Title: Establishing consensus of position-specific predictors for elite youth soccer in England

Authors: Authors: Simon J Roberts[1], Allistair P McRobert[2], Colin J Lewis[1], & Matthew J Reeves[3]

Affiliations:

[1] Faculty of Education, Health and Community,
Liverpool John Moores University
IM Marsh, Barkhill Road,
Aigburth,
Liverpool, England,
United Kingdom,
L17 6BD

[2] Research Institute for Sport and Exercise Sciences, United Kingdom
Liverpool John Moores University,
Tom Reilly Building,
Byrom St Campus,
Liverpool, England,
United Kingdom,
L3 3AF

[3] Institute of Coaching and Performance,
School of Sport, Health and Wellbeing,
University of Central Lancashire,
United Kingdom

Address for correspondence:
Simon J Roberts
Liverpool John Moores University
s.roberts2@ljmu.ac.uk

Title: Establishing consensus of position-specific predictors for elite youth soccer in England

Abstract

Purpose: To construct a valid and reliable methodology for the development of position-specific predictors deemed appropriate for talent identification purposes within elite youth soccer in England. **Method:** $N = 10$ panel experts participated in a three-step modified e-Delphi poll to generate consensus on a series of generic youth player attributes. A follow up electronic survey completed by coaches, scouts and recruitment staff *(*$n = 99$) ranked these attributes to specific player-positions. **Results:** A final list of 44 player attributes found consensus using the three-step modified e-Delphi poll. Findings indicated that player-positional attributes considered most important at the youth phase are more psychological and technical than physiological or anthropometric. Despite 'hidden' attributes (e.g. coachability, flair, versatility, vision, etc.) finding consensus on the e-Delphi poll, there was no evidence to support these traits when associated with a specific playing position. **Conclusion:** For those practitioners responsible for talent recruitment, our findings may provide greater understanding of the multiple attributes required for some playing positions. However, further ecological research is required to assess the veracity of our claims.

Keywords: talent identification, youth, expertise, recruitment, e-Delphi

Introduction

Talent identification of youth soccer players is an important function of professional clubs in England and Wales and continues to receive research attention in the sport, exercise and pedagogic literature (Unnithan et al., 2012; Fenner, Iga & Unnithan, 2016; Larkin & Reeves, 2018). In the pursuit of this goal, the English Premier League introduced the Elite Player Performance Plan (EPPP) in an attempt to increase the number of players graduating from clubs who participate in the top four professional leagues in England (i.e. English Premier League, Championship, League 1 and League 2) (Towlson et al., 2017). Professional clubs in England and Wales annually invest between £2.3 and £4.9 million in their youth (i.e. U12 to U16 years: Premier League, 2011) talent identification and development environments (Tears, Chesterton & Wijnbergen, 2018; Premier League, 2011). Such investiture in the academy infrastructure has seen an increase in the number of state-of-the-art, purpose-built facilities, all designed to support talented players' development and progression (Haugaasen, Toering, & Jordet, 2014). Despite this investment, however, evidence demonstrates that maintaining a place in an academy is challenging, with ~90% of youth players in England and Wales failing to achieve full professional status (Anderson & Miller, 2012).

Regarding previous talent identification research, studies have explored the skills and qualities that may discriminate between skilled and less-skilled youth soccer players. (Coutinho et al., 2016; Coelho e Silva et al., 2010; Vaeyens et al., 2006). For instance, skilled youth players tend to be heavier, taller (Coelho et al., 2010), and faster (Gil et al., 2014) than there less skilled counterparts. In a team sport such as soccer where body size, strength and power also contain advantages (Boone et al., 2012), the selection process has resulted in the over-representation of relatively older players due to advanced normative growth advantages around the time of age of peak height velocity (Cobley, Schorer, & Baker, 2008; Philippaerts et al., 2006).

Whilst these studies provide useful, informative data, the assumption that talented youth players can replicate features of peak adult performance appears to be flawed (Baker, Schorer & Wattie, 2018; Vaeyens, et al., 2008). This predictive, early selection approach is problematic for a number of reasons: (i) talent identification and development is reported to be complex, multifaceted and non-linear with confounding elements such as growth and maturation which are difficult to control (Leyhr et al., 2018; Malina, 2008) and (ii) current performance does not always translate into future potential (Vaeyens et al., 2008; Unnithan et al., 2012).

Talent identification continues therefore to rely on subjective evaluations of players by recruitment staff (Christensen, 2009), and for those individuals responsible for identifying talented youth (i.e. talent scouts, academy coaches, recruitment staff, etc.) the job is complex, as no objective or valid indicator or measure of talent exists (Baker, Schorer, Wattie, 2018). This state of affairs was illustrated recently in a series of talent studies conducted in elite youth soccer environments in England, where the complex, and at times confused relationship between the organisational requirements, and the 'on the ground' work undertaken by recruitment staff was exposed (Reeves et al., 2018a; Reeves et al., 2018b; Larkin and Reeves, 2018). For instance, the multidimensional nature of talent in youth soccer can include prognostic dimensions such as 'physical abilities', 'fitness requirements', 'technical skills', 'perceptual-cognitive skills' and 'personal skills' (Murr et al., 2018; Vrljic & Mallet, 2008). Due to the multifaceted nature of talent some have called for more objective predictors of future potential (i.e. Larkin & O'Connor, 2017) or research designs that are in a position to infiltrate applied talent identification practice (Collins, MacNamara, & Cruickshank, 2018).

Indeed, our recent talent identification work with talent scouts, heads of recruitment and academy coaches, provides some initial evidence to support this supposition. Using a verbal reporting protocol, we captured concurrent cognitions of recruitment staff during formal

11 v 11 competition (under 16s) at a professional English Premier League Academy. Content analysis of the concurrent verbal reports indicated that the recruitment staff openly disagreed about the skills and attributes required for identical playing positions. Furthermore, in a series of face-to-face follow up interviews, discrepancies between their own judgements and their club's recruitment philosophy were also captured (Lewis et al., in review).

