Journal of Expertise
2024. Vol. 7(2)

ISSN 2573-2773

# A Comparison of In-person Versus Video-recorded Player Assessment by English Category One Football Academy Scouts

Robin Owen[1], Seamus Harvey[2], Ben Smith[3], and Benjamin Jones[4]
[1]School of Health and Sport Sciences, Liverpool Hope University, UK
[2]Netwell CASALA, School of Health and Science, Dundalk Institute of Technology, Ireland
[3]Breakaway Data, UK
[4]The Football Association, UK

Correspondence: Robin Owen, owenr@hope.ac.uk

## Abstract
Talent identification is undertaken by football academies via scouts who traditionally attend football matches in-person. However, no previous study has compared in-person against video-recorded modalities for scouting. In the present study, a total of 30 scouts working for an English category one football academy observed the same U14 and U15 inter-academy matches either in-person ($n$ = 13) or video-recorded ($n$ = 17). Non-parametric analyses compared modalities (in-person vs video-recorded) in relation to the following: player performance ratings; subjective perception of modality accuracy; observation report submission time; and attentional/affectual factors including scout fatigue, joyality, attentiveness, self-control, and mental effort during observations. Results revealed no significant difference in player performance ratings when comparing in-person and video-recorded observation modalities ($p$ > .05), despite scouts subjectively rating in-person as being the more accurate modality ($p$ < .001). Scouts also reported that the video-recorded modality resulted in significantly quicker observation report submission ($p$ < .001). However, video-recorded observations produced significantly greater fatigue during whole-team observations ($p$ < .05) but not during individual-player observations ($p$ > .05). No significant differences emerged between the modalities for joyality ($p$ > .05), attentiveness ($p$ > .05), self-control ($p$ > .05), nor mental effort ($p$ > .05). The present findings suggest that using video-recordings for the scouting of academy-level football players offers an adequately accurate and possibly more efficient alternative to in-person scouting.

## Keywords
soccer, talent identification, performance, scouting, TIDS, Bayesian

## Introduction
Talent identification and development programs in football are part of a “Global Sporting Arms Race” intent on using strategic financial investment to bring the best athletes to the fore (Oakley & Green, 2001). These programs generally comprise stages of talent detection (i.e., detecting promising players not currently in the sport), talent identification (i.e., identifying players in football who have the potential to become elite performers), talent development (i.e., providing a learning environment which seeks to develop elite performers), talent selection (i.e., continuously

selecting and deselecting players to squads/teams/programs depending on performance prerequisites), and talent transfer (i.e., players exiting football to pursue careers in sports offering them greater opportunities for success) (Reilly et al., 2000; Rea & Lavallee, 2015; Williams et al., 2020). However, despite English category one football academies reportedly investing between £2.3 and £4.9 million per annum into their talent identification and development programs (Larkin & Reeves, 2018), player turnover. via deselection or dropout, remains a prominent issue. Only 2% of players who secure an academy scholarship at 16 years old still play professionally by 21 years old (Gernon, 2016), and it is estimated that less than 1% of players who enter development programs will establish a professional career (Green, 2009). This places considerable emphasis on the need for more effective and efficient talent identification and development programs as part of football academy systems.

In their talent identification and development programs, the majority of academies utilize a deterministic approach, wherein early signs of talent are assumed to be predictive of future success (Morganti et al., 2023). A result of this approach is that academy structures encourage early specialization to achieve success in football, with players recruited from as young as 9 years old (Sieghartsleitner et al., 2018; Hendry & Hodges, 2018). This is despite findings that early specialization is detrimental to players' progression to elite senior level, potentially as a consequence of reduced enjoyment, burnout, and injury risk among other reasons (Barth et al., 2022; Güllich et al., 2022). However, to counter this, potentially half of academies seemingly incorporate different sports (e.g., tag and handball) into their coaching curriculum at least once per week (Taylor et al., 2023). This means that a substantial proportion of players may experience a hybrid of specialization and diversification, believed to facilitate enhanced physical outcomes (e.g., fundamental movement skills), reduced injury risk, increased enjoyment, less burnout, and improved interpersonal skills (Güllich et al., 2022). Given that current values of top players in senior teams can total billions (Transfermarkt, 2023), academies' focus on early player recruitment is unlikely to change; there are significantly greater costs associated with buying established senior players compared to contracting and developing a large number of promising young players via an academy. Therefore, it is essential for academies to maximize the accuracy with which talented players are identified/developed, as well as doing so efficiently (Bergkamp et al., 2022).

Academy scouts are responsible for evaluating players' potential for future success. However, this is frequently done in a subjective intuition-based manner and/or without structured frameworks (Miller et al., 2015). For example, scouts struggle to verbalize which factors guide their decisions and how they weight attributes (Christensen, 2009). However, when pressed on which attributes they do look for, scouts identify attributes such as technical skills with the ball, motor skills, sprinting speed, psychological, and physical attributes (Bergkamp et al., 2022). Generally, the player attributes considered most important by scouts in the youth phase tend to be psychological and technical, while physiological and anthropometric attributes are considered important but to a lesser extent at initial talent identification stages (Roberts et al., 2019). These physiological and anthropometric attributes can re-gain greater relevance when players attempt to progress through development pathways and differences induced by the relative age effect begins to level out (Jones et al., 2018).

Traditionally, scouts evaluate player attributes and make predictions of talent based on live in-person observations of football matches. However, in doing so, significant time and financial costs are incurred. Accommodation, travel, and sustenance can total thousands of pounds/dollars/euros and traveling between matches limits the ability of scouts to perform other valuable tasks during this time. A potentially more cost and time efficient alternative may be evaluation of players via video recordings of matches. Interestingly, during the COVID-19 lockdowns,

academies were forced into using video recordings for such purposes (including the academy participating in the present study). Lockdowns and travel restrictions presented academies with a choice of pausing scouting activities or utilizing video recordings of matches that were allowed to go ahead (Murray et al., 2022). Few studies have been published on the scouting process, or talent identification more generally, during the Covid-19 lockdowns, nor on the use of video recordings for such purposes; researchers have also typically tended to focus on what scouts assess (e.g., players' technical, tactical, physiological, and psychological attributes) rather than how they do so (e.g., Bergkamp et al., 2022; Larkin & O'Connor, 2017; Reeves et al., 2019).

Recent research indicates that scouting process and talent identification practices more generally were beginning to incorporate virtual evaluations prior to COVID-19 lockdowns (e.g., Ford et al., 2020; Marković et al., 2020), with anecdotal evidence indicating that this change perhaps accelerated during the lockdowns (e.g., James, 2023; Karlsen, 2020, 2021). For instance, clubs may use data analytics and video-based evaluations to sift through players across the world, whom they would not traditionally have the capacity to see in-person, to target those of whom it is worth the time and expense for scouts to assess in-person. Numerous platforms that facilitate virtual evaluations, as well as data analytics, have emerged (Karlsen, 2020, 2021); as an example, the Wyscout platform includes data on more than 500,000 players and videos of more than 200,000 matches (How Football Clubs Use Data to Sign Players, 2021). However, despite this technological shift within football, no previous study has directly compared "in-person" to "video-recorded" modalities within any form of scouting.

There are numerous factors which may create discrepancies in player performance ratings between in-person and video-recorded modalities. Practical factors such as the device on which scouts perform video-recorded observation, the number of sittings scouts take to observe video-recorded matches, and the use of pause/rewind facilities in video-recorded matches may create discrepancies in performance ratings. Some of these practical factors may give video-recorded scouting an accuracy advantage; for instance, pause/rewind may enable evaluation of moments otherwise missed in-person via overloaded attentional demands, particularly when required to observe/report on multiple players (Baddeley, 1992). These practical factors may function similar to commercial systems which compile performance metrics (e.g., on-the-ball actions, off-the-ball actions, and sprint speed), by making sure scouts do not miss out on key events/information (Bradley et al. 2007).

