The construction and validation of a Test of Wrestling Skill

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Abstract: This study was conducted to determine the objectivity, reliability and validity of a wrestling skill test protocol among male Samples (n = 50), consisted of skilled (n = 25) and amateur (n =25). Researchers tested a researcher made questionnaire and Rear take down test twice in a single trial, test and re-test protocol. Pearson-Product Moment Correlation method's was used to determine the value of objectivity and reliability. Validity tested through independent T-test, analyze of variance, and discriminate analysis. Findings suggested that the high consistency between the two testers with a value of r = 0.90. Likewise, the reliability value between test and re-test for the Rear take down test (r=.83). RMANOVA conducted to check objectivity and there were no difference between each time conducting the test (p > 0.05). Validity of Rear take down checked trough ANCOVA, significant differences between skilled and amateur wrestler (F=11.932, p<0.05) specified, Agility (F= 3.68, p= 0.014), and power (F= 2.68, p= 0.028) had significant effect on the Rear take down skill. To check the remaining items validity a discriminate and T-test analyses was run and revealed all skills except single leg tackle predicted significantly meaningful (Canonical Correlation= o.442, Wilks' Lambda=0.804, sig. = 0.039).

Keywords: Agility; Objectivity; Power; Questionnaire; Wrestler

1. Introduction

Among different sports Wrestling is a sport of hand-to-hand struggle between unarmed contestants who try to throw each other down and, a physical competition between two (occasionally more) competitors or sparring partners who attempt to gain and maintain a superior position. There are a wide range of styles with varying rules for both traditional historic and modern styles. Wrestling disciplines defined by FILA are broken down into two categories; International wrestling disciplines and folk wrestling disciplines. According to the International Federation of Associated Wrestling Styles, there are five current International wrestling disciplines acknowledged throughout the world. They are Greco-Roman Wrestling, Freestyle Wrestling, Grappling, Beach wrestling and Sambo, among them freestyle and roman style wrestling are the most world known and international disciplines(Randall and Wroble, 2009). In sport of wrestling, wrestlers need to have a high level of physical, mental, technical and tactical preparation to perform successfully in national and international level competitions. Wrestling is one of the most demanding sports from a metabolic perspective and it is a sport where the requirement of absolute strength and power is critical (Klinzin and Karpowicz, 1983; Mackenzie, 2007)

Evaluation is essential in the process of teaching and coaching. Through evaluation, one can understand the extent to which learning has taken place. Hence, the teacher/coach must be aware of evaluation techniques, enable him to measure the student's/player's skill objectively and classify them initially. There are few skills tests in various physical activities which measure skills of students/players in different games. Sport skill tests are designed to measure the basic skills used in performing specific sport. Because of the wide range of skills in most sports, selection of the most important skill is invariably necessary. Selection usually based on the available literature, opinion of experts as well as by applying appropriate statistical techniques. The skill test helps students to evaluate their performance (Purashwani et al., 2010).

Furthermore, one of the important stages to prepare elite wrestlers is to technically evaluate champions. Although few scatter research to evaluate wrestlers were conducted, lack of reliable and standardized tool is recognized (Baumgartner et al., 2003;Fleishman, 1964;Rousson et al., 2002;Schultz, 1992). Despite all effort to build a skill test, many researchers like Edwin Fleishman (1964) concluded a one dimensional evaluation cannot be a valid criterion(Fleishman, 1964). Base on above statements,

aim of this study is developing an instrument to evaluate a wrestler's skill status. Above all, we are going to validate the test.

2. Methodology

Development of the instrument was completed in two stages. The first stage was developing items of instrument and the second stage comprised processes used to evaluate validity and reliability of the instrument.

Development of the items

In the first part, authors conduct a survey to prioritize the techniques. After that the export panel assigned ten indexes to evaluate each selected technique. Each item scored based on the Likert scale from 0 to 2.