Soccer is a team sport where each outfield playing position has role responsibilities that are both unique and common to other positions in the team (Murr et al., 2018). Due to the continuous, invasion-type nature of soccer, in a natural sequence of events players are required to act as either attackers or defenders depending upon the configuration of play (Gréhaigne, Richard & Griffin, 2005). The rules of soccer do not constrain players to zones and so they are free to move up and down the field exploiting the width and depth of the playing area by creating or reducing space and time to achieve the game's primary objective (e.g. score or not concede goals). Despite previous attempts to establish a relationship between playing position and specific anthropometrical and fitness performance characteristics (Bidaurrazaga-Letona et al., 2015; Towlson et al., 2017) there currently appears to be no definitive agreement concerning position-specific differences and the attributes of youth players. For instance, Deprez et al., (2015) reported anthropometric, physical fitness and functional profile differences in 744 high-level soccer players aged 8 – 18 years. Amongst the outfield positions defenders were observed to be taller than midfield and attacking players. Midfield players performed better on dribbling tests (U9 – U15) and exhibited superior endurance attributes. Attacking players were recorded as the most explosive, fastest and agile when compared to other outfield positions (Deprez et al., 2015). However, this study was unable to include other talent predictors such as training history, and bio-psycho-social factors considered to be as important in the talent identification process (Collins, MacNamara, & Cruikshank, 2018). A later cross-sectional study reported the physical fitness characteristics of elite youth players in

central versus lateral roles and found specific anthropometrical attributes such as relatively older, mature, taller and heavier players selected for goalkeeping and central defensive positions (Towlson et al., 2017). However, with the exception of Larkin and O'Connor (2017) who aimed to understand generic attributes considered important for youth coaches at the entry level of representative soccer in Australia, there is limited agreement on generic attributes when associated with certain playing positions. Therefore, the specific aim of this study was to propose a methodological framework for establishing position-specific attributes for talent scouts and coaches involved in the talent identification and development process.

Methods

The position-specific consensus process featured a three-step modified e-Delphi method (Meshkat et al., 2014) and online survey which took place between September 2017 and March 2018 following full ethical approval from an Institutional Review Board in the United Kingdom. The Delphi method, developed (primarily) by Dalkey and Helmer (1963) is an iterative process that provides a process of acquiring consensus from experts where there is little or no evidence and where opinion is considered important (Eubank et al., 2016). Initially, a comprehensive list of generic attributes was identified and consensus was built from the feedback provided by experts from the proceeding rounds. For the present study the modified e-Delphi method consisted of three rounds of email questionnaires.

Panel selection

As our study required consensus of attributes in elite youth soccer, involvement from recruitment staff, coaches, academy directors, coach educators and academics involved in talent identification research was necessary. Despite no exact criterion for the selection of Delphi participants available in the extant literature, it is considered important that panel members are highly trained and competent within the area of specialist knowledge (Hsu, 2007). Initial recruitment strategies for our panel included a presentation of our proposed body of

research at the World Conference on Science and Soccer held in Rennes in April 2017 (i.e. Reeves et al., 2018). Face-to-face meetings were then conducted with members of the Football Association's (FA) talent identification department, before a series of final face-to-face meetings were held with delegates and academics interested in researching talent in soccer at the International Council for Coach Education (ICCE) conference held in Liverpool in July 2017.

Interested participants were contacted further, on the basis of talent identification and recruitment experience and expertise. As the aim of our study was to provide position-specific predictors for talent scouts and coaches and since our aim was to also advance the evidence base for talent identification in youth soccer, players were not included as panel members. Following verbal agreement to participate, a letter of invitation was forwarded to each of our panel members. The participants who agreed to be involved completed a written consent form and provided an email address for correspondence purposes. Following receipt of written consent, the aim of the project was explained. The final panel included the following members; the Academy Director of an English Premier League club, talent identification staff at the English Football Association (n = 2), head of player recruitment at an English Premier League club and Championship club, Union of European Football Associations (UEFA) B licensed coaches working in elite youth football in England (n = 4) and a professor of sport sciences who specialises in researching and writing about talent identification in sport.

Generic attribute statements

For stage one of the study, we requested from our panel a list of generic attributes archetypal of a talented youth soccer player. An open-ended text document with four categories: 'technical attributes', 'physical attributes', 'psychological attributes', and a heading termed 'hidden attributes' was forwarded to our panel. The first three headings (i.e. technical, physical, and psychological) were adapted from the model of potential talent criteria by Williams and Reilly

(2000). The term 'hidden' was adopted as this was a phrase commonly used by heads of recruitment, academy coaches and talent scouts in a recent study (i.e. Reeves et al., 2018). Other studies have adopted the term 'personal' (Jokuschies, Gut, & Conzelmann, 2017) or 'social' (Williams & Reilly, 2000). Panel members were invited to propose generic attribute statements under the four headings and invited to provide a brief explanation for its inclusion. The final list was compiled into a Microsoft Excel (2016) spreadsheet and reviewed by author (3) who had worked previously as a professional youth soccer coach with an English League club and author (4) who had worked as a performance analyst for an English Premier League club. All the attributes were then compiled into a draft consensus document.

Round 1:

In the first round of the e-Delphi process the draft consensus document was forwarded to our ten panel members. Each participant was requested to state how important each attribute was using a nine-point scale (Meshkat et al., 2014). As with previous e-Delphi studies (i.e. Meshkat et al., 2014) a score between 1-3 indicated that the panel disagreed with the attribute; 4-6 represented an attribute that was ambiguous; and 7-9 represented a statement that found agreement. Attributes for which 70% of participants did not grade within the scale 7-9 were eliminated. The results were then distributed back to participants for round 2.

Round 2:

The list of attributes that did not meet consensus from round 1 were forwarded to each panel member using the email address provided. Each participant was requested using the same nine-point scale to grade the remaining statements eliminated at the end of round 1. At the end of round 2 two new attributes were introduced by one of the panel members (i.e., 'coachability' and 'flair') these were accepted by the research team and included under the 'hidden attributes' category for round 3.

Round 3:

During round 3, the participants graded the attributes using the same nine-point scale but with the knowledge of the group scores from the previous two rounds. An identical procedure of elimination was then performed and a final list of attributes was agreed.