Video-recorded observation could reduce the accuracy of player performance ratings via affectual, attentional, and practical mechanisms. During observation of video recordings, scouts may experience less joyality (i.e., less happiness because watching video-recorded matches may not have the same atmosphere and excitement), thus requiring greater use of self-control to maintain attentiveness and overcome fatigue (Baumeister et al., 2007). Similarly, practical issues such as incomplete camera coverage of the entire pitch and frequent absence of match audio may impair evaluation of players' off-the-ball behavior and communication.

The primary aim of the present study was to investigate whether the player performance ratings that are given by English category one academy scouts (i.e., the highest tier of academy football in England) differ between in-person and video-recorded observation. Secondary aims were to elucidate differences in match observation report submission times (with greater speed suggesting greater efficiency) as well as affectual, attentional, and practical usage differences between in-person and video-recorded observation.

Two different types of observation were performed in line with the academy's usual procedure: a "whole-team observation" wherein a performance rating had to be given for all fielded players and an "individual-player observation" wherein a performance rating had to be given to only two of the fielded players. The purpose of these observation types was

twofold: (1) to replicate real-world demands where scouts are either sent to broadly evaluate entire teams versus focus on individual players and (2) to manipulate attentional demands to exacerbate any associated trade-offs between in-person and video-recorded modalities. Player performance ratings were given by scouts via the academy's own rating scale. Observation report submission times were collected in hours post-match. Scouts' fatigue, joyality, attentiveness, and invested effort were assessed via psychometric self-report questionnaires following live in-person and video-based scouting modalities to evaluate wider factors which may affect ratings. Practical factors of perceived modality accuracy, device used for video-recordings, number of sittings taken to watch video-recordings, and use of pause/rewind functions were assessed via custom scales to evaluate potential organizational implications (see methods for precise details on these custom scales). Given the novel and exploratory nature of the present study's primary and secondary aims, exploratory analyses were performed (i.e., negating the need for directional hypotheses) using both frequentist null hypothesis significance testing and Bayesian tests of the null.

# Materials and Methods

## Participants

A total of 30 football academy scouts ($N_{male}$ = 29, $N_{female}$ = 1, $M_{age}$ = 43.40, $SD_{age}$ = 13.80) with an average of 10.79 ($SD$ = 6.98) years of professional scouting experience participated in this study (see Figure 1). All scouts were qualified in line with the Elite Player Performance Plan for Category One status (Premier League, 2012; e.g., FA Level 1 and 2 awards in Talent Identification). Based on availability to attend matches in-person, scouts were assigned to one of two groups: a group conducting their scouting 'in-person' ($n$ = 13; $M_{age}$ = 39.46, $SD_{age}$ = 12.74, $M_{experience}$ = 12.24, $SD_{experience}$ = 6.80) or a group conducting their scouting 'video-recorded' ($n$ = 17; $M_{age}$ = 46.41, $SD_{age}$ = 14.18, $M_{experience}$ = 8.75, $SD_{experience}$ = 7.00). All scouts watched the matches (in-person or video-recorded) for the present study as part of their routine work. The study was conducted in accordance with the institutional ethics guidelines of Liverpool Hope University.


**Figure 1.** Scouts' professional experience

**Note.** The number of years which scouts in the present study's sample had spent working in a professional capacity.

## Procedure and Measures

All scouts watched the same two competitive matches between category one academies based in London. For the first match (U14 friendly), scouts had to complete a "whole-team" observation comprising a performance rating for each fielded player. For the second match (U15 friendly), scouts had to complete two "individual-player" observations comprising a performance rating for a specific left-back and a specific right-wing player. The teams and players in the matches were unaffiliated with the scouts' own clubs to mitigate confounding familiarity effects. The group assigned to conduct their scouting in-person did so from the stands or sidelines of the facilities where the matches were hosted. To avoid diffusion of opinions, scouts in this group were instructed not to stand together nor to confer with each other at any point. The video-recording group were given match recordings in a format commonplace for scouting purposes in the academy; this entailed 1080p, 16:9 aspect ratio, and 50hz framerate with the camera following the ball from the stands approximately 8m up from the ground and 8m from the intersection between center line and sideline. A manual operator moved the camera to follow the ball during play. Approximately 40% of the pitch was visible at any given time (a percentage which is commonplace).

Scouts in the video-recording group were instructed to watch the video recordings in their usual manner (e.g., at home on their device of choice) and avoid conferring with their fellow scouts. For all observations (one left-back individual-player observation, one right wing individual-player observation, and one whole-team observation), player performance was rated in the scout's report on a club-specific rating scale ranging from 0 to 4 in 0.5 increments (0 = no impact, 1 = poor performance, 4 = excellent performance). The club's instructions for the scale suggested a broad range of factors for scouts to consider when deciding on an "overall" performance score (i.e., factors frequently associated with football player performance in literature); however, scouts were also allowed to base their decisions on factors not suggested by the scale. Player performance ratings were broken down by player position as well as averaged across the report; this gave a "combined" score for the two players in the individual-player observation and a "team overall" score in the whole-team observation. In addition to quantitative performance ratings in the scouts' report, all scouts also provided their usual qualitative written opinion of players' performance, but these were not analyzed to protect intellectual property specific to the club.

Immediately after scouts completed their observation of each match, they were given psychological questionnaires to evaluate the effects of match observation modality on perceptual sensations, mental effort, and self-control. Perceptual sensations were assessed via the fatigue, joyality, and attentiveness subscales of the expanded version of the Positive and Negative Affect Schedule (PANAS-X; Watson & Clark, 1994; Cronbach's Alpha scores >.74 within the present sample); scouts rated how strongly they felt 16 items representing different feelings (e.g., sleepy, tired, sluggish, and drowsy representing the fatigue subscale) on a Likert scale from 1 (Not at all) to 5 (Extremely). Mental effort required for the observation was assessed via the Rating Scale of Mental Effort (RSME; Zijlstra, 1993); scouts rated the amount of mental effort (i.e., focus) required by the task on a vertical scale from 0 to 150 with 9 anchors starting from 3 (no mental effort at all) to 114 (extreme mental effort). Self-control was assessed via two items commonly used in self-control research (e.g., Bertrams et al., 2010; Cronbach's Alpha scores > .84 within the present sample) which were modified to fit the context of scouting ("how difficult did you find this scouting activity" and "how strongly did you have to regulate your attentional habits, i.e., how hard did you have to try to maintain focus on the match"); scouts provided a Likert scale rating from 1 (not at all) to 7 (very much).

