch holistic well-being across various age groups.[27] Time and resource constraints often dictate that the psychological development of football players is assessed through snapshot assessments (i.e., self-report scales).[28] While this is common practice, reliably measuring the "difficult to quantify" psychological qualities and skills that contribute to on-pitch performance and well-being outcomes in football is problematic.[29]

Applied football psychology researchers acknowledge the inherent limitations of these self-report measures (e.g., the influence of social desirability),[30] meaning that player perceptions may not accurately reflect their real-world behaviours. This has led to calls for methods with better translation to the football pitch,[28] including approaches that focus on player behaviours,[26] which enable the collection of "objective observational data".[31] Through quantifiable behaviour analysis and tracking, player development can then be "determined by behaviour change".[32]

The emergence of behavioural assessment in football

In applied practice, psychology provision in youth football is often guided by a framework of desired psychological attributes seen as critical for progression through the academy system towards professional status.[27] Emerging work in this area has demonstrated the value of behaviour observation in assessing these key psychological aspects of performance.[26,33] For example, when adopting the 5Cs framework, which encompasses five core psychological skills and characteristics (i.e., confidence, control, concentration, commitment and communication), psychologists have identified 'positive' and 'negative' actions for each 'C' and observed these in action. Behaviours such as showing persistence despite setbacks (commitment) and refocusing following mistakes (concentration) can be observed, used as individual development targets, and deliberately promoted through coaching intervention.[26] Practitioners can then track these "valued behaviours and responses representative of good psychological performance"[26] in a way that is more contextually relevant than self-report approaches. However, while this highlights the use of behavioural outcomes to assess psychological performance, it is not clear how systematically the observational approach has been applied. Recent empirical research on the 5Cs demonstrates clear advances towards a structured behavioural focus. For example, Rafnsson et al.[34] worked with professional football coaches to identify position-specific behaviours associated with the 5Cs. Through two phases of qualitative data collection, they generated a set of 5Cs-related behaviours across seven playing positions, each with clear observable features. For a goalkeeper, as an example, these include: quickly organising the defence on set pieces (commitment), remaining alert when the game is on the other side of the field (concentration) and visibly regaining composure quickly after mistakes (confidence). By establishing this framework of clearly defined observable behaviours, these researchers provide a foundation for systematic analysis of the 5Cs that can generate quantifiable behavioural data. For example, observers could analyse frequencies of communication behaviours, the contexts in which these occur, and how these behaviours change over time, "all of which can be captured and analysed through advanced video notational techniques".[35]

Alongside these examples of behaviour observation in applied practice, there have been developments in observational tools that offer a systematic means of directly analysing behaviour in action. For example, Toering et al.[36] created an observational measure to assess self-regulation behaviours in youth football, including a range of "objectively visible behaviours" such as showing preparedness to start training by arriving early and practising areas of weakness. Practitioners then observed video recorded training sessions and noted how frequently each behaviour was displayed. This study represents progress in formalising the measurement of "overt behaviours" that reflect psychological factors in football. Equally, it highlights opportunities to enrich player development by engaging players in video review and discussing the reasons behind any observed behaviours. Robinson et al.[37] similarly created an observational tool encompassing seven psychological areas of football performance, including resilience, competitiveness, and decision-making. Observable behaviours and descriptors linked to these seven areas were agreed upon by expert coaches. These descriptors were then used to assess video footage of small-sided games. Despite employing a rigorous development process, the study reported low inter-observer agreement, largely due to the complexity and volume of behaviours being assessed. The use of a five-point scale (from 1 = poor to 5 = excellent) to rate performance also highlights the subjective challenges involved in these assessments, particularly when multiple observers bring different perspectives to the same events. This reinforces the need for precise behaviour definitions and a robust analysis strategy to minimise discrepancies between observers, especially when observational assessment may be shared across different practitioner roles (e.g., psychologists, analysts, coaches). In published literature, the most well-developed understanding of behaviour definitions for psychological concepts is in the areas of mental toughness and resilience, both of which are regarded as highly desirable qualities in football.[38,39]

