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FACTOR STRUCTURE OF DANCE PATTERNS IN FOLK DANCES OF SERBIA

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Abstract In the series of theoretical folk dance (FD) models there are a great number of classifications, based on most varied criteria. For instance, there are classifications of FDs with regard to folk customs and beliefs, and there are types of so-called horo dances, shepherds' dances or village gathering dances. Further classifications into symmetrical and asymmetrical FDs take into account whether the number of steps to the right and to the left is identical or not. The most common theoretical model of the folk dances of Serbia is based on the division by their geographical origin. However, this research responds to the requirement to outline a new theoretical model which will emphasize the dance technique as the basis of classification. The accessible literature concerning dance in general was mostly turned to the research of the connection between music and physical exercise, or between dances and primary motoric abilities; also, there were studies of different relationships between dance and space, of aesthetic issues, or influences of dancing on particular anthropologic statuses of dancers and non-dancers. This research was aimed at building a completely new typology of the folk dances of Serbia based on the representativeness of the elements of the dance technique. The entities (dance patterns) were classified through the application of the mathematical statistical multivariance method of taxonomic analysis, namely, Ward`s analysis of hierarchic classification. Dance patterns were classified upon both the absolute and the relative, i.e., binary presence indicators of a technique. Relative to a posteriori classification precision, the solution which yielded five taxonomic groups of the reduced data was the most fruitful. Based on the results of the research, a FD typology was derived, and it distinguishes the following five types (groups) of folk dances of Serbia:

1. Folk dances whose performance technique includes slide-in steps,
2. Folk dances whose performance technique includes steps across and hop steps,
3. Folk dances whose performance technique includes triple steps,
4. Folk dances whose performance technique includes slide-in steps, leaps, steps across and spins,
5. Folk dances whose performance technique includes hitch steps.

Key words: factor structure, dance patterns, folk dances

INTRODUCTION

Considering the traditional culture of a nation, it is of utmost importance to recognize the scientific status of physical culture and sports that in particular will appreciate the aspect of cultural heritage and legacy which in its expression uses movement and motion; in fact it is this aspect of creativity that leaves a mark and bestows identity on an independent national physical culture. Notwithstanding historical and civilizational changes, folk dances represent the traditional national treasure which has preserved ethnical characteristics and unique, distinctive structure in the culture of a nation, especially in its physical culture.

It is fairly difficult to establish the occurrence, age and exact origin of folk dances, and their evident and remarkable diversity within one particular country came as a result of a wide variety of causes,

be them historical, climatic, geographic, or due to the fact that dances had been handed down from one generation to another by a great number of folk artists.

Folk dances reflect the past of the people of Serbia, its folk spirit, its customs and lore, which make up an integral part of peoples' lives. The folk dance itself, performed in a "kolo" (wheel dance), which shows no bias with regard to age, gender or profession, represents a special form of socialization, arousing exquisite friendly and healthy human emotions. The possibility of artistic adaptation and stylization of the folk dances of Serbia could be a step toward creating Serbian national artistic dance [31].

Efforts made so far in discovering and recording folk dances of Serbia are certainly of particular importance for their preservation and further rendering. Nevertheless, it has to be noticed that the ways of recording folk dances have varied, with the records quite often unclear, even wrong when determining time or rhythmic structures, with imprecise terminology etc. Since the oldest records to our days almost no work has been done on recording new dances, and even less has been invested in determining the dance accents within rhythmic structures, which are of prime importance to the definition of dance techniques and different dance styles.

In a series of theoretical folk dance models there are a great number of divisions, based on most varied criteria. For example, folk dances have been classified with regard to folk customs and beliefs, and there are types of so-called horo dances, shepherd`s dances or village gathering dances. Further classifications into symmetrical and asymmetrical folk dances take into account whether the number of steps to the right and to the left is identical or not [7, 8, 9, 10, 11, 31].

The accessible literature concerning dance in general was mostly turned to the research of the connection between music and physical exercise, or between dances and primary motoric abilities; also, there were studies of different relationships between dance and space, of aesthetic issues, or of influences of dancing on particular anthropologic statuses of dancers and non-dancers. Quite unjustly, scientific approach to the research into Serbian folk dances has remained aside and there is a wide uncharted field yet to be studied.

