

## A COMPARISON OF SOMATIC AND MOTOR CHARACTERISTICS IN ARAB AND HUNGARIAN PUPILS

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*Abstract: It is an exciting problem of human biology, education and replacement in sports to compare young representatives of two populations differing in geographical situation, in history and in customs. There were examined 313 girls and 1125 boys in Hungary and 319 girls and 1053 boys in Lybia, aged 10–18 years. The anthropometric characteristics were as follows: height, body weight, chest circumference in rest, upper arm circumference in flexion, and thigh circumference. The conditional capacities were examined through the tests: 30 m running, Cooper test, Abalakov test, trunk bending. The paper presents the specific development found in the characteristics examined broken down according to nationalities and sex. It can be found differences in the biological development as a consequence of the effects of social (educational and family) environmental factors.*

*Key words: Growth and development; Motoric development; Lybian boys and girls; Hungarian boys and girls.*

### Introduction

In our study we compared the Lybian and Hungarian pupils' somatomotor capacities. It is verified in the literature as well as in the praxis that the movement performance is determined by the somatic structure. But besides the biological development we must calculate the social effects, too. That's why the comparative analysis of pupils, living on different continents, among different general social and family traditions, studying in different school-systems, seemed to be useful for the education and sport-policy as well, besides the human-biological results.

We examined Lybian and Hungarian pupils. Their age varied from ten to eighteen years.

Our questions were:

1. What similarities and differences can be found in the somatic characteristics of Lybian and Hungarian Pupils?
2. What similarities and differences can be found in the conditional abilities of Lybian and Hungarian Pupils?
3. What dynamics can be found in the changes of capacities between the ages of 10–18?
4. What somatomotor capacities are in the groups created according to the number of children in the families?

### Material and Methods

The Lybian measurement has been executed in Tripoli in 1988. The data of Hungarian pupils were chosen from the data-bank at the University of Physical Education, in the Ball games' Department, according to age and sex groups. All together we examined 632 girls and 2178 boys, that is 2810 pupils (*Table 1*).

*Table 1. Age-distribution of the Hungarian and Lybian pupils examined*

Age (years)	Hungarian			Lybian			Total		
	girls	boys	together	girls	boys	together	girls	boys	together
11	44	198	153	59	198	158	84	217	312
12	32	111	143	32	111	143	64	222	286
13	55	178	233	55	129	184	110	307	417
14	37	162	199	37	164	201	74	326	400
15	40	183	223	40	158	198	80	341	421
16	31	136	167	31	136	167	62	272	334
17	40	115	155	40	115	155	80	230	310
18	34	131	165	34	131	165	68	262	330
Total	313	1125	1438	319	1053	1372	632	2178	2810

The anthropometrical methods were taken by Martin (Martin – Saller 1957) (1) and Mészáros (1987), the conditional capacities were examined by traditional test, published by Nádori and his co-workers (1989).

Anthropometry	Conditional capacities
1. Height (cm)	6. 30 m running (s)
2. Body mass (kg)	7. Cooper test (m)
3. Chest circumference in rest (cm)	8. Abalakov test (cm)
4. Upper arm circumference flexed (cm)	9. Trunk bending forward (cm)
5. Thigh circumference (cm)	

There were observed the muscularity of body parts, the explosiveness, the aerob endurance and the flexibility of joints. The average and standard deviation were calculated according to usual mathematical statistical methods. We used the double T test and trend equations. Now we intend to show the mean results and the discussion.

On the (Table 2) it can be seen the abilities according to the nationality and sex. Only the significant differences are described in the starting and in the final age (that means 11 and 18 years).

Among Lybian pupils in the age 11 there is no difference between the somatic characteristics of boys and girls, but the boys' abilities are better. In the age of 18 the boys have bigger results in the linear and fulness signs. The similar thigh circumference in the case of girls is due to the fatty layer under the skin, in boys to the muscles.

The Hungarian boys are bigger and stronger already attaining the age of 11. The girls showed better mobility in the joints.