Mental toughness and resilience as behavioural constructs

In a mental toughness context, researchers have identified representative observable behaviours by interviewing key individuals involved in their development (e.g., international football players and staff,[40] Australian Football League (AFL) coaches,[41] and English Premier League referees[42]). These mentally tough behaviours (MTbs) are context-dependent (e.g., consistent training conduct in AFL vs. forming a barrier between players for referees) and have been used to create behaviour assessment tools (e.g., MTb Scale,[43] referee-specific MT scale[44]). With a clear MTb framework in place, researchers have then implemented their assessment tools within interventions,

designed to evaluate the participant's ability to more frequently display desired MTbs, and thereby increase their levels of MT. For example, McKay et al.[40] worked with international football coaches to identify targeted MTbs (what MTb are we targeting in today's session?), clarify (how is this MTb outlined to players?), reinforce (repeatedly encouraging players to display the MTb in all drills), and review (video analysis to assess MTb displays) over the course of a 7-day international camp. Through this behavioural approach, scores on the MT Index[45] showed that player MT levels significantly increased from pre- to post-camp. Anthony et al.[43] implemented a GROW coaching framework over a 20-week intervention period to aid coaches in developing player MTbs by identifying a target goal for their upcoming session (e.g., develop a specific MTb), understanding the athlete's current reality or starting point for development (e.g., how much time are they committing to developing this MTb?), discussing potential options for improvement (e.g., providing the player with video footage of them performing the MTb effectively), and constructing a way forward (e.g., when will you work on this MTb during training?). The effectiveness and maintenance of the behavioural coaching programme was evaluated through coaches completing the MTb Scale for each of their players at several time points, pre-, during- and post-intervention. Overall, MTb Scale scores demonstrated that displays of MTbs increased gradually during the initial stages of the programme before levelling off until its completion. Finally, Slack et al.[44] utilised social learning theory to provide referee participants with video footage of English Premier League referees role modelling desired MTbs, against which the participants could evaluate their own performances. Alongside this, participants engaged in a series of workshops designed to enhance their awareness of MT and their ability to display key MTbs across a variety of match-specific situations (e.g., manager altercations). Measured using a self-report referee-specific MT questionnaire and an independent referee assessor after each match, participant's MT levels and display of desired MTbs significantly increased from pre- to during- to post-intervention. Collectively, these findings highlight the importance of researchers and practitioners operationalising desired psychological behaviours to ensure their accurate observational assessment, and thus their integration alongside existing technical and tactical behaviours within practice.

Resilience has long been recognised as a behavioural construct linked to success in football, with Holt and Dunn[46] describing it as "a set of behaviours" associated with positive outcomes for youth players. In research on resilience in sport, there are several references to the demonstration of "resilient behaviours",[47,48] but limited concrete examples of how these behaviours manifest in practice. Recently, research in youth football has begun to address this by identifying context-specific behavioural markers of resilience. For example, Mitchell et al.[49]

outlined behaviours such as 'sticking at a task', 'keeping level-headed', and 'seeking support' which coaches regarded as valid observable indicators of resilience that are developable through training. Similarly, Wixey et al.[50] identified nine behavioural descriptors of resilience through interviews with experienced football coaches. These included seemingly observable on-pitch actions such as 'wanting to get on the ball after a mistake', and some more generalised descriptors such as 'responding well to mistakes'. While this research offers improved insight on how resilience might be demonstrated on the football pitch, a more precisely defined set of behaviours is required for reliable observational assessment.[8] To address this, Ashdown et al.[51] explored on-pitch behavioural indicators of resilience through interviews and focus groups with 60 youth football practitioners. This yielded 36 resilience behaviours across six themes, including teammate support behaviours, emotion-focused behaviours, effort-focused behaviours, rebound behaviours, robust behaviours and learning-focused behaviours. Additionally, four avoidance-focused behaviours were identified as contrasting displays of resilience, highlighting the multifaceted nature of this concept. This research provides a foundation for the observational assessment of resilience in football, and offers a novel metric to assess the impact of intervention programmes focused on resilience development.

