

DIFFERENCES IN THE FINAL TESTING RESULTS OF PUPILS BETWEEN THE TWO RELATIVELY CLOSE TIME INSTANTS

Boris Neljak, Vladimir Findak and Dario Novak

Faculty of Kinesiology, University of Zagreb, Croatia

Abstract

The objective of this study was to determine optimal time interval needed for the final testing of pupils. The sample consisted of 230 pupils (from 5th to 8th grade) in the Primary School of Zagreb. Anthropological characteristics were measured in 11 variables between the two relatively close time intervals. The first final measurement was conducted in April, and the second in June. Results between the time intervals were different, and analyses of differences has shown a great variability in accordance with continuous changes in anthropological characteristics in pupils of different age. On the basis of noticed variability in anthropological changes between the two time intervals, we have concluded that the most important for the final testing is, that **it most always be conducted in the same time of the school year**, and the accurate time can depend on the other factors.

Key words: *anthropological characteristics, final testing, primary school pupils*

Introduction

In every human activity, knowledges of objective condition are postulate for analyses and strategic thinking with purpose of conducting the same activity further (Maud & Foster, 1995). That also refers to educational area of physical education, in which the objective of anthropological characteristics testing of pupils is, to determine the results of realised educational programme in that area for the certain class. Namely, on the basis of results comparison, which are obtained by the initial and final testing, we can define the changes in pupils anthropological area (Findak, 2004).

In physical education, the final testing is always preformed in the end of school year, what means in June. It has certain disadvantages, like, adverse atmospheric and climate conditions in that time of year in the Republic of Croatia, not to mention tests in other subjects. When we take under consideration the facts of hypothermia and stress level of children under above mentioned conditions (Bruckner & Khan, 2005), we must think of option for shifting the final testing term. That is the reason why this study was conducted; to take under consideration what the optimal time for final testing really is.

Considering the objective of this study, following postulates can be formulated:

- P1: there are no statistically significant differences between the two close time intervals in the area of pupils anthropological characteristics,
- P2: there are no statistically significant differences between the two close time intervals in the area of pupils motorical abilities,
- P3: there are no statistically significant differences between the two close time intervals in the area of pupils functional abilities.

Methods

The sample consisted of 230 pupils (from 5th to 8th grade) in one Primary School of Zagreb. The subjects were divided in four groups, regarding the grade. They were all healthy and attending the classes of PE regulary. Standard measures and tests for evaluation of anthropological characteristics were applied (Mraković, M., Findak V., Gagro i., Juras V., Reljić J., 1986) in the two relatively close time intervals. The first final measurement was conducted in April, and the second in June. Anthropological characteristics were determined by the measurement of the body height (ATV), body weight (ATT), upper arm length(ANN) and forearm girth (AOP). Motorical abilities were measured by the tests: hand tapping (MTR), long jump (MSD), sit-ups (MPT), bending foward (MPR), polygon backwards (MPN) and hang hold (MIV). Functional abilities were measured by the test of aerobic endurance (F6). Datas were analysed till normal distribution showed, and the differences between the two final testings were determined by Student t-test for depended samples.

Results and discussion

Results of t-test for depended samples are presented in tables 1-4. At first, the distribution of results was calculated, and distribution was normal. That theorem was proved by the fact that values of the curve symmetry (Skewness), curve saliency (Kurtosis) and Kolmogorov-Smirnov test, did not vary significantly.

Values of the results in pupils from 5 th grade differed in the two time intervals, which is seen at the first look. That refers on values in tests regarding anthropological characteristics (ATV & AOP) and motorical abilities (MTR, MSD, MPT, MPR, MIV) and functional ability test F6. That differences are due to growth and development characteristics of pupils in that age (Malina, 1994), and to the influence of programme contents of PE which is preformed in the open area in that time of year. It is possible that the cause of differences was also influence of the other physical exercising contents, preformed by extracurricular activities, and activities in the free time preformed on the open in April and May. It is also important to say that, in the three variables there were no statistically significant differences between the two final testing results (ATT, ANN, MPN). Statistical significance was set at $P=0,05$.

