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APPLICATION OF TAXONOMY ANALYSIS IN THE SELECTION OF PUPILS IN SPORT

Introduction

Correct and timely selection of sport is important precondition for success of children. Correct selection of sport is important and difficult since there are no sure indicators based on which one can identify talent of a child for a specific sport. For correct selection of sport, testing the child by professionals is important, test in which child can demonstrate its motoric abilities important for a given sport. When selecting the sport, the motoric abilities are the most important. In some sports the results depend more on good technique and in others, depend more on functional endurance or anthropometric abilities. However, the age limit for commencing to practice a competitive sport moved its limits to an earlier age. Selection of a sport where children should have top results is for children a precondition for success because of early beginning of specialization in sport.

Correct selection of children fit for certain sport is the most demanding and responsible task for kinesiology professionals and sport trainers. Sport activities are, to a great extent, different in structure and content. Different sports are marked with authentic kinesiology structures and specific anthropologic symbols (Srhoj, Lj. i sur., 2006.).

The success of an individual in specific sport activity mostly depends on compatibility of their anthropological symbols i.e. anthropological model for the given sport (Viskić Štalec, 2006.). This is why it is important to select sportsmen and women whose anthropological symbols are to the biggest extent possible fitting specific kinesiology activities.

Starting from the importance of proper selection of children in the sport, the Kinesiology Faculty in Split, Croatia and in the Institute for Poly-technique of Natural and Mathematics Science within the scientific project "Discovering talents in sport" is developing an expert content in discovering talent in sport – TALENT (Rogulj, Papić 2006.). The knowledge base on the project is on normative orientation values of school kids in Croatia gained through a comprehensive research which was commissioned in 1992 by V. Findak, D. Metikoš and M. Mrakoviću within the scope of project dealing with methodology of monitoring and evaluation of body and health education in schools.

In selection of children for sports, very supportive are also specific quantitative methods that group entities based on anthropologic characteristics. One of quantitative methods that found its application in the selection of children for sports is cluster or taxonomy analysis.

Correct selection and orientation of children in sports represents a very important professional task of, not only the trainer but of a bigger team of professionals

that engage in developing sport in specific geographical area. In development of specific sports important place is given to as early as possible selection of youth for specific sport. Use of taxonomy analysis in selection of youth in specific sport based on physical development and motoric abilities is one of the goals of this article.

Methods

Research is of transversal nature, meaning that it contains measurement of anthropometric indicators and motoric indicators in the sample of 26 pupils aged 15 years from primary and secondary lower level school from urban and a sample of 30 pupils from rural area. Measurements have been completed at the beginning of school year. Sample of variable are six anthropometric and four motoric variables have been applied (Kurelić et al., 1975).

Anthropometric variables:
- Body height (ATV),
- Foot length (ADS),
- Body mass (ATT),
- Volume of upper arm at relaxed position (AONL),
- Volume of upper leg (AONK),
- Volume of lower leg (AOPK).

Motoric variables:
- Long jump from standing position (MESDM),
- 30 m distance running (MTR30V),
- Bench bending (MFLPRK), and
- Push-ups (MSKLEK).

For data analysis, the taxonomy analysis has been applied.

Results

Taxonomy analysis was used for the purpose of forming sub samples with as much as homogenous characteristics and abilities as possible. A hierarchal method was used based on iterative process of connecting respondents into groups, thus in the given phase of research we connect respondents in previously formed groups, meaning that previously formed groups are only expended with new members according to their particularities and there is no possibility for respondents to move from one formed group to another.

Based on the analysis of dendogram (chart 1) true taxonomy analysis of anthropometric characteristics and motoric abilities we can notice visual configuration of collection of respondents into clusters according to similar structures of their characteristics and abilities. From total of ten applied variables, 6 anthropometric and 4 motoric abilities on the given sample, two taxonomy dimensions have been extracted and this is verification that we are dealing with relatively good sample based on anthropometric characteristics and motoric abilities.