Challenges in behaviour observation

Despite increased attention on behaviour observation in sport psychology research, guidance on the assessment of psychological behaviours remains inconsistent. Current literature has identified psychological behaviours critical to talent development in football using three main approaches: analysis of match footage,[52] observations of coaching practice,[49] and systematic literature reviews.[37] Researchers have then validated their behavioural categories via practitioner workshops or coach surveys, and established inter- and intra-observer reliability through observation training in real-world contexts. A key challenge highlighted in this research is maintaining a clear distinction between psychological behaviours and technical actions. For example, Diment[52] identified 28 mental toughness behaviours in football by observing match footage, some of which could be interpreted as technical rather than psychological in nature (e.g., 'taking time on the ball'). To mitigate this, the original behaviour list was then refined to 10 MTbs through expert ranking, ensuring that the behaviours were both conceptually accurate and meaningfully distinct from technical components of performance. In assessing achievement motivation through observable behaviours, Shafizadeh and Gray[53] developed a behavioural tool based on six indicators grouped into three categories: persistence, commitment, and intensity of behaviour. These behaviours were derived from published literature and refined through

expert consensus. Using this tool, observers analysed player behaviours via video in one international football match. Their findings indicate the feasibility of assessing achievement motivation through on-pitch behaviours and they argue that such data could inform live tactical decisions, such as substitutions. While other studies have adopted similar systematic approaches to establishing and observing psychological behaviours,[54] the methodological limitation of observing a single match should not be overlooked. In behaviour analysis, assumptions should be based on multiple rather than singular observations,[55,56] as 'one off' behaviours are likely to reflect situational factors rather than a reliable indication of psychological performance.[57] However, the time-intensive nature of systematic observation poses challenges in football environments, where resource constraints can inhibit multiple observations being conducted.[58] Since analysing behaviour requires "a considerable amount of time and effort",[59] emerging technologies could offer a supplementary option.[55] For example, Caso et al.[20] suggest that artificial intelligence tools may be able to reliably detect emotion-focused behaviours and inter-player communication from video footage. Although this is yet to be empirically tested, such automated tagging tools could streamline the process and enable practitioners to focus on the analysis of the tagged video footage and subsequent feedback.

Collectively, the above research demonstrates the potential for analysing psychological constructs in football through observable behaviours. In particular, it highlights the importance of identifying valid behavioural indicators and ensuring that all observers are clear on *what* and *how* to observe. However, despite these advances and the development of some validated, context-specific tools,[52] there remains limited guidance for practitioners on how to analyse psychological behaviours in action.

Framework for analysing psychological behaviours

To support the practical application of this research, we propose a six-stage framework that offers a guide for practitioners on how to integrate psychological behaviour assessment with performance analysis methods. The structure of this framework draws inspiration from the work of Yoder and Symons[60] where they discuss six key decisions that need to be made before systematic observation should take place, including: *what* behaviours are to be observed, *how* these behaviours are to be assessed (e.g., frequency counts or Likert scale ratings), *which* method of recording will be used (e.g., live observations or video recordings), *how much* is observed (e.g., full match continuous tagging or intermittent samples of shorter segments), *what* recording methods will be used (e.g., computer software or paper/pen methods), and *what metric* will be used to indicate the *level* of behaviours (e.g., relative proportion or actual duration of behaviours).

