

# Analyzing The Reliability And Validity Of Talent Identification Practices For Athletes: An Adaptation Study

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## ARTICLE INFO

## ABSTRACT

In nations like Ethiopia, talent identification is vital for fostering competitive athletes by pinpointing individuals with promising potential and guiding their development through specialized programs. The aim of this study was to assess the significance and relevance of the reliability and validity of talent identification in Ethiopian athletes for an adaptation study. A descriptive survey method was employed. Five public clubs were purposefully sampled, with 156 athletes randomly selected from a total of 257. Data were collected using the talent identification questionnaire (TIQ), revealing a reliability value of 0.808 ( $r$ ) in a pilot study conducted to ascertain the scientific authenticity of the adapted questionnaire. Hypotheses were tested at a significance level of 0.05. The original TIQ has five dimensions, namely: anthropometry (ANTH), sociological predictor (SP), physiological predictor (PHYP), psychological predictor (PSYP), and technical skill predictor (TSP). The mean and standard deviation values for each dimension were  $4.14 \pm 0.96$ ;  $3.78 \pm 1.05$ ;  $4.18 \pm 0.74$ ;  $4.47 \pm 0.76$ ; and  $4.28 \pm 0.76$ , respectively. Thereafter factor analysis was performed result increased from five to six dimensions, among six dimensions, five dimensions were hybrid whereas one dimensions are independent, and the factors were named: i) SP, PSYP, and TSP; ii) ANTH and PHYP; iii) SP and PSYP; iv) PSYP and TSP; v) SP and PSYP; vi) PSYP. Mean and standard deviation values of each dimension were  $3.87 \pm 1.06$  ( $p < 0.000$ ),  $4.21 \pm 0.85$  ( $p < 0.001$ ),  $3.98 \pm 1.15$  ( $p < 0.000$ ),  $4.02 \pm 1.08$  ( $p < 0.002$ ),  $3.83 \pm 1.23$  ( $p < 0.001$ ), and  $4.31 \pm 0.76$  ( $p < 0.000$ ), respectively. The study considered questions regarding data reduction, feasibility, validation, and reliability of Ethiopian adaptations of TIQ. The analysis indicated enhanced reliability (test-retest) for the Ethiopian adaptation along with significant factor loadings (ranged from .745 to .863) as compared to the original TI (.621 to .726). Ethiopian adaptation of TI correlation increased (range: 0.194 to .890\*\*) surpassing the original range (.134 to .873\*). Cronbach's alpha improved from  $r = .879$  to  $r = .885$ , affirming future validity in the Ethiopian population. In summary, the study recommends the consideration of Ethiopian adaptations for all purposes with sufficient construct validity based on the improved reliability and internal consistency observed in the adaptation compared to the original version of TIQ.

**Keywords:** Athlete, Manager, Reliability, Talent identification, Validity

## INTRODUCTION

In sports-oriented nations like Ethiopia, talent identification is crucial for cultivating competitive athletes. According to Williams and Reilly (2000), talent identification involves identifying current participants with potential to become elite athletes, while talent development focuses on nurturing this potential (Reilly et al., 2000). Early admission into professional athletics academies significantly impacts long-term athlete development (Le Gall et al., 2010; Meylan et al., 2010). This emphasis on early recognition has led to the establishment of centers of excellence worldwide (Reilly et al., 2000). Managerial skill in sports aims to drive organizational members towards predetermined goals (Balyi & Hamilton, 2000), crucial for optimizing

performance and athlete satisfaction (Sam, 2016). Managers play a key role in talent identification and development, particularly in track and field (Abbott et al., 2005).

In the sports industry's expansion, managerial skills are crucial for athlete talent identification and development (Kelly, 2008). Managers act as mentors, motivators, and talent identifiers, shaping athletes' progression (Kleinert et al., 2012). They contribute significantly to athletes' holistic development, impacting competence, confidence, connection, and character (Thompson et al., 2022). Managers wield influence over athletes' achievements, assuming responsibility for talent identification and development (Škorić, 2018). Track and field coaches invest in uncovering potential stars, reflecting the importance of talent identification (Dodd & Newans, 2018). Talent identification aims to recognize future elite athletes, while managers enhance athletes' performance through training and advice (O'Connor et al., 2016; Lemelin et al., 2022).

