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Coordination tests predictive value on success during the performance of dance and aerobics motion structures

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Abstract
The aim of this study was to determine the predictive value of coordination tests in achieving of students success at the Faculty of Sport and Physical Education in the performance of stylized movement structures in classes of Dance and Aerobics. The significance of this research is to define those coordination tests that have a real / realistic predictive contribution of achieving success in these classes during the study and could be rightly used for selection of students in universities entrance examination.
The sample for this study consisted 80 students (male) third academic year at the Faculty of Sport and Physical Education in Sarajevo. The sample of variables to evaluate coordination consisted three tests: (MKRKUS) - side steps, (MKROSS) - eight with bending, (MKRBUB) - not rhythmic drumming. The variables for the estimation of basic dance structures (total of 9 variables) and aerobic movement structures (a total of 5 variables) accounted for the dance elements of the English waltz, Vienna waltz, Cha-cha-cha and the basic steps Hi-low aerobics.
All of these movement structures students learn and pass within the practical teaching of dance and aerobics in universities. Assessment of success performing stylized movement structures was undertaken by three competent evaluators, numerical grade from one to five, corresponding Linker scale of assessment. To determine the significance of the predictor variables of the system (coordination tests) on each criterion (the total efficiency in dance and total efficiency in aerobic) it was used Regression analysis.
Results of regression analysis confirmed a significant predictive contribution to tests of coordination in achieving success in performing stylized movement structures of the male sample. Test of coordination in rhythm, not rhythmic drumming - (MKRBUB) has the highest predictive value, and therefore it is suggested that as one of the measuring instruments should be included in a battery of tests for selection of students in the entrance exam and admission to the Faculty of Sport and Physical Education.

Key words: **relation, coordination, dance, aerobics**

Introduction

Sports dancing can be described as a specific combination of art and sport, which in an original way allows a dance pair a unique expression of sincere emotion provoked by various music and converted in harmony and fluency of most beautiful movement and motions (Lukić, 2011). The art of connecting and synchronization of complex dance structures of different dances, in a certain rhythm, time and space, causes the aesthetic impression, is what makes dancer an artist. The basics of dance form the basis for many other aesthetic movement žactivities. For example, hi-low aerobics as a form of recreational exercise takes the basic steps and connecting them to the dance aerobics choreography with appropriate musical accompaniment. In view of the fact that aerobic was built on the foundations of dance is not surprising that these two areas are treated side by side. It is indisputable that the quality of technical performances and artistic movement structures of dance and aerobics depends on a wide range of motor skills and coordination among them takes an important place. Coordination (lat coordination - regulated entities) is a basic motor skill that is specific to its significant points in relation to other motor skills. It is believed that coordination is the least explored motor skill. Regardless, through its indirect indicators, her factors can point us to the level of its development and success. Coordination is the ability of athlete to dominate the distinctive and economical movements in expected situations (stereotype), unplanned situations (adaptation) and relatively quickly overcome sports movement (Frey, 1977, according Weineck, 2007). It is

believed that the high level of coordination skills is basic precondition for the efficient performance of stylized movement structures, their development and successful use. In previous studies of relations and size of the impact of basic motor skills on success in sports where is predominant the performance of stylized movement structures prevailing attitudes that the most important motor skills are: coordination (Kioumourtzoglou et al., 1997; Rutowska-Kucliarska and Bober 1998; Šebić –Zuhrić 2003), coordination in rhythm (Wolf-Cvitak 1984; Srholj 1989; Persicshini et al., 1998; Jelavic-Mitrovic et al. 2006.), flexibility (Srholj, 1989; Hume et al., 1993) and power (Wolf-Cvitak 1984; Srholj 1989; Hume et al., 1993).