Questionnaire validation

In the second part to validate the first test, a sample of 22 male wrestlers divided to two groups of weak and strong skill wrestler. They performed the prioritized techniques in front of the camera. To evaluate the wrestlers 'technique the films were assembled by Peremyer software. Then, the experts'

panel evaluated performance and scored wrestlers by the questionnaire. To determine the objectivity of the questionnaire, the film was evaluated by tree experts; the correlation between them can confirm the reliability of the test. Logical and face validity determined by expert's panel and the construct validity assessed trough the discriminate analyze. The authors used test-retest method to evaluate the stability of the questionnaire which the correlation should be significant.

Validity of Rear take down test was examined through a 50 member sample divided to subject and control groups. Both groups were in the same level of physical fitness but the control group was better in terms of skill of Rear take down. Scores calculated based on the frequency of correctly performing the test. Tests of power and agility were conducted after performing the rear take down. Reliability of the test was assessed though test- retests method by the same export. Face and logical validity achieved through exports assessment and construct validity examined trough covariance analyze with control variable of physical fitness.

Table 1 participant characteristics

Measuring Tools

Groups	Experiment		Control		Total	
	age	weight	age	weight	age	weight
Mean	15.44	54.04	15.68	54	15.56	54.44
N	25	25	25	25	50	50
Std. Deviation	1.71	9.25	1.68	7.06	1.68	8.15
Minimum	13	45	13	45	13	34
Maximum	19	71	19	71	19	71

Rears take down test: the test was developed to measure rear take down skill. Necessary equipment for this test are wrestling dummy and marked wrestling mat. The wrestler must start each new turn at the start point. Scores calculated according to performance frequency. Each time performing the skill the wrestler must be in the designated area and perform the technique from the start point otherwise he may lose a score each time failing to do correctly.

Single leg tackle test, Armdrag and go behind test, Rear throw test, Flying mare test: the researcher made questioner, camera and premier software were the tools analyzing performance of wrestlers. For each technique a 10 items questionnaire designed by the expert panel.All questions scored on a scale from 0 to 2, with 2 representing the highest level of performance possible, 1 average level, and 0 not being able or wrong.

Standing long Jump: explosive power of legs was determined by standing long jump adopting AAHPER Youth fitness Test (Mackenzie, 2000).

Shuttle Run test: Objective of this test is to assess the athlete's ability to accelerate between marked lines and to rapidly change direction to assess agility (Mackenzie, 2007).

3. Data analysis Method

At first the 6 most important techniques of wrestling selected based on the experts' suggestion to choose the most common techniques. Objectivity and reliability of Rear take down accessed using Pearson correlation coefficient. Construct validity of the Rear take down test was accessed using analysis of covariance. Construct validity of the remaining SSRCI items was accessed using discriminate analyze and for

determining reliability the test re-test method carried out through utilization of RMANOVA.

4. Results

The expert panel carefully selects a 10 item questionnaire for each chosen techniques [1]: arm go

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[1]Table 8 introduce a brief description of items of questionnaire to access a full version of the questionnaire send an email to sholeh.khodadad@kntu.ac.ir

behind and rear throw, flaying mare and duckundergo behind and single leg tackle. Reliability and validity of the test verified in a group of participant.

Participant

According to table 1 Fifty male wrestlers from different age (14 to 19 years old) participated in the study; the average age of participant was 15.66. Participant divided to two homogenous groups according to their ages and weight (average weight= 55.44).

Objectivity and reliability of the Test of Rear take down skill:

According to table 2, Assessing Interrater reliability of SSRCI Skills, two raters assessed Rear take down skill. Raters output were significantly correlated (r= 0.9, p<

0.0001) which was acceptable as an indicator of reliability (Baumgartner et al., 2003). Inaddition, test re-test administered; The Pearson correlation coefficient was high (r= 0.803) which was acceptable as an indicator of a reliability (Rousson et al., 2002).

Table 2 Reliability of the Rear take down test

	Inter rater	reliability
Pearson Correlation	0.900	0.803
Sig. (2-tailed)	0.00	0.00
N	25	25

Reliability of arm go behind test, rear throw, Duck under go behind, and single leg tackle test:

According to table 3 Pearson correlation except Duck undergo behind coefficient was high enough (r>0.7)

which was acceptable as an indicator of a reliability of the test (Rousson et al., 2002).