Once all scout reports and psychological measures were completed, all scouts gave their overall opinion of the scouting modalities. All scouts within the sample had plentiful experience with both in-person scouting and

video-recorded scouting modalities prior to data collection for the present study (e.g., during COVID-19 lockdowns in the UK, all of their scouting was based on video-recordings). To ascertain the perceived accuracy of each modality, all scouts were asked the following question, once for the "in-person" and once for the "video-recorded" modality: "Do you believe that [modality] match observation allows you to accurately assess player attributes?", rated from 1 (very inaccurate) to 5 (very accurate) on a Likert scale. To ascertain efficiency in terms of scouts' ability to submit observation reports quickly following matches, all scouts were asked the following question once for the "in-person" and once for the "video-recorded" modalities: "Considering a typical mid-season week, how long after a [modality] match observation do you tend to write the majority of your player report(s)?", with scouts being given the option to write the number of hours taken. To ascertain the use and perceived value of the unique opportunities offered by the video-recorded modality, all scouts were also asked: (1) "What type of device do you most frequently use to watch video-recorded matches for scouting?", with selectable options comprising laptop/computer, tablet, phone, television, projector, or other; (2) "when observing video-recorded matches for scouting, in how many sittings do you usually watch the full match", with scouts being given the option to select one, two, three, four, or five/more sittings; (3) "when observing video-recorded matches, how often do you usually pause or rewind the footage to help you decide player ratings/reports?", with scouts being given the option to select never/once, twice, three times, four times, five times, up to ten times, or more than ten times; and (4) "do you find the ability to rewind and pause matches useful?", rated on a Likert scale from 1 (very un-useful) to 5 (very useful).[1]

### Analysis

Given the ordinal nature of the Likert scales used, non-parametric analyses were chosen (Jamieson, 2004; Kuzon et al., 1996). Between-group comparisons (e.g., in-person vs video-recorded player performance ratings) were conducted using Mann Whitney's U tests. Within-group comparisons (e.g., comparing within-sample perceptions of modality accuracy) were conducted using Wilcoxon Signed Rank tests. Alpha was set at .05. Bayes Factor 01 ($BF_{01}$) scores were also calculated for each Wilcoxon Signed Rank and Mann Whitney's U test, using non-informative Cauchy priors of .707 and bi-directional tests (therefore, a $BF_{01} > 1$ provided support to the null hypothesis and a $BF_{01} < 1$ provided support to the alternative hypothesis; van Doorn et al., 2021). Rosenthal *r* effect sizes (small effect = .1, moderate effect = .3, large effect = .5) were calculated for Mann Whitney's U and Wilcoxon Signed Rank tests (Rosenthal, 1994). Response distribution comparisons were conducted using one-way goodness of fit chi-square tests. $BF_{01}$ scores were also calculated for each chi-square test using a multinomial test for equal proportions, featuring priors of equally distributed counts. All statistical tests were performed in JASP Statistics (version 0.18.3).

## Results

### Player Performance Ratings

Within the whole-team observation, where all fielded players were observed and rated, there were no statistically significant differences between the player performance ratings of in-person and video-recorded modalities (see Figure 2). Specifically, no significant difference in player performance ratings was revealed between: video-recording (*Mdn* = 1.72) and in-person (*Mdn* = 1.68) across the overall team (*U* = 119.50, *p* = .706, $BF_{01}$ = 2.397, *r* = .07); video-recording (*Mdn* = 1.75) and in-person (*Mdn* = 2.00) across keepers (*U* = 139.00, *p* = .231, $BF_{01}$ = 1.560, *r* = .22); video-recording (*Mdn* = 1.60) and in-person (*Mdn* = 1.50) across defenders (*U* = 137.50, *p* = .254, $BF_{01}$ = 1.477, *r* = .21); video-recording (*Mdn* = 1.80) and in-person (*Mdn* = 2.00) across midfielders (*U* = 86.5, *p* = .292, $BF_{01}$ = 2.296, *r* = .19); nor video-recording (*Mdn* = 1.75) and in-person (*Mdn* = 1.63) across forwards (*U* = 83.00, *p* = .248, $BF_{01}$ = 1.934, *r* = .21).

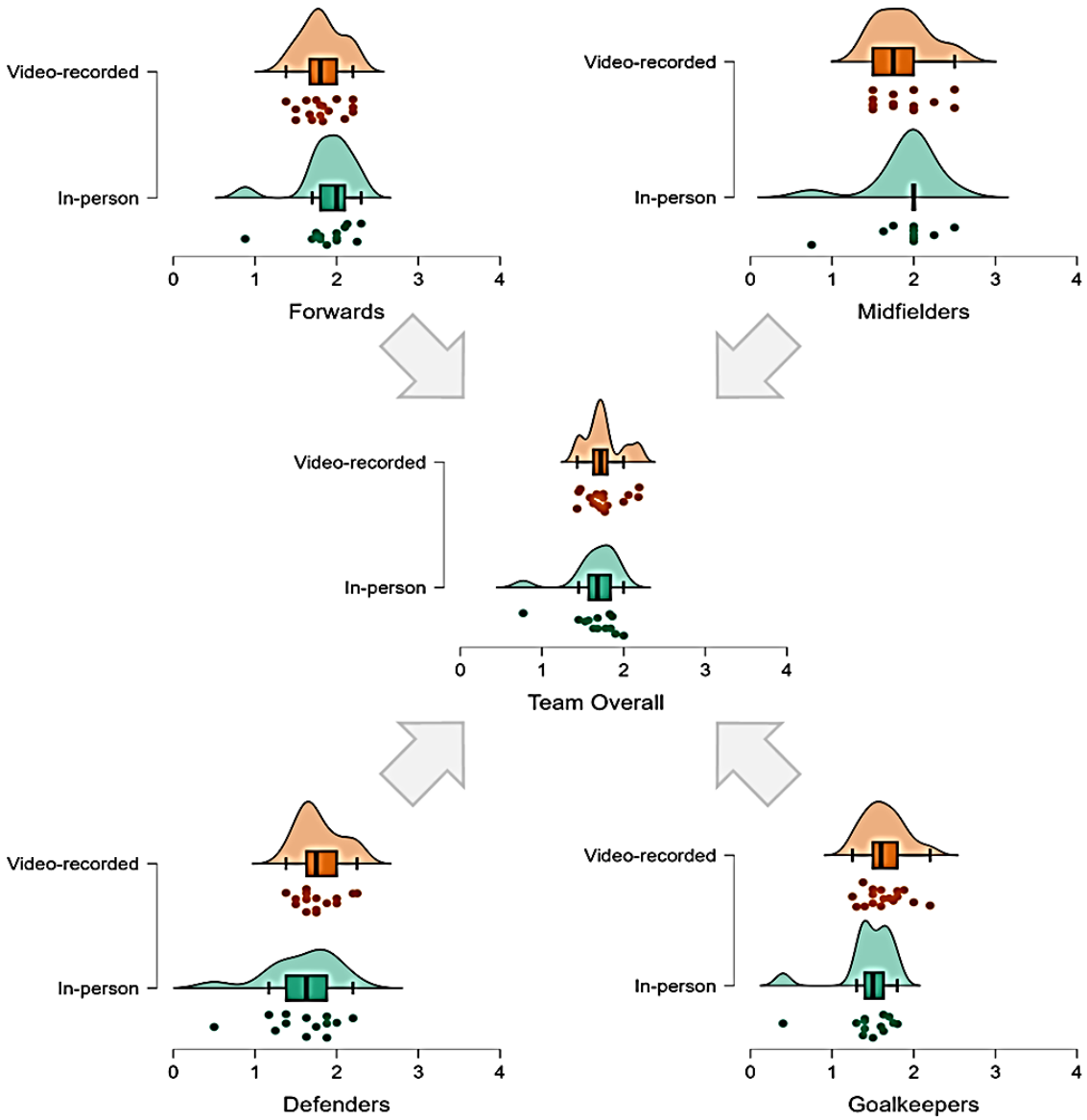


**Figure 2.** Whole-Team Observation, Performance Ratings

**Note.** Raincloud plots of player performance ratings following in-person vs video-recorded observation when a rating needed to be provided for all fielded players during a match (i.e., whole-team observation). Raincloud represent the distribution density of data; boxplots within the raincloud comprise a center line (median), box (interquartile range), and whisker lines (lower and upper 25% of data, excluding outliers); dots represent individual datapoints.

Within the individual-player observation where a specific player was observed and rated, there was also no statistically significant difference between the player performance ratings of in-person and video-recorded modalities (see Figure 3). Specifically, we observed no significant difference in player performance ratings between: video-recording (*Mdn* = 1.50) and in-person (*Mdn* = 1.50) observation of the left back (*U* = 116.00, *p* = .800, $BF_{01}$ = 2.606, *r* = .05); video-recording (*Mdn* = 1.50) and in-person (*Mdn* = 2.00) observation of the right wing (*U* = 91.00, *p* = .372, $BF_{01}$ = 2.297, *r* = .16); nor video-recording (*Mdn* = 1.75) and in-person (*Mdn* = 1.5) observation of the right back and left wing combined (*U* = 107.00, *p* = .880, $BF_{01}$ = 2.680, *r* = .21).