Coordination as a global neurological power quality has a dominant role in achieving success in many sports disciplines. Good coordination is essential for learning and mastering new motor tasks. Studies at the Faculty of Sport and Physical Education are very specific and demanding a serious task that should satisfy the prospective students is an entrance exam. Candidates are selected on the basis of the evaluation results of the entrance exam, which consists of a series of motor tests, and greater number of these tests is exactly coordination tests. The interest of this study was to determine whether there are coordination tests that have a significant predictive value in relation of achieving success in the field of stylized movement structures which students will be encounter with in course of the study subjects in the Aerobics and Dance.

Method

The sample for this research is consisted of 80 male students in stable phase of growth without any cognitive, conative or motor aberrations. All students are regularly involved in teaching the subject Aerobics, Rhythmic gymnastics and dance. It was estimated their success in performing stylized movement structures that form an integral part of the examination from these cases and 3 tests to evaluate of coordination abilities: side steps (MKRKUS), eight with bending (MKROSS) and, not rhythmic drumming (MKRBUB). The variables for the evaluation of basic dance structures (total of 9 variables) are consisted of: English Waltz - basic Step (EVALBA), turn in place (EVALOK), turn in space (EVALP) Viennese Waltz - basic Step (BVALBA), turn in place (BVALOK), turn in space (BVALPR) cha- cha- cha - basic step (CACABA), the opening of New York (CACANY), turn (CACAOK). Variables for evaluation of aerobic movement structures (a total of 5 variables) are accounted of the basic steps of hi-low of aerobic: side to side (ASTS), leg curl (ALEC), V step turn (AVST), box step (ABOX) and chasse mambo (ASMA). To determine the significance of the predictor variables of the system (coordination tests) on each criterion (the total efficiency in dance and the total efficiency in aerobic) it was used Regression analysis.

Assessment of success performing stylized movement structures was undertaken by three evaluators, a professor of sport and physical education, numerical grade from one to five what corresponds to Linkers scale of assessment (Table 1).
Table 1. Criteria for evaluation of stylized movement structures of dance and aerobics

Results and discussion

Relations between the investigated areas of coordination and dance movement structures are shown in the matrix Cross-correlations (Table 2). The variable not rhythmic drumming (MKRBUB) achieved the highest number of statistically significant relationships with all other variables to estimate movement structures of dance. A statistically significant relationship has achieved variable for assessing the coordination side steps (MKRKUS) with variables for assessing structure of Cha-cha-cha dance. This relationship is quite logical because the basic step of this is just sideways movement of the "chasse" step is very similar to the side steps that are performed in the test side steps.

ASSESSMENT	GENERAL IMPRESSION TECHNIQUE	COORDINATION OF MOVEMENT	ERROR PERFORMANCE
5 (five)	The technique is fully correctly.	The optimal range of motion and suitable speed and rhythm of performance. Extremely good coordination of the whole body. Element is refined aesthetic.	No mistakes in the initial position, body position, foot position, hand position, and the final position.
4 (four)	Less insecurity and inaccuracy.	The optimal range of motion, slightly slower performance.	The maximum number of minor faults 1-3.
3 (three)	Elements are still performed well but there is uncertainty and inaccuracy.	Lack of range of motion, a smaller loss of balance, improper posture, but the whole structure of the movement is not disrupted.	The maximum number of minor faults 2-4.
2 (two)	The technique is significantly affected, loss of balance. There was a violation of the structure of the movement.	Low tension of all muscles, violated the balance position, the movement is incomplete. The obvious is poor coordination of the whole body.	There are major errors in almost all of the above technical requirements.
1 (one)	The technique is completely wrong done, the greater the loss of balance or fall.	Poor range of motion, there are larger gaps and structure of the movement is substantially violated complete loss of balance or fall.	Elements is poorly performed, with many faults,it does not recognize the structure of the movement.

