MEASURE CHARACTERISTICS OF PRECISION TESTS WITH TOP BASKETBALL PLAYERS FROM KOSOVO

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Original scientific paper

Abstract
The paper presents the basic results from three applied tests of examining precision with basketball players. The results obtained from the items of the tests provide the basic statistics parameters together with the measure characteristics of the tests, as it is presented. A satisfactory homogeneity and high coefficients of validity and reliability are determined for the three tests. The obtained results should be treated as preliminary results from the conducted pilot investigation.

Key words: *homogeneity, validity, reliability, motor tests.*

Introduction

Precision as a motor ability is of a particular importance in achieving better sports results (Stanković, Joksimović, Raković, Michailov, & Piršl, 2009 and Pojskić, Šeparović, & Užičanin, 2011). And with regard to basketball players it is even more important. A considerable number of the latest investigations suggest that the improvement of man's movement activities is closely related to the improvement of his/her precision. The goal of the research is to determine measure characteristics of the three applied tests for assessing the precision with the top basketball players at the age of 18 from the Republic of Kosovo. According to the research the following tasks are aimed:

1. To assess the basic results for each of the applied tests and each item;
2. Defining the homogeneity, validity and reliability as measure characteristics;
3. Recommendations of the completed research.

Methods

The research is conducted within the period of April-May 2017 year on 34 basketball players, who compete for junior category. In order to obtain the necessary results we applied the method of testing. Three precision tests after Metikoš and collaborators (1989) were applied: 'hitting with aluminum long stick' (PLS), 'hitting a target on a wall with the internal part of the foot' (PTF) and 'hitting with aluminum short stick' (PSS). Three items were used for each of the tests (Safrid, & Wood, 1989; Thomas, Nelson, & Silverman, 2005; Vincent, 2005). The obtained data is processed with IBS SPSS Statistics 20, and the following were calculated:

1. Basic statistical methods:
   - Minimal result (Min)
   - Maximal result (Max)
   - Arithmetical mean (Mean)
   - Standard deviation (StdDev)
   - Skewness (Skew)
   - Kurtosis (Kurt), and
   - Kolmogorov-Smirnoff's test (KS)
2. Factor analysis:
   - Principal component analysis
   - Communality (Com)
   - Main component (Lambda)
   - Percent (%), and
   - Normal varimax rotation (Varimax).
3. Measure characteristics:
   - First main component (H)
   - Communality (Com)
   - Main component (Lambda)
   - Percent (%)
   - Coefficient of representation (MSA)
   - Square multiple correlation (SMC)
   - Inter-item correlation (IIC)
   - Cronbach alpha coefficient (α)
   - Spearman-Brown coefficient of reliability (SB).

Results

According to the basic statistical parameters of the precision tests (table 1), similar values can be noticed with regard to the minimal (Min) and maximal (Max) results between the three repetitions in each test. The values of arithmetic means (Mean) between the three repetitions are quite similar. That indicates a certain level of adaptation of respondents while performing the motor tests of precision. Values of the standard deviation (Std Dev) are less than 1/3 of the arithmetic mean. It indicates an explicit homogeneity, namely, the achieved results are grouped around the value of the arithmetic mean.

Values of skewness on the peak of the curve (Skew) are explicitly less than +1, which indicates that Gauss curve is not significantly asymmetrical. Values of kurtosis on the peak of the curve (Kurt) indicate an insignificant variety of the obtained