Agreeing on the psychological components of performance to be targeted

Effective observation of psychological characteristics requires clear agreement on what behaviours are being assessed.[56] To do this, practitioners should draw upon both published literature and expert insights, to establish consensus on the psychological characteristics of interest and the behavioural features of these.[52] As has been identified in existing literature, the focus could be on a single aspect of psychological performance (e.g., mental toughness)[40] or a range of psychological qualities (e.g., 5Cs).[31] For example, Mitchell et al.[49] consulted with practitioners at a professional football academy and identified *eight* psychosocial qualities considered important for success in that environment. They then assigned several age-specific behavioural indicators to each quality that could be observed and reinforced through coaching. While this provides a valuable example of holistic psychosocial assessment, evidence from wider contexts highlights the difficulty in observing multiple behaviours simultaneously, creating a high cognitive load for "even the best of assessors".[61] Therefore, focusing on a smaller subset of behaviours during each observation may enhance observer reliability. Some football club academies will value certain psychological attributes more than others in line with their player performance plan, and so psychological behaviours may be defined and prioritised differently across settings. In one of few studies using observational methods to assess psychological performance in football, Caso et al.[20] focused on *three* elements: intra-team communication, emotions and visual exploratory activity, as these were valued by the technical staff of the participating club and were supported by insights from published literature. Focusing on the behavioural features of one or multiple psychological components offers different advantages. A narrow focus enables deeper analysis and development of a desired characteristic, while a broader approach supports a more holistic understanding of psychological behaviours.

Ultimately, the selected psychological concepts must be represented by valid observable behaviours that can be feasibly assessed. For example, Asendorpf et al.[62] focused on a single behavioural domain (shyness) and assessed six observable manifestations associated with this (e.g., gaze aversion). In this case, they focused on a small range of behaviours "to pinpoint a particular issue of direct theoretical relevance".[56] Alternatively, Funder et al.[63] developed an observational tool to analyse various facets of social behaviour that encompasses *64* different behavioural items. Whether adopting a broad or narrow focus, it is also important to establish clarity and buy-in on the chosen psychological framework from all staff who play a role in player development. For example, a psychologist might work with coaching staff to identify and develop a set of mental toughness behaviours, with analysis staff supporting the assessment of these behaviours in training and match contexts through video clipping.[40]

Defining context-specific behavioural indicators of psychological components

Once agreement is reached on the psychological focus, defining associated behaviours can be done in different ways. Some definitions of psychological behaviours are developed using the intuition of expert observers having watched match footage,[52] and others are based on established theoretical definitions.[57] While either approach does not guarantee construct validity,[64] the clarity of these definitions should enable consistent observations across practitioners and limit definitional errors (i.e., by reducing uncertainty on how to categorise a behaviour). While certain psychological behaviours are more clearly defined and observable (e.g., gestures and arm movements), other behaviours (e.g., emotional responses to setbacks) may require the observer to make a subjective judgement on the meaning behind the observed actions.[56] Providing various video-based examples of representative behaviours can enhance the accuracy of behaviour tagging, particularly when the behaviours are subjectively defined. Equally, applied performance analysts suggest that periodic reviews and refinement of operational definitions can further enhance inter-observer consistency over time.[64] Alongside establishing clear behaviour definitions, the use of player tracking cameras might allow observers to better recognise and interpret the more nuanced psychological behaviours in comparison to the commonly used wide-angle footage.[22]

Considering developmental or position-specific differences

When developing an organisational strategy to analyse psychological behaviours, a phase-specific approach might offer the greatest value (e.g., tailoring behavioural indictors according to player age or development stage). Previous research has demonstrated that the psychological characteristics of youth football players may vary between different stages of development.[65,66] For instance, Saward et al.[65] longitudinally examined changes between age groups in Psychological Characteristics of Developing Excellence (PCDEs) in 111 male academy footballers aged 11–16 years. Results revealed that compared to the U12-U14 age groups, the U15-U16 age groups showed higher scores on coping with performance and developmental pressures, but lower imagery use during practice and competition. More recently, Barraclough et al.[66] examined age-group differences in 375 male English youth footballers aged 12–18 years and showed that adverse response to failure, perfectionistic tendencies, imagery and active preparation tended to increase with age. While there is inconsistency in which specific PCDEs differ at particular ages, this work demonstrates that age-related differences in psychological characteristics exist across the academy pathway. Thus, identifying age- or stage-relevant psychological behaviours would provide an appropriate basis for assessing players relative to their developmental stage. Such an approach could better target developmentally appropriate support within academies.