Table 2. Matrix Cross-correlations coordination and dance movement structures

	EVALBA	EVALOR	EVALPR	BVALBA	BVALOK	BVALPR	CACABA	CACANY	CACAOK
MKRKUS	-,161	-,196	-,114	-,291	-,242	-,171	**-,407**	**-,369**	**-,380**
MKROSS	-,157	-,230	-,118	-,277	-,258	-,233	-,233	-,248	**-,306**
MKRBUB	**,336**	**,441**	**,451**	**,503**	**,488**	**,450**	**,415**	**,457**	**,436**

Relations between the studied areas of coordination and aerobic movement structures are shown in the matrix Cross-correlations (Table 3). The greatest number of statistically significant relationships was again variable not rhythmic drumming (MKRBUB), while the variable side steps (MKRKUS) and eight with bending (MKROSS) achieved in most cases considerably smaller and statistically insignificant low correlation with other variables for assessing aerobic movement structures.

Table 3. Matrix Cross-correlations coordination and aerobic movement structures

	ASTS	**ALEC**	**AVST**	**ABOX**	**ASMA**
MKRKUS	-,225	-,248	-,281	-,289	-,272
MKROSS	-,117	-,181	-,188	-,243	-,106
MKRBUB	**,541**	**,576**	**,545**	**,469**	**,606**

In processing the data by applying regression analysis it has been defined the criterion variable as the first principal component in which is condensed overall efficiency in the performance of dance structures (PLESUE), which is then projected in space of predictor variables (tests of coordination). The value of the coefficient of multiple correlation (Table 4) is R = 0.633, which indicates that the applied system of predictors (tests of coordination) was statistically significantly connected with the criteria variable (success in performing dance movement structures). This explains 40% of common variability (R Square = 0.401). An insight into contribution of individual predictive variables of coordination, variable not rhythmic drumming (MKRBUB) has statistically significant predictive contribution to the level of significance, 000 The variable side steps (MAGKUS) is located on the verge of statistical significance and its contribution to the level of significance is 0,072. To Understand and identify the rhythmic configuration allows a cognitive ability, and performance of dance structure allows component of rhythmic abilities. Moving in rhythm is consequence of natural instinct for movement, and rhythmic skills are developed in parallel with motor skills (Miletic, 2006). The impulse for action, i.e. moving in rhythm of music manifests by tapping, knocking or clapping and it is easily visible by the listener. In perception of rhythm the whole body is engaged with the five primary skills: a sense of duration, a sense of intensity, auditory imagination, motor imagination and motor impulse (Seashore, 1960).

Authors Metikos & Hosek (1972) had defined the dimension of coordination in rhythm as the ability to perform a set movement in a given or arbitrary rhythm. Later research (Hosek et al., 1973) confirmed good psychometric properties of some tests (MBUB, MPLH, MP3R, MPUK, MBNR) for assessing hypothetical factors of coordination in rhythm. Viskić - Štalec, (1989) has isolated the factor of coordination in rhythm and it is interpreted as a factor stimulation of rhythm movement on the sample of 693 men aged between 19 and 27 years.

Model Summary

Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	**,633**	,401	,377	,957

ANOVA

Table 4. Regression analysis of overall efficiency in the performance of dance structures

Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	46,600	3	15,533	16,937	**,000**
	Residual	69,702	76	,917		
	Total	116,302	79			
Model		**Unstandardized Coefficients**	**Standardized Coefficients**	**t**	**Sig.**	**Model**
		B	Std. Error	Beta		
1	MKRKUS	-,268	,147	-,172	-1,826	**,072**
	MKROSS	,093	,067	,135	1,401	,165
	MKRBUB	,206	,032	,608	6,431	**,000**

In processing the data using regression analysis it has been defined the criterion variable as the first principal component of which is condensed overall efficiency in performing movement structures (AEROUE). Criterion variable is as a latent dimensions projected in space of predictor variables consisting of 3 coordination tests.

Observing results of the regression analysis (Table 5), we conclude that the multiple correlation coefficient R = 0.514, which indicates how the system is applied predictors (tests of coordination) was statistically significantly connected with the criteria variable (success in performing aerobic steps). This explains 26% of common variability (R Square = .264). An insight into predictive contribution of variables of coordination only one variable not rhythmic drumming (MKRBUB) has statistically significant predictive contribution at the level of significance 0,001. By the similar data in the study came Jelavić-Mitrović et al. (2006), where a statistically significant contribution in explaining the association of predictors (motor skills) with the criterion (dance steps), there are only with variables for assessing coordination in rhythm (MKRBNR) where beta = .68 at the level of significance of 0.00.