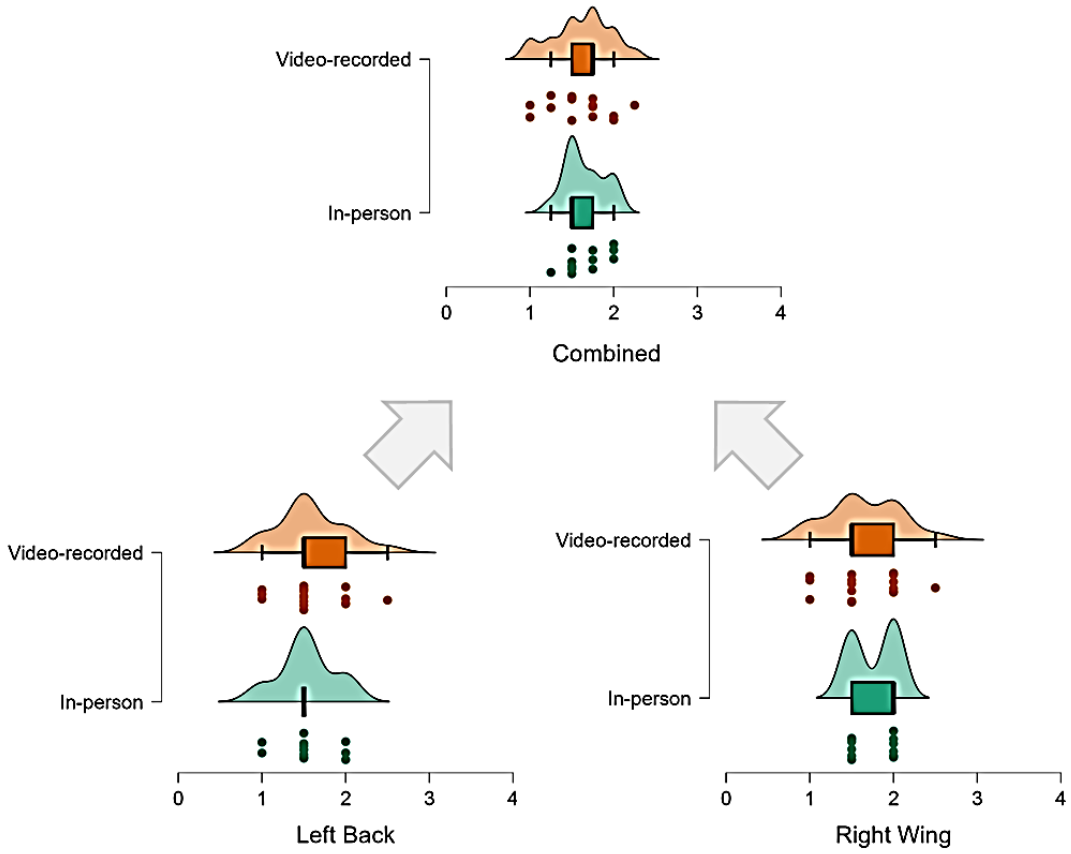


**Figure 3.** Individual-Player Observation, Performance Ratings

**Note.** Raincloud plots of player performance ratings following in-person vs video-recorded observation when a rating needed to be provided for only two specific players (i.e., individual-player observation). Rainclouds represent the distribution density of data; boxplots within the rainclouds comprise a center line (median), box (interquartile range), and whisker lines (lower and upper 25% of data, excluding outliers); dots represent individual datapoints.

Despite the non-significant difference in actual player performance ratings, scouts reported that they perceive the overall accuracy of in-person observation (*Mdn* = 5.00) as significantly greater than video-recorded observation (*Mdn* = 4.00; $z$ = -4.10, $p$ < .001, $BF_{01}$ < .001, $r$ = .75) (see Figure 4).

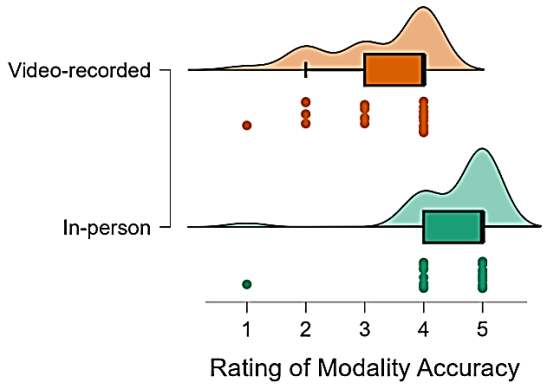


**Figure 4.** Rating of the Modality's Overall Accuracy

**Note.** Raincloud plots of scouts' perceived overall accuracy of in-person versus video-recorded modalities. Rainclouds represent the distribution density of data; boxplots within the rainclouds comprise a center line (median), box (interquartile range), and whisker lines (lower and upper 25% of data, excluding outliers); dots represent individual datapoints.

## Modality Efficiency

Scouts reported submitting their observation reports significantly quicker when writing their reports and grading players based on a video-recorded modality (*Mdn* = 12hrs) compared to an in-person modality (*Mdn* = 24hrs; $z$ = -3.83, $p < .001$, $BF_{01} = .001$, $r = .70$) (See Figure 5).

## Modality Affectual and Attentional Effects

Scouts reported significantly greater fatigue following video-recorded observation (*Mdn* = 2.25) compared to in-person observation (*Mdn* = 1.50) when tasked with a whole-team observation ($U$ = 167.00, $p = .017$, $BF_{01} = .348$, $r = .43$), but no other significant differences were observed between modalities following whole-team observation (see Figure 6; for medians, see text below). Specifically, there was no significant difference in: joyality between video-recording (*Mdn* = 2.75) and in-person (*Mdn* = 2.88) ($U$ = 83.00, $p = .249$, $BF_{01}$ = 1.212, $r = .21$); attentiveness between video-recording (*Mdn* = 3.75) and in-person (*Mdn* = 4) ($U$ = 79.00, $p = .183$, $BF_{01} = 1.193$, $r = .24$); mental effort between video-recording (*Mdn* = 70) and in-person (*Mdn* = 80) ($U$ = 74.50, $p = .129$, $BF_{01}$ = 1.051, $r = .28$); nor self-control between video-recording (*Mdn* = 4) and in-person (*Mdn* = 3) ($U$ = 131.50, $p = .376$, $BF_{01} = 2.563$, $r = .16$).

In the individual-player observation, there was no significant difference in fatigue between video-recording (*Mdn* = 2.50) and in-person (*Mdn* = 1.75) ($U$ = 146.00, $p = .134$, $BF_{01} = 1.491$, $r = .27$); joyality between video-recording (*Mdn* = 2.88) and in-person (*Mdn* = 2.88) ($U$ = 113.00, $p = .916$, $BF_{01}$ = 2.833, $r = .02$); attentiveness between video-recording (*Mdn* = 3) and in-person (*Mdn* = 3.5) ($U$ = 78.00, $p = .169$, $BF_{01} = 1.579$, $r = .25$); mental effort between video-recording (*Mdn* = 62) and in-person (*Mdn* = 75) ($U$ = 75.50, $p = .142$, $BF_{01}$ = 1.113, $r = .27$); nor self-control between video-recording (*Mdn* = 3.5) and in-person (*Mdn* = 3.5) ($U$ = 99.50, $p = .642$, $BF_{01} = 2.600$, $r = .08$) (see Figure 6).

