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'Goalkeepers are players too': key attributes coaches' look for in talented youth soccer goalkeepers

Leago Lethole¹, Alliance Kubayi^{1*}, Abel Toriola¹, Paul Larkin² and Joseph A. Stone³

Abstract

Objective Currently, there is a gap in knowledge on what the key goalkeeper attributes are during talent identification and selection in soccer. Hence, the objective was to investigate South African coaches' perceptions regarding key attributes of talented youth soccer goalkeepers.

Design Cross-sectional survey.

Methods A total of 173 soccer coaches (130 men and 43 women; $M_{age} = 36.6 \pm 10.4$ years; $M_{coaching\ experience} = 8.4 \pm 7.3$ years) were purposively recruited to participate in the study. All of the participants completed the Talent Identification Questionnaire in Soccer – Goalkeepers (TIDQS-GK).

Results The six-component solution identified by the principal component analysis accounted for 68.96% of the total variance. Coaches deemed psychological (e.g. concentration, bravery, self-discipline), physical (e.g. speed, flexibility), social (e.g. coachability, communication), technical (e.g. catching the ball, first touch), tactical (e.g. defensive organisation against set plays) and perceptual-cognitive skills (e.g. decision-making) as important factors in identifying talented goalkeepers.

Conclusions The study offers new insights into the key attributes that soccer coaches look for in talented goalkeepers such as concentration, bravery, speed, coachability and decision-making and could direct coaches towards more objective evaluation strategies for informing their decisions.

Keywords Talent identification, Tactical, Psychological, Elite level

Introduction

Talent identification and development programmes have become central to the operations of youth soccer academies globally, with sports science spearheading the process of identifying key attributes of youth players that may predict their future success [1, 2]. The process of talent detection, identification and selection is important for the development of future elite-level players [3], whereby the central premise of this process is to identify and select the most promising young talents to focus resources on their development [4]. Within the applied context, soccer member associations and professional

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clubs have a general belief that early talent identification and selection is essential to ensure clubs focus resources on player development and reduce potential attrition rates. However, researchers have indicated only a small proportion of players in professional development programmes reach the professional level [4–7]. Therefore, talent identification and development programmes should focus their limited resources on players who have the best potential for future elite performance [8].

The general objective of talent identification is to identify players who demonstrate the potential to excel at an elite senior performance level [3, 9, 10]. Traditionally, talent identification decisions are made by coaches / scouts observing players during a game or training session [11]. A limitation of this method is the subjectivity and potential influence of biases related to the assessors preconceived notion of what constitutes a talented player [12–13]. Hence, there is a growing use of objective measures in talent identification or the combination of subjective and objective assessments (see Barraclough et al. [14] for a review of methodological approaches to TID). Therefore, with the importance of these decisions on the organisation and the player, it is imperative to understand what specific characteristics youth coaches and scouts consider important when making talent identification decisions. Researchers have explored this, highlighting recruiters (i.e., coaches, scouts and technical directors) consider technical (i.e., finishing, first touch, heading, striking the ball and tackling), tactical (i.e., creativity and decision-making), psychosocial (i.e., coachability, communication and self-discipline), and physical (i.e., speed and stamina) attributes when assessing potential talent [1, 3, 7, 15]. While the findings do provide some insight into the factors which may guide talent identification decisions, a key limitation of the data is they are focussed on the attributes of outfield players, with little to no discussion of goalkeeper attributes.

The lack of information on goalkeeper attributes significantly constrains the knowledge on talent identification and selection in soccer. Goalkeeper attributes are worth exploring because goalkeepers are an essential component of soccer teams and their skill set differs significantly from that of their outfield counterparts. For instance, goalkeepers alternate between low-intensity activities like walking or jogging [2, 16] and high-intensity ones like diving, stopping shots and managing one-on-one situations [2]. The lack of goalkeeper-specific information for youth soccer talent-identification efforts limits recruiters' ability to reliably identify promising players in that position [2]. This study provides novel data on the attributes South African coaches consider when identifying promising goalkeepers and provides a baseline for future research on desirable soccer goalkeeper attributes.

