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## BASIC MOTOR ABILITIES AND DANCING EFFICIENCY OF THE FEMALE STUDENTS AT FACULTY OF KINESIOLOGY IN ZAGREB

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### Abstract

The aim of the study was to determine the correlation between motor abilities and the rate of efficiency in performing folk and social dances of 80 female students at Faculty of Kinesiology. Efficiency in dancing was represented by the marks given to the subjects after performing each dance by five experts on the basis of a video recording. The variables' sample to determine motor abilities consisted of the results achieved by measuring motor abilities of coordination, realization of rhythmical structures, balance, movement frequency, flexibility and explosive strength. Statistically significant relation between a predictor set of the students' motor abilities and the overall dancing efficiency criterion ( $R=0.58$ ), predictor set and the folk dances efficiency criterion ( $R=0.63$ ) ( $p<0.01$ ) was established by the means of regression analysis. The students with a higher level of rhythmic abilities, coordination, flexibility and movement frequency will be more successful in performing dancing structures.

**Key words:** motor abilities, dancing efficiency, female students

### Introduction

Dance is a conventional aesthetic movement many authors consider a combination of sport and art (Bijelić, 2006; Šifrar & Zaletel, 2014). As a kinesiology operator, dance is functional from the transformational, educational and pedagogical effects (Li & Yoa, 2005). Different dancing techniques demand different hierarchy structure of basic motor and functional abilities as well as morphological characteristics of the dancers efficient in performing specific dancing techniques. According to the authors who have done research on efficiency in different dancing techniques, it is evident that the success in folk dances (Srhoj, 2002) is influenced by a high level of coordination in rhythm, agility of feet on the dance floor and repetitive strength of torso. The similar findings resulted from the research of Vlašić, Oreb and Furjan-Mandić (2007), in which the correlation between efficiency in performing folk dances and motor space is defined by realization of rhythmic structures, coordination, explosive strength and flexibility. The efficiency in doing sport, standard and Latin dances is conditioned by a somewhat different motor structure. Model of an ideal motor structure of a sport dancer was presented in the research of Uzunović, Kostić and Miletić, 2009, in which it was determined that coordination, movement frequency velocity, balance, coordination in rhythm and flexibility assessment variables account for 66% of the dancers' efficiency variance, while movement frequency velocity, explosive strength, static balance and flexibility assessment variables account for 71% of the efficiency variance of the standard dances' competitors. It has been established on the sample of Latin dancers that speed, coordination and flexibility have important influence on efficiency in competitions (Uzunović & Kostić, 2005). The authors Srhoj, Katić and Kaliterna (2006) (according to Šifrar and Zaletel, 2014) found that, regardless of the dance genre, general motor abilities of dancers are based primarily on power strength, coordination and frequency of movements, which is expected due to the choreographic structure of movement patterns.

On the basis of the above mentioned facts, a question arises, whether the female students (a motor selected sample, not dancers), who have higher level of basic motor abilities important for efficiency in folk and social dances, would be more efficient in demonstrating folk and social dances. The aim of the research was to establish a correlation between motor abilities and the efficiency of the female students at Faculty of Kinesiology in performing folk and social dances.

### Methods

The sample of subjects consisted of 85 graduate female students at Faculty of Kinesiology, aged 21-23, who had passed the course Dance, attended by students in the 5<sup>th</sup> semester for 75 classes (15 theoretical and 60 practical, covers mastering 28 Croatian folk and 12 social dance). The dancing efficiency assessment variables have been marks of the judges for 5 folk and 5 social dances. The selected dances have been evaluated by five competent field experts on the basis of a video recording. A demonstration of five folk and social dances to the music that had been recorded beforehand, which ensured same conditions for all of the students (tempo, rhythm), followed. The judges had been instructed on assessment criteria, they were independent and the assessment was made simultaneously. Dancing competence has