In this view, an attempt has been made by this research to outline a new scientifically based theoretical model, which should not only serve as an addition to the already existing models, but also to set a basis for comparison. This research was aimed at building a completely new typology of the folk dances of Serbia based on the representativeness of the elements of the dance technique. In comparison with its predecessors, the theoretical model presented here determines its typology upon scientifically based facts. So far, the most common theoretical model of the folk dances of Serbia has been based on the division by the geographical origin, but this research aims to meet the requirement to outline a new theoretical model which emphasizes the dance technique. It was essential for the research to establish the accurate time structure of the dances analyzed. In order to achieve accurate recording and future presentation of the folk dances such meticulous work on establishing the time and rhythmic structure was essential for the comprehensive overview of dance types. This was made possible only by accurate definition of dance (rhythmic) accents.

The research is focused on dance in the function of physical culture, that is, on the folk dances of Serbia. The representative samples of Serbian folk dances comprised of dance patterns taken from the dances that are characteristic of particular areas of ethnic choreographies throughout Serbia. Their performance techniques all bear the elements which provide distinction and uniqueness of Serbian style of dancing. Ethnically least diverse regions within areas of ethnic choreographies yielded most dances for analysis, since their dance patterns bear the distinctive dance techniques that are significant to this research.

The aim of the research was to establish a theoretical model of folk dances based on the analysis of the coordinative complexity of their dance techniques. Among all, the proposed new theoretical model was based on such an approach which targeted a thorough analysis of the dance technique.

MATERIAL AND METHODS

THE SAMPLE OF ENTITIES (VARIABLES)

The sample of entities consisted of 114 dance patterns from 79 Serbian folk dances. The dance patterns belong to the dances sampled and analyzed.

The sample included 1411 times, 1941 steps and 17 technical elements. The sampled folk dances are typical representatives of areas of ethnic choreographies of Central, West, East, and South Serbia and Vojvodina [7, 8, 9, 10, 11, 12, 13, 31].

We applied 17 variables which cover the manifest space of the technique elements of the folk dances, as follows: 1. Slide-in (TEHb1); 2. Slide-back (TEHb2); 3. Hitch (TEHb3); 4. Front weave (TEHb4); 5. Back weave (TEHb5); 6. Front launch (TEHb6); 7. Back launch (TEHb7); 8. Leap (TEHb8); 9. Hop (TEHb9); 10. Jump (TEHb10); 11. Across (TEHb11); 12. Triple step (TEHb12); 13. Stomp (TEHb13); 14. Free leg circle (TEHb14); 15. Gallop (TEHb15); 16. Squat (TEHb16); 17. Spin (TEHb17).

All variables applied in this research were classifiable into a group of: 1) steps, 2) hops, 3) jumps, 4) spins, and 5) squats.

Observation and registering methods used by three measurers isolated and grouped the elements of the dancing technique and established their number. The folk dances were also divided according to their geographical origin and their typical representatives were isolated [7, 8, 9, 10, 11, 12, 13, 31].

Some of the typical representative dances from the areas of ethnic choreographies of central Serbia are the following: Moravac, Makazice, Komitsko kolo, Devojačko kolo, Ruzmarin, Žikino kolo, Gružanka, Šetnja. From the region of West Serbia these are: Trojanac, Užička čarlama, Valjevska podvala, Sakajdo, Užičanka I and II, Kriva Kačerac. From the region of South-East and East Serbia these are: Oganj gori, Basara, Devla, Jove, Leskovačka četvorka, Vlasinka, Šestorka, Rumenka, Katanka. From the region of South Serbia these are: Šilovačko kolo, Čiček, Vranjanka, Pembe, Serez, Iz banju ide. From the region of Vojvodina these are: Kolo vodi Vasa, Banatsko veliko kolo, Rokoko, Tandrčak, Ficko, Sremsko kolo.

Statistical Analysis

The entities (dance patterns) were classified through the application of the mathematical statistical multivariance method of taxonomic analysis, namely, Ward`s analysis of hierarchic classification. Dance patterns were classified upon both the absolute and the relative, i.e., binary presence indicators of a technique [1, 14, 17, 18, 19, 20, 21].