Methods

This study used a cross-sectional survey. A total of 200 soccer coaches was targeted in the Gauteng Province of South Africa. A purposive sample of 173 soccer coaches (130 men and 43 women; $M_{age} = 36.6$ years, $SD=10.4$ years; $M_{Coaching-experience} = 8.4$ years, $SD=7.3$ years) took part in the study, which yielded an 86% response rate. The inclusion criteria included having worked in youth soccer talent identification programmes for at least a year and having a formal role in identifying, recruiting and selecting talented young soccer players. Institutional ethical approval was granted for this study, and all participants provided informed consent prior to participating.

To assess the participants' perceptions of attributes relevant to identifying promising goalkeepers, the Talent Identification Questionnaire in Soccer – Goalkeepers (TIDQS-GK; see supplementary file), was developed following a review of the current literature on goalkeeping performance [3, 7, 17, 18]. The questionnaire contained 61 items related to technical (16 items), tactical (8 items), physical (13 items), perceptual-cognitive (4 items), psychological (12 items) and social (8 items) attributes of goalkeepers. All items were anchored on the Miller's Scale Battery of International Patterns and Norms [19], which is a 9-point Likert scale ranging from 1 (not important) to 9 (very important). The scale uses three reference points with a bandwidth of three points each: 1–3 points (least important), 4–6 points (moderately important 4) and 7–9 points (most important), and has been used in previous talent identification studies [3, 20]. The Cronbach's alpha coefficient values were 0.87 for perceptual-cognitive skills, 0.91 for social skills, 0.93 for tactical skills, 0.94 for physical skills, 0.95 for technical skills and 0.95 for psychological skills, demonstrating that the questionnaire is reliable [21].

The Gauteng Sports Council was contacted to gain access to youth soccer coaches who were actively involved in identifying, selecting and recruiting youth goalkeepers. Eligible coaches were contacted during training sessions, coaching seminars and workshops and informed of the study's aims and methods. Participants were then given a hard copy of the TIDQS-GK along with the associated definitions and explanations of each attribute (see Table 1) [3, 15, 17, 18, 22, 23]. Participants were instructed to complete the questionnaire on their own in a quiet, private area before returning their responses to the researcher. The TIDQS-GK took 10 to 15 min to complete.

All data were transferred to Statistical Package for Social Sciences (SPSS, version 28) for statistical analysis. Descriptive statistics for each attribute were reported as means (M), standard deviations (SD), frequencies and percentages. Principal component analysis (PCA) was used to reduce the number of items and group them into