Table 3 Reliability of the test– Pearson Correlation

		reliability
Arm go behind test	Pearson Correlation	0.952
	Sig. (2-tailed)	0.00
	N	22
Rear throw	Pearson Correlation	0.755
	Sig. (2-tailed)	0.00
	N	22
Flaying mare	Pearson Correlation	0.937
	Sig. (2-tailed)	0.00
	N	22
Duck undergo behind	Pearson Correlation	0.476
	Sig. (2-tailed)	0.025
	N	22
Leg tackle	Pearson Correlation	0.860
	Sig. (2-tailed)	0.000
	N	22

Objectivity of arm go behind, rear throw, flaying mare, duck under go behind, single leg tackle tests:
To check the objectivity of the questionnaire RMANOVA conducted. To fulfill the repeated measure ANOVA assumptions, Mauchys test was conducted. It became clear that there is no significantly different between groups' variances (GreenHouse-Geisser= 0.999, Lower Bound= 0.500). Therefore, repeated ANOVA is permissible. According to table 4 it can be inferred there is not a significant difference between each time conducting the tests (p>0.05) except for Single leg Tackle (p<0.05).

Test		Source		*SS*	*df*	*MS*	*F*	*p*
arm go behind	Greenhouse-Geisser=0.999	Factor 1	Sphericity Assumed	0.576	2	0.288	0.858	0.431
	Lowe-bound=0.500		Greenhouse-Geisser	0.576	1.997	0.288	0.858	0.431
	Huynh-Feldt=1.00		Huynh-Feldt	0.576	2.00	0.288	0.858	0.431
	Sig.= 0.98		Lower-bound	0.576	1.00	0.576	0.858	0.365
	W= 0.999	Error	Sphericity Assumed	14.091	42	0.335		
			Greenhouse-Geisser	14.091	41.947	0.336		
			Huynh-Feldt	14.091	42.00	0.335		
			Lower-bound	14.091	2100	0.671		
Rear throw	Greenhouse-Geisser=0.899	Factor 1	Sphericity Assumed	0.485	2	0.242	0.433	0.651
	Huynh-Feldt=0.978		Greenhouse-Geisser	0.485	1.799	0.270	0.433	0.631
	Lowe-bound=0.500		Huynh-Feldt	0.485	1.957	0248	0.433	0.647
	Sig.= 0.303		Lower-bound	0.485	1.00	0.485	0.433	0.518
	W= 0.888	Error	Sphericity Assumed	23.515	42	0.560		
			Greenhouse-Geisser	23.515	37.777	0.622		
			Huynh-Feldt	23.515	41.097	0.572		
			Lower-bound	23.515	21.00	1.120		
Flaying mare	Greenhouse-Geisser=0.947	Factor 1	Sphericity Assumed	2.212	2	1.106	0.433	0.170
	Huynh-Feldt=1.00		Greenhouse-Geisser	2.212	1.894	1.168	1.849	0.172
	Lowe-bound=0.500		Huynh-Feldt	2.212	2.000	1.106	1.849	0.170
	Sig.= 0.562		Lower-bound	2.212	1.00	2.212	1.849	0.188

	W= 0.94	Error	Sphericity Assumed	25.121	42	0.598		
			Greenhouse-Geisser	25.121	39.781	0.631		
			Huynh-Feldt	25.121	42.00	0.598		
			Lower-bound	25.121	21.00	1.196		
Duck under go behind	Greenhouse-Geisser=0.748	Factor 1	Sphericity Assumed	1.848	2	0.924	0.853	0.433
	Huynh-Feldt=0.792		Greenhouse-Geisser	1.848	1.496	1.236	0.853	0.406
	Lowe-bound=0.500		Huynh-Feldt	1.848	1.585	1.166	0.853	0.411
	Sig.= 0.16		Lower-bound	1.848	1.00	1.848	0.853	0.366
	W= 0.663	Error	Sphericity Assumed	45.485	42	1.083		
			Greenhouse-Geisser	45.485	31.417	1.448		
			Huynh-Feldt	45.485	33.285	1.367		
			Lower-bound	45.485	21.00	2.166		
Single leg tackle	Greenhouse-Geisser=0.983	Factor 1	Sphericity Assumed	7.758	2	3.879	3.628	0.035
	Huynh-Feldt=1.00		Greenhouse-Geisser	7.758	1.967	3.944	3.628	0.036
	Lowe-bound=0.500		Huynh-Feldt	7.758	2.000	3.879	3.628	0.035
	Sig.= 0.845		Lower-bound	7.758	1.00	7.758	3.628	0.071
	W= 0.983	Error	Sphericity Assumed	44.909	42	1.069		
			Greenhouse-Geisser	44.909	41.300	1.087		
			Huynh-Feldt	44.909	42.00	1.069		
			Lower-bound	44.909	21.00	2.139		