Online survey

Following final consensus, the generic physical, psychological, technical, and hidden attributes were then incorporated into a position-specific survey using an online survey tool (https://www.onlinesurveys.ac.uk). Specific examples of each of the attributes was included to avoid any potential confusion. The online survey was distributed using various social media platforms (i.e. Facebook, Twitter, LinkedIn) for a period of four weeks. Specifically, on-line communities considered relevant for talent identification in soccer (e.g. The Football Collective, Professional Football Scouts Association) were targeted. The survey consisted of two sections. The first of these included a series of demographic questions for each respondent (i.e. age and gender, country of residence, coaching qualification and current job role). The second section required each respondent to imagine they were responsible for talent recruitment and using the generic attributes captured in the e-Delphi poll rank them according to a recognised playing position.

For example, after selecting a recognised defensive position (e.g. central defender and/or full-back), midfield positions (e.g. central midfield, left midfield, right midfield) and/or attacking positions (e.g. wide attacking player and centre-forward), participants were asked to select an attribute from the e-Delphi they thought was indicative of the position and rank using a 7-point Likert scale. Attributes were ranked in order of importance from: (7 = most important; 1 = least important). The frequency of responses was recorded on a Microsoft Excel (2016) spreadsheet for each playing position and the overall mean score was determined by summing the item rank scores and dividing by the frequency of respondents to each question (See Table 1 for an example). Therefore, higher values indicated higher levels of importance

for each attribute and player-position. Due to the specialist nature of the position and the specific coaching and talent identification routeway goalkeepers are not included in this analysis.

Table 1 About Here

Results

e-Delphi

Ten panel members with high levels of expertise and experience in the field of talent identification and player recruitment in elite youth soccer participated in three e-Delphi rounds. Following the first round 95 attributes did not reach full consensus. 31 of the original 126 attributes were accepted into the final list without modification. At the beginning of round two, 95 attributes that did not reach agreement were disseminated to the panel members. Following the second round of voting, agreement was reached on five positional attributes. Twenty-three attributes were omitted and 67 out of 95 attributes did not reach any consensus. During the third and final round, four attributes reached agreement. In addition, two new attributes were introduced and accepted. The panel also agreed to omit 61 attributes as they could not reach 70% agreement.

The final list of physical, psychological, technical, and hidden player attributes that received full consensus from the e-Delphi poll are presented in Table 2. A breakdown of the full e-Delphi process and results is provided in Figure 1.

*****TABLE 2 ABOUT HERE*****

*****FIGURE 1 ABOUT HERE*****

Online survey

During the four weeks that the survey was live (12th April 2018 – 10th May 2018), a total of 99 participants registered their interest and fully completed the online survey. The majority of the participants were male (n = 88). All of the participants held a formal soccer coaching

qualification which ranged from the UEFA A licence or equivalent, to the FA Level 2 in coaching soccer, or equivalent. None of our respondents indicated whether they had completed any formal talent identification awards (i.e. FA level 1 in talent identification: an introduction to scouting). The participants recorded a range of job roles within soccer which included; professional soccer academy managers, academy coaches who had responsibilities for player recruitment, participation coaches, coach educators and designated talent scouts. The respondents were located in various geographic locations around the world including; Europe (n = 81), Oceania (n = 13), North America (n = 4) and Asia (n = 1).

The descriptive statistics (mean ± standard deviation) and rankings for the player positional requirements based on responses to physical, psychological, technical, and hidden attributes generated by the e-Delphi poll are provided in Table 3. Of note is the relative importance attached to perceptual-cognitive skills, with *decision-making* ranked highest for central defensive positions, central midfield positions, and left/right midfield positions. The importance of *anticipation* was ranked highest for central attacking and wide positions. Participants rated technical skills such as *technique under pressure* in congested areas of the pitch (i.e. central midfield and right/left midfield) as important. *Tackling* was recorded as most important for full-back positions with technical skills such as *crossing* and *passing also* highly rated. Interestingly, there were relatively low scores for physiological or anthropometric attributes. The highest recorded mean scores for physiological requirements included *agility* for right/left midfield positions, *strength* for central defensive positions, *stamina* for central midfield positions and *speed* for central/wide attacking positions.

*****TABLE 3 ABOUT HERE*****

Discussion

The aim of this study was to develop a robust methodology for the construction of player-positional attributes, considered important for talent identification purposes in elite youth soccer. This was accomplished by the implementation of a validated e-Delphi protocol (Meshkat et al., 2014) and an online survey. This paper, therefore, adds to previous research (i.e. Larkin & O'Connor, 2017) by providing a hierarchy of player attributes that are explicitly linked to outfield positions. During our e-Delphi poll our panel members reported similar generic attributes to those identified previously by Larkin and O'Connor (2017). However, when the list of attributes was compiled into an online survey and linked to player position we observed some interesting differences to that of our Australian colleagues. For instance, Larkin and O'Connor (2017) rated a number of generic technical skills as most important (i.e. first touch, 1 v 1, and striking the ball). In the follow up interviews conducted as part of Larkin and O'Connor's study, the justification for first touch as the most important attribute for players at the U13 age group was because it was a considered to be a 'foundation skill' and a pre-requisite for all on-the-ball actions. Whilst we do not disagree with this assumption, we too found literature on the importance of a player's first touch limited and so further work is required in this area. The same may be said for indicating whether the player was receiving the ball with their stronger or weaker foot and this may be worthy of further examination.

In contrast, our respondents ranked perceptual-cognitive skills such as *decision-making* in central defensive and midfield positions (i.e. central and right/left) and *anticipation* in attacking positions higher than any technical skills such as first-touch, passing or 1 v 1. Moreover, technical attributes were only considered most important when *under pressure* which supports Larkin & O'Connor's (2017) point that further research is required to provide more ecologically valid assessments for assessing the technical abilities of young players.