Chart 1. *Dendogram of anthropometric characteristics and motoric abilities*
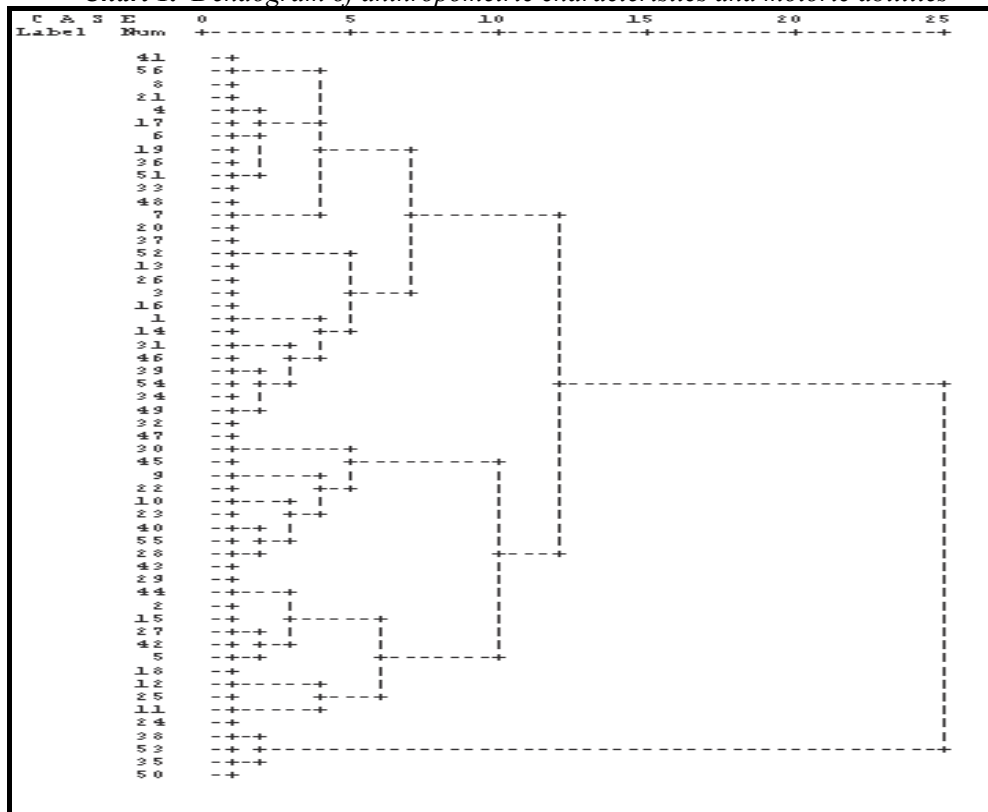
Dendrogram using Average Linkage (Between Groups), scaled Distance Cluster Combine

Table 1. *Taxonomy analysis of anthropometric characteristics and motoric abilities*

Final Cluster Centers	
Cluster	
1 (N=22)	2 (N=34)
167.20	172.24
25.64	26.50
64.15	66.82
25.22	25.87
54.77	54.85
36.39	36.44
157.64	210.47
5.85	5.26
28.09	42.71
9.36	24.47

In the group of six anthropometric characteristics and four motoric abilities two taxonomy dimensions are extracted, where based on squared Euclidean distances and given arithmetic means (table 1) it can be seen that out of 56, 22 pupils are grouped in the first group while 34 pupils fit the second group.

Second taxonomy dimension (Table 1) in a satisfactory manner defines anthropometric variables: body height (ATV) and foot length (ADS), body mass (ATT), volume of upper arm in relaxed position (AONL), volume of upper leg (AONK), volume of lower leg (AOPK) and motoric variables: jump from standing position (MESDM), 30 meter distance running (MTR30V), bench bending (MFLPRK) and push-ups (MSKLEK).

