

Scientific Paper

**DANCE STEPS: DIFFERENTIATING BETWEEN
MORE AND LESS SUCCESSFUL 7 – YEAR OLD GIRLS**

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Abstract. *On the sample of 55 seven – year – old girls the applicability of two newly constructed tests for the assessment of the knowledge of polka and waltz dance steps performance was researched. Five referees, through the video record, on Likert's five-point scale did the assessment of success for each test. The referees' objective assessing and their good correlation can be noticed in both tests so that the authors recommended them to be applied in practice when assessing the knowledge of dance steps performance in physical education (PE) teaching with seven year old pupils. The structure of discriminative function shows the motor superiority of the second, rhythmically better cluster, in relation to the first, less successful cluster of seven year old girls. A satisfactory level of dance steps acquisition and a faster process of learning are the best with the examinees having a pronounced coordination in rhythm, above average speed of movements and explosive strength.*

Key words: *waltz, polka, adequacy, motor abilities, differences*

1. INTRODUCTION

Dancing structures are an integral part of physical education (PE). Rhythm and dance have a great motivational force in the sphere of emotions and are one of the important elements of socialisation (Niemien, 1997), tradition and culture (Kim et al., 1996), while self – expression is the most prominent motivational factor among dancers (Moeckel et al., 1994). Song and dance are the child's essential needs, especially at an earlier school age. The child prefers rhythm to melody, which is the consequence of his natural impulse of movement; therefore rhythm should be used particularly when teaching PE.

Dancing structures in PE should, (1) by their content and intensity, be adequate to the pupil's age; (2) give rise to positive transformation of anthropological characteristics (especially physiological characteristics) in pupils. Are the basic dance steps (of waltz and polka) adequate to the first form primary school pupils and what kind of motor structures differentiates more successful girls from less successful ones in dance step performing?

The condition for appropriate assessing of the motor knowledge of dance structures is the existence of measuring instruments suitable to the specific qualities of the population they are intended for. For that purpose two measuring instruments have been employed to enable the assessment of the motor knowledge of dance structures performing (waltz and polka steps) with seven year old girls.

1.1. Aim

The aim of this research is, firstly, to check the sensitivity and objectivity of the newly constructed tests for the assessment of dance structures knowledge (waltz and polka) and, secondly, to determine the groups of girls on the basis of waltz and polka dance steps performing, with an aim of establishing the characteristics of the groups obtained through eighteen standard tests for the assessment of motor abilities.

2. METHODS

2.1. Sample of examinees

The study has been conducted on 55 school girls representing the population of schoolchildren of elementary schools in Split (Croatia), attending the first grade, aged seven years.

2.2. Sample of variables for the assessment of motor abilities

For the assessment of the pupils' motor abilities, standard motor measuring instruments (Katić, 1995; Katić et al., 2001), supposedly related to the performance of dances, were selected (Miletić, 1999). Eighteen motor tests were applied.

For assessing coordination /agility: polygon backwards (measured in seconds), side – steps (measured in seconds), figure eight with bending (measured in seconds). For assessing the speed of movement: hand tapping (taps/15s), foot tapping (taps/15s), foot tapping against the wall (taps/15s). For assessing explosive strength: standing jump (m), high jump (cm), ball throw (dm). For assessing static strength: bent arm hang (s). For assessing repetitive strength: sit-ups (per minute), knee - bends (per minute). For assessing flexibility: shoulder flexibility (cm), seat and reach (cm), maximal left leg lifting lying on the back (degrees), maximal right leg lifting lying on the back (degrees). For assessing the realisation of rhythmic structures: non-rhythmic thumping (taps/20s), foot and hand thumping (taps/20s).

Sample of variables for assessing the knowledge of performance of dance steps performing.

Girls were able to perform the waltz and polka steps after they had seen them performed by a demonstrator, and after three periods of learning (within the frame of PE lessons).