been evaluated using marks from 1-5 and the assessment results have been presented on the Likert's five degrees' scale. The course *Dance* plan, structural analysis of the particular dance, diversity of the rhythm and tempo as well as ethnic determination were taken into account when choosing the folk and social dances. The same criteria had been followed in the classes at the time of teaching and training. The group of the folk dances consisted of *Sotiš* (Adriatic dancing region), *Došla sam vam japa* (Alpine dancing region), *Slavonsko kolo* (Pannonian dancing region), *Poskočica* (Adriatic dancing region) and *Vrličko kolo* (Dinaric dancing region). The above mentioned dances cover all Croatian dancing regions, they are performed in pairs or circle and they have different rhythm and tempo. The group of social dances consisted of *English Waltz*, *Rumba*, *Cha-cha-cha*, *Samba* and *Slowfox*. The attention was given to the diversity of rhythm and tempo, the structure of movement and to the choice of dances that start from different initial positions (either right or left foot is the starting foot of the dancer) when social dances were chosen. Dancing images that should have been demonstrated in each dance were defined precisely. The variables' sample to assess motor abilities has consisted of the results achieved by measuring motor abilities (14 tests) for which the influence on dancing efficiency had already been determined in the previous research (Uzunović et al., 2005; Kostić, et al., 2006; Srhoj, et al., 2006; Vlašić, et al., 2007). The evaluation has been done using the following motor tests: Coordination: FEWB - *figure of eight with a bend*, OCB - *obstacle course backwards*, SS - *side-steps*, SS360 - *side-steps with a 360° turn*. Rhythmic structures' realization: DWR - *drumming without the rhythm*, DWFH - *drumming with feet and hands*, ORT - *Oreb's rhythm test*. Balance: S1FEO - *standing on a foot on the balance bench with eyes open*, S2FEC - *standing on both feet on the balance bench with eyes closed*. Frequency of movement: HT - *hand tapping*, FT - *foot tapping*. Flexibility: S&R- *sit-and-reach* and to evaluate explosive strength: SLJ - *standing long-jump*, SARGENT - *Sargent test* bibliography. The evaluation of motor abilities was done within the classes of the course *Dance*, after the planned course topics had been thought and trained.

## Results

Table 1: Descriptive parameters of the individual dances evaluations, overall efficiency in performing folk dances (EPFD), overall efficiency in performing social dance (EPSD), total efficiency of the female students (TE) and descriptive parameters to evaluate motor abilities of the female students

Dance	AM	SD	Motor ability	AM	SD
Sotiš	3,49	0,70	Fewb	18,98	1,75
Japa	3,45	0,81	Ocb	9,97	2,13
Slkolo	3,11	1,05	Ss	9,34	0,73
Posko	3,63	0,88	Ss360	10,64	0,89
Vrlika	3,16	0,86	Dwr	16,74	2,14
Eng	3,40	0,85	Dwfh	14,26	3,27
Rumba	3,27	0,95	Ort	7,37	0,59
Cha	3,08	1,00	S1feo	7,86	6,29
Samba	3,11	0,87	S2fec	1,92	0,52
Slow	3,17	0,82	Ht	45,50	2,64
EPFD	16,84	3,67	Ft	38,27	4,54
EPSD	16,02	3,77	S&r	55,47	6,69
TE	32,85	6,53	Slj	196,30	19,16
			Sargent	39,00	5,23

The results of the descriptive parameters for evaluation of motor abilities of the female students (Table 1) point at an average mark, a little over 3, for folk and social dances, the highest mark being given for the dance *Poskočica* (3,63) and the lowest for *Slavonsko kolo* (3,11). The lowest average mark for social dances is for *Cha-cha-cha* (3,08) and the top one for *English Waltz* (3,40). When observing the average mark of the total success in performing folk (16,84), that is social dances (16,02), it becomes evident that the female students have been more efficient when performing folk dances. Descriptive indicators for evaluating students' motor abilities (Table 1) illustrate that the students achieved better test results when doing FEWB - *figure of eight with a bend* OCB, SS360 - *side-steps with a 360° turn*, DWFH - *drumming with feet and hands*, HT - *hand tapping*, FT - *foot tapping*, S&R- *sit-and-reach* and SLJ - *standing long-jump*. It has been calculated an average correlation and Cronbach's reliability coefficient of the marks given by five judges for each of ten dances (Table 2). Correlation coefficients are higher than 0.85 for folk and 0.88 for social dances ( $p > 0.05$ ), which shows 72%, i.e. 87% agreement in the process of evaluating the students' efficiency in performing dances.

Table 2: Correlations of the judges' marks and Cronbach's reliability coefficient for each dance individually

Dance	Sotiš	Japa	Slkolo	Posko	Vrlika	Eng	Rumba	Cha	Samba	Slow
AVR	0.89	0.85	0.91	0.89	0.87	0.94	0.90	0.95	0.88	0.90
alpha	0.97	0.96	0.98	0.98	0.97	0.99	0.98	0.99	0.97	0.98

The relation between some motor abilities and efficiency in performing folk and social dances as well as the overall students' efficiency was determined by regression analysis (Table 3).