Results

Relative to a posteriori classification precision, the solution which yielded five taxonomic groups of the reduced data was the most fruitful. Table 1 shows the arithmetic means of all the techniques for each isolated taxonomic group.

Table 1. Mean values for the techniques in particular taxonomic groups

NCLU5	ng	TEHb1	TEHb2	TEHb3	TEHb4	TEHb6	TEHb7	TEHb8
1	15	1.00000	.20000	.00000	.00000	.00000	.00000	.00000
2	38	.60526	.02632	.00000	.02632	.34211	.02632	.00000
3	19	.52632	.00000	.00000	.00000	.05263	.00000	.00000
4	20	.75000	.00000	.10000	.00000	.10000	.00000	.60000
5	22	.54545	.13636	.95455	.00000	.13636	.00000	.18182
Total	114	.65789	.06140	.20175	.00877	.16667	.00877	.14035
NCLU5	**ng**	**TEHb9**	**TEHb10**	**TEHb11**	**TEHb12**	**TEHb13**	**TEHb14**	**TEHb17**
1	15	.00000	.00000	.00000	.00000	.00000	.00000	.00000
2	38	.63158	.00000	.84211	.07895	.07895	.00000	.02632
3	19	.10526	.05263	.47368	.94737	.00000	.15789	.00000
4	20	.20000	.00000	.60000	.20000	.10000	.05000	.60000
5	22	.68182	.00000	.54545	.13636	.09091	.00000	.04545
Total	114	.39474	.00877	.57018	.24561	.06140	.03509	.12281

The first taxonomic group consists of 15 dance patterns, all characterized by having only Technique 1 (Slide-in) and practically no other.

The second and also largest taxonomic group, which has 38 dance patterns, characterized, more often than other groups, by Techniques 11 (Across) and 9 (Hop), with the occasional appearance of Technique 3 (Hitch), 8 (Leap), 10 (Jump), and 14 (Free leg circle).

The third taxonomic group, which consists of 19 dance patterns, is characterized by the appearance of Technique 12 (Triple step) in almost every pattern, and by the presence of Technique 1 (Slide-in) and Technique 11 (Across) in most of the dances, while the rest of the techniques do not appear in this dance pattern group.

The fourth taxonomic group, which consists of 20 dance patterns, is mostly characterized by Techniques 1 (Slide-in), 8 (Leap), 11 (Across), and 17 (Spin), while there is absolutely no occurrence of Techniques 2 (Slide-back), 4 (Front weave), 7 (Back launch), and 10 (Jump).

The fifth taxonomic group, which consists of 22 dance patterns, is almost entirely characterized by Technique 3 (Hitch), and quite a few of those dance patterns feature Techniques 9 (Hop), and 11 (Across), while there is no occurrence of Techniques 4 (Front weave), 7 (Back launch), 10 (Jump), and 14 (Free leg circle).

Table 2. The structure of the isolated discriminatory functions

	r1	r2	r3	r4
TEHb3	.84927*	.35503	.14910	.07851
TEHb17	-.10543	.45178*	-.16103	.20110
TEHb8	-.01943	.44908*	-.11213	.16238
TEHb12	-.11211	-.00419	.76608*	.26529
TEHb14	-.05218	.02480	.21618*	.06083
TEHb10	-.02378	-.01846	.14881*	.02597
TEHb11	.00184	-.06501	-.14486	.64583*
TEHb9	.15627	-.12116	-.21523	.43502*
TEHb1	-.04499	.04250	-.09856	-.30518*
TEHb2	.06583	-.01551	-.03435	-.28661*
TEHb6	.00378	-.10549	-.15708	.26684*
TEHb13	.02256	.03631	-.07823	.11279*
TEHb7	-.00907	-.04920	-.05548	.06909*
TEHb4	-.00907	-.04920	-.05548	.06909*

The fact that the taxonomic groups of the analyzed dance patterns of the Serbian folk dances quite differ among themselves, is shown by the discriminatory analysis that isolated 4 significant discriminatory functions (r1, r2, r3 and r4). Table 2 shows the correlations of variables, that is, of techniques with isolated discriminatory functions.

