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**Development of the Talent Identification Questionnaire in Soccer for Outfield Players
(TIDQ-OP): Coaches' perceptions of the key attributes for player recruitment**

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Abstract

The aim of this study was to develop a questionnaire that assesses talent identification in youth soccer in South Africa and provide a reliable and valid understanding of the attributes youth soccer coaches consider important when making talent identification decisions for outfield soccer players. The questionnaire was constructed following established instrument development phases. In phase 1, 61 questionnaire items were generated based on a review of the literature. In phase 2, a panel of experts examined the content validity of the preliminary items. In phase 3, the provisional 59-item questionnaire (Talent Identification Questionnaire in Soccer for Outfield Players; TIDQ-OP) was administered to 173 experienced South African soccer coaches (130 males and 43 females) who ranged in age from 18 to 64 years ($M_{age} = 36.61$ years, $SD = 10.41$ years). In phase 3, the factorial structure of the questionnaire was established through principal component analysis. The final questionnaire consisted of 58 items. The TIDQ-OP had a Cronbach's alpha coefficient of 0.97, confirming the reliability of the instrument. These preliminary analyses indicate that the TIDQ-OP is a sound psychometric assessment tool for South African coaches during the talent identification and selection process.

Keywords: Talent; Soccer; Youth performance; Coaching; Development

Introduction

Approximately 4% of people worldwide are regularly involved in soccer, making it the most popular sport in the world (FIFA, 2007). The global interest in soccer has prompted many professional clubs to expand their scouting networks in an attempt to identify the best players from around the world (Bahdur & Pruna, 2017; Bennet et al., 2019; Darby & Solberg, 2010). National federations and professional clubs invest heavily in efforts to identify talented soccer players (Meylan et al., 2010), but this is an expensive process requiring substantial time and financial resources to fund and manage scouting networks, travel and talent identification programmes (Vrljic & Mallett, 2008). As such, there is a need to expedite this process for all key talent identification stakeholders, including national federations, professional clubs, coaches, scouts, parents and players.

The process of talent identification in sports involves the detection, selection and promotion of athletes who have the necessary skills and competencies (i.e., technical, tactical and physical attributes) to succeed in senior adult competition (Pruna et al., 2018). However, it should be noted that the development of talented players does not occur overnight but instead requires systematic training programmes that nurture players and facilitate their ability to reach their full potential (Pruna et al., 2018). To achieve this, players selected for these training programmes are provided with highly qualified coaches and exposed to high-performance youth competitions at both the national and international levels (Meylan et al., 2010). In many cases, federations and professional clubs believe that early detection of talent is critical to ensure that the club concentrates its resources on player growth and minimises potential attrition rates; however, studies have shown that less than 1% of players in professional development pathways progress to a professional career (Güllich & Larkin, 2023; Reed et al., 2016; Vrljic & Mallett, 2008). Thus, researchers have recommended that talent identification and development programmes direct their limited resources to players with the highest

potential for future elite performance (Sieghartsleitner et al., 2019; Suppiah et al., 2015). The benefits of a targeted talent development process lie in the potential of more talented players to benefit current team performance and, in some cases, generate future financial gains through player transfer fees (Cobley et al., 2023).

Forecasting future sporting achievement based on youth players' current performance is a challenge for the coaches and scouts involved in talent identification and selection (Larkin et al., 2022; O'Connor et al., 2016). While previous research has applied a retrospective approach to investigating this process by evaluating the skills that differentiate performance at various stages in an athlete's development (Figueiredo et al., 2009; Huijgen et al., 2014; Williams & Reilly, 2000), it has been recommended that researchers assess the factors coaches and scouts consider when making talent identification and selection decisions (Larkin & Reeves, 2018). Exploration in this area has focused on coaches' nuanced thought processes during the talent identification process, which have been evaluated using qualitative and descriptive methods, such as interviews with and concurrent verbal reports from experienced soccer coaches (Christensen, 2009; Larkin & O'Connor, 2017; Lund & Söderström, 2017; Reeves et al., 2019). The results of these studies have highlighted the general thought processes undertaken when making talent identification decisions (Reeves et al., 2019) and the specific attributes coaches consider important when identifying talented players (Larkin & O'Connor, 2017). Overall, this body of research has shown that coaches and scouts do not focus solely on any single player attribute but rather apply a multidimensional approach to finding new talent (Larkin & O'Connor, 2017; Larkin & Reeves, 2018). This approach includes understanding how technical, tactical, physical, socio-cultural and psychological attributes serve as important potential predictors of future success (Figueiredo et al., 2009; Huijgen et al., 2014; Williams & Reilly, 2000). Despite the growing body of research, in practical contexts, the emphasis of talent identification continues to be on the coach's eye, whereby the performance of potential

95 players is monitored during training sessions or games, with the coach or scout making
96 subjective decisions regarding players' future potential (Jokuschies et al., 2017; Lath et al.,
97 2021).

