BMI AND REACTION TIME IN SECONDARY SCHOOL PUPILS

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Abstract
In this study we evaluated the effect of physical development on reaction time in 129 children (62 m. & 67 f. from10-14 years age) and Reaction Time (RT) in pupils which seems to be very sensitive under the influence of physical development, related to BMI at this age. Tests conducted were RT to simple acoustic stimuli, RT to Simple Visual Stimuli and Balance test. Correlation analysis using P. Correlation showed significant positive correlation between scores of RT to simple visual and acoustic stimuli. (p=.77), significant positive correlation between BMI and balance test (p=0.22). One-way ANOVA used to evaluate differences based on gender and age pointed out no significant differences between males and females but significant differences between grades (age groups). So in general, both genders have similar and no significant difference between male & female in all tests. Were found a significant positive correlation between scores of RT to simple visual and acoustic stimuli related to BMI in both genders and ages. We found a significant positive correlation between BMI and balance test related to BMI in both genders and ages. BMI data in our study showed a lower level than WHO data, which mean this sample has a healthy index.

Keywords: BMI, reaction time, visual stimuli, acoustic stimuli, balance.

Introduction
Pupils in their school age represent a very wide range of their general development profile that differs in terms of physical development and cognitive parameters assembled in their behavior. Pupils have also a great need for physical activity that comes out with the games they play or improvise, wherever they are expressing changes in their personality profile, bringing out the need to become fastest and agile time after time. Reaction time in simple and complex mode of responses express the cognitive development functioning in this age.

Method
This study we evaluated the effect of physical development on reaction time in (10-14 years age) children. Reaction Time (RT) in pupils which may be very sensitive under the influence of children's physical development parameters, related to BMI diversity to this age.
But which is the correlation between the physical development (BMI) and RT in inactive and active pupils, or in those who become active by increasing physical activity.
In this study we tested 129 children (48% male & 52% female) from 5th to 9th grade.
Conducted tests were: Reaction Time to simple acoustic stimuli, RT to simple visual stimuli and Balance test.
Statistical analyses were conducted using IBM SPSS Statistics 20. Correlation analysis was applied using Pearson Correlation to see if there was any correlation between the test scores and the child ability to these cognitive redevelopment parameters.

Correlation analysis was applied using Pearson Correlation, to investigate if there is any correlation between the test scores and the child ability to these RT parameters.

Results

The results of Pearson correlation coefficient. and p-values (2-tail.) between BMI and the RT revealed: a) there was a significant positive correlation between scores of RT to simple visual and acoustic stimuli p=.77 related to BMI. b) There was a significant positive correlation between BMI and balance test p=0.22 related to BMI.

One-way ANOVA was used to evaluate diff. based on gender and age. ANOVA results pointed out: a) there were no significant difference between male & female. b) There was significant difference between grades.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Age	129	6.2669	13.4209	9.863553	1.9229773
BMI	129	10.6558690	26.7532120	1.789392070E1	3.2240967613E0
RTArlScale	129	151.92308	1000.00000	340.5099631	1.24737677E2
RTVrlScale	129	192.19230	1000.00000	328.6151527	1.10901798E2
Balance	129	15	33	29.31	3.243
Concentration	129	0	7	.60	1.181
Valid N (listwise)	129				

DISCUSIONS

Correlations

		BMI	RTArlScale	RTVrlScale	Balance	Concentration
BMI	Pearson Correlation	1	-.095	-.151*	.208**	.013
	Sig. (1-tailed)		.113	.026	.004	.433
	N	129	129	129	129	129
RTArlScale	Pearson Correlation	-.095	1	.777**	-.097	-.007
	Sig. (1-tailed)	.113		.000	.107	.466
	N	166	166	166	166	166
RTVrlScale	Pearson Correlation	-.151*	.777**	1	-.125	-.054
	Sig. (1-tailed)	.026	.000		.054	.246
	N	129	129	129	129	129
Balance	Pearson Correlation	.208**	-.097	-.125	1	-.199**
	Sig. (1-tailed)	.004	.107	.054		.005
	N	129	129	129	129	129
Concentration	Pearson Correlation	.013	-.007	-.054	-.199**	1
	Sig. (1-tailed)	.433	.466	.246	.005	
	N	129	129	129	129	129

*. Correlation is significant at the 0.05 level (1-tailed).

**. Correlation is significant at the 0.01 level (1-tailed).

ANOVA FOR THE AGE

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
BMI	Between Groups	531.536	6	88.589	11.901	.000
	Within Groups	1183.606	159	7.444		
	Total	1715.142	165			
RTArlScale	Between Groups	653717.783	6	108952.964	9.053	.000
	Within Groups	1913597.739	159	12035.206		
	Total	2567315.522	165			
RTVrlScale	Between Groups	670150.090	6	111691.682	13.066	.000
	Within Groups	1359219.364	159	8548.549		
	Total	2029369.454	165			
Balance	Between Groups	149.637	6	24.940	2.500	.024
	Within Groups	1586.073	159	9.975		
	Total	1735.711	165			
Concentration	Between Groups	9.232	6	1.539	1.108	.360
	Within Groups	220.725	159	1.388		
	Total	229.958	165			

ANOVA FOR THE GENDER

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
BMI	Between Groups	.070	1	.070	.007	.935
	Within Groups	1715.072	164	10.458		
	Total	1715.142	165			
RTArlScale	Between Groups	50.143	1	50.143	.003	.955
	Within Groups	2567265.378	164	15654.057		
	Total	2567315.522	165			
RTVrlScale	Between Groups	8198.125	1	8198.125	.665	.416
	Within Groups	2021171.329	164	12324.215		
	Total	2029369.454	165			
Balance	Between Groups	17.511	1	17.511	1.671	.198
	Within Groups	1718.200	164	10.477		
	Total	1735.711	165			
Concentration	Between Groups	.071	1	.071	.050	.823
	Within Groups	229.887	164	1.402		
	Total	229.958	165			

CONCLUSIONS

In general, both genders have similar and no significant difference between male & female in all tests. We found a significant positive correlation between scores of RT to simple visual andacoustic stimuli related to BMI in both genders and ages. We found a significant positive

correlation between BMI and balance test related to BMI in both genders and ages. We found a significant difference between ages (grades) that shows a uniform development at this sample in both genders. Indicators are similar with the literature and in the same direction of impact. Our study groups did not represent qualitative changes in relation to impacts on increasing physical activity for that period. BMI data in our study show a lower level than WHO data, which mean this sample has a healthy index.

RECOMMENDATIONS
The Albanian educational system should be aware of BMI index problem showed in pupils at this age undertaking educational interventions to keep them healthy in body and mind. Physical education teachers should give a clear message to student performance and goals to be achieved in the classroom and how to maintain proper active attitude during leisure time. Physical education teachers should be careful to increase the time in which students work in aerobic function as a normal function that allows the pupil's body to work in conditions of oxygen added. The family must be informed of the therapeutic effect of children involved in physical activity and sport, especially in those areas where the process of socialisation is to be added. The media should have an impact on the public information about adding gyms presence and sporting facilities, etc.

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