Table 4: Reliability of the test RMANOVA

Validity of the Rear takes down test:
Table 5 shows the analysis of variance (ANOVA) result. One-wayANOVAprovides a direct method for assessing a test's content validity by comparing the groups' mean to explore the discriminate validity. NOVA is tolerant of moderate departures from normality and unequal variances, particularly if cell sample sizes were equal(Agresti A and Agresti BF, 1979). It can be inferred from the table 5 there is a significant difference between groups of skilled and amateur wrestlers in terms of Rear take down test (F=11.932, p<0.05).

Table 5 Content Validity of rear take down test Result of ANOVA

ANCOVA tests whether certain factors have effect on the outcome variable. According to the table 6 analyze of covariance with control variables of agility and power; there is a significant difference between skilled and amateur groups (F=2.86, p=0.005). In addition, Agility (F= 3.68, p= 0.014), and power (F= 2.68, p= 0.028) have significant effect on the Rear take down skill which means certain factors have effect on the test, as in can be predicted in literatures.

Table 6 Content Validity of rear take down test Result of ANOVA

Test		Source	*SS*	*df*	*MS*	*F*	*p*
Rear take down test	Intercept	Hypothesis	13911.414	1	13911.414	889.395	0.000
		Error	385.638	24.655	15.641		
	Skill	Hypothesis	104.860	3	34.953	7.095	0.005
		Error	64.042	13	4.926		
	Jump	Hypothesis	199.674	11	18.152	3.685	0.014
		Error	64.042	13	4.926		
	Agility	Hypothesis	268.556	19	14.135	2.869	0.028
		Error	64.042	13	4.926		

Construct validity of the arm go behind test, rear throw, Duck undergo behind, single leg tackle test:
To assess the ability of the questionnaire to distinguish between two independent groups in terms of Skill, discriminate analyses were conducted. According to Table 7 The result of prediction was significantly meaningful (Canonical Correlation= o.442, Wilks'Lambda=0.804, sig. = 0.039) 71.4% Good group and 75% poor Group were correctly classified in their groups. Besides, five T- tests were conducted to evaluate the ability of the test to

distinguish between groups, the results show that there is a significant difference between groups. Except single leg tackle (p=0.7).

Test	Source	SS	df	MS	F	p
Rear take down test	Corrected model	385.948	3	128.649	11.932	0.000
	intercept	39325.673	1	39325.673	3647.343	0.000
	skill	385.948	3	128.649	11.932	0.000
	Error	495.972	46	10.782		
	Total	46002.000	50			
	Corrected model	385.948	3	128.649	11.932	0.000

Table 7 Result of discriminate analyze Construct validity of the arm go behind test, rear throw, Duck undergo behind, single leg tackle test

Test	Groups			Predicted group Membership		Total	Group means	Conical Correlation	Wilks'Lambda	sig.	Levene's Test	t-test
				Good	Poor							
go behind	original	Count	Good	10	4	14	18.119	0.442	0.804	0.039	F=1.738	
			Poor	2	6	8	15.708				Sig.=0.202	Sig.= 0.039
rear throw	original	Count	Good	9	3	12	17.487	0.420	0.824	0.052	F=1.451	
			Poor	3	7	10	16.985				Sig.=0.242	Sig.= 0.017
Flaying mare	original	Count	Good	10	3	12	17.487	0.503	0.747	0.017	F=3.274	
			Poor	3	6	10	16.985				Sig.=0.084	Sig.= 0.052
Duck undergo behi	original	Count	Good	10	1	12	17.487	0.600	0.640	0.003	F=2.171	
			Poor	2	9	10	16.985				Sig.=0.156	Sig.= 0.003
single leg tack	original	Count	Good	1	3	12	17.487	0.077	0.994	0.0733	F=2.339	
			Poor	8	10	10	16.985				Sig.=0.142	Sig.= 0.733