Perceptual-cognitive skills

Previous soccer related research has consistently demonstrated that players with enhanced

316 perceptual-cognitive skills (e.g., decision-making and anticipation), have a considerable
317 advantage when compared to less-proficient players (Roca et al., 2011; Vaeyens et al., 2007).
318 In this respect the development of perceptual-cognitive adaptations appropriate for decision-
319 making are believed to be optimized when the training environment includes game-specific
320 activities (O'Connor, Larkin & Williams, 2017, Roca et al., 2012; Savelsbergh, Van Gastel, &
321 Van Kampen, 2010 Williams & Ford, 2013). The quality of decision-making is often defined
322 as the appropriateness of the decision preceding an appropriate action (O'Connor, Larkin &
323 Williams, 2017, Hohman, Obelöer Schlapkohl, & Raab, 2016), and evidence of experts having
324 superior visual search behaviour and fewer fixations to determine responses when compared
325 to near-experts, or non-experts has been demonstrated in striking and fielding sports (i.e.
326 cricket; McRobert et al., 2011) and invasion type sports such as a handball (Rabb & Johnson,
327 2007) and field hockey (Elferink-Gemser, et al., 2007). Research surrounding how practice
328 structure should be designed in order to promote the improvement of decision-making and
329 anticipation in soccer has suggested practice should replicate the experiences a player
330 encounters during competition (Patterson & Lee, 2008; Vickers, 2007; Williams & Ford,
331 2009). For instance, Ford et al. (2010) examined the differences between two types of practice
332 activities structure – Training Form (TF) and Playing Form (PF) – in English youth soccer.
333 While TF was defined as the type of activities that are based on technical and skill practices
334 that did not contain game-specific elements (i.e. opposition); PF was defined as activities
335 similar to the game-context incorporated through either small-sided games or phases-of-play.
336 The results indicated that TF was predominantly used in the youth soccer sessions when
337 compared to the PF. Despite this, several authors (i.e. Roca et al., 2012; Williams et al., 2012)
338 have suggested that practices designed with a structure similar to the PF are beneficial to
339 promote the development of decision-making and anticipation. This is supported by evidence
340 that casual links exist between superior anticipation and decision-making skills for those

341 players who experienced higher levels of soccer-specific play and practice hours during
342 adolescence (Roca et al., 2013).

343 *Technical attributes*

344 Similar to Larkin and O'Connor (2017) our respondents rated the importance of technical
345 attributes such as *tackling, heading*, *passing and crossing* for defensive and midfield positions
346 and *shooting,* and *1 v 1* for more attacking positions and *technique under pressure.* Clearly the
347 ability to distribute the ball effectively from one player to another in order for a team to
348 maintain possession is imperative, and there is evidence a positive association between time in
349 possession of the ball, and overall team success exists (Bradley et al., 2013). However, some
350 caution is required here as ball possession is multifaceted and influenced by factors such as the
351 playing style (Fernandez-Navarro et el. (2016), the quality of the opposition (Lago, 2009), the
352 score and the match location (Lago & Martin, 2007). *Passing* was indicated to be an important
353 technical indicator for fullbacks. This has also been reported in high percentage ball possession
354 teams where defensive players performed better passing completions than offensive players
355 (Bradley et al., 2013).
356 An important technical attribute for midfield players was *technique under pressure*. One might
357 speculate that due to the often small, congested area where midfield players operate, their
358 ability to control the ball, pass, dribble and turn is performed while under a rapidly changing
359 environment with constraints on time and space (Vaeyens et al., 2006). This particular attribute
360 is an interesting one given that the interdependency of executing a technique (i.e. passing) in
361 an unpredictable, interactive environment could arguably be termed a 'technical skill' rather
362 than 'technique' *per se*, due to the ability to adapt to different in-game scenarios, and decision-
363 making processes (Le Moal et al., 2014). For instance, previous research has illustrated that
364 when the proportion of attacking to defensive players in open-play situations is constrained by

numbers, time and space (i.e. 2 vs. 1, 3 vs. 1, 3 vs 2, 4 vs. 3 and 5 vs. 3) typically skilled youth players employ faster and more accurate decisions than their less-skilled counterparts (Vaeyens et al., 2007a, 2007b). This has been attributed to more skilful players employing a smaller number of fixations for longer periods in 2 versus 1 or 3 versus 1 situation towards the ball or player in position of the ball. Whereas in situations where the number of attacking and defensive players is increased (i.e. 3 vs 2, 4 vs. 3, and 5 vs 3) skilled players employed a higher number of fixations for a shorter time period (Vaeyens et al., 2007a, 2007b). However, some have questioned the ecological validity of such skill-related performance tests as they are conducted independent of match context (Aquino et al., 2017).

Physiological attributes

Because soccer has movement demands such as walking, jogging, running, sprinting, and jumping, it was no surprise that eight physiological attributes found consensus in the e-Delphi process. However, the respondents in our survey only selected five of these (i.e. speed, stamina, strength, agility and acceleration) and when requested to associate these with specific player positions it was noticeable how physiological attributes recorded relatively lower mean scores when compared to tactical and technical attributes. Clearly, an emphasis on physiological requirements are important considerations when assessing talented youth players, and as such there are a battery of standardised tests which sports science and medicine staff employ as part of both a habitual training programme (Enright et al., 2018) and the EPPP requirement that periodic audits of player somatic maturation status are carried out (Towlson et al., 2017). For example, repeated sprint ability tests (Chaouchi et al., 2010), agility tests (Pojskic et al., 2018), vertical jump height (Acero et al., 2011) and the Yo-Yo intermittent recovery test 2 (Krustrup & Bangsbo, 2001). However, due to the unpredictable nature of youth development (Bailey and Collins, 2013) some have questioned the relevance of such tests in the talent selection process (Carling & Collins, 2014).

The importance of *stamina* was reported for midfield players but not for central defenders, fullbacks, or those players in more offensive positions. This is supported by well-established research that midfield players cover more total and high-intensity running than central defenders (Bradley et al., 2013; Gregson, Drust, Atkinson & Di Salvo, 2010) and is consistent with cross-sectional studies conducted amongst elite-youth populations (Deprez et al., 2015). The inclusion of *acceleration* instead of *stamina* for fullbacks may be indicative of modern styles of play where fullbacks require explosiveness to pass an opponent in wide areas of the pitch. Diverse speed abilities such as *acceleration* were considered important antecedents for fullbacks and players with attacking roles. This appears to be supported by a recent study where elite youth fullbacks and wide midfield recorded superior sprint times across 10m and 20m when compared to other outfield positions (Towlson et al., 2017).