98 Although soccer is the most popular sport in South Africa (Kubayi et al., 2015), little
99 empirical research has been performed on talent identification from the perspective of soccer
100 coaches and scouts (Larkin & Reeves, 2018). Further, there is minimal understanding of the
101 objective information used by coaches and scouts to form their talent identification decisions
102 (Huijgen et al., 2014), with a particular lack of valid and reliable instruments that assess talent
103 identification protocols. Therefore, to better comprehend the methods utilised by scouts and
104 coaches to identify potentially talented players, it is imperative to evaluate the player attributes
105 they value when making talent identification decisions. The primary aim of this study was thus
106 to develop a valid and reliable talent identification questionnaire for the purpose of assessing
107 youth soccer talent in a South African context. The secondary aim was to ascertain the
108 perspectives of South African youth coaches regarding the most important attributes of talented
109 soccer players.

111 **Methods**

112 A questionnaire investigating the important attributes considered when assessing the potential
113 talent of outfield soccer players was constructed following the instrument development phases
114 recommended in previous studies (Artino et al., 2014; DeVellis, 2003; Toering et al., 2013).
115 First, a comprehensive search and review of pertinent literature were performed to generate a
116 pool of potentially relevant questionnaire items. Second, the content validity of the pool of
117 items was assessed by a panel of experts. Third, principal component analysis (PCA) was
118 carried out on the preliminary questionnaire. Finally, reliability testing of the questionnaire was
119 conducted.

Phase 1: Literature review

A thorough literature review was performed as part of the questionnaire's initial development (Artino et al., 2014). Existing questionnaire items were identified and utilised as a frame of reference during the item development process (Gehlbach et al., 2010; Toering et al., 2013). An extensive review of the soccer talent identification literature was then conducted to generate and develop content for the preliminary pool of player attribute items (Kittel et al., 2019; Larkin & O'Connor, 2017; Roberts et al., 2019; Towlson et al., 2019; Vrljic & Mallett, 2008; Williams & Reilly, 2000). An initial pool of 61 items was developed for the Talent Identification Questionnaire in Soccer for Outfield Players (TIDQ-OP), which included technical (10 items), tactical (13 items), physical (12 items), perceptual-cognitive (three items), psychological (12 items) and social (eight items) attributes. All items were anchored on a 9-point Likert scale ranging from 1 (not important) to 9 (very important) to facilitate item validation.

Phase 2: Content validity

Content validity is the degree to which an instrument accurately measures the concept or items it claims to measure (Thomas et al., 2023). The preliminary pool of 61 items was sent to a panel of four experts (i.e., two high-performance youth coaches and two academics who have published extensively in the talent identification domain) who had extensive knowledge and experience in testing constructs for content validity. The experts were asked to evaluate the pool of items for clarity and applicability. Based on their feedback, 10 items were rephrased for clarity and two items were removed. The new item pool for the provisional TIDQ-OP comprised 59 items.

Phase 3: Principal component analysis

The PCA methodology was chosen based on the rationale that it is psychometrically sound and mathematically easier than other methods. It also avoids some of the potential shortcomings associated with ‘factor indeterminacy’ commonly attributed to factor analysis (Stevens, 1996, p. 363). PCA is useful when researchers initially develop a survey instrument comprising multiple questions (items) with the intent of reducing the number of items to achieve the best measure of the constructs with the fewest number of questions (Burton & Mazerolle, 2011). Therefore, the purpose of this phase was to rigorously examine the psychometric properties of the provisional 59-item TIDQ-OP and offer support for the factor structure of the subscales.