Table 1 Attributes and descriptions

Attribute	Description
Perceptual-cognitive skills	
Anticipation	Anticipating game developments; being proactive; anticipating and intercepting passes.
Creativity	Ability to create plays and options for teammates.
Decision-making	Choosing when to do what effectively; game intelligence; being clever with the ball.
Game awareness/sense	Ability to read the game; ability to scan; perception; being aware of surroundings.
Physical skills	
Acceleration	Quicker off the mark than peers at the same stage of development.
Agility	Sharpness; good mobility, quickness, reaction speed, agility and athleticism.
Balance	Ability to maintain equilibrium while moving.
Body mass	Greater weight than peers at the same stage of development.
Down-up speed	Ability to get up quickly after saving a ball.
Flexibility	More flexible than peers at the same stage of development.
Jumping reach	Ability to jump higher than peers at the same stage of development.
Power	Greater explosive power than peers at the same stage of development.
Repeated sprint ability	Ability to make several sprints in a short period of time without much rest.
Speed	Greater top speed than peers at the same stage of development.
Stamina	Greater ability to physically endure a game than peers at the same stage of development.
Standing height	Taller, with an imposing physicality relative to that of peers at the same stage of development.
Strength	Physically stronger than peers at the same stage of development.
Psychological skills	
Anxiety control	Ability to control anxiety.
Bravery	Ability to take calculated risks.
Commitment	Desire or resolve to perform.
Composure	Ability to be calm and in control.
Concentration	Ability to maintain focus throughout a game.
Grit	Passion and perseverance towards long-term goals.
Intrinsic motivation	Behaviour that is driven by internal rewards.
Positive attitude	Positive reaction after mistakes.
Resilience	Ability to recover quickly from difficulties.
Self-confidence	Confidence in themselves.
Self-discipline	Ability to motivate themselves to do what is right.
Willingness to take risks	Willingness to execute technical actions that could yield positive team outcomes but also carry a risk of potential negative outcomes.
Social skills	
Accountability	Completing tasks to the best of their ability and not making excuses, blaming others or complaining when outcomes do not meet expectations.
Character	Strength of character; developed morals.
Coachability	Receptivity to coaching; willingness to learn.
Communication	Ability to communicate relevant information precisely and vocally.
Leadership	Being a good leader; ability to influence players around them and ensure they are accountable.
Socioeconomic background	Family social and economic circumstances.
Supportive family life	Positive engagement with their family; family support of the athlete and assistance in being the best they can be.
Teamwork	Ability to work together with other team members to achieve the team's overall goals.
Tactical skills	
Ability to come off the line and deal with high balls	Ability to come off the line and compete with the opponents for aerial balls.
Ability to judge flight of the ball	Ability to read the trajectory of the ball in the air.
Ability to start attack	Ability to build up play during offensive phase of play.
Defending in 1v1 situations	Ability to prevent single opponent from getting behind or running at the goalkeeper.
Defensive organisation during open play	Ability to tactically organise players during the defensive phase of play.
Defensive organisation against set plays	Ability to organise their players when defending set plays (e.g. corners, free kicks, penalties, throw-ins).
Goalkeeper positioning and angling	Ability to position themselves and come off the line to narrow the goalpost.
Sweeper-keeper	Ability to push up the field to deal with balls being played behind defensive players.

Table 1 (continued)

Attribute	Description
Technical skills	
Receiving the ball with both feet	Ability to control the ball with left and right foot.
Catching the ball	Ability to hold the ball using hands.
Diving at a player's feet	Ability to dive onto the ball when it is at an opponent's feet.
Diving at low and high balls	Ability to dive at low and high balls.
Drop kick	Ability to drop the ball and kick it as soon as it touches the ground or as it rises.
First touch	Good first touch; good with their feet; consistent.
Footwork	Ability to stay on their toes and keep moving to save the ball.
Kicking the ball away from goal box	Ability to kick the ball far up the field.
Parrying the ball	Ability to strike the ball out of the way if it cannot be caught.
Passing accuracy	Quality of delivery, passing and kicking.
Punching the ball	Ability to strike the ball with their fist.
Punting	Ability to use the top of the foot to kick the ball from hands before it touches the ground.
Quick reflexes	Ability to react quickly to shots from different angles in a split second.
Shot saving at close proximity	Ability to prevent goals attempted from a short distance.
Taking the ball at chest height and above head	Ability to hold the ball at chest height and above their head.
Throwing the ball up-field	Ability to throw the ball a great distance.

meaningful subscales [24]. The following were the extraction criteria used in the PCA: (1) significant ($p < 0.05$) Bartlett's test results for sampling adequacy and sphericity with a Kaiser-Meyer-Olkin measure of sampling greater than the threshold of 0.60; (2) eigenvalues greater than 1.0, indicating that a component explained more variance than any single item; and (3) factor loadings greater than or equal to 0.30 [25, 26].

Results

The 61 items of the TIDQS-GK were evaluated for the factor structure and for how well they represented the underlying latent variables using PCA with an oblique oblimin rotation [24]. Bartlett's test of sphericity showed significant results ($\chi^2 = 12627.75$; $df = 1830$; $p < 0.001$), and the Kaiser-Meyer-Olkin statistic was 0.89, exceeding the 0.60 threshold [27]. The TIDQS-GK correlation matrix was therefore deemed appropriate for the PCA. The six-component solution identified by the PCA accounted for 68.96% of the total variance. The first component, psychological skills, had 12 items with an eigenvalue of 30.86 with a variance of 50.59%. Coaches deemed concentration ($M = 7.12$, $SD = 1.61$), bravery ($M = 7.11$, $SD = 1.45$) and self-discipline ($M = 7.11$, $SD = 1.38$) to be the most important psychological attributes for goalkeepers.

