

INTERNATIONAL CONFERENCE

ON

# PHYSICAL EDUCATION AND SPORTS OF CHILDREN AND YOUTH

August 13 - 16, 1995, BRATISLAVA, SLOVAKIA

**CONFERENCE PROCEEDINGS**

---

## ORGANIZERS

Slovak Scientific Society  
for Physical Education  
and Sports  
Faculty of Physical Education  
and Sports, Comenius University



Slovak  
Olympic  
Committee



## IN CO-OPERATION

The International  
Federation  
of Physical  
Education - EUROPE



International Council for Health,  
Physical Education, Recreation,  
Sports and Dance - EUROPE



European  
Physical  
Education  
Association



## **STRUCTURAL CHANGES OF MOTOR DIMENSIONS IN SEVEN-YEARS OLD MALE PUPILS**

*Stipe BLAŽEVIC, Ratko KATIC, Dobromir BONACIN*

Faculty of Economics, University of Rijeka, Rjeka, CROATIA

Faculty of natural and mathematical sciences and education, University of Split, Split, CROATIA

### **The problem and aim**

By entering school life child is exposed to completely new conditions, agents and systematic and unsystematic stimuli. Many of them reflect themselves upon the negative side of development.

Evaluation of the effects of activity in various phases of the development of the child organism is a serious task and involves the knowledge of the fundamental regularities of development and an adequate methodological apparatus which leads to the results.

Every treatment activity will lead always to quantitative and structural changes, but the frequency of various effects will be essentially different from case to case, or it will depend directly on the aim and the applied operators-stimuli.

The intention of this research was to determine the structural differences of motor dimensions after the period of 6 months as the consequence of a provoked maturation in the changed conditions after entering the institution of school.

### Method of work

The total effective sample of 325 children consisted of an experimental group of 185 and a control group of 140 male seven-year old pupils from Split.

The experimental group attended a program of physical education specially designed for the needs of this research, while the control group participated in a regular elementary school physical education.

The cluster of 12 motor tests has been applied on both sub-samples of the testees twice in the interval of six months. The following variables have been applied in this examination: steps aside (STPSD), polygon backwards (PLGBKW), standing on two legs along the small bank for balance with open eyes (STDBLB), front bow with stretched legs (VSITRC), tapping by hand (HANDTP), tapping by leg (FOOTTP), jump at a distance from the spot (STD LGJ), throwing of small ball from the spot-200 gr. (THWGBL), running 20 metres from high start (RUNN20), lifting of the body from lying down with bent legs (CURLUP), endurance in height with bent arms (FXARMH), and running three minutes (RUNN3M).

The structural respectively quality differences in the time function, were obtained for both groups by rotated factor solutions, LSDIF analysis, QDIFF1, CRAMER and by the analysis under the model of KRZANOWSKI.

### Results

The factor analysis of the experimental group of boys isolated three latent motor dimensions in the first, and four in the second measurement (Table 1.).

TABLE 1. - Varimax factors in the first and the second measurements - the experimental group

VARIABLES	First measurement			Second measurement			
	V1	V2	V3	V1	V2	V3	V4
STPSD	-.47	-.38	-.24	-.71	-.26	-.05	.05
PLGBKW	-.46	-.11	-.57	-.69	-.17	-.19	-.19
STDBLB	.52	.22	.00	.20	.42	-.19	.47
VSITRC	.35	-.18	-.01	.01	-.09	.08	.91
HANDTP	.10	.80	.16	.07	.81	.23	-.03
FOOTTP	.09	.86	.06	.25	.84	.05	.03
STD LGJ	.63	.23	.29	.65	.23	.39	.13
THWGBL	.11	.10	.71	.36	.14	.65	.12
RUNN20	-.74	-.18	.02	-.68	-.13	.04	-.33
CURLUP	.43	.04	.51	.69	.12	-.02	-.08
FXARMH	.45	-.08	.30	.64	-.15	.19	-.04
RUNN3M	-.27	.22	.70	.02	.06	.86	-.06

In the first measurement the first factor is defined by variables of explosive strength and coordination. The second factor is defined by variables of frequency of movements while the basis of the third is a motor complex of strength and endurance.