Practitioners may also consider that certain behaviours are more relevant to the psychological demands of specific playing positions. This was demonstrated in applied practice by Chandler et al.[26] and empirically by Rafnsson et al.,[34] who identified "desirable actions and behaviours" related to the 5Cs across different positions. A notable finding from this research was that these behaviours seemingly vary in both *type* and *amount* according to playing roles. For example, 12 behaviours were linked to the defensive midfield role, while 18 were associated with the full-back position. This was due to the combined defensive and attacking responsibilities of the full-back role and the perceived need for both psychological commitment and control by players in this position. According to the authors, adopting this position-specific view of psychological behaviours can inform individualised player assessment and development practices, and provide sport psychologists with a tailored way of measuring their intervention work when adopting the 5Cs framework.

Establishing video-based tagging protocols

As noted by Yoder and Symons,[60] when engaging in behaviour analysis it is important to establish clear protocols for the observers (i.e., addressing the questions of *how* and *how much* to observe). 1. *'How much?'*: to gain a meaningful insight into psychological behaviours, several observations should be conducted in a variety of game contexts.[57] For example, to assess mental toughness behaviours in football, Diment[52] assessed 31 games (45 h of footage), while Robinson et al.[37] analysed 14 small-sided game segments (10 min in duration) to assess seven psychological indicators. To facilitate the analysis of large volumes of video data, Barraclough et al.[58] draw on the idea of "multiple eyes, multiple times" to emphasise the value of multidisciplinary staff contributions to behaviour observation. They suggest that coaches and analysts can supplement a psychologists' insights by reviewing the same footage, as this encourages collaborative discussions around the psychological development of their players. 2. *'How?'*: observers should decide whether to tag specific, quantifiable behaviours or to use a broader Likert-style rating that provides an overall impression of psychological performance.[37] When adopting Likert ratings, there is more scope for subjectivity as observers must translate complex behavioural displays into broad categorical judgements. Unless each scale point is defined with absolute clarity, observer ratings are inevitably vulnerable to inconsistent interpretation and unreliable scoring. For example, in the Hull Soccer Behavioural Scoring Tool,[37] observers must distinguish between five categories (1 = never displayed; 2 = rarely displayed; 3 = sometimes displayed; 4 = often displayed; 5 = always displayed) to

assess observed psychological performance. Even with observers agreeing on behaviour definitions, differentiating between such terms as 'rarely' and 'sometimes' remains inherently subjective. Tagging behaviours by frequency offers a systematic approach to tracking specific psychological responses, with quantifiable evidence of the context in which these occur. Although, Caso et al.[35] recently argued that psychological behaviour analysis should "go beyond merely counting and classifying" and systematically analyse how behaviours unfold over time in different contexts. Depending on resource constraints, observers may therefore choose to tag several segments of game or training footage, and monitor the proportion of observed 'positive' and 'negative' psychological behaviours occurring over time.[60] This type of behaviour tagging is "far from a straight and simplistic process", with observers often noting multiple behaviours by different players within the same footage.[55] As such, clearly highlighting the player(s) to focus on (e.g., using player tracking or spotlight tools) and providing a tagging flowchart that outlines the relevant sequence of events (e.g., preceding stressor, behavioural response, subsequent action) may help mitigate these challenges.[67]

Training observers and establishing inter-observer agreement

Once the tagging protocol is agreed, it is then vital that observers are "selected carefully, trained well, and monitored regularly".[56] Observer training typically involves education and familiarisation with the chosen behaviour definitions alongside tagging practice with short segments of relevant footage. Reliability checks should then be made between observers, with 85% agreement deemed to be the accepted threshold.[55] Where there are disparities, typically the observers will be retrained (e.g., re-familiarised with the behaviour definitions) until an acceptable level of agreement is attained. In other cases, training will be supplemented with instruction manuals and video clips that illustrate examples of targeted behaviours.[20] Ensuring the reliability of observations by practitioners from different roles presents a significant a challenge to behaviour analysis. Even with the more familiar tactical concepts in football, research has highlighted inconsistencies and limited agreement between observers when assessing the same video-based game footage.[68] This inconsistency has also been demonstrated when two experienced analysts within the same football academy, despite sharing agreed operational definitions, produced different views on performance indicators that required subjective interpretation (e.g., intention to pass directly to a teammate or clear the ball into space for a teammate to run on to).[69] In such cases, while operational definitions can improve reliability, subjectivity is likely to remain.[70] Supplementing observational frameworks with written and video-based examples, alongside robust observer training, should help enhance clarity and