The cognitive factor that is very noticeable in the coordination of their stronghold finds in Fleishman's (1955, By: Hosek, 1981) definition of the coordination as a motor intelligence. This is repeatedly confirmed in previous studies e.g. Ismail and Gruber (1967), Mejovšek, (1975). However, there is another approach, which is also based at the previous one, but his main goal was to calm the effects of previous approaches, but, more importantly, provide a more systematic insight into the essence of the phenomenon of movement coordination. This approach, called in theory and as a functional, which originates from the theoretical settings Bernstein (1947), Anokhin (1970), Chaidzea (1970) and empirically-based settings Kurelić et al. (1975), Gredelj et al. (1975), based on the identification of functional mechanisms latently contained in a complex system of functioning of the central nervous system. Rhythmic coordination of movement is determined by the central nervous system. Scientists have succeeded, thanks to precision technology of measuring instruments to find a place in the brain that coordinate the movement and rhythm. One such place is cerebellum, so called little brain which its actions in everyday situations "helps" big brain, because it regulates and develops repetitive movements. The second place in which comes to the coordination of rhythm and movement is under the area of large brain called the basal ganglia which participates in a complicated, unusual movements. Basal ganglia's in these moments send electrical vibrations which are spread in brain and fulfill rhythm of coordinated the muscles responsible for performance of movement structures. Motor skills and neurological processes of a healthy brain can be trained by rhythmic coordination of movements. The simplest example of this is the art of dance movements in the proper rhythm. Conscious knowledge of steps and listening to music, we determine their rhythm (slow or accelerated motion). Dancing awareness of the desired motion directs the activities of the brain. With training where the movements performed in a set rhythm of the music we are improving brain activity in the community and with him we achieve the desired results. The theory of Multiple Intelligence, by Hauard Gardner (Gardner, 1983, by Miletic, 1999), suggests that there are at least seven ways in which we process and understand information from the external world. Among others, this theory promotes the body-kinesthetic intelligence - the wisdom of the body and the ability to control physical movement and musical-rhythmic intelligence - the ability to recognize sounds and sensibility of rhythm. From the all the above it is clear that the ability, of coordination in rhythm cannot be ignored, and that the test "not rhythmic drumming" has a significant predictive contribution of achieving success in performing dance and aerobics stylized movement structures.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,514	,264	,225	,880

ANOVA

Table 5. Regression analysis of overall efficiency in performing movement structures

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15,822	3	5,274	6,805	**,001**
	Residual	44,178	57	,775		
	Total	60,000	60			
Model		**Unstandardized Coefficients**	**Standardized Coefficients**	**t**	**Sig.**	**Model**
		B	Std. Error	Beta		
1	MKRKUS	-,181	,163	-,137	-1,112	,271
	MKROSS	-,039	,071	-,072	-,554	,581
	MKRBUB	,118	,033	,437	3,608	**,001**

Conclusion

This study represents one of the researches in area of polystructural aesthetic activities of dance and aerobics, activities which aim to achieve an aesthetic criterion for performing a specified movement with the rhythm of music. Proper technical execution of the aesthetic movement structures requires an excellent sense of rhythm, and plasticity of expression and movement. Powerful and dynamic rhythmic accents make the movement structures harmonious and such motion that satisfies the basic aesthetic criteria. That is why it is not surprising that tests that assess coordination of in rhythm have the highest predictive value in achieving success in the execution movement structures of dance and aerobics. Tests for estimating coordination in rhythm have particular prominent place in many other disciplines, so that may have justified its practical applicability in the selection of students on the entrance exam of the Faculty of Sport and Physical Education.

Estimated level of rhythm coordination abilities in the student population creates the preconditions for the successful implementation of teaching and improving the quality of work on the subjects Rhythmic Gymnastics, Dance and Aerobics.

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