## Modality Practicalities

Significantly more scouts reported observing video-recorded matches on laptop/computer (86.67%), followed by television (10.00%), and tablet (3.33%) ($X^2_{(2, N = 30)} = 38.60$, $p < .001$, $BF_{01} < .001$). Most scouts usually watched video-recordings in one sitting (50.00%), followed by two sittings (30.00%), three sittings (13.33%), four sittings (6.67%), and five/more sittings (0%) ($X^2_{(3, N = 30)} = 13.47$, $p = .004$, $BF_{01} < .001$). Last, most scouts (36.67%) paused or rewound video-recordings more than 10 times to help their evaluations, followed by up to ten pauses/rewinds (26.67%), four pauses/rewinds (13.33), five pauses/rewinds (10.00%), three pauses/rewinds (6.67%), never/one rewinds (6.67%), and two pauses/rewinds (0%) ($X^2_{(5, N = 30)} = 13.60$, $p = .018$, $BF_{01} = .025$); 96.67% of scouts reported the capacity to pause and rewind video-recordings as somewhat useful or very useful (i.e., responded with a score >3 out of 5).

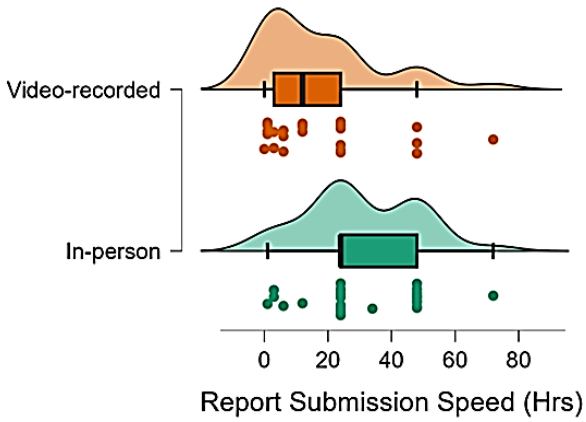


**Figure 5.** Report Submission Speed

**Note.** Raincloud plots of the report submission time in hours after in-person versus video-recorded match observation. Raincloud represent the distribution density of data; boxplots within the raincloud comprise a center line (median), box (interquartile range), and whisker lines (lower and upper 25% of data, excluding outliers); dots represent individual datapoints.

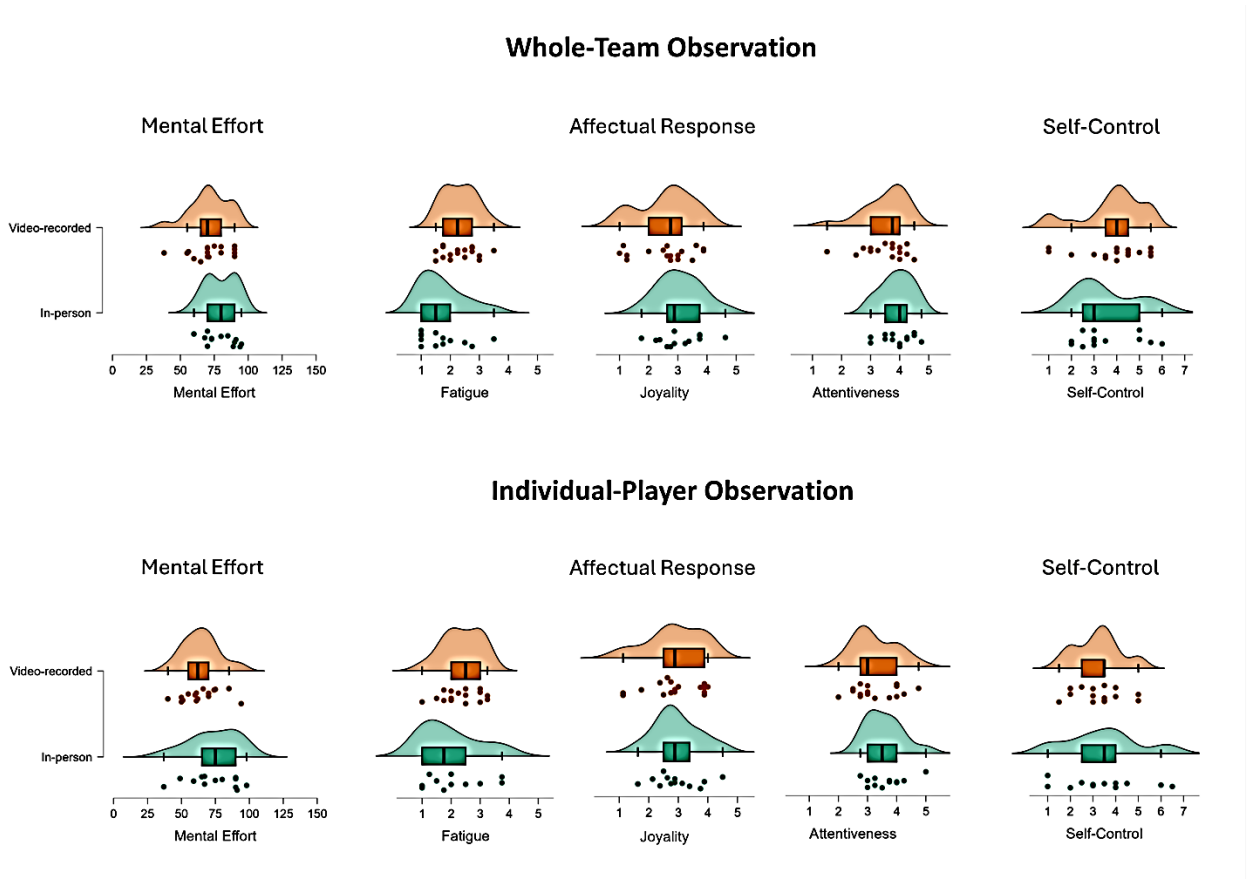


**Figure 6.** Attentional and Affectual Responses to Observation Modalities

**Note.** Attentional and affectual responses following the whole-team and individual-player observations. Rainclouds represent the distribution density of data; boxplots within the rainclouds comprise a center line (median), box (interquartile range), and whisker lines (lower and upper 25% of data, excluding outliers); dots represent individual datapoints.

## Discussion

The primary aim of the present study was to investigate differences in performance ratings given to players via in-person or video-recorded scouting modalities. For both whole-team and individual-player observation types, no strong evidence was found to suggest modalities differ in player performance ratings ($p > .05$, $BF_{01} > 1$). Position-based breakdown of the whole-team observation also found no evidence to suggest differences. Effect sizes (Rosenthal's $r$) were all either small (0.1) or small-to-moderate (between 0.1 and 0.3). However, scouts reported that they perceived the in-person observation as more accurate than the video-recorded observation, with this difference constituting a statistically significant large effect size ($r = .75$; $p < .001$) and receiving Bayesian evidence for non-equivalence ($BF_{01} < .001$). Therefore, results suggest that scouts perceive in-person scouting as more accurate than video-recordings, but actual differences between modalities are likely small and/or non-systematic.

These findings are especially interesting, when considering that only approximately 40% of the pitch was visible at any given time in the video-recordings (a percentage which is currently commonplace in match recordings at youth level). In such a scenario, it is possible that players who compete in certain positions may receive less attention from scouts who observe matches via video (i.e., positions that attain less camera time, such as goalkeepers who are out of shot when the camera focuses on the midfield). In fact, some scouts attend matches in-person in order to observe particular players at all times, including off-the-ball, and relatedly off-camera (James, 2023). However, given that a significant difference did not emerge between the in-person and video-recorded modalities for whole-team evaluations,

one may surmise that this issue is not a concern. Moving forward, technological advancements (e.g., the use of multi-position tracking camera systems, wearable devices, and machine learning and AI) also mean that player movement can be tracked at all times and their behavior (e.g., the quality of their off-the-ball runs) evaluated (e.g., Kılınçarslan, 2023; Marković et al., 2020; Spearman, 2018). In fact, researchers have developed fully-automated mechanisms that extract players' positional data from just broadcast video recordings (Theiner et al., 2022). Such technology was not available to the academy scouts who participated in the present study, but the influence of positional data on video-based scouting should be investigated in future research.