Participants

A total of 173 soccer coaches (130 males and 43 females) ranging in age from 18 to 64 years ($M_{age} = 36.61$ years, $SD = 10.41$ years) and having between 1 and 46 years of coaching and talent identification experience ($M_{experience} = 8.42$ years, $SD = 7.29$ years) were purposively recruited to participate in the study. With the purposive sampling method, participants are selected based on criteria established by the investigator (De Vos, 2001). The inclusion criterion for participation in this study was soccer coaches who were involved in youth talent identification processes for a minimum of 1 year. Coaches who were not formally involved in the identification, selection and recruitment of talented players were excluded from the study.

Data collection procedure

Ethical approval was obtained from the university ethics committee. Before data collection was initiated, the Gauteng Sports Council was contacted to gain access to youth soccer coaches who were actively involved in the identification, selection and recruitment of talented players. Eligible soccer coaches were contacted at training sessions, coaching seminars, workshops and

conferences within the Gauteng Sports Council. Following the initial contact, all participants were informed of the study's purpose and gave informed consent to participate in the study. The participants were then provided with a hard copy of the TIDQ-OP and instructed to independently complete the questionnaire in a private quiet space. The participants returned their completed questionnaires to the researchers. Overall, the TIDQ-OP took 10 to 20 minutes to complete.

Data analysis

Descriptive statistics, including means, standard deviations, frequencies and percentages, were computed to analyse the data collected via the TIDQ-OP. PCA was conducted to reduce the number of items grouped into meaningful components. All data were analysed using IBM Statistical Package for Social Sciences version 28.

Results

PCA was performed using direct oblique rotation on the 59 items of the TIDQ-OP. One item was eliminated from the pattern matrix due to the component loadings being less than 0.30. The remaining 58 items of the TIDQ-OP were then subjected to PCA with an oblique rotation. The Kaiser-Meyer-Olkin value was 0.894, which is greater than the permitted threshold of 0.60 (Kaiser, 1974). The results from Bartlett's Test of Sphericity (Bartlett, 1954) were significant ($\chi^2 = 11655.20$; $df = 1653$; $p < 0.000$), supporting the factorability of the correlation matrix (Pallant, 2011).

A total of 69.73% of the total variance was explained by the revised six-component structure. The first component, psychological skills, comprised 12 items and accounted for 48.88% of the variance. The psychological skills perceived as most important by the soccer coaches were self-discipline ($M = 7.50$, $SD = 1.54$), willingness to take risks ($M = 7.48$, $SD =$

1.50) and commitment ($M = 7.43$, $SD = 1.43$). The second component, physical skills, consisted of 12 items and explained 8.75% of the overall variance. The key physical skills recognised as most important by the soccer coaches were balance ($M = 7.05$, $SD = 1.69$), stamina ($M = 7.02$, $SD = 1.74$) and agility ($M = 6.95$, $SD = 1.69$). The third component, social skills, had an eigenvalue of 2.32% and included eight items that accounted for 4.00% of the variance. The social skills perceived as most important by the soccer coaches were coachability ($M = 7.49$, $SD = 1.52$), communication ($M = 7.44$, $SD = 1.53$) and leadership ($M = 7.29$, $SD = 1.63$). The fourth component, technical skills, had 10 items and accounted for 2.93% of the variance. The technical skills that were considered most important were finishing ($M = 7.02$, $SD = 1.79$), receiving and turning with the ball ($M = 6.89$, $SD = 1.80$) and first touch ($M = 6.73$, $SD = 1.87$). The fifth component, tactical skills, had 13 items and accounted for 2.71% of the variance. The tactical skills most favoured by the soccer coaches were attacking in a 1v1 situation ($M = 7.06$, $SD = 1.64$), defending in a 1v1 situation ($M = 7.03$, $SD = 1.63$) and defensive coverage ($M = 7.00$, $SD = 5.74$). The final component, perceptual-cognitive skills, had an eigenvalue of 1.43% and was made up of three items, accounting for 2.46% of the variance. The soccer coaches perceived creativity ($M = 7.30$, $SD = 1.40$), decision-making ($M = 7.01$, $SD = 1.78$) and anticipation ($M = 6.75$, $SD = 1.92$) to be the most important perceptual-cognitive skills.