Waltz step (measure: $\frac{3}{4}$; tempo: 32 tact's per minute). The task is to perform, in the time given, 4 measures of waltz steps with accompanying circling and waves with hands. In the third measure the examinee performs the turning. Before performing the task, the examinee watches the demonstrator.

Polka step (measure: $\frac{2}{4}$; tempo: 60 tact's per minute). The task is to perform alternatively, in the time given, the steps and leaps, changing the directions of movements. The examinee watches the demonstrator before performing the task.

In order to avoid subjective assessing (Seltzer, & Glass, 1991), five assessors, experts in dance and teachers of PE, assessed the school - girls individually for performing dance steps through a video record (Stettum, 1998.)

2.3. Methods of data processing

The pupils' success in dance performing was assessed in each particular test, through a video recording, by five independent experts (Likert's scale). The following measurement characteristics of instruments were tested: sensitivity and objectivity (Cronbach's alpha and Spearman–Brown's coefficient of item correlation). The basic descriptive parameters were calculated and the normality of distribution was tested by using Kolmogorov–Smirnov test (K-S). On the ground of the referee's assessments, taxonomization of the examinees into qualitatively different groups (clusters) was carried out. Ward's hierarchical cluster analysis was calculated on the basis of Euclidean distances. The differences in clusters of pupils were tested by a group of 18 standard indicators of motor abilities, and they were analysed by canonical discriminative analysis. The data were processed by the STATISTICA program, ver. 6.0.

3. RESULTS AND DISCUSSION

The applied tests of the motor knowledge of dance step performing (polka and waltz steps) have high values of objectivity (Table 1), which indicates objective assessing and high level of the referees' coordination in assessing the examinees' when performing dance steps. The waltz step is more difficult to perform than the polka step (Figure 1), though polka had to be performed in a faster rhythm. The reason for this is probably the coordinated movements of hands and turning, which are the integral parts of performing the waltz steps. Both tests have normal distributions (Table 1), and by this, a satisfactory sensitivity, so that they can be regarded adequate to the age of seven – year – old girls.

Table 1. Arithmetic mean (Mean), standard deviation (SD), asymmetry (Skew) and the degree of peakedness (Kurt) of distribution, normality of distribution (KS), Cronbach's alpha coefficient (α), Spearman–Brown's coefficient (SB)

	Mean	SD	Skew	Kurt	KS(d)	SB	A
Waltz steps	3.02	1.19	0.01	–1.11	0.10	0.96	0.97
Polka steps	3.05	0.92	0.11	–0.29	0.11	0.95	0.94

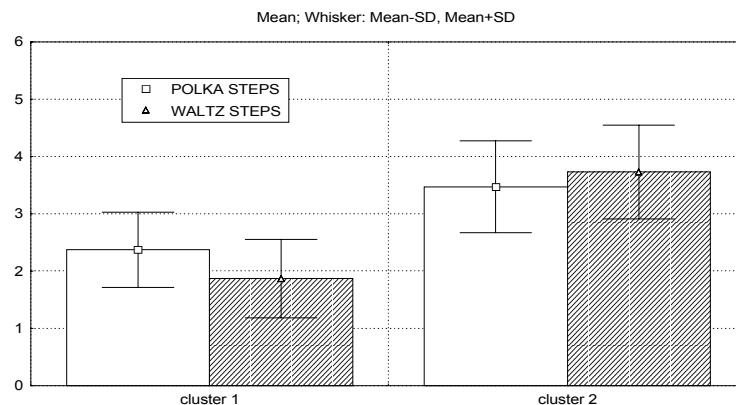


Fig. 1. Box Plot for the dance steps measurement instruments

On the basis of success in performing the above mentioned motor knowledge of dance structure performance (polka and waltz steps), applying the hierarchical cluster analysis, two groups of examinees were obtained: $N1 = 21$, the less successful pupils in performing the required motor knowledge, and $N2 = 34$, the more successful ones (Figure 2). The applied analysis is shown by dendrogram (Figure 2) in which the development of hierarchical formation of the of the examinees' groups is shown, as well as the level at which each individual examinee joins the group.