A recent systematic review of the physiological and physical characteristics in youth soccer also confirmed the relevance of these performance indicators (Murr, Raabe, & Höner, 2018). Similarly, motor skills such as *agility* and the ability to change direction is also well established in the literature (Murr, Raabe, & Höner, 2018), however, it is worth noting that agility can be considered a speed-related motor ability without cognitive loads (Young, Dawson, & Henry, 2015). Our e-Delphi poll and online survey however was not sensitive enough to distinguish the potential differences between agility and change-of-direction, therefore the term motor ability may be a more intuitive term.

Despite the stated importance of power in soccer (i.e. Boone et al., 2012) this physiological attribute was not recorded in the final list or included on the survey. This omission is not easily explained, however, power was recently reported to only contain small prognostic relevance as a performance indicator (Murr, Raabe, & Höner, 2018) although the authors did provide a footnote stating that power can also be regarded as a component of speed and, therefore, should not be totally discounted. Anthropometric and physical performance

attributes which have featured in previous talent research (i.e. body mass, body height, maturation and chronological age) were not accepted into the final list. This may be due to a body of well-established research suggesting that biological maturity temporarily affected several attributes, which makes these attributes not a stable predictor of future performance (Bidaurrazaga-Letona et al., 2015; Vandendriessche, et al., 2012).

Limitations

Despite making a novel contribution to the sport, exercise, and pedagogy literature this study contains a number of methodological limitations which need to be acknowledged. Firstly, consensus methods such as e-Delphi may contain bias in the recruitment of participants or participants may be obliged to vote in a certain way to pacify the group. The selection of panel members is considered to be the most important stage in the Delphi process (Hsu, 2007), as it relates to the quality of the eventual data capture. Despite our best efforts to recruit participants who were appropriately qualified and had experiences and knowledge of talent recruitment, we acknowledge that our completely male panel, who were all residents of the same country may be biased towards a national, rather than international context. Future studies should, therefore, consider including more international participants as well as female members. Another consideration may be the inclusion of players: as key stakeholders in this process, their input into the criteria selection would be beneficial as issues of vocabulary and definition might vary between scouts, coaches, and players. Secondly, the sample size of the online survey was modest, with the majority of those completing the survey listed as coaches, and it was not clear how many of these coaches had responsibility for player recruitment. Thirdly, the player-position attributes are reported as isolated, discrete statements and a further suggestion is whether these attributes can occur in combination.

In order to verify the veracity of some of our claims, we propose that future research considers capturing verbal cognitions of talent scouts using real game footage. As talent identification processes are often undertaken away from the professional academy environment, this may help support coaches, teachers, and scouts identify potentially talented players as a grading system could be added to each of the positional components.

Conclusion

Talent identification in youth soccer continues to operate with a limited number of objective measures or consensus surrounding generic player-positional attributes. Thus, the purpose of this study was to provide real-world information surrounding player-positional attributes which, in-turn, could help inform youth talent selection programs for both coaches and recruitment staff. The findings include some initial evidence that player-positional attributes considered important at the junior-elite phase are more perceptual-cognitive and technical than physiological or anthropometric. Despite 'hidden' attributes (e.g. coachability, flair, versatility, vision etc.) finding consensus in the e-Delphi poll, there was no evidence to support these traits when associated with a specific playing position.

Acknowledgements

The authors would like to thank the panel members and the soccer coaches and recruitment staff who participated in this exploratory study.

460 **References**

461 Anderson G, Miller R. 2012. The academy system in English professional football. Liverpool,
462 Liverpool University Management School.
463
464 Baker J, Schorer J, Wattie N. 2017. Compromising Talent: Issues in Identifying and Selecting
465 Talent in Sport. Quest. iFirst:1–16. doi:10.1080/00336297.2017.1333438.
466
467 Bidaurrazaga-Letona I, Lekue JA, Amado M, Santos-Concejero J, Gil SM. 2015. Identifying
468 talented young soccer players: conditional, anthropometrical and physiological characteristics
469 as predictors of performance. Rev Int Cienc Deporte. 11(39):79–95.
470 doi:10.5232/ricyde2015.03906.
471
472 Boone J, Vaeyens R, Steyaert A, Bossche L Vanden, Bourgois J. 2012. Physical Fitness of
473 Elite Belgian Soccer Players by Player Position. J Strength Cond Res. 26(8):2051–2057.
474 doi:10.1519/JSC.0b013e318239f84f.
475
476 Bradley PS, Lago-Peñas C, Rey E, Gomez Diaz A. 2013. The effect of high and low percentage
477 ball possession on physical and technical profiles in English FA Premier League soccer
478 matches. J Sports Sci. 31(12):1261–1270. doi:10.1080/02640414.2013.786185.Carling
479
480 Christensen MK. 2009. “An Eye for Talent”: Talent Identification and the “Practical Sense” of
481 Top-level Soccer Coaches. Sociol Sport J. 26(3):365–382.
482

483 Coelho e Silva MJ, Figueiredo AJ, Simões F, Seabra A, Natal A, Vaeyens R, Philippaerts R,
484 Cumming SP, Malina RM. 2010. Discrimination of U-14 Soccer Players by Level and Position.
485 Int J Sports Med. 31(11):790–796. doi:10.1055/s-0030-1263139.Coutinho P,
486
487 Collins D. 2014. Comment on "Football-specific fitness testing: adding value or confirming
488 the evidence?" J Sports Sci. 32(13):1206–1208. doi:10.1080/02640414.2014.898858.
489
490 Collins D, MacNamara A, Cruickshank A. 2018. Research and practice in talent identification
491 and development – some thoughts on the state of play. J Appl Sport Psychol. 0: 1-12.
492
493 Deprez D, Fransen J, Boone J, Lenoir M, Philippaerts R, Vaeyens R. 2015. Characteristics of
494 high-level youth soccer players: variation by playing position. J Sports Sci. 33(3): 243-254
495 doi: 10.1080/02640414.2014.934707
496
497 Elferink-Gemser MT, Visscher C, Lemmink KAPM, Mulder T. 2007. Multidimensional
498 performance characteristics and standard of performance in talented youth field hockey
499 players: A longitudinal study. J Sports Sci. 25(4):481–489. doi:10.1080/02640410600719945.
500
501 Enright K, Morton J, Iga J, Lothian D, Roberts S, Drust B. 2018. Reliability of "in-season"
502 fitness assessments in youth elite soccer players: a working model for practitioners and
503 coaches. Sci Med Footb. 2(3):177–183. doi:10.1080/24733938.2017.1411603.
504
505 Fenner JSJ, Iga J, Unnithan V. 2016. The evaluation of small-sided games as a talent
506 identification tool in highly trained prepubertal soccer players. J Sports Sci. 34(20):1983–1990.
507 doi:10.1080/02640414.2016.1149602.