Table 3: Regression analysis of the motor abilities and the variables of the overall dancing efficiency (TE), folk dances' efficiency (EPFD) and social dances' efficiency of the female students (EPSD)

	Total efficiency R=0,58 R <sup>2</sup> =0,34 Adj.R <sup>2</sup> =0,20 F=2,367 p<0,01 Std. Err. =5,86					Folk Dances' Efficiency R=0,63 R <sup>2</sup> =0,40 Adj.R <sup>2</sup> =0,27 F=3,07 p=0,00 Std. Err. =3,14					Social dances' efficiency R=0,46 R <sup>2</sup> =0,21 Adj.R <sup>2</sup> =0,04 F=1,22 p=0,29 Std. Err.=3,70				
Female students	B	S.E.	Beta	t	p	B	S.E.	Beta	t	p	B	S.E.	Beta	t	p
Fewb	0,18	0,52	0,05	0,35	0,73	0,07	0,28	0,04	0,27	0,79	0,11	0,33	0,05	0,32	0,75
Ocb	-0,71	0,40	-0,23	-1,79	0,08	-0,37	0,21	-0,21	-1,73	0,09	-0,34	0,25	-0,19	-1,37	0,18
Ss	-0,09	1,59	-0,01	-0,06	0,96	-0,99	0,85	-0,20	-1,17	0,25	0,90	1,00	0,18	0,90	0,37
Ss360	-1,40	1,09	-0,19	-1,29	0,20	-0,41	0,58	-0,10	-0,71	0,48	-0,99	0,69	-0,23	-1,43	0,16
Dwr	0,83	0,40	0,27	2,11	0,04	0,43	0,21	0,25	2,02	0,05	0,41	0,25	0,23	1,64	0,11
Dwfh	0,45	0,24	0,23	1,89	0,06	0,27	0,13	0,24	2,08	0,04	0,18	0,15	0,16	1,22	0,23
Ort	-1,01	1,39	-0,09	-0,73	0,47	-0,43	0,75	-0,07	-0,58	0,57	-0,58	0,88	-0,09	-0,66	0,51
S1feo	-0,08	0,13	-0,07	-0,61	0,55	-0,11	0,07	-0,20	-1,69	0,10	0,04	0,08	0,06	0,47	0,64
S2fec	-1,25	1,45	-0,10	-0,86	0,39	-0,63	0,78	-0,09	-0,80	0,43	-0,63	0,92	-0,09	-0,69	0,50
Ht	-0,28	0,28	-0,11	-0,98	0,33	-0,25	0,15	-0,18	-1,66	0,10	-0,03	0,18	-0,02	-0,15	0,88
Ft	0,08	0,16	0,06	0,48	0,63	0,10	0,09	0,12	1,09	0,28	-0,02	0,10	-0,02	-0,16	0,87
S&r	0,15	0,11	0,16	1,32	0,19	0,10	0,06	0,18	1,63	0,11	0,05	0,07	0,09	0,72	0,48
Slj	-0,07	0,05	-0,21	-1,46	0,15	-0,04	0,03	-0,21	-1,51	0,14	-0,03	0,03	-0,16	-1,03	0,31
Sargent	0,06	0,17	0,05	0,34	0,73	0,01	0,09	0,01	0,11	0,91	0,05	0,10	0,07	0,45	0,66

The correlation between the motor abilities' predictor set of the female students and the criterion of the overall dancing ability is statistically significant ( $R=0,58$ ) at the 0,01 fault level. The predictors with the highest contribution to the explanation of the correlation with the criterion are *DWR - drumming without the rhythm* ( $Beta=0,27$ ) and *DWFH - drumming with feet and hands* ( $Beta=0,23$ ) for rhythmic structures' realisation assessment at the 0,05 fault level and, with a slightly lesser contribution, the *OCB - obstacle course backwards* ( $Beta=-0,23$ ) for coordination assessment. The correlation between the female students' motor abilities' predictor set and the folk dance efficiency criterion is statistically significant ( $R=0,63$ ) at the 0,01 fault level. The predictors with the highest contribution to the explanation of the correlation with the criterion are *DWR - drumming without the rhythm* ( $Beta=0,25$ ) and *DWFH - drumming with feet and hands* ( $Beta=0,24$ ) for rhythmic structures' realisation assessment at the 0,05 fault level. The tests for coordination (*OCB - obstacle course backwards*) ( $Beta=-0,21$ ), balance (*SIFEO - standing on a foot on the balance bench with eyes open*) ( $Beta=-0,20$ ), frequency of movement (*HT - hand tapping*) ( $Beta=-0,18$ ) and flexibility assessment (*S&R - sit-and-reach*) ( $Beta=0,18$ ) show notably lesser contribution. No statistically significant correlation has been established between the variables' predictor set and the social dances' efficiency criterion.