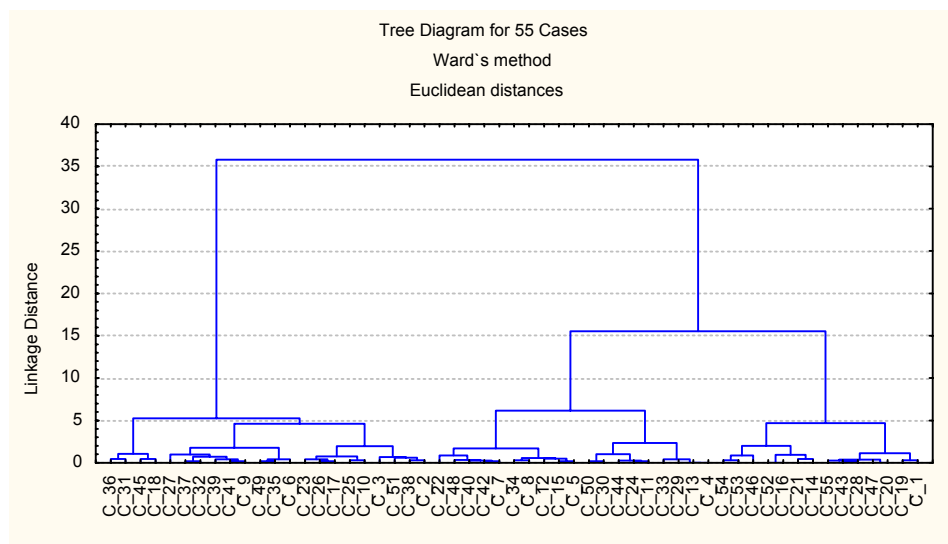


Fig. 2. Dendrogram of hierarchical grouping for 55 examinees on the basis of performing dance steps

The results of discriminative analysis (Table 2) indicate significant differences of motor abilities between the groups of girls who are more or less successful in performing the polka and waltz dance steps. The better performing group has pronounced motor abilities of co-ordination in rhythm, speed of movements of hands and legs, explosive strength and also co-ordination and agility. It is evident that these motor abilities are especially important for a good performance of dance structures (waltz and polka steps), specifically in the initial, motor, phase of learning (Schmidt, & Wrisberg, 2000). The girls having more pronounced abilities of rhythm and speed co-ordination learn waltz and polka steps more quickly and easily. The waltz steps were performed in a slower rhythm (32 tact's per minute), but in the complete structure (with turns and waves with hands) the girls with better co-ordination in rhythm achieved better marks in dance steps performing.

Table 2. Arithmetic mean (Mean), standard deviation (SD), discriminant function structure (F1), canonical discrimination coefficient (R) and centroids of groups.

	CLUSTER 1 (N=21)		CLUSTER 2 (N=34)		F1
	Mean	SD	Mean	SD	
Polygon backwards (s)	23.22	5.56	20.35	4.58	-0.26
Side steps (s)	15.70	1.60	14.54	1.10	-0.39
Figure eight (s)	27.60	2.28	25.92	2.24	-0.33
Hand thumping (taps/15s)	16.40	1.86	18.97	2.47	0.51
Foot thumping (taps/15s)	14.30	1.84	16.63	1.79	0.57
Foot thump.-wall (taps/15s)	14.21	2.02	15.92	1.80	0.40
Standing jump (m)	1.06	0.11	1.14	0.13	0.31
High jump (cm)	18.49	4.55	22.71	3.91	0.45
Ball throw (dm)	2.28	0.39	2.68	0.55	0.36
Bent arm hang (s)	6.00	6.38	9.60	6.89	0.24
Sit-ups (per minute)	20.38	8.49	26.65	7.66	0.35
Knee-bends (per minute)	35.33	10.37	42.09	9.78	0.30
Shoulder flex (cm)	57.22	6.73	53.00	8.82	-0.23
Seat and reach (cm)	52.02	7.16	55.85	7.34	0.23
Right leg lifting (degrees)	90.81	13.93	97.70	11.08	0.25
Left leg lifting (degrees)	88.40	14.59	94.68	9.14	0.24
Non-rhy. thump.(taps/20s)	4.30	1.96	6.07	1.68	0.44
Foot and hand thp.(taps/20s)	3.51	2.02	4.74	2.02	0.27
Centroids	-1.39		0.86		R = 0.74 p = 0.008