5. Discussion and Conclusion

The researcher made instrument captured 6 techniques of wrestling including single leg tackle, duck under go behind, flying mare, rear throw, and arm drag and go behind. Rear take down evaluated by frequency of valid execution. The test has demonstrated very good reliability, validity, and objectivity in all techniques. But test re-test showed all techniques except duck under go behind are reliable. Discriminate analysis reveals the instrument was able to divide wrestlers to two independent groups and t- test showed that there were significant difference between two groups so the questionnaire had good construct validity in arm go behind, rear throw, flaying mare, duck under go behind. But single leg tackle showed poor validity because the result of t-test between skilled and amateur group was not significant. Also, Single leg Tackle showed a poor objectivity performing RMANOVA.

Literatures suggest that agility and power have significant influence on wrestling techniques (Kraemer, 2002; Mcguigan et al., 2006) therefore ANCOVA revealed control variables (power and agility) have significant effect on the output of test which means there is a significant difference between subjects with good agility and power and poor agility and power so the test demonstrated good validity in Rear take down test.

Generally, the test demonstrates a good validity and reliability in all techniques except single leg tackle so further investigation is needed for this technique.

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References

[1]. AgrestiA, Agresti BF, 1979. *Statistical methods for the social sciences*. San Francisco:Dellen.

[2]. Akbarnejad A, Sayyah M, 2012. Frequency of Sports Trauma in Elite National Level Greco-Roman Wrestling Competitions. *Arch Trauma Res*. 22-23

[3]. Baumgartner TA, Jackson AS, Mahar MT, & Rowe DA, 2003. Measurement for physical education exercise science. In: Realibility and objectivity, 7th edn.Mcgraw-hill, New Work.

[4]. Chumakov E, 1999. Wrestler´s Competitive Activity Levels. In: Theory and Practice of Physical Culture. Moscow. 16-20.

[5]. Fleishman E A, 1964. The structure and measurement of physical fitness. Englewood Cliffs, NJ: Prentice-Hall.

[6]. Klinzin JE, Karpowicz W, 1983. A test to measure the performance capabilities of national wrestlers. Strength and ,Conditioning.

[7]. Kraemer WJ, 2002. Periodized training programs for athletes. In: Strength training for sport. Oxford: Blackwell Science. 101-108.

[8]. Mackenzie B, 2000.*Standing Long Jump Test*. Available from: http://www.brianmac.co.uk/stndjump.htm [Accessed 14/http://www.brianmac.co.uk/3/2013]

[9]. Mackenzie B, 2007.*Shuttle Run Test* [WWW] Available from: http://www.brianmac.co.uk/runtest.htm [Accessed 14/http://www.brianmac.co.uk/3/2013]

[10]. McguiganMR, Winchester JB, Erickson T, 2006. The importance of isometric maximum strength in college wrestlers. Journal of Sports Science and Medicine CSSI, 108-113

[11]. Purashwani P, Datta A K, PurashwaniM, 2010. International Journal of Table Tennis Sciences. 6: 93

[12]. Randall R, Wroble, 2009. Combat Sport medicine. In: Wrestling.springer

[13]. RoussonV, Gasser T, Seifert B, 2002. Assessing intrarater, interrater and test–retest reliability of continuous measurements. Statistics in Medicine, 3431-3446.

[14]. Schultz J, 1992. Pre-season and post-season testing, are your wrestler improving? Wrestling USA 27(7): 15.

[15]. Stavrev I, Hristov P, Berberov N, Todorov, K, 1986. Objectifization of some indexes for evaluation of sports skills in Roman wrestling. 14-19

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