As for the two groups of pupils the 11 years old girls show similarity sometimes, but later the Hungarians have bigger or better values; the mean values of Hungarian boys are significantly better than those of the Lybian ones.

Table 2. Differences in characteristics\*

Characters	Group	L - L		H - H		L - H		L - H	
		Age	11	18	11	18	11	18	11
1. Height	(cm)						H	H	H
2. Body mass	(kg)							H	H
3. Chest circumference	(cm)						H	H	H
4. Upper arm circumference FL.	(cm)					H		H	H
5. Thigh circumference	(cm)					H	H	H	H
6. 30 m running	(s)					H	H	H	H
7. Cooper-test	(m)					H	H	H	H
8. Abalakov-test	(cm)					H	H		H
9. Trunk bending forward	(cm)					L	L	L	L

- \* Signs:
- = The boys' value is bigger or better
  - = The girls' value is bigger or better
  - L = The Lybians's value is bigger or better
  - H = The Hungarians' value is bigger or better

Figure 1 shows the changes during the eight years. Taking the bigger standard error we show the process with linear trend equations. As for the height, the changes in both sexes are similar, but the Hungarians are taller (Fig. 1a). Body mass: the Lybians get near to the Hungarian boys and girls, but they develop in different way (Fig. 1b). The chest circumference is similar in boys and girls in both groups. The change during the eight years is more pronounced in the case of boys (Fig. 1c). Upper arm inflexed: The difference between the sexes is getting less in Lybians, it is growing in Hungarians (Fig. 1d). There is no significant difference in the thigh circumference of boys and girls anywhere. But the values are bigger among Hungarians (Fig. 1e).