consistency for practitioners. However, Francis et al.[64] reported substantial variation in how often performance analysts implement these reliability procedures, and subsequently proposed guidelines for best practice. While acknowledging that time constraints are a barrier to implementation, these guidelines include regular feedback between observers to address any discrepancies, systematically identifying any barriers to reliability (e.g., definitional issues), and using video footage to cross-check the accuracy of coded data.

Embedding behavioural data into individual development plans

The analysis of psychological behaviours offers a range of applications for player development. For example, behavioural data can inform individual and team goal setting, reflecting on video examples can increase player self-awareness, and highlighting behaviour patterns in game situations can provide insights for targeted interventions.[20] Tornberg et al.[71] illustrated this in a case study with an elite-level football player who identified that certain psychological issues were impacting their performance. To address this, two on-pitch behavioural goals were agreed: 1. To challenge opponents in one-on-one situations and 2. To be available when a teammate has possession of the ball. These behaviours were then reflected on and reinforced using "video sequences" as part of an intervention package. Following the intervention, the player demonstrated a higher proportion of the targeted behaviours in comparison to baseline. Tornberg et al.[71] suggest that focusing on observable behaviours in this way allows for targeted feedback from multidisciplinary staff. As an example, an observation of the player's tendency to run into space prompted discussion by coaches, psychologists and conditioning staff, each offering insights on tactical, psychological and physical factors that can influence this behaviour. A parallel can be seen in the sports coaching literature, where behavioural data and video have been used to support coach development. For example, Partington et al.[72] employed systematic observation data, supported by video, to change academy football coaches' behaviours. This process enabled coaches to develop individual development plans that enhanced their self-awareness, encouraged evidence-informed reflection, and fostered dialogue between coaches and the coach developer. Such an example highlights how behavioural data can be used to support development through personalised feedback and reflective practice.

Critical perspectives and challenges

Having outlined an observational framework for analysing psychological behaviours in football, a development that we view as both timely and innovative, we also recognise the challenges that must be addressed to implement it effectively.

Challenge 1: role clarity

While the expertise of performance analysts in managing observational frameworks and video analysis software equips them to identify and tag psychological behaviours, their role should be well defined. Crucially, their contribution should complement rather than replace the specialist functions of a sport psychologist. Failing to clearly delineate roles can risk diluting the impact of each discipline, especially with the expanding responsibilities often assigned to analysts, such as troubleshooting technological issues, compiling tactical clips and overseeing data workflows. Establishing role clarity within a multidisciplinary model can benefit both the analysts who broaden their expertise in tagging the behaviour patterns that interest psychologists, and the psychologists and coaches who learn to employ performance analysis tools when resources allow. While Wright et al.[73] caution that analysts conducting psychological behaviour tagging without specialist expertise should be "somewhat limited", it may be both practical and beneficial in some resource-constrained environments for a suitably trained, experienced analyst with a deep understanding of the game to tag psychological behaviours. In this case, the analyst might offer valuable insights from their observations, provided that tagging protocols are collaboratively developed to ensure validity and objectivity. A systems-led approach may be valuable in this context, where psychology is not seen as the sole responsibility of the psychologist but is integrated across the organisation. This allows all staff to be psychologically informed, share a common understanding of the behaviours they aim to develop in their players, and contribute to that development through their own roles. Such clarity around what psychology involves and how it is observed through specific behaviours can ultimately help reduce the risk of misinterpreting psychological data.[74,75]