With regards to efficiency, scouts reported that they are able to submit observation reports twice as quickly following video-recorded observation compared to in-person; reports following video-recorded matches are reportedly submitted within a median time of 12 hours post-match compared to 24 hours when observation is in-person. This effect received strong statistical support ($p < .001$, $BF_{01} = .001$, $r = .75$). It is assumed that a primary facilitator of video-recorded scouting's greater efficiency is that scouts do not need to travel long distances between matches and/or their home before being able to write their reports.

In terms of affectual and attentional factors, no strong evidence to suggest differences between the modalities was found for joyality, attentiveness, mental effort, and exerted self-control during neither whole-team nor individual-player observations ($p > .05$, $BF_{01} > 1$, $r \leq .3$). However, an exception was that scouts reported greater fatigue only during whole-team video-recorded observation ($p = .017$, $BF_{01} = .348$, $r = .43$). Particularly within the more demanding whole-team observation, it is possible that the "flattening" of players into a two-dimensional video environment may induce fatigue by requiring additional extrapolation/transformation for player position/movement information (Nadler, 2020), and that any asynchrony in the video footage (e.g., stutters in the video and lower than in-person optical resolution; Reidl, 2022) may induce greater fatigue when engaging with computer video feeds. Future studies may wish to investigate if there are any long-term fatigue effects on scouts utilizing video-recorded modalities, and whether this influences organizational efficiency.

Evaluation of the video-recorded modality's practicalities also provides new insights into scouts' working and decision making, an area of football which is only beginning to be investigated and understood (Bergkamp et al., 2022). There was strong statistical evidence suggesting preferences among scouts. Within the sample, 87% of scouts reported performing their video-recorded observations via their laptops. A total of 93% of scouts reported making use of pause/rewind functions, with 37% pausing or rewinding footage at least 5 times or more per match. This propensity to use pause/rewind functions to aid ratings and decision making is underscored by 97% of scouts perceiving the ability to pause/rewind video footage as useful. Additionally, although the majority of scouts watched video-recorded matches in one sitting (50%), it was interesting to see that 30% observe matches in two sittings, 13% in three sittings, and 7% in four sittings. In sum, scouts seem to make the most of the unique advantages and opportunities offered by the video-recorded modality, which may make up for drawbacks such as incomplete camera coverage of the entire pitch and greater fatigue during observation; this may be a contributor in facilitating similarly accurate performance ratings compared to in-person observation.

Overall, the present results suggest that there is no large difference in player performance rating between video-recorded and in-person modalities, but adopting a video-recorded modality offers organizational efficiency gains via faster observation report submission times. However, despite the absence of performance rating differences, scouts rated in-person scouting as significantly more accurate. Future studies should endeavor to ascertain to what extent scouts' perception of greater accuracy when scouting in-person is true, and what factors underlie this perception. For example, it

is possible that scouts have implicit biases which result in their preference of in-person scouting and thus perceptions of greater rating accuracy (Gawronski et al., 2019). Scouts may enjoy the "prestige" of attending matches in-person and value the feeling of authenticity seeing matches first-hand. Similarly, it is possible that scouts enjoy traveling, and thus have implicit (or in some cases explicit) biases towards portraying in-person assessment as more accurate. Future research should endeavor to add further controls to account for potential implicit and explicit biases (e.g., via honesty checks to accompany self-report scales).

## Limitations

The present study features two limitations which were infeasible to mitigate against. Firstly, the study's sample size was 30 scouts. Although this is an excellent sample size considering the specific nature of the population, it is smaller than optimal for statistical evaluation of small effect sizes (Brysbaert, 2019); for example, in order to be adequately powered to evaluate the statistical significance ($\alpha = .05$) of small effect sizes ($r = .1$) within Mann-Whitney U between-group comparisons, a total sample size of 824 scouts are required when power is .8, the test is two-tailed, and a normal parent distribution is assumed (G*Power V3.1.9.7; Faul et al., 2007). Similarly, a larger sample size may facilitate $BF_{01}$ scores further from 1 (e.g., > 10 or < .03), and thus lend even stronger evidence in favour of/against the null hypothesis (Schmalz et al., 2023; van Doorn et al., 2021). Future studies are encouraged to test the replicability of the present results via larger sample sizes (Anderson & Kelly, 2022).

A second limitation is the study's unidimensional rating of player performance. To ensure representativeness of current scouting practices within the Category 1 academy, the academy's actual (unidimensional) rating system for player performance was used. However, various studies have ascertained that talent in football is a complex multidimensional construct which should be assessed as such (Huijgen et al., 2014; Louzada et al., 2016). Despite this limitation, the present approach aligns with the concept of "representative design" for psychological experimentation (Pinder et al., 2011), which proposes that typical environmental stimuli should be prioritized over artificial experimental rigor, in order to collect generalizable data.

Lastly, it is possible that some factors associated with talent in football cannot be measured accurately via video. Coaches and scouts have capacity to assess anthropometrics and communication accurately during in-person player observations (Romann et al., 2017). However, anthropometrics may be difficult to assess in video-recordings because of an inability to perceive relative distances/sizes given an absence of physical reference points which are more readily available when attending matches in-person. Similarly, communication skills may not always be detectable if the video's associated audio is unable to pick up player voices clearly enough. Future studies are encouraged to assess the effect of video-recorded observation on communication and anthropometric player evaluation.

## Applied Implications

The absence of significant differences in player performance ratings between in-person and video-recorded modalities provide initial evidence to suggest that academies could use video-recorded scouting as a valuable supplement to current in-person proceedings. For instance, video-recordings could help academies evaluate players who have been identified as having potential but may be impractical or too expensive to observe in-person; if the video-based observation suggests the player is promising, a follow-up in-person observation could be arranged to get the most accurate evaluation possible. Such an approach offers speed and flexibility and is in line with the continually greater use of video for performance analysis in sport (O'Donoghue, 2006; Reeves & Roberts, 2013).

However, additional research is needed to directly test and confirm supplementary/efficiency benefits of a video-recorded scouting modality at an organizational level. Specifically, the stage of talent

identification may be an important consideration within this context. The observations completed as part of the present study comprised an early stage of talent ID for the participating academy, where scouts saw most of the observed players for the first time. There may be additional differences between video and in-person approaches at follow-on stages of increasing depth. This may explain, in part, the scouts' perceptions of in-person scouting being more accurate, given that in-person observation is often prioritised when making final decisions at later stages of the talent identification process.

The efficiency gains of video-based scouting may also offer a way to level the playing field given the growing wealth disparity between Europe's upper and lower football divisions (Platts & Smith, 2010); for example, some lower league clubs have recently had insufficient funds to run a traditional academy (Aarons, 2017; O'Keeffe, 2018). In such instances, the present results suggest that video-based scouting provides a more cost-effective alternative to in-person scouting via digitalisation. Digitalisation entails the formation of new value-producing opportunities via emergent technologies (Parida, 2018), something that has been identified as especially valuable in highly competitive environments (Christofi et al., 2021). Clubs and academies who would be able to evaluate a small number of matches in-person may be able to evaluate far more matches via video-recordings, especially if the sharing of videos between academies is encouraged and becomes standard practice (with adequate data protection and safeguarding in place). An initiative of increased sharing of match videos between academies would likely benefit talent identification across the industry, as well as level the playing field between clubs with and without plentiful resources. However, these benefits are presumed, and would require targeted evaluation via additional research.