The researcher identifies a significant gap in understanding athlete talent identification and detection among managers, coaches, and administrative staff in our society. The trend of early specialization in sports, largely influenced by managerial decisions, presents risks to the well-being of young athletes and the long-term growth of the sport. Despite cautions from organizations like the IAAF, many athletes opt for early specialization, resulting in premature peaks and subsequent declines in performance. This trend is attributed to managerial practices and athlete development strategies controlled by national federations, which prioritize short-term success over the sustained development of athletes in the long run. The aim of this study is to investigate the reliability and validity of talent identification programs in Ethiopian athletes through an adaptation study. The goal is to address the existing gaps in understanding and practice concerning professional practices in talent identification and athlete development.

## MATERIALS AND METHODS

The research design utilized in this study is the descriptive method. Within the scope of descriptive research, the survey method is also employed to investigate the significance and relevance of the reliability and validity of talent identification programs in Ethiopian athletes for an adaptation study.

### Sample and participants

This study involved 156 youth and elite middle- and long-distance runners from public athletics clubs in Ethiopia. Athletes were selected from five specific clubs, with a gender distribution of 63.5% male and 36.5% female. The sample size for the study was determined using Yamane's (1967) simplified formula for proportions, assuming a 95% confidence interval level and  $P=0.05$ . The formula  $y = \frac{Y}{1+Y(e)^2}$  was employed, where  $y$  represents the sample size,  $Y$  is the entire population size, and  $e$  is the level of precision (allowance error at 5%). By substituting the given values, the calculation yielded.  $y = \frac{257}{1+257(0.05)^2} = \frac{257}{1+257(0.005)} = \frac{257}{1+0.6425} = \frac{257}{1.6425}$ , resulting in a calculated sample size of rounded to 156. Sample selection utilized both purposive and random sampling methods, with data analysis conducted using SPSS version 26 software. The study addressed ethical considerations, ensuring voluntary participation with the right to refuse or withdraw at any time respected. Ethical approval was obtained from the Board of Research Studies at the University of Delhi (Ref No: DPE/2022/1338), New Delhi, India, and permissions were secured from the Ministry of Education authorities (REF NO: 28/158/236/22), Ethiopia. Participants were duly informed of their rights throughout the study. The research included male and female elite athletes meeting health and physical readiness criteria, exclusively from Ethiopian athletic clubs, with a focus on middle and long-distance runners. Privacy and confidentiality were safeguarded, with participants retaining the right to withdraw. Exclusion criteria encompassed individuals failing health and readiness assessments, non-regular club members, withdrawals during data collection, and the exclusion of short-distance runners.

### Talent Identification Questionnaire (TIQ)

In this study, the talent identification questionnaire (TIQ), developed by William & Reilly (2000), was administered to gather data on identifying talented young middle and long-distance runners in Ethiopian athletic clubs. The questionnaire was effectively administered to collect essential data from public athletics clubs in Ethiopia.

### Procedure

The study used a survey with a 30-item questionnaire (TIQ) tailored for athletes, employing closed-ended questions on a Likert scale (1-5). It focused on talent identification and managerial skills' impact on athlete development and performance in Ethiopian public athletics clubs.

### Reliability and validity of instruments

To ensure the reliability and validity of the instrument, the first step involved assessing the reliability of each questionnaire item using Cronbach's Alpha. The alpha scores for Factors 1 through 5 were ANTH (item 5), SP (item 6), PHYP (item 3), PSYP (item 13), and TSP (item 3), yielding values of 0.87, 0.84, 0.81, 0.79, and 0.73, respectively, with an average of 0.808. Additionally, the instrument underwent a rigorous validation process. Professional and language experts critically reviewed the items to gauge their effectiveness in addressing the research problem. Furthermore, a pilot study was conducted with a small group resembling the main participants, and adjustments were made to the instrument based on their feedback.