Insert Table 1 here

Phase 4: Reliability testing

In Phase 4, Cronbach's alpha coefficients were computed to determine the reliability of the questionnaire (Table 2). Cronbach's alpha coefficient is categorised as follows: $\alpha < 0.50$ (unacceptable), $0.50 \leq \alpha < 0.60$ (poor), $0.60 \leq \alpha < 0.70$ (questionable), $0.70 \leq \alpha < 0.80$ (acceptable), $0.80 \leq \alpha < 0.90$ (good) and $\alpha \geq 0.90$ (excellent; George & Mallery, 2003). The

Cronbach's alpha coefficient values for the questionnaire components ranged from 0.87 (tactical skills) to 0.96 (psychological skills). The Cronbach's alpha value for the overall questionnaire was 0.97.

Insert Table 2 here

Discussion

This study's primary aim was to develop and validate the TIDQ-OP questionnaire to ascertain the important attributes coaches and scouts consider when identifying talented outfield soccer players in South Africa. The questionnaire was developed over a sequence of phases that consisted of a review of the scientific literature, the generation of preliminary items, the validation of the questionnaire by a panel of experts and the performance of PCA. The 58-item PCA yielded a six-component tool comprising technical, tactical, physical, psychological, perceptual-cognitive and social factors. These preliminary analyses demonstrate that the TIDQ-OP is a sound psychometric assessment tool for South African coaches who participate in talent identification and recruitment. Furthermore, the Cronbach's alpha coefficients for the overall questionnaire and each component were higher than the recommended benchmark of 0.70 (Nunnally & Bernstein, 1994), indicating that the TIDQ-OP is a valid and reliable instrument that can be used by coaches and scouts to inform talent identification decisions.

The secondary objective of the study was to examine South African coaches' perceptions of the key attributes of outfield youth soccer players that they consider when performing talent identification and selection. The findings add to the current body of knowledge by providing preliminary evidence of a set of attributes South African soccer coaches perceive as important when identifying and recruiting talented youth players. The current results additionally highlight the multifaceted nature of youth soccer talent identification, with coaches indicating technical, tactical, physical, psychological, perceptual-

cognitive and social skills as critical elements to consider when assessing youth talent. This corroborates previous research highlighting the need for a multidimensional approach to talent identification and recruitment (Larkin & O'Connor, 2017; Unnithan et al., 2012).

The coaches in this study rated three technical attributes – finishing, receiving and turning with the ball, and first touch – as very important, with finishing (i.e., being able to score goals) being the highest-rated skill. This finding is not surprising, as, in soccer, finishing is the most essential performance indicator due to its relationship with team success (Kite & Nevill, 2017; Lago-Ballesteros & Lago-Peñas, 2010). The results highlight the importance of players' first touch as well as their ability to receive and turn with the ball. Researchers have identified ball control as an important skill in elite soccer players and an attribute that differentiates high-performing players from those who are regarded as less talented (Vrljic & Mallett, 2008; Reeves et al., 2019). In addition, in previous research by Larkin and O'Connor (2017), first touch was rated as one of the most important attributes, as it is a fundamental skill that precedes all other on-ball movements.

The South African coaches considered several physical qualities, specifically balance, endurance and agility, as important to assess during the talent identification and recruitment process. Coaches may consider balance to be important due to its role in enabling players to execute basic skills, such as heading, volleying and jumping, while maintaining equilibrium (Gstöttner et al., 2007). The consideration of endurance as a key attribute for talented youth soccer players is consistent with previous research (Vrljic & Mallett, 2008). Empirical evidence has demonstrated that endurance is an important performance attribute that is associated with greater talent (Gil et al., 2007). Agility, which relates to the motor skills required to change direction and speed (Murr et al., 2018), was also perceived by the coaches to be an important physical attribute in soccer players. Earlier research by Williams and Reilly (2000) found speed to be an essential factor in successful soccer performance, particularly speed across distances

of 5–40 metres. Vrljic and Mallett (2008) confirmed that coaches consider speed to be critical when identifying and recruiting talented soccer players, as speed can help offensive players move faster and make quick turns to evade defensive players and score goals and is needed in defensive play to retrieve the ball from opponents as quickly as possible to prevent goal-scoring opportunities. The current findings are, however, in contrast to previous research in Australia that indicated that coaches did not consider physical attributes as important in the talent selection process (Larkin & O'Connor, 2017). This may suggest context-specificity in the process of talent identification and development, as within the South African context of the current study, coaches valued physical attributes.