The second component, physical skills, had 13 items with an eigenvalue of 3.58 and accounted for 5.87% of the variance. Coaches rated flexibility ($M = 6.82$, $SD = 1.58$) and agility ($M = 6.71$, $SD = 1.76$) as important attributes. The third component, social skills, had eight items and an eigenvalue of 2.58 and accounted for 4.23% of the variance. Soccer coaches identified coachability ($M = 7.23$, $SD = 1.32$), communication ($M = 7.07$, $SD = 1.46$) and

character ($M = 7.02$, $SD = 1.34$) as the most important social attributes for goalkeepers. The fourth component, technical skills, had 16 items with an eigenvalue of 1.88 and accounted for 3.08% of the variance. Coaches rated catching the ball ($M = 6.88$, $SD = 1.50$) and first touch ($M = 6.74$, $SD = 1.72$) as the most important technical attributes for goalkeepers.

The fifth component, tactical skills, had eight items with an eigenvalue of 1.70 and accounted for 2.79% of the overall variance. Coaches identified defensive organisation against set plays ($M = 6.85$, $SD = 1.61$), defending in one-on-one situations ($M = 6.84$, $SD = 1.83$) and ability to come off the line and deal with high balls ($M = 6.78$, $SD = 1.58$) as the most essential tactical skills for goalkeepers. The final component, perceptual-cognitive skills, had four items with an eigenvalue of 1.47 and accounted for 2.40% of the variance. Soccer coaches rated decision-making ($M = 6.96$, $SD = 1.55$) and game awareness/sense ($M = 6.91$, $SD = 1.61$) as important perceptual-cognitive attributes in goalkeepers (Table 2).

Discussion

The purpose of this study is to investigate the attributes youth soccer coaches in South Africa perceive as important in identifying promising youth goalkeepers. The findings indicate that coaches deem concentration (i.e., ability to maintain focus throughout a game), bravery (i.e., ability to take calculated risks) and self-discipline (i.e., ability to motivate themselves to do what is right) to be the most important characteristics in goalkeepers. These results complement those of previous studies on talent identification that concluded that psychological and mental attributes are important in selecting youth

Table 2 Item loadings, eigenvalues, percentages of variance, and descriptive statistics for the TIDQS-GK

Psychological skills (eigenvalue = 30.86, % of variance = 50.59)	Item loading	M (SD)
Concentration	0.720	7.12 (1.61)
Bravery	0.765	7.11 (1.45)
Self-discipline	0.862	7.11 (1.38)
Positive attitude	0.914	7.07 (1.62)
Self confidence	0.706	6.96 (1.65)
Commitment	0.634	6.89 (1.69)
Intrinsic motivation	0.793	6.86 (1.39)
Resilience	0.745	6.82 (1.57)
Grit	0.618	6.81 (1.48)
Willingness to take risks	0.636	6.80 (1.68)
Anxiety control	0.635	6.75 (1.63)
Composure	0.818	6.72 (1.62)
Physical skills (eigenvalue = 3.58, % of variance = 5.87)		
Flexibility	0.63	6.82 (1.58)
Agility	0.730	6.71 (1.76)
Jumping reach	0.463	6.70 (1.59)
Acceleration	0.353	6.67 (1.67)
Strength	0.632	6.64 (1.52)
Balance	0.477	6.62 (1.59)
Repeated sprint ability	0.492	6.62 (1.41)
Standing height	0.660	6.61 (1.72)
Power	0.461	6.60 (1.60)
Down-up speed	0.454	6.51 (1.53)
Speed	0.570	6.51 (1.64)
Body mass	0.546	6.35 (1.75)
Stamina	0.357	6.21 (1.65)
Social skills (eigenvalue = 2.58, % of variance = 4.23)		
Coachability	0.684	7.23 (1.32)
Communication	0.780	7.07 (1.46)
Character	0.530	7.02 (1.34)
Leadership	0.718	7.02 (1.57)
Accountability	0.730	6.88 (1.65)
Teamwork	0.858	6.83 (1.85)
Supportive family life	0.584	6.62 (1.58)
Socioeconomic background	0.744	6.41 (1.49)
Technical skills (eigenvalue = 1.88, % of variance = 3.08)		
Catching the ball	0.628	6.88 (1.50)
First touch	0.706	6.74 (1.72)
Punching the ball	0.433	6.72 (1.65)
Parrying the ball	0.534	6.69 (1.48)
Taking the ball at chest-height and above head	0.328	6.68 (1.75)
Drop kick	0.606	6.64 (1.72)
Footwork	0.726	6.64 (1.80)
Punting	0.558	6.59 (1.60)
Quick reflexes	0.594	6.58 (1.78)
Diving at low and high balls	0.636	6.57 (1.67)
Receiving the ball with both feet	0.671	6.54 (1.58)
Shot saving at close proximity	0.344	6.54 (1.52)
Kicking the ball away from goal box	0.465	6.46 (1.87)
Passing accuracy	0.409	6.46 (1.90)
Throwing the ball up-field	0.797	6.39 (1.71)
Diving at a player's feet	0.704	6.34 (1.63)
Tactical skills (eigenvalue = 1.70, % of variance = 2.79)		