The first discriminatory function was almost exclusively defined by Technique 3 (Hitch). The second discriminatory function was primarily defined by the Techniques 8 (Leap) and 17 (Spin). The third discriminatory function is primarily defined by the Technique 12 (Triple step). The fourth discriminatory function is mostly defined by Techniques 11 (Across) and 9 (Hop). Table 3 gives the centroids (D1, D2, D3 and D4), that is, the average values of the results on the isolated significant discriminatory functions for every taxonomic group (TX1 to TX5).

Table 3. Discriminatory functions centroids for taxonomic groups

	D1	D2	D3	D4
TX1	-.99510	-.50851	-.46826	-2.21217
TX2	-.67491	-1.64971	-1.04656	.58301
TX3	-1.74523	-.61069	2.76901	.21621
TX4	-2.10064	3.40367	-.60174	.32130
TX5	5.26115	.62938	.28258	.02246

The first discriminatory function is primarily responsible for the separation of the 5th taxon from the 4th and 3rd taxons. The second discriminatory function primarily divides the 4th group from the 2nd group. The third discriminatory function is responsible for the separation of the 3rd group from the 2nd, and the fourth discriminatory function is responsible for the differentiation of the 1st taxonomic group from all other groups.

For a better view of the underlying technique structure on which the folk dance classification was based, the most frequent method of the main components was applied, with the use of Cattel's Scree criterion. Further, the significant main components were rotated to the acute triangle oblimin position with Delta parameter fixed on zero. The congruence of the factor solutions for reduced and non-reduced variables was established upon the result correlations of entities defined as their projections on the factors isolated. The similarity at the start remained even after the factors were rotated into oblimin position. The only potentially confusing fact is that the resulting factors are not designated in the same order, so that Fac1 in the first solution is similar to Fac2 in the second solution; Fac2 in the first solution is similar to Fac4 in the second and, to make things even slightly more complicated, the factor in the second solution is inverted so that the projections have inverted signs; Fac3 from the first solution is similar to Fac3 in the second solution, and Fac4 from the first solution is similar to Fac1 in the second solution. Table 4 gives data from the factor structure matrices for the factors isolated.

Table 4. Factor structure matrices for non-reduced and binarized data

	non-reduced data				*binarized data*			
	Fac1	**Fac2**	**Fac3**	**Fac4**	**Fac1**	**Fac2**	**Fac3**	**Fac4**
TEHb1	-.11606	.23453	.74645	.20104	-.61414	-.00127	.43202	.08380
TEHb2	.85981	.05314	.00906	.06633	-.10841	-.81313	-.08579	.04869
TEHb3	-.01669	-.57558	-.08250	.08669	.05597	-.03494	-.02398	.50977
TEHb4	.75413	.07659	.02747	.07010	.05761	-.70180	.06772	.09683
TEHb6	-.09590	-.56518	.04165	-.22680	.04115	.25239	-.65032	.25918
TEHb7	.05760	-.21784	-.00392	-.04338	.05247	.05965	-.51809	.05567
TEHb8	.02782	-.57001	.09018	.14712	-.17708	.36737	-.00172	.45263
TEHb9	.64803	-.30847	.09796	-.40204	.67973	-.19479	-.15209	.39461
TEHb10	-.06781	.19614	-.24841	.16171	-.02633	.00332	-.17549	-.43385
TEHb11	-.02160	-.13299	.03033	-.80702	.71804	.12954	.26634	.14835
TEHb12	-.22198	.39580	-.36355	.29153	-.03740	.06645	.03617	-.66447
TEHb13	.11465	-.08729	.16295	-.02869	.06791	.10744	.43014	.17986
TEHb14	.00306	.22077	-.06570	-.63752	.53195	.01358	.12357	-.33484
TEHb17	-.02438	.10554	.80587	.01953	.14336	.27257	.54140	.17066

Based on the data from the factor structure matrices, the factors isolated can be interpreted as follows:

- The first factor isolated in the space of non-reduced variables was dominantly fixed by three techniques: TEHb2 (Slide-back), TEHb4 (Front weave), and TEHb9 (Hop), while other techniques had almost no influence; TEHb12 (Triple step) possibly had a slightly negative projection on that factor; with the corresponding factor the binarized variables (Fac2) showed somewhat weaker influence of TEHb9 (Hop) and somewhat stronger influence in the negative direction, of the variables TEHb8 (Leap), TEHb6 (Front launch), and TEHb17 (Spin). Thus this factor was most dominantly defined by TEHb2 (Slide-back), and TEHb4 (Front weave). The correction of 0.74 in these two factors was not of such size to allow a claim on identicalness; however, they may be treated as showing a fair degree of similarity.
- The second factor isolated in the space of non-reduced variables dominantly defined the absence of TEHb3 (Hitch), since it was reversely scaled, of TEHb8 (Leap) and of TEHb6 (Front launch).In a smaller extent it also showed the presence of TEHb12 (Triple step) and TEHb14

(Free leg circle); the factor structure matrix also revealed the influence of absence of TEHb9 (Hop) on this factor.