Previous soccer-based research has shown that players with better perceptual-cognitive skills have a significant edge over less-skilled players (Roca et al., 2013; Vaeyens et al., 2007). These skills can be defined as the ability to make the right decisions at the right time and choose the best option within a game situation (Vrljic & Mallett, 2008). There is considerable evidence suggesting that decision-making and creativity are critical cognitive-perceptual traits in talented young soccer players, with previous findings emphasising the high importance coaches place on these attributes (Larkin & O'Connor, 2017). The current findings further reinforce this position, with the coaches rating decision-making as a highly important skill to consider during the talent identification and selection process. While decision-making has been shown to be an important attribute, additional research is needed to facilitate coaches' assessment of perceptual-cognitive attributes and inform this portion of the talent identification process.

In addition to specific game-related skills, the coaches in the current study highlighted the importance of psychological attributes, such as self-discipline, willingness to take risks and commitment. Regarding self-discipline, Wolff et al. (2019) reported that top players showed higher levels of self-control than their less-successful peers. Coaches may probably select risk-taking players, as they may be more likely to step outside of their comfort zones, stretch their

limitations and accomplish tasks on the field that facilitate successful outcomes. The importance of commitment lies in its role in enabling players to develop their abilities through intensive training and effort, see mistakes as opportunities for improvement, be open to feedback and accept challenges (Dweck, 2006; Larkin et al., 2016; Larkin & O'Connor, 2017; Weiss, 2020). While previous studies have explored psychological skills in isolation and provided some insight into the psychological skills that contribute to high performance levels, a deeper understanding of how coaches determine or assess these psychological qualities during the talent identification process is needed. Research within Australian football has illuminated how elite-level recruiters use extensive background checks and player interviews to gain insight into players' character and psychology (Larkin et al., 2022). However, within a soccer context, the exploration of the approaches coaches and scouts employ to assess these attributes in youth players is limited, warranting further research in this area.

The South African coaches in this study identified a number of social factors as imperative to successful talent identification, including communication and coachability. Communication skills have been shown to be important in soccer because they promote players' capacity to ask questions and listen to and form effective relationships with both their teammates and coaches. Communication has been shown to influence in-game performance, with better communication between players found to promote more effective performance (Levi & Jackson, 2019; McLean et al., 2021) and group cohesion (McLaren & Spink, 2018). Coachability refers to a player's desire to learn new skills and ability to understand and respond to the coach's instructions (Larkin & O'Connor, 2017). This has been highlighted as a key attribute to consider during the talent identification process, as players identified as coachable are generally open to feedback and embrace challenges due to their commitment to learning and belief that they can improve with training and hard work (Dweck, 2006; Favor, 2011; Larkin & O'Connor, 2017; Mills et al., 2012). It should be noted, however, that while social

skills have been identified as important, there is limited understanding of how to measure them. Future research should therefore investigate how coaches monitor and assess these skills during the talent identification process and seek to develop social skill assessment methods.

From a tactical-skill perspective, the South African coaches indicated that attacking and defending during 1v1 situations were critically important skills to assess when recruiting soccer players. This supports previous research showing that Australian soccer coaches rated 1v1 ability as a highly important attribute to consider when making talent identification decisions (Larkin & O'Connor, 2017). This is further supported by the commonly held belief that the attacker's and defender's accelerations at the moment the attacker attempts to outwit the defender are important elements of performing well in 1v1 situations (Leser et al., 2015). It is thus necessary to consider the specific elements of 1v1 scenarios that coaches view as important, as numerous factors, including the type of 1v1 duel (i.e., aerial versus ground duel), situational variables (i.e., match status, opponent's strength, match location), kinematic parameters (i.e., accelerations, velocity) and pitch location (i.e., first, middle or final third), may influence the decision-making process. As such, further research should evaluate the measures and assessments coaches consider important when evaluating players during 1v1 situations.

Conclusions

The findings of the present study demonstrate the development of a valid and reliable tool to assist coaches during the talent identification and selection process. The TIDQ-OP may be useful in directing coaches to consider the more important attributes of youth soccer performance and in educating coaches on the skills they value as important, which may guide their youth training programmes. Overall, the findings highlight the multidimensional approach to youth soccer talent identification, with the results indicating the influence of technical,

tactical, physical, psychological, perceptual-cognitive and social skills in the talent identification decision-making process. The results suggest that South African coaches apply the recommendations from current research (Larkin & O'Connor, 2017) regarding the benefit of a multidimensional approach to youth talent identification. The findings additionally offer initial evidence of the attributes coaches consider important during the talent identification process and provide the foundation for the development of further objective assessment methods to inform this process.

