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STUDIES
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THE RELATIONSHIP BETWEEN MENTAL AND PHYSICAL
VARIABLES IN SOMALI CHILDREN

Subjects and Methods

In 1975 the Somali authorities from the Ministry of Education gave permission to carry out research in seven of the capital's schools. During our visit we measured the more important anthropometric traits in 1270 children. Of these children 372, in the age from 12 to 18 years, took Raven's Progressive Matrices (PM 38), considered to be a general intelligence test (Raven 1954) and which measures the reasoning ability of the youths. The subjects examined represented children growing up in a good environment; in other words, they belong to an elite group which is determined by educational level, nutrition, the type of housing and the use of medical facilities.

In our previous works we have both analysed the physical growth of Somali children and proposed the standardization of Raven's "culture free" test in Somalia (Grassivaro Gallo et al. 1980 a and b). We have now considered the relationship between physical and mental variables in growing children. The comparisons were made on the methodological basis of:

- the correlations between physical and mental variables;
- the differences in intelligence test scores between groups of children who were more advanced or less advanced in somatic development.

Results

Table I gives the correlations between anthropometric variables (measures and indices) and psychometric test results for groups of subjects (girls and boys, separately) of the same chronological age. For the boys, the positive relationship regarding height and weight is evident: the strength of this relationship is not great (Z_I by Fisher test results are significant only sporadically); the relationship was verified at all age levels in the groups that were examined (excepting for the small group of 18 year old subjects).

The values of the coefficients of correlations seem to decrease with an increase in age (between 12 and 17 years) passing from 0.70 to 0.13 and from 0.52 to 0.09, for height and weight respectively. The afore mentioned positive relationship regarding stature corresponds a negative link with regards to 'skelique' index.

Arm and leg circumference are positively related to psychometric test scores at 12 and 13 years of age but this relationship is inverted after the age of 14; this age corresponds to the nearcheal period. The results for the girls are not so evident.

In tables 2 and 3 we analysed mean test scores for early and late maturing boys and girls. We based our analysis on the assumption that the large children (for height and weight) were also more advanced in their mental development.

Since in a previous work (Grassivaro Gallo et al. 1979) we proved that, in Somalia, the scores in response to Raven's test increase with growth until the age of 15 when there is a halt; we now find it possible to consider, with regard to this psychometric variable, a single group where all members are ≥ 15 years old (n. 222; 126 boys and 96 girls). Subsequently all subjects were matched for chronological age and

divided into the three following subgroups according to their physical traits:

	short subjects	(< mean -)
height	in average subjects	(mean \pm)
	tall subjects	(> mean +)
	light subjects	(< mean +)
weight	in average subjects	(mean \pm)
	heavy subjects	(> mean +)

We then analysed the scores obtained from the subgroups in response to Raven's test; they were evaluated separately for boys and girls.

From table 2 it is evident that the "average" and "taller than average" subjects have higher scores than the shorter and smaller children of the same age. For boys there is a tendency for a positive relationship; in fact, only the girls reach a value of significance of the F index.

In table 3 there is a tendency that "the average" and "heavier than average" children have higher scores than the lighter ones.

Discussion

As the psychophysical relationships appear to be influenced by the age, the ethnical homogeneity and the socio-economic status of the subjects (Kohen Raz 1975; Susanne 1979), we believe our results to be of value when considering young healthy Somali subjects of a high socio-economic status. However, our positive coefficients of correlation between the psychometric and physical traits are in general agreement

with those reported in literature: 0.25 ± 0.01 between test scores and height and 0.19 ± 0.01 between test scores and weight (Scottish Council 1953).

The higher test scores obtained by the children who were above average in height and in weight would seem to be an indication of greater mental ability in the more physically mature subjects; what we don't know is whether the large child is really advanced in his development or whether he is simply destined to be a large adult (Tanner 1976).

Furthermore, we have found no other accounts of the negative link between the psychometric test and the "skelique" index. Such a link, if confirmed, could be compatible to the hypothesis that there may be a positive relationship between mental growth and the growth in length of the legs. One might also consider the possibility of a physical growth spurt in connection with a mental growth spurt, although there is yet no proof that the latter exists.

Moreover, it is interesting to note how the relationships between mental test scores and limb circumferences are inverted in the predominantly post puberty age groups. These anthropometric measures are very important physical indices for research on nutrition and it is a fact that, as young Somali children grow older, such measures appear to be quite under average with respect to the average values of the western populations (Grassivaro Gallo et al. 1980).

Table I
A N T H R O P O M E T R I C T R A I T S

age (years)	boys (n.)	height	sitting height	weight	arm circ.	calf circ.	indice skelique	body build index
I2	15	0.70 ⁺⁺	0.56 ⁺	0.52 ⁺	0.17	0.32	- 0.06	- 0.53 ⁺
I3	30	0.24	0.24	0.35 ⁺	0.36 ⁺	0.21	- 0.05	0.22
I4	36	0.08	0.03	0.18	- 0.33 ⁺	- 0.34 ⁺	- 0.19	0.17
I5	50	0.15	0.11	0.10	- 0.59 ⁺⁺	- 0.58 ⁺⁺⁺	- 0.01	0.03
I6	43	0.28	- 0.14	0.14	- 0.30 ⁺	- 0.25	- 0.41 ⁺⁺⁺	- 0.12
I7	22	0.13	- 0.05	0.09	0.02	0.03	- 0.10	0.00
I8	11	- 0.42	- 0.40	- 0.59	- 0.04	- 0.06	0.22	- 0.11
girls								
I2	20	0.51 ⁺	0.32	0.24	0.00	0.24	- 0.27	- 0.27
I3	30	- 0.08	0.00	- 0.27	- 0.36 ⁺	0.01	0.11	- 0.36
I4	24	0.10	0.15	0.14	- 0.35	- 0.35	0.40	0.53
I5	53	0.24	0.35 ⁺⁺	0.10	- 0.32 ⁺	- 0.32 ⁺	0.19	- 0.05
I6	29	0.18	0.22	- 0.05	- 0.39 ⁺	- 0.39 ⁺	0.02	- 0.14
I7	11	- 0.26	- 0.15	- 0.58	- 0.21	- 0.24	0.19	- 0.45
I8	3	--	--	--	--	--	--	--

Correlation coefficients between anthropometric traits and Raven Test score: Giuffrida-Ruggeri's "Indice Skelique", is sitting height, 100/height (Comas 1960). Rohrer's Body Build Index is weight (gr.). 100/height (cm) (Comas 1960). Significant level (+++ < 0.001, ++ < 0.01, + < 0.05).

Table 2

Height	Boys		Girls	
	mean score	subjects (n.)	mean score	subjects (n.)
< M - 6	33.28	18	25.19	16
M ± 6	35.55	95	31.38	68
> M + 6	37.31	13	35.33	12
total	35.40	126	30.84	96

F = 0.4 NS F = 3.1 +

Mean Raven score in subjects (aged ≥ 15 years): short, "in average" and tall, matched for chronological age.
 Significant level (+ 0.05, NS non significant).

Table 3

Weight	Boys		Girls	
	mean score	subjects (n.)	mean score	subjects (n.)
< M - 6	32.86	21	28.65	17
M ± 6	35.89	86	31.85	61
> M + 6	36.00	19	29.50	18
total	35.40	126	30.84	96

F = 0.49 NS F = 0.55 NS

Mean Raven test score in subjects (aged ≥ 15 years): light, "in average", and heavy, matched for chronological age.
 Significance level (NS non significant)

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