Table 1. Results of depended t-test for pupils in 5 th grade

5 r. N=68	X	S.D.	Diff.	t	p
ATV1	148,73	8,27			
ATV2	149,88	8,64	1,14	-4,55	0,00
ATT1	42,97	10,81			
ATT2	43,30	10,76	0,32	-1,46	0,14
AOP1	21,27	2,13			
AOP2	20,98	2,15	-0,28	5,22	0,00
ANN1	11,3	0,46			
ANN2	11,4	0,46	0,01	-0,46	0,64
MTR1	20,97	3,27			
MTR2	23,29	2,83	2,32	-5,35	0,00
MSD1	147,42	20,06			
MSD2	152,10	20,10	4,67	-3,09	0,00
MPT1	29,76	8,40			
MPT2	34,72	9,57	4,95	-5,98	0,00
MPR1	48,79	8,24			
MPR2	54,00	8,25	5,20	-8,96	0,00
MPN1	15,87	5,06			
MPN2	15,53	4,41	-0,33	1,06	0,28
MIV1	26,19	18,07			
MIV2	31,44	20,91	5,25	-3,08	0,00
F61	1178,16	141,37			
F62	1240,07	154,97	61,91	-3,99	0,00

In the pupils of 6 th grade, there were statistically significant differences in 6 of 11 variables (ATV, ANN, MSD, MPT, MPR & F6). Subjects from that group are in the age of boyhood in which growth and development is in process, and it was the reason for statistically significant differences in the two measurements (Malina, 1994). It is the best seen in variable body height, which differed in two measurements for 1,32 cm. In other 5 variables for anthropological characteristics of pupils (ATT, AOP, MTR, MPN, MIV), there were no statistically significant differences in the two testings, and the testing values from April can hypothetically be taken as a final values.

Table 2. Results of depended t-test for pupils in 6 th grade

6 r. N=52	X	S.D.	Diff.	t	p
ATV1	155,72	7,70			
ATV2	157,04	7,92	1,32	-4,19	0,00
ATT1	45,87	9,94			
ATT2	45,41	9,45	-0,45	1,08	0,28
AOP1	21,45	1,95			
AOP2	21,37	1,83	-0,08	0,83	0,40
ANN1	11,7	0,63			
ANN2	10,2	0,46	-0,15	2,52	0,01
MTR1	23,09	3,41			
MTR2	24,19	3,86	1,09	-1,85	0,06
MSD1	165,50	22,68			
MSD2	170,44	20,70	4,94	-4,26	0,00
MPT1	33,76	6,66			
MPT2	38,26	8,17	4,50	-6,89	0,00
MPR1	52,30	7,53			
MPR2	60,30	7,34	8,00	-9,39	0,00
MPN1	14,64	4,94			
MPN2	15,24	4,41	0,60	-1,30	0,19
MIV1	42,92	26,82			
MIV2	45,11	25,18	2,19	-0,92	0,36
F61	1242,88	189,64			
F62	1314,03	191,14	71,15	-5,33	0,00

In the pupils of 7 th grade, there were at least individual changes, and statistically significant differences were determined in four variables (AOP, MPT, MPR & MPN). In other 7 variables for anthropological characteristics assessment (ATV, ATT, ANN, MTR, MSD, MIV, F6), there were no statistically significant changes between the two measurements, and the testing values from April can hypothetically be taken as a final values.