- In the space of binarized variables (Fac4) this factor had a somewhat different structure because it was primarily defined by the presence of TEHb3 (Hitch), TEHb8 (Leap), and TEHb9 (Hop), as well as by the absence of TEHb12 (Triple step), TEHb10 (Jump), and TEHb14 (Free leg circle). The correlation between these two factors is 0.75, so was of the same order as above mentioned.
- The third factor in the space of non-reduced variables was dominantly, almost exclusively, defined by TEHb17 (Spin), and TEHb1 (Slide-in), with much weaker presence of TEHb12 (Triple step) in the opposite direction. In the space of binarized data this factor was somewhat more complex so that these two factors showed small correlation of 0.22. This second factor (Fac3 for the binarized data) was dominantly defined by the absence of TEHb6 (Front launch) and TEHb7 (Back launch), with the presence of TEHb17 (Spin), TEHb1 (Slide-in), and TEHb13 (Stomp), which necessarily elicited a different interpretation of this factor.
- The fourth factor in the space of non-reduced variables was dominantly defined by the absence of TEHb11 (Across) and TEHb14 (Free leg circle), and somewhat less by the absence of TEHb9 (Hop). In the space of binarizedbinarized variables this factor somewhat differed from the previous one with the correlation of 0.68, because these three variables defined it almost evenly (in this case in the positive direction, i.e. by their presence).There was also the absence of TEHb1 (Slide-in).

Table 5. Factor inter-correlation matrices for both solutions (non-reduced and binarized data)

	non-reduced data				*binarizedbinarized data*			
	Fac1	**Fac2**	**Fac3**	**Fac4**	**Fac1**	**Fac2**	**Fac3**	**Fac4**
Fac1	1.0000				1.0000			
Fac2	-.1028	1.0000			-.0039	1.0000		
Fac3	.0941	-.0898	1.0000		.0132	.0385	1.0000	
Fac4	-.0790	.1208	-.0612	1.0000	.0238	.0532	.0275	1.0000

The data from Table 5 display the tight similarity of the factor inter-correlation matrices in both solutions of variables, since they practically contain zero correlation, which favors the conclusion that the isolated factors are in a great extent mutually independent.

Table 6. The relationship between different taxonomic classifications and the grouping of folk dances by geographic origin

results	**reduction**	**N of groups**	**C**	**Sig.t**
original	non-reduced	4	.36805	.11996
original	binarized	4	.42326	**.01540**
factor	non-reduced	4	.38718	.06515
factor	binarized	4	.36802	.12004
original	non-reduced	5	.44986	**.02445**
original	binarized	5	.46602	**.01118**

It is obvious from Table 6that only the correlation between the geographic classification of dances into 4 or 5 groups with the binarized data and taxonomic classification into 5 groups with non-reduced data could be treated as significant. Even such a correlation was so weak that the classifications cannot be claimed to follow the same principles. In other words, geographic classification of folk dances undoubtedly includes some elements other than the techniques they use.

Table 7. Precision of the a posteriori classification

	Cases	G1	G2	G3	G4	G5
Group 1	30	26	1	3	0	0
		86.7%	3.3%	10.0%	.0%	.0%
Group 2	25	7	13	5	0	0
		28.0%	52.0%	20.0%	.0%	.0%
Group 3	43	8	4	31	0	0
		18.6%	9.3%	72.1%	.0%	.0%
Group 4	8	1	3	1	2	1
		12.5%	37.5%	12.5%	25.0%	12.5%
Group 5	8	2	0	2	0	4
		25.0%	.0%	25.0%	.0%	50.0%

Table 7 reveals that in order to make a substantial distinction among groups of folk dances classified according to their geographical origin some other elements should be taken in consideration beside technique. Following the geographical criterion, the most precise classification based on binarized data on the technique was obtained in dances from central Serbia. Fairly high precision was obtained in the dances from South-East and East Serbia. The lowest precision was obtained in the dances from South Serbia whereas in the dances of West Serbia and Vojvodina the precision was only 50%.