Table 2. *Taxonomy analysis of anthropometric characteristics and motoric abilities inside and outside isolated groups*

	Cluster		Error			
	Mean Square	df	Mean Square	df	F	Sig.
ATV	339.451	1	57.150	54	5.940	.018
ADS	9.963	1	1.687	54	5.906	.018
ATT	94.730	1	204.455	54	.463	.499
AONL	5.685	1	9.563	54	.595	.444
AONK	11.300	1	45.651	54	.248	.621
AOPK	.026	1	13.425	54	.002	.965
MESDM	37285.867	1	349.659	54	106.635	.000
MTR30V	4.677	1	.181	54	25.910	.000
MFLPRK	2853.052	1	198.979	54	14.338	.000
MSKLEK	3048.367	1	72.177	54	42.235	.000

With the insight of the size of calculated parameters of the descriptive statistics in the values of first and second cluster, it is obvious that pupils in the second cluster dominate with some anthropometric and all of the motoric abilities. In anthropometric variables pupils in the second cluster are dominant in longitudinal dimension: body height (ATV) and foot length (ADS). On statistically significant level variables selecting pupils for the second cluster (table 2) represent: variable defining explosive power of lower parts of body, distance jump from standing position (MESDM), defining speed and starting position 30 meter distance running from high start (MTR30V), followed by variable defining flexibility, bench bending (MFLPRK) and variable defining repetitive power, push-ups (MSKLEK).

Discussion

Taxonomy analysis was used in order to group, namely classify sample of pupils based on anthropometric and motoric parameters. Goal of this analysis was to form sub samples in the given sample that are homogenous in as more parameters that are

common in terms of anthropometric dimension and motoric abilities. Results obtained indicated that we have gained two homogenous sub-groups where the second group of 34 pupils represents a group with best anthropometric and motoric parameters.

Based on taxonomy analysis of anthropometric characteristics we can conclude that classification of pupils occurred on two self-types out of which one is presented with longitudinal dimension while the second one is characterized with lower height and increased body mass. In general the second cluster in anthropometric sense has given numerous numbers of pupils that belong to ecto-mesomorph type. In the same cluster for basis motoric space, pupils that have motoric dimensions responsible for explosive and repetitive power as well as for flexibility stand out.

Taxonomy analysis as quantitative method contributes in proper selection and orientation of pupils for specific sports based on characteristics and anthropological abilities applied in this procedure.

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APPLICATION OF TAXONOMY ANALYSIS IN THE SELECTION OF PUPILS IN SPORT

Primary aim of physical and health education and of this education and upbringing activity, among other things, is to secure favorable conditions for physical education as modern civilization value and a need, in order to advance quality and effectiveness of life, and for advancement of health level especially in the adolescent phase of life, and to create opportunities for involvement of pupils in various sports. Methods: This research has the goal to evaluate importance of taxonomy analysis in

the selection of pupils in sports. This means involvement of a process of measurement of morphological and motoric indicators of 26 pupils involved in sport activities in the age group of 15 years in the elementary and lower level secondary school "Faik Konica" from Prishtina and 30 pupils of age group 15 years in the elementary and lower level school „Avdulla Tahiri" from Malishevë. 6 anthropometric variables have been applied and 4 motoric variables (Kurelić et al., 1975). Anthropometric variables applied are: body height (ATV), length of foot (ADS), body mass (ATT), volume of upper arm in down position (AONL), volume of upper leg (AONK), volume of lower leg (AOPK). Motoric variables applied were: distance jump from standing position (MFESDM), running from 30 meter distance (MTR30V), bench bending (MFLPRK), and push-ups (MSKLEK). Results: Taxonomy analysis applied demonstrates that these groups of pupils has been divided in two groups, first group composed of 22 pupils and second group of 34 pupils. Results obtained in the table using Anova discriminative analysis have verified statistical significance of the difference between these groups. Discussion: Taxonomy analysis is used in order to group, namely classify sample of students on the basis of anthropometric and motoric parameters. Goal of this analysis was to create a homogenous sub sample on the basis of given sample, one that has as more as possible of a joint morphological and motoric parameters. Obtained results demonstrate that this research has resulted in two sub-groups of homogenous nature, the second group of 34 pupils' shows to be a group with better anthropometric and motoric parameters for selection for football. Similar results when it comes to selection have been obtained in other researches (Goletić, et al. 2012). The other group of 22 pupils has lower anthropometric and motoric parameters.