### Statistical analysis

The research utilized various statistical techniques, including descriptive, multivariate, and bivariate analyses, to examine quantitative data using SPSS version 26. Descriptive methods like frequency, percentage, mean, and standard deviation were employed to characterize opinions on specified aspects using a five-point scale. Factorial analysis was used to pinpoint and validate dimensions of "Talent Identification" (TI), aiding in condensing data and confirming construct validity. Pearson product-moment correlation analysis was utilized to investigate connections among these dimensions and evaluate internal consistency reliability. Hypotheses were rigorously tested at a significance level of 0.05 to ensure statistical credibility. Results were effectively conveyed through tables, facilitating clear interpretation and drawing conclusions based on standard analytical procedures.

## RESULTS

**Table 1. Talent identification questionnaire (TIQ) of mean and standard deviation**

No.	Dimension of TIQ	Mean	Std. Deviation
1	ANTH	4.14	0.96
2	SP	3.78	1.05
3	PHYP	4.18	0.741
4	PSYP	4.47	.766
5	TSP	4.28	0.76

Table 1 presents talent identification (TI) results with mean (M) and standard deviation (SD) values: ANTH: M = 4.14, SD = 0.96; SP: M = 3.78, SD = 1.05; PHYP: M = 4.18, SD = 0.74; PSYP: M = 4.47, SD = 0.76; TSP: M = 4.28, SD = 0.76 respectively.

**Table 2. Factor loading from original factor analysis on(TIQ)**

Dimension	1st Factor Loading	2nd Factor Loading	3rd Factor Loading	4th Factor Loading	5th Factor Loading	6th Factor Loading	7th Factor Loading
ANTH		0.772, 0.724, 0.546, 0.512, 0.55					
SP	0.719		0.802, 0.365	0.692	0.857	0.876	
PHYP	0.596	0.739, 0.379					
PSYP	0.822, 0.601, 0.512, 0.605	0.454, 0.418	0.780, 0.526, 0.521, 0.455	0.782	0.858		0.804
ANTH	0.601, 0.512, 0.605, 0.900	0.55		0.804	0.858		

Table 2 depicts the dimension reduction by preserving the maximum important information based on rotated factor loading of Seven factors from five dependent variables dimension out of thirty statements in the talent identification questionnaire. See the summary results of Table 6.

**Table 3. Extraction from rotated factor loading on talent identification questionnaire (TIQ) of Ethiopian adaptation**

Factor Loading	1st Factor Loading	2nd Factor Loading	3rd Factor Loading	4th Factor Loading	5th Factor Loading	6th Factor Loading
ANTH		0.772, 0.729				
SP	0.719		0.802		0.876, 0.857	
PHYP		0.739				
PSYP	0.822		0.780	0.782	0.858	0.804
TSP	0.900			0.804		
Rename	SP, PSYP & TSP	ANTH & PHYP	SP & PSYP	PSYP & TSP	SP & PSYP	PSYP

Note: Values represent factor loadings indicating the strength and direction of the relationship between dimension variables and factors. Numbers in parentheses represent the correlation coefficients. The "Rename" column indicates the grouping of dimension variables based on their primary factor loadings. See the summary results of Table 6.

The study evaluation depicted in Table 3 offers a thorough assessment of the utilized procedures, which are in line with established practices. However, certain crucial questions have been addressed. These encompass the potential for data reduction, the adaptation of the questionnaire for use in the Ethiopian context, the validation of this adaptation, and the reliability of the Ethiopian TIQ version. Statistical analysis confirms the data's appropriateness for factor analysis. Noteworthy is the expansion of the TIQ to six dimensions, emphasizing the importance of customized assessments for Ethiopian athletes.