Table 2 (continued)

Psychological skills (eigenvalue = 30.86, % of variance = 50.59)	Item loading	M (SD)
Defensive organisation against set plays	0.529	6.85 (1.61)
Defending in 1v1 situations	0.654	6.84 (1.83)
Ability to come off the line and deal with high balls	0.587	6.78 (1.58)
Goalkeeper positioning and angling	0.624	6.69 (1.64)
Ability to judge flight of the ball	0.409	6.68 (1.79)
Ability to start attack	0.358	6.64 (1.65)
Defensive organisation during open play	0.520	6.58 (1.80)
Sweeper-keeper	0.337	6.44 (1.92)
Perceptual-cognitive skills (eigenvalue = 1.47, % of variance = 2.40)		
Decision-making	0.523	6.96 (1.55)
Game awareness/sense	0.632	6.91 (1.61)
Creativity	0.331	6.78 (1.75)
Anticipation	0.519	6.75 (1.50)

M=Mean. SD=Standard deviation

players [3, 12, 20]. Previous studies have highlighted the importance of qualities like bravery, presence, focus, concentration and the capacity to deal with mistakes in making talent-identification decisions [17, 18, 28]. These characteristics are crucial in defending the goal and preventing the opposition from scoring [17].

This study's results highlight that coaches perceive other physical qualities, such as flexibility and agility, as important in identifying promising goalkeepers. Coaches may value these attributes because they enable goalkeepers to manipulate and control their bodies to make diving saving, or also perform several dives in succession during continuous attacks by their opponents [29]. This study's findings highlight that coaches perceive speed (i.e., greater top speed than peers at the same stage of development) as the least important attribute for goalkeepers. This result contrasts Otte et al.'s [18] finding that speed is a key factor in goalkeepers' performance. A possible reason for this finding may be because goalkeepers may only perform two sprints during a match, and often over a short distance (generally less than 10 m) [30, 31].

Coaches rated coachability (i.e., receptivity to coaching; willingness to learn) as the most important social attribute for goalkeepers. According to Larkin and O'Connor [3], coachable players are receptive to instructions and motivated to learn new things. Empirical evidence has demonstrated that players who are deemed coachable and have positive attitudes are more likely to have a growth mindset [32]. Contrastingly, players who are judged to lack openness to being coached or a positive attitude can detrimentally affect a team's dynamics and performance [33]. The results also indicate that coaches perceive other attributes like communication as important. A goalkeeper's ability to communicate may be useful in coordinating their actions with the defensive players on their team and modifying the defensive strategy to counter the opposition's efforts to score goals [34].

