VALIDITY AND RELIABILITY OF THE YOUNG FUTSAL SPECIFIC TEST BATTERY (YFSTB) TO MEASURE THE SKILLS PERFORMANCE OF FUTSAL PLAYERS

Rumi Iqbal Doewes*[1,2], Gunathevan Elumalai[1], Siti Hartini Azmi[1]

[1]Fakulti Sains Sukan dan Kejurulatihan, Universiti Pendidikan Sultan Idris, Perak Darul Ridzuan 35900, Malaysia; [2]Faculty of Sport, Universitas Sebelas Maret, Jl. Ir. Sutami, 36A, Kentingan, Surakarta, Indonesia

Abstract

The research purpose was design, assess the validity and reliability of test-retest the Young Futsal Specific Test Battery (YFSTB) to measure the skill performance of young futsal players. YFSTB provided a competency assessment of futsal skills which includes running with the ball, wall pass, checking off (moving without the ball and returning to the ball), dribble with the ball, and shoot in the shooting area. YFSTB's assessment is based on response time and performance accuracy (errors in doing futsal tests are recorded in the form of time penalties). The 60 young futsal players participated in this study. All participants underwent YFSTB 2 times on 2 different days. Participants also completed a futsal match to assess the players' technical-tactical behavior in the match. Intraclass correlation (ICC) and paired t-test were used to assess test retest reliability. To assess validity, researchers assessed content validity and construct validity. The results showed that all experts confirmed the content validity with Aiken V > 0.69 (mean Aiken V = 0.80). There was a significant correlation between YFSTB and various aspects of GPET (r = 0.502–0.611; p < 0.05) and contributed 25.2%–37.3% to the technical-tactical behavior of players in matches (R-square = 0.252–0.373). So that confirms the construct validity. In addition, a significant strong correlation was observed between the YFSTB test and retest (r = 0.981; ICC = 0.980; 95% Confidence Interval (CI) = 0.966–0.988) and no difference was observed in player performance in the YFSTB test and retest (p value > 0.05). So it can be concluded that YFSTB can be used to assess the skill performance of young futsal players in relation to the players' technical-tactical behavior during matches.

Keywords: YFSTB, Futsal technique, Tactic-technique behavior.

Manuscrito recibido: 08/03/2023
Manuscrito aceptado: 22/03/2023

*Corresponding Author: Rumi Iqbal Doewes, Fakulti Sains Sukan dan Kejurulatihan, Universiti Pendidikan Sultan Idris, Perak Darul Ridzuan 35900, Malaysia

Correo-e: king.doewes@staff.uns.ac.id

Introduction

The current futsal test has several limitations, such as checking only skill parameters such as the MFST (Massey Futsal Shooting Test) which is modified based on the LSST (Loughborough Soccer Shooting Test) to simulate shots similar to futsal game situations (Naser & Ali, 2016). So the test is not specifically for futsal and only checks the shooting parameters. Therefore the test is general. Furthermore, recently, Farhani et al (2019) have designed a specific performance test for futsal, namely the FSPT (Futsal Special Performance Test). This test is designed to evaluate futsal skills including dribbling, dribble, long pass, short pass, ball control, rotation, shooting, and returning from attack to defense. However, FSPT is only performed by senior male futsal players, so it cannot be applied to young futsal players. In addition, FSPT only considers anaerobic power because it is considered capable of predicting the performance of futsal players when scoring goals.

Therefore, this research was conducted with the aim of designing a special futsal test for young players consisting of futsal skill competencies which include running with the ball, wall pass, checking off (moving without the ball and returning to the ball), dribble with the ball, and shoot in the shooting area. In addition, the designed test also considers the technical-tactical behavior of futsal players in matches, so that it better applies the principles of the game where players appear as offensive and defensive principles. This is because sports such as futsal require players to continuously adapt to the movements of teammates and opponents to determine the behavior or action to be taken. Technical behavior is the main action carried out through possession of the ball (offensive) or when a player tries to stop the opponent's attack during the game and prevents the opponent from scoring goals (defensive) (Reis et al., 2019). Technical behavior is carried out as a player's decision making through motor actions to solve problems experienced in the game. Thus, technical behavior must be analyzed because it is related to tactical behavior, which together will shape the knowledge process of futsal players. Pizzaro et al (2019), explained that tactic behavior is active and continuously seeks and explores relevant information in the context of the game. So that in a futsal match, it includes technical-tactical behavior, namely the reasons for making (tactical behavior) and how to make (technical behavior) an action.