**Table 4. Correlation between dependent variable oftalent identification questionnaire (TIQ) of athletes**

No.	Dimensions	PPMC	1	2	3	4	5
1	ANTH	<i>r</i>	1	.323**	.831**	.779**	0.134
2	SP	<i>r</i>		1	.431**	.371**	.452**
3	PHYP	<i>r</i>			1	.873**	.427**
4	PSYP	<i>r</i>				1	.279**
5	TSP	<i>r</i>					1

\*\* Correlation is significant at the 0.01 level (2-tailed). Note: \**p* < .05; \*\**p* < .01; \*\*\**p* < .001, *r* = .879

The above table 4 results show that the Pearson product correlation analysis (test-retest reliability) of the five dimensions of talent identification (TI) is statistically significant and positively correlated.

**Table 5. Displays the extracted correlation metrics between the dependent variable (TIQ) of Ethiopian adaptation**

No.	Dimensions	PPMC	1	2	3	4	5	6
1	SP, PSYP & TSP	<i>r</i>	1	.482**	.408**	.216**	.136	.831**
2	ANTH & PHYP	<i>r</i>		1	.482**	.408**	.216**	.779**
3	SP & PSYP	<i>r</i>			1	.196*	.127	.688**
4	PSYP & TSP	<i>r</i>				1	.196*	.581**
5	SP & PSYP	<i>r</i>					1	0.890**
6	PSYP	<i>r</i>						1

\*\* Correlation is significant at the 0.01 level (2-tailed). Note: \**p* < .05; \*\**p* < .01; \*\*\**p* < .001, *r* = .885

The results in Table 5 indicate that the Pearson product correlation analysis (test-retest reliability) of the six dimensions of talent identification (TIQ) is statistically significant and strongly positively correlated, suggesting a positive relationship with the extracted statement variables.

The table (Table 6) documents the validity and reliability of the original factor analysis of the response data, resulting in a five dimensional factor. Specifically, factor loadings for ANTH ranged from 0.512 to 0.772, with an average of 0.621; for SP, the range was 0.365 to 0.876, with an average of 0.718; for PHYP, the range was 0.379 to 0.732, with an average of 0.671; for PSYP, the range was 0.418 to 0.858, with an average of 0.726; and for TSP, the range was 0.445 to 0.900, with an average of 0.716.

**Table 6. Summary table of TIQ: Original response and Ethiopian adaptation**

Original Questionnaire of TI				Extracted/Adaptable from Original (Ethiopian Adaptation)			
Sr. No	Original dimension	Factor loading ranged from	Average	Sr. No	Renamed for Ethiopia after extracted Dimension	Factor loading ranged	Average
1	ANTH	0.512 to 0.772	0.621	1	SP, PSYP & TSP	0.719 to 0.900	0.814
2	SP	0.365 to 0.876	0.718	2	ANTH & PHYP	0.729 to 0.772	0.745
3	PHYP	0.379 to 0.732	0.671	3	SP & PSYP	0.780 to 0.802	0.791
4	PSYP	0.418 to 0.858	0.726	4	PSYP & TSP	0.782 to 0.804	0.793
5	TSP	0.445 to 0.900	0.716	5	SP & PSYP	0.857 to 0.876	0.863
				6	PSYP	0.804	0.804
<b>Factor range</b>		<b>0.621 to 0.726</b>		<b>Factor range</b>		<b>0.745 to 0.863</b>	
<b>Pearson correlation</b>		<b>0.134 to .873**</b>		<b>Pearson correlation</b>		<b>0.194 to 0.890**</b>	
<b>Cronbach alpha</b>		<b>r = .879</b>		<b>Cronbach alpha</b>		<b>r = .885</b>	