508

509 Fernandez-Navarro J, Fradua L, Zubillaga A, Ford PR, McRobert AP. 2016. Attacking and
510 defensive styles of play in soccer: analysis of Spanish and English elite teams. J Sports Sci.
511 34(24):2195–2204. doi:10.1080/02640414.2016.1169309.

512

513 Ford PR, Yates I, Williams AM. 2010. An analysis of practice activities and instructional
514 behaviours used by youth soccer coaches during practice: Exploring the link between science
515 and application. J Sports Sci. 28(5):483–495. doi:10.1080/02640410903582750.

516

517 Gil SM, Zabala-Lili J, Bidaurrazaga-Letona I, Aduna B, Lekue JA, Santos-Concejero J,
518 Granados C. 2014. Talent identification and selection process of outfield players and
519 goalkeepers in a professional soccer club. J Sports Sci. 32(20):1931–1939.
520 doi:10.1080/02640414.2014.964290.

521

522 Gregson W, Drust B, Atkinson G, Salvo V. 2010. Match-to-Match Variability of High-Speed
523 Activities in Premier League Soccer. Int J Sports Med. 31(04):237–242. doi:10.1055/s-0030-
524 1247546.

525

526 Gréhaigne J-F, Richard J-F, Griffin LL. 2005. Teaching and Learning Team Sports and Games.
527 Abingdon, Oxon: Routledge.

528

529 Haugaasen M, Toering T, Jordet G. 2014. From childhood to senior professional football: A
530 multi-level approach to elite youth football players' engagement in football-specific activities.
531 Psychol Sport Exerc. 15(4):336–344. doi:10.1016/j.psychsport.2014.02.007.

532

533 Helmer-Hirschberg O. 1963. An experimental application of the Delphi method to the use of
534 experts. Manage Sci. 9(3):458–467.
535
536 Hohmann T, Obelöer H, Schlapkohl N, Raab M. 2016. Does training with 3D videos improve
537 decision-making in team invasion sports? J Sports Sci. 34(8):746–755.
538 doi:10.1080/02640414.2015.1069380.
539
540 Hsu C-C, Sandford BA. 2007. The Delphi Technique: Making Sense Of Consensus. Pract
541 Assess Res Eval. 12(10):1–8.
542
543 Lago-Ballesteros J, Lago-Peñas C, Rey E. 2012. The effect of playing tactics and situational
544 variables on achieving score-box possessions in a professional soccer team. J Sports Sci.
545 30(14):1455–1461. doi:10.1080/02640414.2012.712715.
546
547 Lago C. 2009. The influence of match location, quality of opposition, and match status on
548 possession strategies in professional association football. J Sports Sci. 27(13):1463–1469.
549 doi:10.1080/02640410903131681.
550
551 Lago C, Martín R. 2007. Determinants of possession of the ball in soccer. J Sports Sci.
552 25(9):969–974. doi:10.1080/02640410600944626.
553
554 Larkin P, O'Connor D. 2017. Talent identification and recruitment in youth soccer: Recruiter's
555 perceptions of the key attributes for player recruitment. Sampaio J, editor. PLoS One.
556 12(4):e0175716. doi:10.1371/journal.pone.0175716.
557

558 Larkin P, Reeves MJ. 2018 Jan 31. Junior-elite football: time to re-position talent
559 identification? Soccer Soc.:1–10. doi:10.1080/14660970.2018.1432389.
560
561 Le Moal E, Rue O, Ajmol A, Abderrahman AB, Hammami MA, Ounis OB, Kebsi W, Zouhal
562 H. 2014. Validation of the Loughborough Soccer Passing Test in Young Soccer Players. J
563 Strength Cond Res. 28(5):1418–1426. doi:10.1519/jsc.0000000000000296.
564
565 Leyhr D, Kelava A, Raabe J, Höner O. 2018. Longitudinal motor performance development in
566 early adolescence and its relationship to adult success: An 8-year prospective study of highly
567 talented soccer players. Plos ONE. 13(5):1-16.
568
569 Lewis CJ, McRobert AP, Reeves MJ, Roberts SJ. In Review. Using a verbal reporting
570 technique to establish talent scout cognitions during formal competition. High Abil Stud.
571
572 Malina, RM. 2008. Biocultural factors in developing physical activity levels. In Smith, AL &
573 Biddle, SJH (Eds), *Youth Physical Activity and Inactivity* (pp. 141-166). Champaign, IL:
574 Human Kinetics.
575
576 McRobert AP, Ward P, Eccles DW, Williams AM. 2011. The effect of manipulating context-
577 specific information on perceptual-cognitive processes during a simulated anticipation task. Br
578 J Psychol. 102(3):519–534. doi:10.1111/j.2044-8295.2010.02013.x.
579
580 Meshkat B, Cowman S, Gethin G, Ryan K, Wiley M, Brick A, Clarke E, Mulligan E. 2014.
581 Using an e-Delphi technique in achieving consensus across disciplines for developing best
582 practice in day surgery in Ireland. J Hosp Adm. 3(4). doi:10.5430/jha.v3n4p1.

583

584 Meylan C, Cronin J, Oliver J, Hughes M. 2010. Talent Identification in Soccer: The Role of
585 Maturity Status on Physical, Physiological and Technical Characteristics. Int J Sport Sci Coach.
586 5(4):571–592.

587

588 Mesquita I, Fonseca AM. 2016. Talent development in sport: A critical review of pathways to
589 expert performance. Int J Sports Sci Coach. 11(2):279–293.
590 doi:10.1177/1747954116637499.Dalkey

591

592 Murr D, Raabe J, Höner O. 2018. The prognostic value of physiological and physical
593 characteristics in youth soccer: A systematic review. Eur J Sport Sci. 18(1):62–74.
594 doi:10.1080/17461391.2017.1386719.