results, which suggests that the sample of respondents – the basketball players, is explicitly homogeneous with regard to the data obtained from the three applied tests of precision. According to Kolmogorov-Smirnoff's tests (KS) we can say that the three test bear distinction of a normal distribution. According to Hotelling's analysis of the main components, and with the application of Guttman-Kaiser's criteria (table 2) three significant components, that explain about 86% of the total variability, are isolated. According to the results obtained from the normal varimax rotation, the first component is defined with the high projections of test 'hitting with aluminum long stick' (PLS); the second component is defined with the high projections of test 'hitting a target on a wall with the internal part of the foot' (PTF); and the third component is defined with the high projections of test 'hitting with aluminum short stick' (PSS). In Table 3 the measure characteristics of the three applied precision tests are presented. The posted results indicate that in each test individually the three applied tests have a unique subject of measuring. That represents a reliable validity of the applied tests. The values of the coefficient of representation (MSA) are satisfying; whereas the low limit of variability (SMC), correlation between the items (IIC), as well as the coefficient of reliability Cronbach alpha (α) and Spearman-Brown coefficient of reliability (SB) have higher values with 'hitting with aluminum long stick' (PLS) and 'hitting with aluminum short stick' (PSS), but with test 'hitting a target on a wall with the internal part of the foot' (PTF) they are of lower values.

Table 1. Basic descriptive parameters.

	Min	Max	Mean	StdDev	Skew	Kurt	KS
PLS1	17	39	25,46	3,486	,680	1,206	
PLS2	20	36	25,44	3,150	,774	,801	
PLS3	20	38	25,56	3,101	,994	1,429	
PTF1	6	22	15,25	3,444	-,391	-,188	
PTF2	9	25	16,35	3,526	-,106	-,524	
PTF3	9	25	16,60	3,616	-,066	-,342	
PSS1	12	22	17,09	1,897	,236	-,120	
PSS2	13	21	17,50	1,654	,052	-,328	
PSS3	14	21	17,78	1,475	,133	-,427	

Table 2. Principal Component Analysis and Normal Varimax Rotation.

	Principal Component Analysis						Varimax		
	H1	H2	H3	Com	Lambda	%	V1	V2	V3
PLS1	,628	-,630	,303	,883	3,756	41,735	**,933**	,097	,050
PLS2	,678	-,614	,260	,904	2,269	25,211	**,934**	,165	,063
PLS3	,628	-,643	,295	,894	1,754	19,488	**,939**	,102	,037
PTF1	,662	,152	-,620	,846	,172	1,915	,041	**,913**	,098
PTF2	,768	,104	-,573	,929	,135	1,500	,155	**,941**	,144
PTF3	,739	,071	-,525	,826	,102	1,139	,179	**,881**	,133
PSS1	,509	,615	,406	,802	,329	3,659	,001	,101	**,890**
PSS2	,540	,576	,471	,845	,277	3,076	,071	,066	**,914**
PSS3	,619	,578	,364	,850	,205	2,277	,076	,198	**,897**

Table 3. Measure Characteristics.

	H	Com	λ	%	MSA	SMC	IIC	α	SB
PLS1	,928	,880	**2,679**	**89,303**	,800	,744			
PLS2	,954	,903	,179	5,978	,745	,787	,850	,948	,960
PLS3	,942	,893	,142	4,718	,764	,773			
PTF1	,903	,837	**2,590**	**86,342**	,731	,717			
PTF2	,954	,927	,300	9,997	,624	,833	,796	,922	,924
PTF3	,902	,822	,110	3,661	,743	,699			
PSS1	,883	,794	**2,484**	**82,810**	,798	,583			
PSS2	,907	,838	,300	9,988	,728	,660	,743	,890	,892
PSS3	,911	,842	,216	7,202	,719	,670			

Conclusion

In order to reach the goal and tasks of the research, a sample of 34 respondents – basketball players, aged 18 from the Republic of Kosovo was used. They were treated with three motor tests for assessing the precision, which were repeated three times each. Validity of the tests was established by Hotelling's approach, and the main components were isolated with Guttman-Kaiser's criterion.

According to the defined measure characteristics of the motor tests applied with the respondents, we can conclude that they bear distinction of satisfying measure characteristics and are recommended to be put to use. In addition, the research, being a pilot investigation for the Republic of Kosovo, gives space and opportunity for similar investigations with a bigger sample of respondents (athletes) and an application of motor tests.

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Received: May 23, 2018
Accepted: June 15, 2018
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