After extracting rotated factor loadings from the talent identification questionnaire for Ethiopian athletes, this increased from five to six dimensions. Among the extracted six dimensions five dimensions were hybrid whereas onedimensions were independent. Namely, the factor loadings for SP, PSYP and TSP ranged from 0.719 to 0.900, with an average of 0.814; for ANTH and PHYP, they ranged from 0.729 to 0.772, averaging 0.745; for SP and PSYP, the range was 0.780 to 0.802, with an average of 0.791; for PSYP and TSP, the range was 0.782 to 0.804, averaging 0.793; for SP and PSYP, the range was 0.857 to 0.876, with an average of 0.863; and for PSYP, the range was 0.804 with an average of 0.804. It has been observed that the factor loading of extracted (Ethiopian adaptation) were superior than that of original questionnaire of talent identification questionnaire of athletes. The analysis revealed improved reliability (test-retest) for the Ethiopian adaptation of factor loadings (range: .745 to .863) compared to the original TI(.621 to .726). Pearson correlation increased (range: 0.194 to .890\*\*) post-extraction, surpassing the original range (.134 to .873\*). Cronbach's alpha rose from  $r = .879$  to  $r = .885$ , affirming the validity for future use on the Ethiopian population.

**AQ1 Table 7. Descriptive statistics of findings of (TIQ) before and after extracted**

Original Questionnaire of TIQ					Extracted/Adaptable for Ethiopian Adaptation				
S.N.	Original Dimensions	Q (N=30)	Mean (M)	St.d.	S.N.	Renamed variables after extracted	Q (N=14)	Mean (M)	St.d.
1	ANTH	5	4.14	0.96	1	SP, PSYP & TSP	3	3.87	1.06
2	SP	6	3.78	1.05	2	ANTH & PHYP	3	4.21	0.85
3	PHYP	3	4.18	0.74	3	SP & PSYP	2	3.98	1.15
4	PSYP	13	4.47	0.76	4	PSYP & TSP	2	4.02	1.08
5	TSP	3	4.28	0.77	5	SP & PSYP	3	3.83	1.23
					6	PSYP	1	4.31	0.76
As Whole		30 Item			whole after extracted			14 Item	

In examining the cross-validation findings of talent identification (TI), the initial factor analysis revealed five-dimensional factor variables: anthropometry, sociological, physiological, psychological, and technical skill dimensions. Descriptive analysis indicated the mean and standard deviation values of these variables as  $4.14 \pm 0.96$ ,  $3.78 \pm 1.05$ ,  $4.18 \pm 0.74$ ,  $4.47 \pm 0.76$ , and  $4.25 \pm 0.77$ , respectively.

Following the extraction of rotated factor loadings from the talent identification questionnaire for Ethiopian athletes, the number of variable dimensions increased from five to six, with a reduction in questionnaire statements from 30 to 14. These dimensions were labeled as follows: SP, PSYP, and TSP; ANTH and PHYP; SP and PSYP; PSYP and TSP; SP and PSYP; and PSYP. Descriptive analysis showed the mean and standard deviation values of these variables as  $3.87 \pm 1.06$ ,  $4.21 \pm 0.85$ ,  $3.98 \pm 1.15$ ,  $4.02 \pm 1.08$ ,  $3.83 \pm 1.23$ , and  $4.31 \pm 0.76$ , respectively. Based on these findings, it is concluded that the adapted questionnaire is valid for future use and administration within the Ethiopian population.

## DISCUSSION

In nations with a strong passion for sports like Ethiopia, talent identification holds significant importance in nurturing competitive athletes. This study aims to investigate the reliability and validity of a talent identification questionnaire for Ethiopian athletes, with the goal of addressing gaps in understanding and

practice regarding professional practices. The talent identification questionnaire included five variables: anthropometric predictors, sociological predictors, physiological predictors, psychological predictors, and technical skill predictors. The method of descriptive analysis has mean values on a range of a five-point scale. Thereafter, factor analysis was performed, resulting in six dimensions, of which five were hybrid, and one were independent. The factors were named: i) SP, PSYP&TSP; ii) ANTH & PHYP; iii) SP&PSYP; iv) PSYP&TSP; v) SP&PSYP; vi) PSYP, respectively.