The choreography of polka contains a sequence of jumps and change of direction of movements, while faster rhythm requires a quick and precise performance of movements. Presumably, the faster girls are going to be more successful in performing the polka dance steps during the motor phase of learning. Former researches (Oreb, 1992; Kostić, 1994) point up positive correlations between expression of rhythmic structures and success in dance. Coordination and coordination in rhythm, that complex motor ability, can be conversely named also as *motor-intelligence* (Sekulić, 2002). The New Zealand authors (Hume et al., 1993) used the term *visuo – motor proficiency* for the factor-composition of several coordination variables. So, if we accept the given definitions, there is no doubt about the established positive influence of coordination and coordination in rhythm on the dance steps. In fact, the named "simplified" definitions of coordination

present the true-logic of the obtained correlation. The present investigation was conducted with seven year old school girls. Naturally, the participants characterized with a higher level of coordination (*motor-intelligence*, according to Sekulić, 2002, or *visuo – motor proficiency*, according to Hume et.al., 1993) are expected to be more apt for any kind of motor learning, the dance learning as well.

The information obtained can be used for the purpose of better curriculum of physical education as well as in the training process of dancers for the development of those motor abilities that have the greatest correlation with dance steps.

4. CONCLUSION

By applying the Ward method, the sample of seven-year-old girls was divided into two independent clusters defined by the quality of motor information in polka and waltz steps performing. By watching a video recording, 5 referees assessed the success of pupils in each of the investigated tests. The referees' objective assessment and a high degree of accord between them were observed. The satisfactory level of tests objectivity and sensitivity, indicate that the dances steps have been correctly and adequately selected and test have been properly constructed.

The discussed structure of the discriminate function demonstrates general motor superiority of the rhythmically superior pupils.

A higher level of acquisition of dance steps and a faster process of learning are typical of examinees that have expressed higher co-ordination in rhythm, speed of movements, explosive strength but also in co-ordination and agility.

The authors' standpoint is that the acquisition of dance steps should be harmonised and methodically oriented in accordance with the development curve of the pupils' characteristics and abilities in PE curriculum.

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PLESNI KORACI: RAZLIKOVANJE IZMEĐU VIŠE I MANJE USPEŠNIH SEDMOGODIŠNJIH DEVOJČICA

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Na uzorku od 55 sedmogodišnjih djevojčica istraživana je primenljivost dvaju novokonstruisanih testova za procenu izvođenja koraka polke i valcera. Pet sudija procenilo je putem videozapisa izvođenje oba testa na Likertovoj skali od pet ocena. Utvrđena je visoka objektivnost sudija na oba testa, pa autori preporučuju primenu testova u praksi u cilju procenjivanja znanja plesnih struktura u nastavi telesnog vaspitanja kod sedmogodišnjakinja.

Struktura diskriminativne funkcije ukazuje na motoričku superiornost drugog, ritmički boljeg klastera, u poredjenju sa prvim klasterom manje uspješnog izvođenja djevojčica. Zadovoljavajući stepen izvođenja plesnih koraka i brži proces učenja najbolji je kod ispitanica sa izraženim sposobnostima koordinacije u ritmu, natprosječne brzine pokreta i eksplozivne snage.

Ključne reči: valcer, polka, prikladnost, motoričke sposobnosti, razlike