Table 3. Results of depended t-test for pupils in 7 th grade

7 r. N=54	X	S.D.	Diff.	t	p
ATV1	160,97	7,49			
ATV2	162,07	7,53	1,10	-1,89	0,06
ATT1	54,26	12,94			
ATT2	54,77	11,15	0,50	-0,52	0,60
AOP1	23,17	1,96			
AOP2	22,75	1,93	-0,41	2,68	0,00
ANN1	12,9	0,63			
ANN2	12,4	0,62	-0,05	1,07	0,28
MTR1	24,46	3,26			
MTR2	24,96	2,95	0,50	-1,25	0,21
MSD1	170,64	25,12			
MSD2	171,94	25,48	1,29	-0,69	0,49
MPT1	33,59	7,40			
MPT2	36,90	8,34	3,31	-4,85	0,00
MPR1	58,92	9,85			
MPR2	65,11	9,36	6,18	-5,00	0,00
MPN1	14,52	3,74			
MPN2	13,60	3,93	-0,91	2,67	0,00
MIV1	29,72	24,56			
MIV2	31,27	22,66	1,55	-0,56	0,57
F61	1251,57	191,94			
F62	1277,59	163,02	-26,01	-1,86	0,06

In the pupils of 8 th grade, there were statistically significant differences in 6 variables (ATV, MSD, MPT, MPR, MPN, F6), while in the other 5 anthropological variables, there were no statistically significant differences (ATT, AOP, ANN, MTR, MIV) and the testing values from April can hypothetically be taken as a final values.

Table 4. Results of depended t-test for pupils in 8 th grade

8 r. N=56	X	S.D.	Diff.	t	p
ATV1	167,72	8,22			
ATV2	169,12	8,04	1,40	-10,24	0,00
ATT1	56,90	11,44			
ATT2	57,52	11,25	0,61	-1,62	0,11
AOP1	23,23	2,12			
AOP2	23,18	1,98	-0,05	0,61	0,53
ANN1	8,9	0,45			
ANN2	9,3	0,43	0,03	-0,82	0,41
MTR1	27,25	4,37			
MTR2	27,87	3,52	0,62	-1,17	0,24
MSD1	197,32	20,58			
MSD2	200,00	18,90	2,67	-1,94	0,05
MPT1	42,55	6,89			
MPT2	47,33	6,37	4,78	-6,73	0,00
MPR1	61,51	8,93			
MPR2	68,10	8,59	6,58	-6,59	0,00
MPN1	12,16	2,87			
MPN2	11,57	2,02	-0,59	2,63	0,01
MIV1	47,92	26,92			
MIV2	49,21	24,90	1,28	-0,59	0,55
F61	1419,10	136,70			
F62	1468,92	138,52	-49,82	-5,10	0,00

On the basis of the whole sample of subjects, difference analyses between the two close time intervals, showed higher number of statistically significant differences between the variables. So, of 44 possible analyses iteration of anthropological characteristics in the whole sample, 24 changes and 20 statistically identical states were obtained. Higher number of morphological measurements were unchanged, while motorical and functional abilities were significantly different.

Conclusion

An experiment was conducted on the sample of 230 pupils in the Primary School in Zagreb, with objective of determining the optimal time interval for final testing the pupils anthropological characteristics. Subjects were measured by 11 standardised variables for estimating the anthropological characteristics in two relatively close time intervals. The first final testing was conducted in April, and the second in June. On the results bases, it can be concluded:

Only in one variable referring anthropological characteristics, from the 5 th to 8 th grade there were no statistically significant changes between the two final testings (ATT); body weight. It was due to high energy exercising level of pupils between the two time intervals. So, on the bases of above mentioned, all three postulates referring there are no significant differences between the two close time intervals in the area of pupils anthropological characteristics, motorical and functional abilities, are rejected.

So, it can be claimed that in Primary School PE classes exists a great variability of significant changes in the time interval of two months. So, on the basis of this statements, it is obvious that during PE classes there are continuous changes in the area of anthropological characteristics. It presumes that measuring the anthropological characteristics **in different time intervals, enters into register different state of pupils**. So, moving the time interval of final testing to earlier period of school year, for example in May, seems to be reasonable, because of the climate conditions which are better and the final testing can be conducted with difference in quality. In that time interval there is also less of other disordering factors, like: tests in other subjects, stress situations because school year is ending, etc. The time interval without stress factors directly influences motivation level of pupils during the final testing.

For making the final decision on possible changing the time interval for final testing in the area of anthropological characteristics, there is a need for further researches on bigger and more representative samples.

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