The technical attributes coaches identified as important in selecting promising goalkeepers were catching the ball. This result is not unexpected, given that goalkeepers' primary responsibility is protecting and defending the goal from opposition shots [16]. Previous research has revealed that 19.42% of goalkeepers' actions involved protecting the goal (on average, 7.75 actions per game per goalkeeper) and 7.39% of their actions involved defending crosses and sweeping (on average, 2.95 actions per game per goalkeeper) [35]. To provide more representative and beneficial assessment regimes for potential goalkeepers, scouts and coaches should consider designing simulated game-situation tests in pressurised conditions to evaluate goalkeepers' technical proficiency (e.g., shots saved).

Coaches ranked defensive organisation against set plays as the most important tactical attribute for goalkeepers. This is an important finding considering that goals scored from set pieces have increased considerably over time [31]. This may indicate that goalkeeper coaches should spend considerable time preparing goalkeepers to respond effectively to the set plays prevalent in modern soccer. Coaches also rated the ability to defend in one-on-one encounters and to come off the line and deal with high balls as important skills. Goalkeepers' contributions to the implementation of the team's game plan include more than remaining in the goal box to block shots [34].

Coaches identified decision-making and game awareness/sense as the most important perceptual-cognitive skills for goalkeepers. These results support those of previous research that found that coaches regard decision-making attributes as the most crucial skill set for goalkeepers [17]. Goalkeepers' performance is closely related to their game understanding since they must be aware of the potential consequences of their decisions and actions as the game progresses [18]. Goalkeepers must choose which precise movement strategies to employ in order to accomplish an outcome (e.g. saving

a close-distance shot at the goal). Goalkeepers must be knowledgeable about tactical game scenarios and aware of pertinent information as it emerges during play. Game knowledge and awareness enable goalkeepers to react tactically to different circumstances (for example, speaking with teammates or changing their position and body orientation with respect to the goal or ball) [18].

Limitations and future research

While the findings provide some insight into the attributes associated with talented goalkeeping performance, there are few limitations that should be considered. The results cannot be broadly generalised to the entire population due to the small sample size and restriction to a single province in South Africa. Additionally, the study neglected objective measurement (i.e., fitness testing) by using a subjective method that relied on a coach's judgement to identify talent. Further research is needed to fully understand this process and to corroborate the current findings in an applied environment. Future studies should therefore employ a larger sample size and a combination of subjective and objective measurements to identify talented youth soccer goalkeepers. Research could use qualitative interviews to gain greater depth and nuance understanding of coaches' perceptions on talent development, alongside longitudinal research which tracks potential talented goalkeepers through their development over time. Finally, other areas which might influence talent identification of goalkeepers, such as relative age effects should be investigated further.

Conclusion

Youth soccer coaches consider numerous attributes related to goalkeeping performance, including psychological (e.g., concentration, bravery, self-discipline), physical (e.g., flexibility, agility), social (e.g., coachability, communication), technical (e.g., catching the ball, first touch), tactical (e.g., defensive organisation against set plays, defending in one-on-one situations, ability to come off the line and deal with high balls) and perceptual-cognitive (e.g., decision-making) attributes, when identifying promising goalkeepers. The results show coaches consider psychological attributes as important in identifying potentially talented goalkeepers. The findings may provide coaches with an understanding of what attributes to consider when identifying potentially talented goalkeepers. The results may guide talent development programmes' training considerations for goalkeepers.

Abbreviations

M	Mean
PCA	Principal component analysis
SD	Standard deviation
TIDQS-GK	Talent Identification Questionnaire in Soccer – Goalkeepers

Supplementary Information

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Supplementary Material 1

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Author contributions

LL, AK and AT wrote the main manuscript text. PL and JS reviewed and approved the manuscript. All authors reviewed the manuscript.

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Data availability

The data presented in this study are available on request from the corresponding author.

Declarations

Ethics approval and consent to participate

This study received ethical approval from the Tshwane University of Technology's Research Ethics Committee. This research was carried out according to the principles stated in the Declaration of Helsinki. All participants provided written informed consent prior to participating.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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