Concurrently, the digitalisation of scouting and associated efficiency gains provides interesting opportunities for well financed academies/clubs. The use of 'Big Data' (i.e., vast amounts of information collected on players) for analysis via machine learning and artificial intelligence has been touted as the future of talent identification in sport (Herberger & Litke, 2021; Millington & Millington, 2015). For such approaches, video-based evaluation and derivation of data potentially enables more efficient and thus more extensive extrapolation of data from matches to create larger datasets on which to train algorithms and neural networks effectively (Raudys & Jain, 1991; Obermeyer & Emanuel, 2016).

## Conclusion

The present set of results suggest that video-based scouting of academy-level football players offers an adequately accurate and more efficient alternative to in-person scouting. Based on scout perceptions of modality accuracy, in-person scouting remains the gold standard when evaluating players, but video-based scouting offers a cost effective and flexible opportunity for academies to evaluate players they would have otherwise not had the time or funds to observe in-person. Crucially, any such efficiency improvements of scouting procedures could help increase clubs' return on investment, particularly at times when transfer fees are rising dramatically (Platts & Smith, 2010; Poli et al., 2023). Future studies should strive for even larger sample sizes than the present study, as well as qualitative approaches to evaluate how the multifactorial facets comprising talent in football differ when evaluated in-person or via video-recordings.

## Endnote

**1.** Performance ratings were collected online via the Academy's own systems. Psychological questionnaires and opinions regarding scouting modalities were collected online via the Psytoolkit platform (Stoet 2010, 2017).

## Authors' Declarations

The authors declare that there are no personal or financial conflicts of interest regarding the research in this article.

The authors declare that the research reported in this article was conducted in accordance with the Ethical Principles of the *Journal of Expertise.*

The authors declare that they are not able tmake the dataset publicly available but are able to provide it upon request.

## ORCID iDs

Robin Owen
https://orcid.org/0000-0002-4206-899X
Seamus Harvey
https://orcid.org/0000-0001-9076-3295

## References

Analyisport (2021). How Football Clubs Use Data to Sign Players. *Analyisport*. Available at: https://analyisport.com/insights/how-football-clubs-use-data-to-sign-players/

Aarons, E. (2017). Why Brentford ditched their academy in favour of developing Premier League outcasts. *The Guardian*. Available at: https://www.theguardian.com/football/2017/apr/05/brentford-ditched-their-academy-premier-league-outcasts

Anderson, S. F., & Kelley, K. (2022). Sample size planning for replication studies: The devil is in the design. *Psychological Methods*. Advance online publication.

Baddeley, A. (1992). Working memory. *Science*, *255*(5044), 556–559.

Barth, M., Güllich, A., Macnamara, B. N., & Hambrick, D. Z. (2022). Predictors of junior versus senior elite performance are opposite: A systematic review and meta-analysis of participation patterns. *Sports Medicine, 52*(6), 1399–1416.

Baumeister, R. F., Vohs, K. D., & Tice, D. M. (2007). The strength model of self-control. *Current Directions in Psychological Science*, *16*(6), 351-355.

Bergkamp, T. L., Frencken, W. G., Niessen, A. S. M., Meijer, R. R., & den Hartigh, R. J. (2022). How soccer scouts identify talented players. *European Journal of Sport Science, 22*(7), 994–1004.

Bertrams, A., Englert, C., & Dickhäuser, O. (2010). Self-control strength in the relation between trait test anxiety and state anxiety. *Journal of Research in Personality, 44*(6), 738-741.

Bradley, P., O'Donoghue, P., Wooster, B., & Tordoff, P. (2007). The reliability of ProZone MatchViewer: A video-based technical performance analysis system. *International Journal of Performance Analysis in Sport*, *7*(3), 117–129.

Brysbaert, M. (2019). How many participants do we have to include in properly powered experiments? A tutorial of power analysis with reference tables. *Journal of Cognition*, *2*(1).

Christensen, M. K. (2009). "An eye for talent": Talent identification and the "practical sense" of top-level soccer coaches. *Sociology of Sport Journal*, *26*(3), 365–382.

Christofi, M., Pereira, V., Vrontis, D., Tarba, S., and Thrassou, A. (2021). Agility and flexibility in international business research: A comprehensive review and future research directions. *Journal of World Business, 56*, 101194.

Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, *39*(2), 175–191.

Ford, P. R., Delgado Bordonau, J. L., Bonanno, D., Tavares, J., Groenendijk, C., Fink, C., Gualtieri, D., Gregson, W., Varley, M. C., Weston, M., Lolli, L., Platt, D., & Di Salvo, V. (2020). A survey of talent identification and development processes in the youth academies of professional soccer clubs from around the world. *Journal of Sports Sciences, 38*(11-12), 1269–1278.

Gawronski, B. (2019). Six lessons for a cogent science of implicit bias and its criticism. *Perspectives on Psychological Science, 14*(4), 574–595.

Gernon, A. (2016). *Retired: What happens to footballers when the game's up*. Durrington, UK: Pitch Publishing.

Green, C. (2009). *Every boy's dream: England's football future on the line*. London: A. & C. Black Publishers.

Güllich, A., Macnamara, B. N., & Hambrick, D. Z. (2022). What makes a champion? Early multidisciplinary practice, not early specialization, predicts world-class performance. *Perspectives on Psychological Science, 17*(1), 6–29.

Hendry, D. T., & Hodges, N. J. (2018). Early majority engagement pathway best defines transitions from youth to adult elite men's soccer in the UK: A three time-point retrospective and prospective study. *Psychology of Sport and Exercise, 36*, 81–89.

Herberger, T. A., & Litke, C. (2021). The impact of Big Data and sports analytics on professional football: A systematic literature review. *Digitalization, Digital Transformation and Sustainability in the Global Economy: Risks and Opportunities*, 147–171.

Huijgen, B. C., Elferink-Gemser, M. T., Lemmink, K. A., & Visscher, C. (2014). Multidimensional performance characteristics in selected and deselected talented soccer players. *European Journal of Sport Science, 14*(1), 2–10.

James, S. (2023). *The reality of football scouting in 2023: 'You do it for love – not money'*. The Athletic. Available at: https://theathletic.com/4131355/2023/01/30/transfer-window-football-scouting/

Jamieson, S. (2004). Likert scales: How to (ab) use them. *Medical education, 38*(12), 1217–1218.

Jones, B. D., Lawrence, G. P., & Hardy, L. (2018). New evidence of relative age effects in "super-elite" sportsmen: a case for the survival and evolution of the fittest. *Journal of Sports Sciences, 36*(6), 697–703.

Karlsen, T. (2020). *Diary of a scout: How COVID-19 has impacted the search for new talent. ESPN*. Available at: https://www.espn.co.uk/football/story/_/id/37608681/how-covid-19-impacted-search-new-talent

Karlsen, T. (2021). *Transfers during COVID-19: Data replacing live scouting for cautious clubs.* ESPN. Available at: https://www.espn.co.uk/football/story/_/id/37623765/data-replacing-live-scouting-cautious-clubs

Kılınçarslan, G. (2023). Technological advances in football. In I. Bayraktar (Ed.), *The use of developing technology in sports* (pp. 97-123). Sehitkamil/Gaziantep: Ozgur Publications.

Kuzon, W., Urbanchek, M., & McCabe, S. (1996). The seven deadly sins of statistical analysis. *Annals of Plastic Surgery, 37*, 265–272.

Larkin, P., & O'Connor, D. (2017). Talent identification and recruitment in youth soccer: Recruiter's perceptions of the key attributes for player recruitment. *PLoS One, 12*(4), e0175716.