The second measurement reveals a differentiation of motor abilities. The first factor is dominantly defined by variables of coordination and variables of all factors of strength. The basis of the second factor is endurance, the basis of the third is psycho-motor speed, and the basis of the fourth is flexibility followed by balance.

The factor analysis isolated four latent dimensions in the first and three in the second measurement, within the control group (Table 2.).

TABLE 2. - Varimax factors in the first and the second measurements - the control group

VARIABLES	First measurement				Second measurement		
	V1	V2	V3	V4	V1	V2	V3
STPSD	-.14	-.20	.63	.03	-.47	-.04	-.48
PLGBKW	-.18	.05	.55	-.20	-.42	.02	-.59
STDBLB	.01	-.06	-.03	.86	.22	-.46	.49
VSITRC	.01	.90	-.12	-.04	-.08	.76	.21
HANDTP	.00	.13	-.72	.03	.04	.11	.75
FOOTTP	.05	-.03	-.53	.44	.14	.14	.75
STD LGJ	.63	-.14	-.52	-.10	.63	-.13	.48
THWGBL	.66	-.07	-.35	.06	.75	-.05	.13
RUNN20	-.51	.27	.51	-.07	-.67	-.11	-.20
CURLUP	.49	.26	-.16	.34	.40	.27	.42
FXARMH	.68	.19	.23	.11	.69	.10	.07
RUNN3M	.35	.34	-.19	.47	.42	.66	.06

The first factor in the first measurement represents the ability of expressing strength. The second is responsible for flexibility, the third is defined by variables of coordination and frequency of movements, while the fourth factor is defined by the variable for the estimation of balance.

In the second measurement a stagnation of the development of motor dimensions as an amalgamation of motor abilities occurred. Thus, the first factor is defined by variables of mostly explosive strength followed by coordination. The second factor is defined by motor abilities of flexibility and endurance, and the third by speed and coordination abilities.

In both, the experimental, as well as the control group of boys, the LSDIF analysis has shown that the changes in the structure of dimensions have been performed at a significant level (Table 3.). But, as the training administered to the experimental group produced a differentiation of motor abilities as a positive effect, the insufficient physical training of the control group has had an opposite effect, since an amalgamation of motor abilities occurred. So, as the differentiation of motor abilities of the experimental group of boys evolves, the development of the boys in the control group takes place as an amalgamation of motor abilities.

TABLE 3. - Results of the analysis of structural changes  
 - the experimental (E) and control (C) group

LSDIF - Analysis		E	C			
Real matrix trace of the square of differences		.91	1.85			
HI - Square (of functions of trace)		84.46	129.28			
Degrees of freedom		12	12			
Probability		.00	.00			
Differences under QDIFF1 (Q) and Cramer (C) model, similarities under Krzanowski (K) model. Global measurement changes (G) and vector coefficient of correlation (VKK).						
VARIABLES	Q(E)	C(E)	K(E)	Q(C)	C(C)	K(C)
STPSD	.31	.36	1.00	.42	.41	.99
PLGBKW	.30	.33	.97	.28	.37	.54
STDBLB	.49	.51	.83	.44	.55	-.79
VSITRC	.11	.10	.71	.13	.12	-.18
HANDTP	.28	.29	-.53	.30	.33	.41
FOOTTP	.25	.29	.82	.37	.40	.26
STD LGJ	.28	.27	.54	.22	.27	-.29
THWGBL	.13	.14	-.38	.20	.17	-.10
RUNN20	.21	.23	.62	.25	.22	-.25
CURLUP	.20	.20	-.73	.37	.39	-.13
FXARMH	.24	.24	.69	.31	.44	-.37
RUNN3M	.14	.14	.88	.26	.26	.87
G = .28		VKK = .00		G = .30		VKK = .00