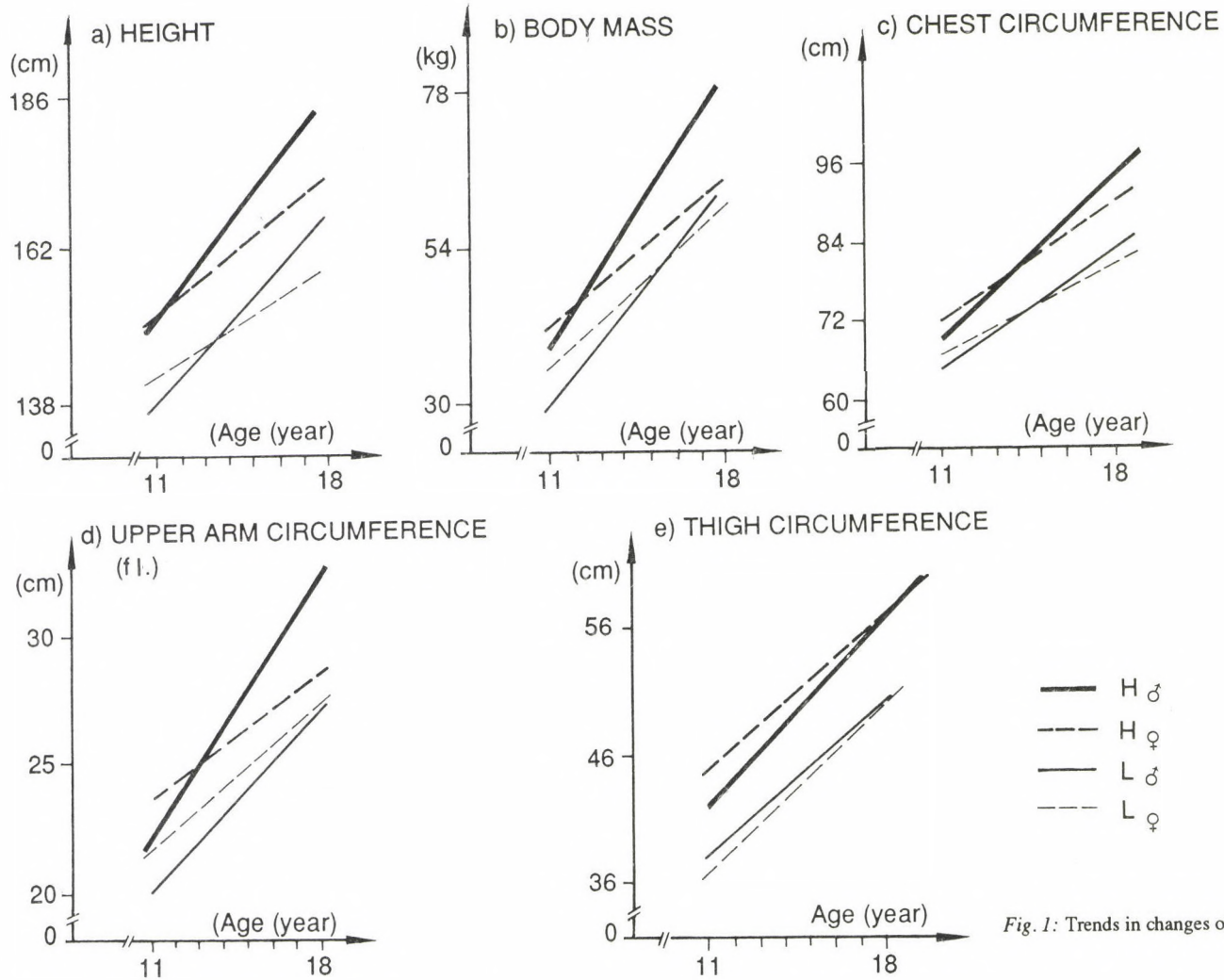


Fig. 1: Trends in changes of somatic characteristics

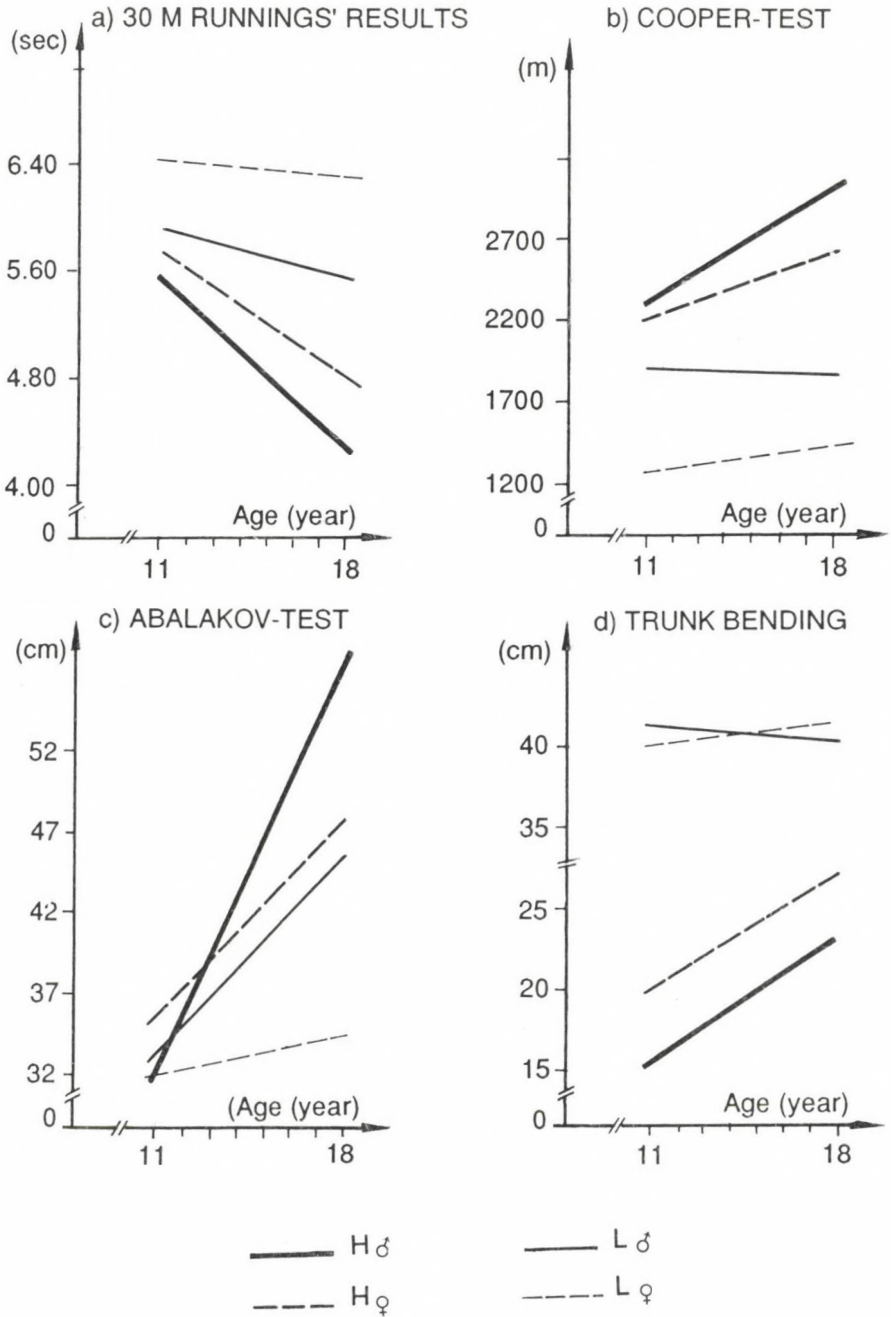


Fig. 2: Trends in changes of conditional abilities

*Thirty meter running:* The Lybian girls don't develop, the boys do a little. In Hungarians there is a significant development (*Fig. 2a*). *Cooper test:* There is a moderate improvement in Hungarian girls, but this is not the case among Lybians. As for the boys, the Hungarian values are much better (*Fig. 2b*). *Abalakov test:* There is a little improvement in Lybian girls, in Lybian boys it is significant, but in Hungarians it is better too (*Fig. 2c*). *Trunk bending forward:* In this test the girls' values are better in both countries. As for the populations, the Lybians reached better results (*Fig. 2d*).

It is an exciting human biological question, what somatic characters and abilities have the pupils living in large families comparing the results with others. We have compared families with 1–4, 5–8, 9–12 children or more. We found significant differences many times, in spite of compensating processes. In the background we found living in a large family and having been born later in chronological order. The biggest differences are in the age of thirteen, to the injury of the great families. The problem is more often in girls. The difference is the largest in somatic characteristics: body mass, upper arm and chest circumference and height. As for the abilities: the result of thirty meter running (requiring explosiveness) is worse in pupils living in great families. Now we wanted only to give the broad outlines of the problem. But the starting results stimulate us to further work.

The main statements of our examination are the following:

(1) In the age of 11, among the Lybian pupils there is no sexdifference in the basic somatic characters. In Hungarians the bigger or higher values of boys are demonstrable already this time.

In the age groups of 18 the boys' values significantly surpass those of girls in both countries.

The somatic characters of Hungarian boys and girls significantly surpass that of Arabian pupils.

(2) The structural advantage of Hungarian pupils is growing in the field of conditional abilities. In tests for quickness, explosiveness and aerobic endurance the Europeans are better significantly.

The Arabians show better results in joint-mobility.

In conditional abilities the boys reach higher level but the dynamic leg force is greater in 11 years old girls in both countries.

(3) The development of characteristics is greater mostly in Hungarians in spite of the fact that the lower starting values of Arabian pupils would offer a greater development. There is a great retardement of Lybian girls in explosiveness and aerobic endurance.

In identical population the development of boys surpasses that of girls.

(4) Pupils living in great families show worse somatomotor characteristics – mainly the girls – than those living with 1–4 sisters or brothers.

We consider the examinations as signs that inspire us to further ones in this direction.

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