Challenge 2: integrating psychological behaviours within a football environment

A pragmatic and context-sensitive route for embedding psychological behaviour analysis in football is through its alignment with existing mechanisms, such as individual player development plans (IDPs).[74] Within Category 1 Premier League academies, IDPs are central to the audit process and serve as structured blueprints for tracking the development of each player across technical, tactical, physical, and psychological domains. Integrating measurable psychological targets into IDPs presents an opportunity to formalise the observation and evaluation of psychological behaviours, treating them with the same rigour afforded to other performance components. Through collaboration within the MDT to develop player IDPs, psychological behaviours can be translated into observable measurements which can be tracked, discussed, and subsequently supported across time through meaningful feedback. By integrating psychological behaviours within player IDPs, support can be player-centred and specific to the development of the individual player, avoiding a reductive, tick-box approach to meet EPPP audit guidelines. Nevertheless, the inherently subjective nature of tagging psychological behaviours requires careful consideration. Without clear operational definitions and consistency across staff, such subjectivity may risk undermining the reliability of IDPs, reinforcing the need for collaborative approaches between analysts and psychologists. Due to these challenges in reliably interpreting certain psychological behaviours (e.g., body language, facial expressions), it is beneficial to triangulate observational data with other self-report sources such as questionnaires and reflective discussions.[16] This allows both the practitioner to corroborate their observations and the performer to explain the intentions behind their observed actions.[57]

Challenge 3: resource

Despite the strategic value of psychological integration, resource constraints remain a significant barrier. While the EPPP mandates psychological provision in Category 1 and 2 academies, the reality is that psychologists are often stretched across large cohorts of players, leaving limited scope for nuanced, individualised support. This often results in a disproportionate allocation of psychological resource toward players deemed to be 'underperforming' or facing specific challenges such as injury, confidence, or off-field issues. This can be at the expense of players who are deemed to be performing 'well' without any off-field issues, raising questions around the wider developmental support to all players throughout the academy pathway. Operating in this way can reinforce the perception that psychological support is remedial rather than developmental, perpetuating stigma and inhibiting player engagement. To counteract this, a universal framework of psychological behaviour analysis, co-developed with and communicated to players, can act as a leveller. Since players increasingly reflect on video footage related to technical and tactical aspects of play,[75] psychological behaviour analysis could similarly be player-led, thus easing the workload of analysis and psychology staff. This would allow all players, regardless of perceived current performance levels, to have visibility and support over psychological behaviours embedded within their own IDPs that are valued by the MDT. Creating a shared language around these behaviours, underpinned by education on their relevance and trainability, may help reposition psychological support as a normal and essential part of their development, similar to their physical, technical and tactical performance indicators. As such, player education is central to facilitate buy-in.

Challenge 4: long term vs. short term focus

A fourth challenge lies in the understanding that psychological support aligns to long term development rather than short term fixes that define elite football. While the integration of psychological behaviour tracking can enhance decision-making and enrich development pathways, it requires a cultural shift, both in how psychological progress is understood and, in the expectations placed upon it. Within MDTs there is often a desire for immediate, visible change, especially when a player is underperforming. However, psychological development is inherently non-linear, context-dependent, and often resistant to rapid shifts. Educating staff and players within elite football that psychological support is not a "quick fix" but a sustained developmental process is essential. Without this understanding, there is a risk that early-stage behavioural tracking tools may be dismissed as lacking impact, particularly if they do not result in immediate on-pitch change. One way to mitigate this is through longitudinal case studies that highlight the development of psychological behaviours over time, linked to video and contextual information.[74] Presenting this evidence within MDT weekly meetings or player cycle reviews can help reframe psychological development as a process aligned with technical, tactical, and physical development. Moreover, involving players in this reflective practice through regular reviews of their psychological targets and behaviours can further embed the process within their own developmental pathways.

Conclusion

In summary, we see significant potential for the integration of performance analysis and psychology in football contexts to support the assessment and tracking of psychological behaviours. This represents an important avenue for future practice and research through access to previously underutilised metrics of psychological performance. To support this direction, further research should equip football practitioners with the resources to carry out contextually valid and robust observational analysis of psychological behaviours. This includes developing football-specific, validated observational tools for psychological components that are considered important for player development and performance. Researchers should also assess the developmental impact of video-based psychological behaviour analysis, using behavioural data to track change over time.

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