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Table 1: Item loadings, eigenvalues, percentages of variance, and descriptive statistics for the BSCQW

	Item loading	M (SD)
Psychological skills (eigenvalue = 28.35, % of variance = 48.88)		
Self-discipline	0.748	7.50 (1.54)
Willingness to take risks	0.564	7.48 (1.50)
Commitment	0.670	7.43 (1.43)
Concentration	0.670	7.42 (1.39)
Bravery	0.726	7.40 (1.73)
Positive attitude	0.832	7.28 (1.65)
Composure	0.573	7.21 (1.53)
Resilience	0.592	7.21 (1.60)
Intrinsic motivation	0.566	7.21 (1.55)
Grit	0.631	7.20 (1.47)
Self confidence	0.819	7.14 (1.81)
Anxiety control	0.660	7.03 (1.64)
Physical skills (eigenvalue = 5.07, % of variance = 8.75)		
Balance	0.705	7.05 (1.69)
Stamina	0.704	7.02 (1.74)
Agility	0.367	6.95 (1.69)
Flexibility	0.405	6.91 (1.67)
Power	0.589	6.90 (1.58)
Strength	0.410	6.81 (1.91)
Speed	0.389	6.80 (1.59)
Repeated sprint ability	0.526	6.77 (1.60)
Jumping reach	0.508	6.76 (1.52)
Acceleration	0.558	6.59 (1.67)
Body mass	0.471	6.41 (1.74)
Standing height	0.397	6.30 (1.98)
Social skills (eigenvalue = 2.32, % of variance = 4.00)		
Coachability	0.771	7.49 (1.52)
Communication	0.834	7.44 (1.53)
Leadership	0.667	7.29 (1.63)
Teamwork	0.892	7.27 (1.96)
Character	0.559	7.27 (1.57)
Accountability	0.855	7.24 (1.75)
Supportive family life	0.572	7.24 (1.58)
Socioeconomic background	0.832	6.59 (2.01)
Technical skills (eigenvalue = 1.70, % of variance = 2.93)		
Finishing	0.746	7.02 (1.79)
Receiving and turning with the ball	0.914	6.89 (1.80)
First touch	0.819	6.73 (1.87)

Dribbling	0.538	6.72 (1.80)
Passing accuracy	0.682	6.62 (2.03)
Long range shooting	0.410	6.51 (1.67)
Crossing	0.538	6.46 (1.59)
Tackling	0.397	6.43 (1.87)
Heading	0.521	6.40 (1.75)
Long throw-ins	0.740	6.25 (1.76)
Tactical skills (eigenvalue = 1.57, % of variance = 2.71)		
Attacking in 1v1 situation	0.396	7.06 (1.64)
Defending in 1v1 situation	0.459	7.03 (1.63)
Defensive coverage	0.665	7.00 (5.74)
Transition from attack to defence	0.494	6.90 (1.75)
Defensive unity	0.478	6.82 (1.63)
Defensive balance	0.538	6.77 (1.53)
Transition from defence to attack	0.386	6.76 (1.73)
Offensive coverage	0.657	6.72 (1.50)
Depth mobility	0.643	6.61 (1.61)
Offensive unity	0.367	6.59 (1.73)
Width and length	0.394	6.56 (1.68)
Delay	0.478	6.28 (1.74)
Penetration	0.484	6.24 (1.86)
Perceptual-cognitive skills (eigenvalue = 1.43, % of variance = 2.46)		
Creativity	0.809	7.30 (1.40)
Decision making	0.740	7.01 (1.78)
Anticipation	0.790	6.75 (1.92)

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556 Table 2: Reliability analyses for TIDQ-OP

Subscale	Number of items	Cronbach's alpha
Tactical skills	13	0.866
Perceptual-cognitive skills	03	0.890
Technical skills	10	0.907
Sociological skills	08	0.915
Physical skills	12	0.944
Psychological skills	12	0.958
Overall	58	0.974

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