## Discussion

According to the descriptive analysis results (Table 1), the female students have achieved better results in performing folk (16,84) than social dances (16,02). Better realisation of the folk dances is caused by a strong aesthetic component of the social dances, which is extremely important when doing a demonstration, and this has represented an additional component for students who had to present it along with a good performing technique of specific dancing elements. The students got the highest average mark for dance Poskočica (3,63) and the lowest for Slavonsko kolo (3,11). When it comes to social dances, the highest average grade was for English Waltz (3,40) and the lowest for Cha-cha-cha (3,08). The most complicated folk, as well as social dances in regard to motor skills and rhythm have been evaluated with the lowest marks. The better results of the female students become apparent when the descriptive results of the motor abilities' assessment tests are analysed (Table 1) FEWB - figure of eight with a bend, SS360 - side-steps with a 360° turn, DWFH - drumming

with feet and hands; HT - hand tapping; FT - foot tapping, S&R- sit-and-reach and SLJ – standing long-jump, which is partially in accordance with the previous study done on the sample of female students at Faculty of Kinesiology (Vlašić, 2006). Statistically significant correlation (Table 3) has been established between students' motor abilities and the overall dancing efficiency criterion ( $R=0,58$ ) and the predictors with the highest contribution to the correlation with the criterion have been DWR - drumming without the rhythm ( $Beta=0,27$ ) and DWFH - drumming with feet and hands ( $Beta=0,23$ ) for rhythmic structures' realization assessment, and with a slightly lower correlation contribution has been OCB - obstacle course backwards ( $Beta=-0,23$ ) for coordination assessment. Rhythmic structure realisation assessment tests confirmed once more an undoubtable influence of rhythmic abilities on the efficient realisation of dancing structures of the folk and social dances, which has already been confirmed in other numerous research on the correlation of motor abilities and dancing efficiency (Srhoj, 2002; Uzunović et al., 2005; Kostić, et al., 2006; Srhoj, et al., 2006; Vlašić, et al., 2007). The plan of the course Dance must be at a quite demanding level because an opulence of folk and social dances are being thought, trained and mastered in classes, so the correlation between rhythmic abilities' tests and the overall dancing efficiency of the female students is fully justified. Coordination as an ability the high level of which implies dancing efficiency, including at the same time rhythm coordination (Uzunović, et al., 2009; Lukić, Gerdijan, Bijelić, Zagorc & Radisavljević, 2012; Šifrar & Zaletel, 2014), has emerged as such in this study as well. The reason why OCB - obstacle course backwards proved to be the most significant of the four tests, is probably because the subjects have to move at the same time in a coordinated fashion and in an unusual way. The high level of ability expressed in this test must be present when performing different dances as well. Namely, dances involve moving in pairs, in circle, in different directions, while the given rhythm should be maintained at different tempo that can be changed even during a particular dance as well. The correlation between the students' motor abilities' predictor set and the folk dance efficiency criterion ( $R=0,63$ ) (Table 3) is also statistically significant. The predictors with the highest contribution to the correlation with the criterion are DWR - drumming without the rhythm ( $Beta=0,25$ ) and DWFH - drumming with feet and hands ( $Beta=0,24$ ) for rhythmic structures' realization assessment at the 0,05 fault level, which is fully justifiable and expected and it is in accordance with all above mentioned. Furthermore, it is connected with the influence of rhythmic abilities on the dancing efficiency in general and in folk dances as well. The coordination (OCB-obstacle course backwards;  $Beta=-0,21$ ), balance (SIFEO - standing on a foot on the balance bench with eyes open;  $Beta=-0,20$ ), frequency of movement (HT - hand tapping;  $Beta=-0,18$ ) and flexibility assessment tests (S&R- sit-and-reach;  $Beta=-0,18$ ) distinguish from the other tests, together with the rhythmic structures' realisation abilities' test, even though the former have a considerably lesser contribution to the explanation of the motor abilities' set with the folk dances' efficiency. Focusing onto these tests in particular, completes the picture of the motor abilities that have a crucial role in efficient performance of dancing structures, what numerous research conducted on the dancer sample have already proved (Uzunović, Kostić, 2005; Uzunović, et al., 2005; Kostić, et al., 2006; Uzunović et al., 2009). No statistically significant correlation has been determined by applying regression analysis between variables' predictor set and the female students' social dances' efficiency criterion (Table 3). Such results could be due to the fact that social dances follow folk dances in the topics' sequence of the course, and the same sequence has been applied for the video recording. In this way, less physical exertion was required by students and they were more relaxed, since they had already experienced learning and training quite demanding folk dances. It must also be stressed that social dances are closer and more familiar to the students than folk dances are.

## Conclusion

Finally, it is possible to determine that the female students of Faculty of Kinesiology in Zagreb who performed better in tests on basic motor abilities relevant for doing folk and social dances efficiently have been evaluated with higher marks when demonstrating dances. In other words, there has been established the correlation between rhythmic structures' realisation, coordination, balance and flexibility assessment tests and dancing efficiency on the sample of female students who are not dancers, which has previously been established on the sample of dancers, which furthermore contributes to the fact that dancing efficiency is defined by the above mentioned motor abilities.

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