595

596 Nicholls SB, Worsfold PR. 2016. The observational analysis of elite coaches within youth
597 soccer: The importance of performance analysis. Int J Sports Sci Coach. 11(6):825–831.
598 doi:10.1177/1747954116676109.

599

600 O'Connor D, Larkin P, Mark Williams A. 2016. Talent identification and selection in elite
601 youth football: An Australian context. Eur J Sport Sci. 16(7):837–844.
602 doi:10.1080/17461391.2016.1151945.

603

604 Patterson JT, Lee TD. 2008. Organizing practice: the interaction of repetition and cognitive
605 effort for skilled performance. In: Farrow D, Baker J, McMahon C, editors. Developing Sports
606 Expertise: Researchers and Coaches Put Theory into Practice. Abingdon, Oxon: Routledge. p.
607 119–134.

608

609 Philippaerts RM, Vaeyens R, Janssens M, Van Renterghem B, Matthys D, Craen R, Bourgois
610 J, Vrijens J, Beunen G, Malina RM. 2006. The relationship between peak height velocity and
611 physical performance in youth soccer players. J Sports Sci. 24(3):221–230.
612 doi:10.1080/02640410500189371.

613

614 Raab M, Johnson JG. 2007. Expertise-based differences in search and option-generation
615 strategies. J Exp Psychol Appl. 13(3):158–170. doi:10.1037/1076-898X.13.3.158.

616

617 Reeves MJ, McRobert AP, Littlewood MA, Roberts SJ. 2018a. A scoping review of the
618 potential sociological predictors of talent in junior-elite football: 2000–2016. Soccer Soc.
619 doi:10.1080/14660970.2018.1432386.

620

621 Reeves MJ, Roberts SJ, McRobert AP, Littlewood MA. 2018b. Factors affecting the
622 identification of talented junior-elite footballers: a case study. Soccer Soc.
623 doi:10.1080/14660970.2018.1432383.

624

625 Roberts SJ. 2014. Talking relative age effects: a fictional analysis based on scientific evidence.
626 Asia-Pacific J Heal Sport Phys Educ. 5(1):55–66. doi:10.1080/18377122.2014.868290.

627

628 Roca A, Ford PR, McRobert AP, Mark Williams A. 2011. Identifying the processes
629 underpinning anticipation and decision-making in a dynamic time-constrained task. Cogn
630 Process. 12(3):301–310. doi:10.1007/s10339-011-0392-1.

631

632 Roca A, Williams AM, Ford PR. 2012. Developmental activities and the acquisition of superior
633 anticipation and decision making in soccer players. J Sports Sci. 30(15):1643–1652.
634 doi:10.1080/02640414.2012.701761.
635
636 Savelsbergh GJP, Van Gastel PJ, Van Kampen PM. 2010. Anticipation of penalty kicking
637 direction can be improved by directing attention through perceptual learning. Int J Sport
638 Psychol. 41(1):24–41.
639
640 Tears C, Chesterton P, Wijnbergen M. 2018. The elite player performance plan: the impact of
641 a new national youth development strategy on injury characteristics in a premier league football
642 academy. J Sports Sci. 36(19):2181–2188. doi:10.1080/02640414.2018.1443746.
643
644 Towlson C, Cobley S, Midgley A, Garrett A, Parkin G, Lovell, R. 2017. Relative age,
645 maturation, and physical biases on position allocation in elite-youth soccer. Int J Sports Med.
646 38(3):201-209.
647
648 Unnithan V, White J, Georgiou A, Iga J, Drust B. 2012. Talent identification in youth soccer.
649 J Sports Sci. 30(15):1719–1726. doi:10.1080/02640414.2012.731515.
650
651 Vaeyens R, Lenoir M, Williams AM, Mazyn L, Philippaerts RM. 2007. The Effects of Task
652 Constraints on Visual Search Behavior and Decision-Making Skill in Youth Soccer Players. J
653 Sport Exerc Psychol. 29(2):147–169. doi:10.1123/jsep.29.2.147.
654

655 Vaeyens R, Lenoir M, Williams AM, Philippaerts RM. 2007. Mechanisms Underpinning
656 Successful Decision Making in Skilled Youth Soccer Players: An Analysis of Visual Search
657 Behaviors. J Mot Behav. 39(5):395–408. doi:10.3200/JMBR.39.5.395-408.
658
659 Vaeyens R, Lenoir M, Williams AM, Philippaerts RM. 2008. Talent identification and
660 development programmes in sport: Current models and future directions. Sport Med.
661 38(9):703–714.
662
663 Vaeyens R, Malina RM, Janssens M, Van Renterghem B, Bourgois J, Vrijens J, Philippaerts
664 RM. 2006. A multidisciplinary selection model for youth soccer: the Ghent Youth Soccer
665 Project. Br J Sports Med. 40(11):928–934. doi:10.1136/bjsm.2006.029652.
666
667 Vandendriessche JB, Vaeyens R, Vandorpe B, Lenoir M, Lefevre J, Philippaerts RM. 2012.
668 Biological maturation, morphology, fitness, and motor coordination as part of a selection
669 strategy in the search for international youth soccer players (age 15–16 years). J Sports Sci.
670 30(15):1695–1703. doi:10.1080/02640414.2011.652654.
671
672 Vilar L, Araújo D, Davids K, Correia V, Esteves PT. 2013. Spatial-temporal constraints on
673 decision-making during shooting performance in the team sport of futsal. J Sports Sci.
674 31(8):840–846. doi:10.1080/02640414.2012.753155.
675
676 Vrljic K, Mallett CJ. 2008. Coaching Knowledge in Identifying Football Talent. Int J Coach
677 Sci. 2(1):63–81.
678

679 Williams AM, Ford PR. 2009. Promoting a skills-based agenda in Olympic sports: The role of
680 skill-acquisition specialists. J Sports Sci. 27(13):1381–1392.
681 doi:10.1080/02640410902874737.
682
683 Williams AM, Ford PR. 2013. “Game intelligence”: anticipation and decision making. In:
684 Williams AM, editor. Science and Soccer: Developing Elite Performers. 3rd ed. Abingdon,
685 Oxon: Routledge. p. 103–138.
686
687
688
689
690
691
692
693
694
695
696
697
698
699
700
701
702
703