Larkin, P., & Reeves, M. J. (2018). Junior-elite football: time to re-position talent identification? *Soccer & Society, 19*(8), 1183–1192.

Louzada, F., Maiorano, A. C., & Ara, A. (2016). iSports: A web-oriented expert system for talent identification in soccer. *Expert Systems with Applications, 44*, 400–412.

Marković, S., Ćuk, I., & Živković, A. (2020). The impact of information technologies on the scouting progress in sports games. *International scientific conference on information technology and date related research.* Sinteza 2020.

Miller, P. K., Cronin, C., & Baker, G. (2015). Nurture, nature and some very dubious social skills: An interpretative phenomenological analysis of talent identification practices in elite English youth soccer. *Qualitative Research in Sport, Exercise and Health, 7*(5), 642–662.

Millington, B., & Millington, R. (2015). 'The datafication of everything': Toward a sociology of sport and big data. *Sociology of Sport Journal, 32*(2), 140–160.

Morganti, G., Lascu, A., Apollaro, G., Pantanella, L., Esposito, M., Grossi, A., &

Ruscello, B. (2023). (Beyond) the field of play: contrasting deterministic and probabilistic approaches to talent identification and development systems. *Sport, Education and Society*.

Murray, A., Pluim, B., Robinson, P. G., Mountjoy, M. L., Falvey, É. C., Budgett, R., ... & Cox, C. (2022). The journey so far: professional sport during the COVID-19 pandemic. *BMJ Open Sport & Exercise Medicine, 8*(2), e001362.

Nadler, R. (2020). Understanding "Zoom fatigue": Theorizing spatial dynamics as third skins in computer-mediated communication. *Computers and Composition, 58*, 102613.

O'Donoghue, P. (2006). The use of feedback videos in sport. *International Journal of Performance Analysis in Sport*, *6*(2), 1–14.

O'Keeffe, G. (2018). Tranmere Rovers close academy to 'protect the club'. *BBC Sport*. Available at: https://www.bbc.co.uk/sport/football/43342943

Oakley, B., & Green, M. (2001). The production of Olympic champions: international perspectives on elite sport development systems. *European Journal of Sports Management, 8*, 83–105.

Obermeyer, Z., & Emanuel, E. J. (2016). Predicting the future—big data, machine learning, and clinical medicine. *The New England Journal of Medicine, 375*(13), 1216.

Parida, V. (2018). *Digitalization. In J.* Frishammar *& A.* Ericson (Eds.), *Addressing Societal Challenges* (pp. 23-38). Lulea: Grafisk Produktion LTU.

Pinder, R. A., Davids, K., Renshaw, I., & Araújo, D. (2011). Representative learning design and functionality of research and practice in sport. *Journal of Sport and Exercise Psychology, 33*(1), 146–155.

Platts, C., & Smith, A. (2010). 'Money, money, money?' The development of financial inequalities in English professional football. *Soccer & Society, 11*(5), 643–658.

Poli, R., Besson, R., & Ravenel, L. (2023). Inflation in the football players' transfer market (2013/14-2022/23). *CIES Football Observatory Monthly Report*, 82. Available at: https://football-observatory.com/Inflation-in-the-football-players-transfer-market#:~:text=In%20ten%20years%2C%20the%20inflation,basis%20rose%20throughout%20the%20period..

Premier League (2012). *Elite Player Performance Plan*. London: Premier League. Available at: https://www.premierleague.com/news/2911912

Raudys, S., & Jain, A. (1991). Small sample size effects in statistical pattern recognition: recommendations for practitioners. *IEEE transactions on pattern analysis and machine intelligence, 13*(3), 252–264.

Rea, T., & Lavallee, D. (2015). An examination of athletes' experiences of the talent transfer process. *Talent Development and Excellence*, *7*(1), 41–67.

Reeves, M. J., McRobert, A. P., Lewis, C. J., & Roberts, S. J. (2019). A case study of the use of verbal reports for talent identification purposes in soccer: A Messi affair!. *PloS One, 14*(11), e0225033.

Reeves, M. J., & Roberts, S. J. (2013). Perceptions of performance analysis in elite youth football. *International Journal of Performance Analysis in Sport, 13*(1), 200–211.

Reilly, T., Williams, A. M., Nevill, A., & Franks, A. (2000). A multidisciplinary approach to talent identification in soccer. *Journal of Sports Sciences, 18*(9), 695–702.

Riedl, R. (2022). On the stress potential of videoconferencing: definition and root causes of Zoom fatigue. *Electronic Markets*, *32*(1), 153-177.

Roberts, S. J., McRobert, A. P., Lewis, C. J., & Reeves, M. J. (2019). Establishing consensus of position-specific predictors for elite youth soccer in England. *Science and Medicine in Football*, *3*(3), 205–213.

Romann, M., Javet, M., & Fuchslocher, J. (2017). Coaches' eye as a valid method to assess biological maturation in youth elite

soccer. *Talent Development & Excellence, 9*(1), 3–13.

Rosenthal, R. (1994). Science and ethics in conducting, analyzing, and reporting psychological research. *Psychological Science, 5*(3), 127–134.

Schmalz, X., Biurrun Manresa, J., & Zhang, L. (2023). What is a Bayes factor?. *Psychological Methods, 28*(3), 705.

Sieghartsleitner, R., Zuber, C., Zibung, M., & Conzelmann, A. (2018). "The early specialised bird catches the worm!" – A specialised sampling model in the development of football talents. *Frontiers in Psychology*, *9*, 188.

Spearman, W. (2018, March). *Beyond expected goals*. Paper presented at the MIT Sloan Sports Analytics Conference, Boston.

Stoet, G. (2010). PsyToolkit: A software package for programming psychological experiments using Linux. *Behavior Research Methods, 42*(4), 1096–1104.

Stoet, G. (2017). PsyToolkit: A novel web-based method for running online questionnaires and reaction-time experiments. *Teaching of Psychology, 44*(1), 24–31.

Taylor, J. M., Quigley, C., Madden, J., & Wright, M. D. (2023). Multi-sports training in English soccer academies: A survey exploring practices, practitioner perspectives, and barriers to use. *International Journal of Sports Science & Coaching.* Online First.

Theiner, J., Gritz, W., Muller-Budack, E., Rein, R., Memmert, D., & Ewerth, R. (2022). Extraction of positional player data from broadcast soccer videos. *Proceedings on the IEEE/CVF Winter Conference on Applications of Computer Vision* (WACV), USA, 1463–1473.

Transfermarkt (2017). Vereins-statistik – wertvollste mannschaften. *Transfer Markt*. Available at: https://www.transfermarkt.com/vereins-statistik/wertvollstemannschaften/marktwertetop

van Doorn, J., van den Bergh, D., Böhm, U., Dablander, F., Derks, K., Draws, T., Etz, A., Evans, N. J., Gronau, Q. F., Haaf, J. M., Hinne, M., Kucharsky, S., Ly, A., Marsman, M., Matzke, D., Komarlu, A. R., Gupta, N., Sarafoglou, A., Stefan, A., Voelkel, J. G., & Wagenmakers, E. -J. (2021). The JASP guidelines for conducting and reporting a Bayesian analysis. *Psychonomic Bulletin & Review, 28*, 813–826.

Watson, D., & Clark, L. A. (1994). *The PANAS-X: Manual for the Positive and Negative Affect Schedule-Expanded Form*. Ames: The University of Iowa.

Williams, A. M., Ford, P. R., & Drust, B. (2020). Talent identification and development in soccer since the millennium. *Journal of Sports Sciences, 38*(11-12), 1199–1210.

Zijlstra, F. R. H. (1993). *Efficiency in work behavior*. Unpublished doctoral dissertation, Technical University, Delft, The Netherlands.

Received: 28 September 2023
Revision received: 20 March 2024
Accepted: 25 March 2024