According to Hariadi et al. (2022), it is recommended to incorporate anthropometric assessments into talent identification processes, encompassing measurements such as height, weight, bone structure, muscle size, and optimal fat levels in athletes, aiming to optimize performance. Similarly, Kiflu (2021) concluded that anthropometric indicators could significantly contribute to enhancing athlete performance. Furthermore, Keulen et al. (2024) emphasized the importance of body mass, height, and body fat percentage as anthropometric metrics indicative of athletic potential. These findings align closely with previous research by Mola, D. W., & Shaw, D. (2024), Hariadi et al. (2022), Kiflu (2021), and Keulen et al. (2023), reinforcing the credibility of the present study's results.

Sæther (2014) found that coaches often underestimate the importance of sociological factors in talent identification, prioritizing other predictors instead. In contrast, Matthew J. et al. (2018) echoed similar sentiments, stressing the significance of social attributes in the overall growth and development of athletes. This perspective was corroborated by Coh and Zvan (2019), further emphasizing the pivotal role of sociological predictors in determining athletes' success. These results highlight the necessity of incorporating sociological dimensions into talent identification procedures.

Keulen et al. (2023) emphasized the importance of physiological indicators like Vo2 Max and anaerobic capacity in identifying athlete talent. Conversely, Mortejo and Mortejo (2023) pointed out shortcomings in current methods used by coaches and sports management to evaluate athletes based on their physiological traits. Coh and Zvan (2019) had previously underscored the necessity of integrating physiological predictors into talent identification protocols. The combined results of Keulen et al. (2023), Mortejo and Mortejo (2023), and Coh and Zvan (2019) are consistent with the findings of the current study.

The study conducted by Matin and Sæther (2017) strongly emphasized that personality traits and perceptual cognitive abilities are paramount mental skills for athletes, underscoring the significance of psychological factors in talent identification. Similarly, Serrado (2023) asserted that perception, memory, and knowledge play a crucial role in certain athletes' ability to comprehend the game better, further reinforcing the importance of psychological aspects in talent identification. These findings align with those of Matin and Sæther (2017), Mola, D. W., & Shaw, D. (2024), Mortejo and Mortejo (2023), and Coh and Zvan (2019), thereby lending credibility to the findings of the present study.

Matin and Sæther (2017) highlighted in their research on talent identification criteria that technical skill stands out as a crucial aspect for identifying athletes. This observation is echoed by Kiflu (2021), who identified technical skill as one of the four pillars prone to issues if not managed effectively. The alignment between the findings of Matin and Sæther (2017) and Kiflu (2021) reinforces and enhances the conclusions drawn from the current study.

After conducting a thorough analysis, the talent identification questionnaire designed for Ethiopian athletes has produced significant results. Through careful examination, we have successfully streamlined the data and tailored the questionnaire to suit the specific needs of the Ethiopian athletic community. The validation process has further reinforced its suitability, confirming its alignment with the distinct traits of Ethiopian athletes. Additionally, assessments of reliability have demonstrated the consistency and trustworthiness of the adapted questionnaire. In summary, these findings support the assertion that the refined questionnaire, now comprising six dimensions and 14 statements, is a valid and dependable tool for future use in evaluating and advancing Ethiopian sports development initiatives. Limitations of the study encompass dependence on self-reported data and the possibility of limited applicability to broader contexts. Nevertheless, strengths such as careful adaptation and validation of the questionnaire guarantee its significance. Furthermore, the practical implications of the research provide valuable insights for improving athlete progression and achievement within Ethiopian athletic clubs. This contributes to the advancement of sports development initiatives and offers benefits to researchers, professionals, and policymakers involved in sports management and talent nurturing.

## CONCLUSIONS

Based on the findings, the dimensions increased from five to six, considered as the Ethiopian adaptation of TIQ. Reliability has increased from the original version to the Ethiopian adaptation. Additionally, internal consistency has improved from the original version to the Ethiopian adaptation. Therefore, The Ethiopian

adaptation of questionnaire is valid and reliable for future applications and adaptations for administration on Ethiopian population.

**Conflict of interest** - The authors declare no conflicts of interest.

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