704 Table 1. Frequency of responses to attributes for ‘Full-Back’ position.

705
706

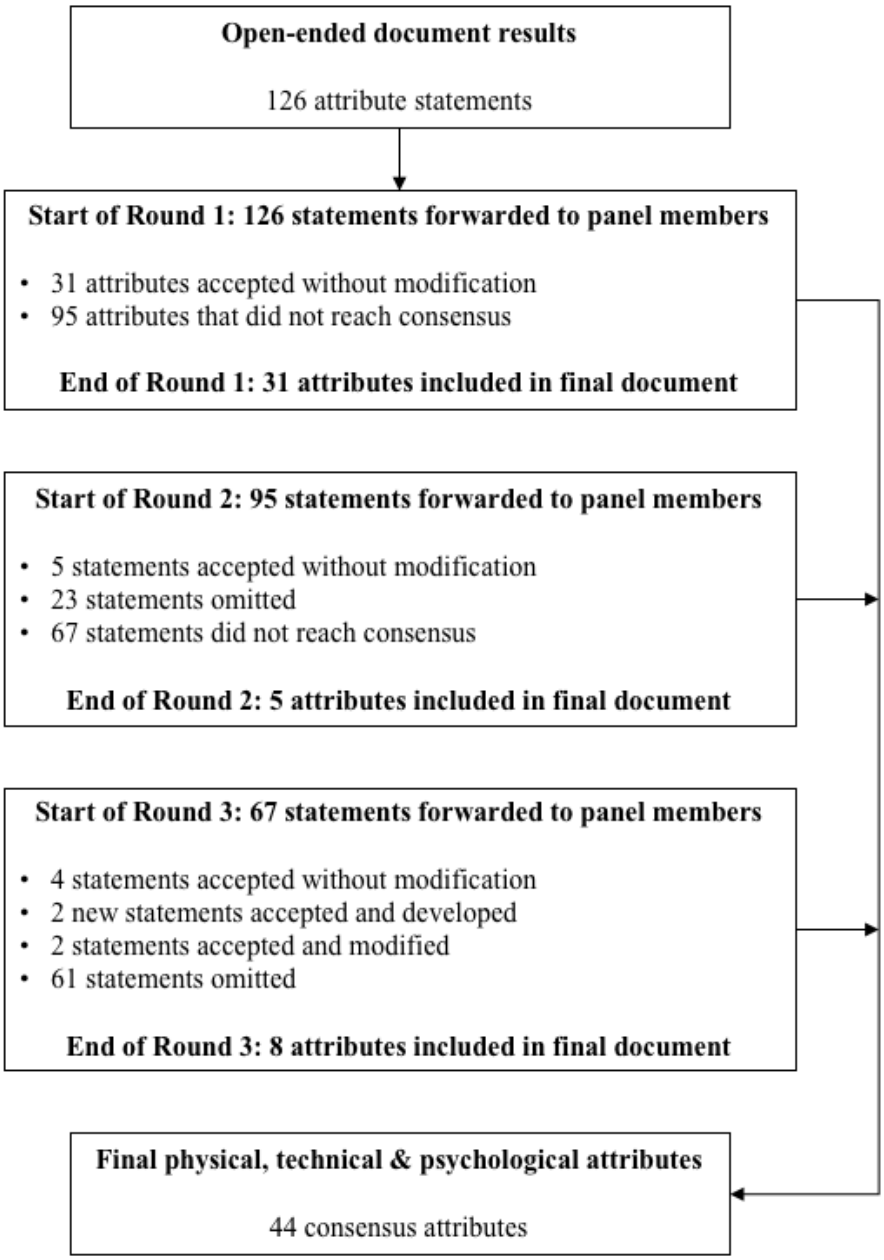
Attribute	Ranking							Mean
	1	2	3	4	5	6	7	
Tackling	0	0	0	6	4	21	22	6.1

707

Table 2: Final list of agreed player attributes resulting from e-Delphi poll

Physical	Psychological	Technical	Hidden
Acceleration	Aggression	First touch	Adaptability
Agility	Anticipation	Crossing	Consistency
Balance	Bravery	Corners (delivering)	Versatility
Fitness	Composure	Dribbling/running with the ball	Important matches
Speed	Concentration	Finishing	Coachability
Stamina	Decision-making	Free-kicks (delivering)	Communication
Strength	Determination	Heading	Flair
Jumping reach	Leadership	Long-range shooting	Creativity
	Off-the-ball thinking	Long throw-ins	
	Positioning	Passing accuracy	
	Team work	Marking	
	Attitude	Penalty taking	
	Vision	Tackling	
		1v1	
		Technique under pressure	

Figure 1. E-Delphi process and results



Player Position	Attribute	Mean score	SD
Central Defender	Decision making	5.21	0.64
	Heading	5.01	0.69
	Marking	4.84	1.71
	Positioning	3.83	1.61
	First touch	3.63	1.13
	Strength	3.32	0.52
Full-back (Left/Right)	Tackling	6.11	0.51
	Crossing	5.67	2.72
	Passing accuracy	5.53	1.66
	Agility	3.13	2.08
	First touch	2.94	2.28
	Acceleration	2.93	1.13
Central Midfield	Decision-making	5.82	1.10
	Technique under pressure	5.71	1.00
	Passing accuracy	4.56	1.79
	Positioning	3.94	1.72
	First touch	3.73	1.91
	Stamina	3.13	2.24
Midfield (Left/Right)	Decision-making	6.14	2.16
	Technique under pressure	5.28	1.05
	Crossing	5.14	1.14
	Dribbling	4.14	1.05
	Agility	4.12	1.06
	Stamina	2.86	1.99
Central/Wide Attacking	Anticipation	5.64	1.82
	Shooting	3.65	1.49
	Finishing	3.23	1.74

First touch	3.14	3.18
1 v 1	3.01	1.66
Speed	2.64	1.45

Table 3. Mean scores of player attributes according to position

708