Methods

Participant

The 60 healthy young futsal players, male, field players, aged 15.05 ± 0.79 years, height 1.65 ± 0.05 m, weight 62.13 ± 3.67 kg, BMI 22.84 ± 1.46 kg/m2, and playing experience 3.02 ± 0.79 years. In relation to this age, Alvares et al (2019), explained that around the age of 14, there is an increase in movement, adaptation to training, maximization of preparation and physical, tactical, and psychological capacity. At this age, the natural process of physical maturation provides many benefits to morphological modifications and training adaptations for individuals involved in futsal. All participants signed a written informed consent form and the study was approved by the Sebelas Maret University Ethics Committee.

Research procedures

Participants are invited to an introductory session to explain the aims and process of the research, and to collect age, height, weight, playing experience and playing position. Participants participated in the YFSTB test which was carried out 2 times on 2 different days. The study was conducted after it was confirmed that the participants did not have a match in the near future. After undergoing 2 times YFSTB test sessions, participants underwent a match to assess the player's technical-tactical behavior in the match.

In addition, 7 experts consisting of 2 PhD Sport Science and 5 futsal coaches with a minimum national level license were recruited to provide comments as an assessment of the content validity of YFSTB. Experts provide an assessment in the form of aspects of the suitability of YFSTB with the basis of the overall game of futsal (Costa et al., 2011). The expert is asked to give his opinion in the "assessment" column. The range of values starts from 1 (does not measure the basic concept of futsal games at all) – 4 (measures the basic concepts of very strong futsal games). Table 1 shown the aspects of content validity that are assessed by experts (Table 1).

Futsal Players' Technique-Tactical Behavior

The technical-tactical behavior of futsal players is assessed by assessing the decision-making and execution of players in matches. For matches, a raffle system is used to allocate subjects into teams. Futsal players are divided into GK + 4 vs 4 + GK teams, and only line players are evaluated (excluding goalkeepers). All games take place on a 25 m × 15 m field in accordance with the futsal law of the game regulations. All matches, following the official

Table 1: Aspects of content validity assessment (Costa et al., 2011).

No	Aspects of content validity assessed
1	YFSTB implements the tactical performance of futsal games
2	YFSTB corresponds to the behavior of players on the playing field
3	YFSTB corresponds to the interaction between players
4	YFSTB is efficient to use
5	YFSTB is effectively implemented
6	YFSTB reflects dribbling, passing, and shooting performance in play or in similar situations

competition format (two halves of 20 minutes on a stopped clock), were recorded using a Canon EOS 1100D DSLR camera, from a fixed position. The camera is always placed in the background of the playing field, at a height of 4m, guaranteeing an optimal view of all the game action. The instrument used to evaluate player decision-making and execution is the GPET (Game Performance Evaluation Tool) observation instrument.

In GPET, the assessment is seen from the tactical problem, on the ball attacker, and off the ball attacker. Tactical problems are related to tactical problems in the form of keeping ball and penetrating defense, these two tactics are assessed with the correct code getting 1 point and 0 point getting wrong. Furthermore, the assessment is based on decision making skills and execution skills. These two dimensions are assessed in on the ball attacker and off the ball attacker. The decision making skills component is coded with 1 (true) and 0 (false). The skill execution component is coded with 1 (success) and 0 (unsuccessful) (Serra-Olivares et al., 2015).

Young Futsal Specific Test Battery (YFSTB)

Before doing YFSTB, all participants warmed up for 15 minutes. As shown in Figure 1, YFSTB was carried out on a 40 m x 20 m interlock futsal court. Consists of 2 balls, 10 orange cones, 1 board measuring 5 m x 1 m, and a goal post (Figure 1).