Taking into consideration the best discriminatory characteristics, a great number of significant discriminatory functions and the data which proved that the taxonomic classification based on relative, i.e. reduced (binary) indicators of the presence of a technique produced more homogeneous groups not only by the number of folk dances, but also by the precision of a posteriori classification, the results of the research show that the most acceptable and best interpretable solution had five taxonomic groups.

Therefore the research prefers the folk dance typology which distinguishes the following five types (groups) of folk dances of Serbia:

1. Folk dances whose performance technique includes slide-in steps,
2. Folk dances whose performance technique includes steps across and hop steps,
3. Folk dances whose performance technique includes triple steps,
4. Folk dances whose performance technique includes slide-in steps, leaps, steps across and spins,
5. Folk dances whose performance technique includes hitch steps.

In the typology of folk dances based on their performance technique several representatives of the first type are: Moravac, Čačak, Ersko kolo, Stara Vlahinja. The second type includes: Makazice, Komitsko kolo, Ljiljan kolo, Ruzmarin, Gružanka, Dupla zavrzlama, Trojanac, Užička čarlama, Valjevska podvala. The third type includes: Jovančica, Četvorac, Vranjanka, Coko Coko, Tandrčak, Momačko kolo II. Some of the representatives of the fourth group are: Šilovačko kolo, Čiček, Pembe, Užičanka II, Kriva, Pešačka. The fifth group partly comprises some of the dances whose variations show its characteristics, such as: Čačak, Pešačka, Užička čarlama, etc.

CONCLUSION

The history of theoretical folk dance models shows a great number of classifications, based on most varied criteria. For example, some classifications of folk dances are based on folk customs and beliefs, and there are types of so-called horo dances, shepherds' dances or village gathering dances. Further classifications into symmetrical and asymmetrical folk dances take into account whether the number of steps to the right and to the left is identical or not.

The accessible literature concerning dance in general was mostly turned to the research of the connection between music and physical exercise, or between dances and primary motoric abilities; also, there were studies of different relationships between dance and space, of aesthetic

issues, or influences of dancing on particular anthropologic statuses of dancers and non-dancers. This research was aimed at building a completely new typology of the folk dances of Serbia based on the representativeness of the elements of the dance technique. The results of the research helped derive a typology of folk dances which distinguishes the following five types (groups) of folk dances of Serbia:

1. Folk dances whose performance technique includes slide-in steps,
2. Folk dances whose performance technique includes steps across and hop steps,
3. Folk dances whose performance technique includes triple steps,
4. Folk dances whose performance technique includes slide-in steps, leaps, steps across and spins,
5. Folk dances whose performance technique includes hitch steps.

This research has made an attempt to outline a new, scientifically based theoretical model, which should not only contribute to the already existing models, but also to serve as a benchmark for comparison.

We assume that the results obtained in this research, mainly from the theoretical point of view, have humbly contributed to resolving classification issues and in general to the typology of the considered Serbian folk dances by defining their latent structure and by researching the yet unexplored manifest area of the specific dance technique. Taking into consideration the multitude and the significance of folk dance, it is necessary to undertake further analysis in subsequent, follow-up studies.

PRACTICAL APPLICATION

Bearing in mind the potential social significance of this research its effects can be perceived as evaluative, intervening and encouraging. The results obtained should be taken primarily as a basis for reconsidering the physical education curriculum in the area which treats the domain of folk dances. On the basis of the research findings and the defined and suggested typology we hold the view that the physical education curriculum should contain such folk dances that have the greatest transformation effects, namely, the dances with the greatest number of the defined variations and the most complex performance technique from the pool of newly established types of folk dances. Future research should undertake to define the potential that folk dances bear in enhancing child growth and development with respect to the right choice of folk dances, their effects and their targeted direct application on the physical education classes.

This paper proposes a way to examine the existing selection and to scientifically establish a possible future choice of folk dances in the physical education curriculum.

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