The Young Futsal Specific Test Battery (YFSTB) consists of running with the ball, wall pass, checking off (moving without the ball and returning to the ball), dribble with the ball, and shoot in the shooting area. Figure 1 shows the layout and sequence of YFSTB tasks. The test taker is in the start position. After the start whistle is sounded, participants are required to run with the ball 15 meters (step 1), then wall pass (step 2). After that the participant checks off (moves and then returns to the ball). Next, participants dribble in a zigzag manner with the ball passing 8 orange cones (step 3). After that the participants are in the shooting area and shot at the goal (step 4). Tasks are carried out as quickly as possible and make as few mistakes as possible. YFSTB's assessment includes response time, penalty time, and YFSTB performance time. Response time is the time it takes participants to complete all tasks. Penalty time is the penalty time given to each error that occurs in each task. The last is YFSTB performance time, which is the sum of response time and penalty time. Time penalties are awarded in the event of an error as follows:

1. For dribbling tasks: A 2 second penalty is imposed each time the ball touches an orange cone.

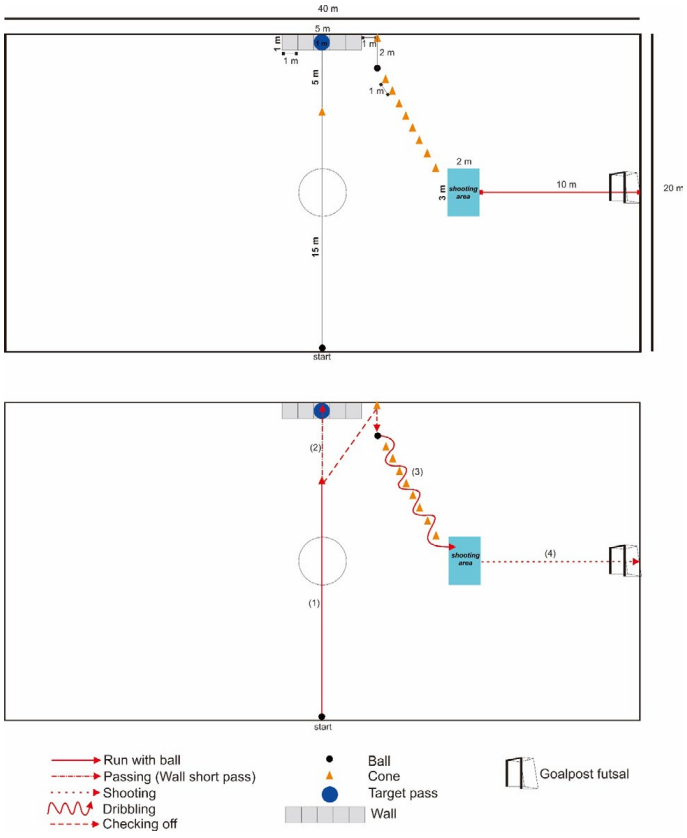

Figure 1: Young Futsal Specific Test Battery (YFSTB).

2. For passing tasks: A 4 second penalty is imposed for inaccurate wall passing targets.

3. For shooting: Shot is done in the shooting area. A 4 second penalty is imposed for missing the goal.

Statistic Analysis

YFSTB content validity is assessed using the Aiken V coefficient > 0.69 which can be declared valid (García-Ceberino et al., 2020). To assess the construct validity of YFSTB, it was tested using linear regression modeling. The Pearson correlation test was used to investigate the relationship between variables with <0.3 (very small correlation), 0.3-0.5 (small correlation), 0.5-0.7 (moderate correlation), and >0.7 (strong correlation) (Farhani et al., 2019). To assess test retest reliability, intraclass correlation (ICC) and paired t-test were used. ICC provides an indication of how well from lowest to highest score of participants in 1 trial was replicated in subsequent trials. For this study, ICC = 0.70 is considered acceptable (Lubans et al., 2014). Mean change was assessed using a paired t-test to identify YFSTB performance in two different trials. All analyzes were performed with SPSS 17, significance was set at 5%.

Research Results

Content validity based on the assessment of 7 experts shows the value of Aiken V > 0.69 (average Aiken V = 0.80). For the results of the assessment of each aspect, it shows that the YFSTB aspect applies tactical performance in futsal games (Aiken V = 0.86); the YFSTB aspect according to the player's behavior on the playing field (Aiken V = 0.76); the YFSTB aspect corresponds to the interaction between players (Aiken V = 0.81); aspect YFSTB efficiently used (Aiken V = 0.71); the YFSTB aspect is effectively implemented (Aiken V = 0.76); and YFSTB aspects reflect dribbling, passing, and shooting performance in games or in similar situations (Aiken V = 0.90).

The test-retest performance showed no difference between test and retest for response time (17.14 seconds vs 17.09 seconds; p = 0.431), penalty time (5.17 seconds vs 5.10 seconds; p = 0.321), and YFSTB performance (22.31 seconds vs 22.19 seconds ;p = 0.164). In addition, strong correlations were shown and ICC was observed between test and retest for response time (r = 0.825; ICC = 0.820; 95% CI = 0.716–0.889), penalty time r = 0.988; ICC = 0.988; 95% CI = 0.980–0.993), and YFSTB performance (r = 0.981; ICC = 0.980; 95% CI = 0.966– 0.988) (Table 2). In addition, YFSTB performance also showed a significant correlation with all GPET variables (r = 0.502–0.611; p < 0.05) and contributed to the player's technique-tactical behavior in matches by 25.2%–37.3% (R-square = 0.252 – 0.373) (Table 3).

Table 2: Performance of futsal players in the YFSTB test and retest.

Variables	Test	Re-test	t_{count}	p_{value}	r_{count}	ICC	95% CI ICC
Response time (second)	17.14	17.09	0.792	0.431	0.825**	0.820	0.716-0.889
Penalty time (second)	5.17	5.10	1.000	0.321	0.988**	0.988	0.980-0.993
YFSTB performance (second)	22.31	22.19	1.411	0.164	0.981**	0.980	0.966-0.988
** strong correlations							

Table 3: Pearson correlation and R-square YFSTB with GPET.

GPET variables		Mean ± SD	r_{count}	p_{value}	R-square
Tactical problem	Keeping ball	26.68±3.34	0.580*	0.000	0.336
	Penetrating defense	27.03±3.39	0.505*	0.000	0.255
On the ball attacker	Control ball	29.25±4.11	0.502*	0.000	0.252
	DM Pass	27.85±4.52	0.509*	0.000	0.259
	DM Dribbling	24.50±4.20	0.526*	0.000	0.277
	DM Shot	6.38±2.78	0.566*	0.000	0.320
	Ex Pass	20.55±7.81	0.502*	0.000	0.252
	Ex Dribbling	22.87±8.81	0.502*	0.000	0.252
	Ex Shot	7.90±3.63	0.505*	0.000	0.255
Off the ball attacker	DM	25.43±7.37	0.503*	0.000	0.253
	Ex	22.62±7.62	0.611*	0.000	0.373
DM : Decision making; Ex : Execution					
** Significant correlation (p < 0.05); moderate correlation*					

Table 4: YFSTB Assessment Criteria.

Class Interval	Classification
32.48 - 35.86	Very weak
29.09 - 32.47	Weak
25.70 - 29.08	Below Average
22.31 - 25.69	Average
18.92 - 22.30	Above Average
15.53 - 18.91	Good
12.14 - 15.52	Very Good

Discussion

The research purposes was designing a special futsal test for young players consisting of futsal skill competencies which include passing, dribbling, and shooting (wall short pass, long pass, dribble, rotation and dribble, shot) as well as indicating the direction of the shot target. The research results shown that the test designed namely YFSTB has acceptable validity and reliability, and YFSTB is designed on the futsal field, used futsal skills, and fulfills the principles of tactic-technical behavior of young players in matches.

Related to the principles of player-tactical behavior in matches, Prieto-Ayuso et al (2019), explained that the concept of talent in sports is not only an important physical parameter, but decision-making and technical skills are also important. So the researchers also assessed the decision-making and technical skills of young players in observing matches. Observation of young players in matches used the selected GPET which is an instrument for observing decision making and player execution, to investigate the relationship between YFSTB data and GPET data. The researcher used bivariate correlation analysis and shown that YFSTB is significantly correlated with tactical problems including keeping ball and penetrating defense; on the ball attacker includes ball control, decision making in passing, dribbling, and shooting, as well as execution in passing, dribbling, and shooting; as well as decision making and execution when off the ball attacker (moderate).

In addition, the researcher also used linear regression and shown that YFSTB contributes to the technical-tactical behavior of players in matches by 25.2%-37.3%. This explains that players are able to transfer knowledge, for example which tactics are used in certain situations which can be in the form of passing, receiving, avoiding, changing directions in various directions, anticipating, and footwork that 25.2%-37.3% explained by the player's competence in YFSTB. Therefore, the YFSTB design meets construct validity because it has the specificity of imitating technical-tactical behavior in actual matches. To assess content validity, the 7 experts mentioned earlier indicated that all experts agreed that the YFSTB was a valid instrument for measuring the performance of young futsal players according to the technical-tactical behavioral aspects of playing futsal.

The test and retest results showed a strong correlation and no differences for performance time, penalty time, targeting accuracy, and YFSTB performance, indicating no learning or training effect. Young players displayed a 0.05 second reduced response time, 0.07 second reduced penalty time, and 0.12 second reduced performance time in the second trial, this could be attributed to players adapting their performance in YFSTB. This means that players can successfully complete the test in the shortest amount of time without sacrificing technical accuracy. So that the overall results of YFSTB support good reliability when players repeat YFSTB.

Conclusion

The results showed that the YFSTB is a valid and reliable test to assess aspects of futsal technical skills related to technical-tactical behavior in matches. In addition, YFSTB has content validity which shown that YFSTB is in accordance with the basic concept of the game of futsal. Table 4 below shown the norms for the YFSTB assessment criteria (Table 4).

References

Alvares, P. D., Chaves, P. J., Oliveira Junior, M. N. S. D., Fernandes, T. L. B., Veneroso, C. E., & Cabido, C. E. T. (2020). Effects of puberty on jump and sprint performance in young futsal players. *Revista Brasileira de Medicina do Esporte*, *26*, 167-171.

Costa, I. T., Garganta, J., Greco, P. J., Mesquita, I., & Maia, J. (2011). System of tactical assessment in Soccer (FUT-SAT): Development and preliminary validation. *System*, *7*(1), 69-83.

Farhani, F., Rajabi, H., Negaresh, R., Ali, A., Shalamzari, S. A., & Baker, J. S. (2019). Reliability and validity of a novel futsal special performance test designed to measure skills and anaerobic performance. *Int. J. Sports Physiol. Perform*, *14*(8), 1096.

García-Ceberino, J. M., Antúnez, A., Feu, S., & Ibáñez, S. J. (2020). Validation of two intervention programs for teaching school soccer. *Revista Internacional de Medicina y Ciencias de la Actividad Fisica y el Deporte, 20*(78), 257-274.

Lubans, D. R., Smith, J. J., Harries, S. K., Barnett, L. M., & Faigenbaum, A. D. (2014). Development, test-retest reliability, and construct validity of the resistance training skills battery. *The Journal of Strength & Conditioning Research*, *28*(5), 1373-1380.

Naser, N., & Ali, A. (2016). A descriptive-comparative study of performance characteristics in futsal players of different levels. *Journal of sports sciences*, *34*(18), 1707-1715.

Pizarro, D., Práxedes, A., Travassos, B., del Villar, F., & Moreno, A. (2019). The effects of a nonlinear pedagogy training program in the technical-tactical behaviour of youth futsal players. *International Journal of Sports Science & Coaching*, *14*(1), 15-23.

Prieto-Ayuso, A., Pastor-Vicedo, J. C., González-Víllora, S., & Contreras-Jordán, O. (2019). Observation Criteria for Physical Education Teachers to Identify Gifted Children through Invasion Games. *International journal of environmental research and public health*, *16*(23), 4830.

Reis, M., Santos, J., Matos, M., Cruz, T., Vasconcellos, F., & Almeida, M. (2019). Assessment of the performance of novice futsal players in the execution of futsal-specific motor skills. *Human Movement*, *20*(3), 29-37.

Serra-Olivares, J., González-Víllora, S., García-López, L. M., & Araújo, D. (2015). Game-based approaches' pedagogical principles: exploring task constraints in youth soccer. *Journal of human kinetics*, *46*, 251.