

SOMATIC, MOTOR AND COGNITIVE CHARACTERISTICS OF ITALIAN SCHOOLCHILDREN

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Abstract: Preliminary results from an ongoing study on associations between somatic, motor and cognitive characteristics in 316 Italian schoolchildren of both sexes aged seven to twelve years are presented. Verbal knowledge of the body was tested, height and weight was measured and psychomotor status was assessed by age specific tasks. The sample was divided according to the region of birth and comparison was made between the children of the South and those of the North and Center combined. A different growth rate is indicated between females only in the two parts of Italy, but both sexes show consistently less verbal knowledge of the body in the South and also less psychomotor achievement. However no significant differences in knowledge of names of body parts with weight for age and for height were verified but there is some indication for better results in psychomotor achievement with lighter weight for age and for height.

Key words: Italian schoolchildren; Body dimensions; Psychomotor status; Cognitive knowledge.

Introduction

The development of a "body scheme", the state of which is assessed by tests of the verbal knowledge of parts of the body (Berges & Lezine 1978) is a functional prerequisite for the development of psychomotor capacities (Vayer 1974). Positive correlation between performance on motor tests and physical development has been confirmed for preschool children (Welon & Sekita 1975), schoolchildren and adolescents (Malina 1984). It is the aim of this preliminary study to enquire if there exist associations between somatic, motor and cognitive characteristics in Italian schoolchildren which are reflected by measures of body dimension, dynamic coordination and cognitive knowledge investigated and to what degree such are influenced by age, sex and place of origin.

Materials and Methods

In an ongoing study 316 Italian elementary schoolchildren aged seven to twelve years from all parts of Italy were tested in summer camps for verbal knowledge of the body (Berges & Lezine 1978). This test includes 29 questions and to answer them the child points to various parts of his body as for example his cheek, eye-lashes, elbow, heel, hip, etc. The correct responses were pooled into four different groups according to increasing knowledge (A = 18–23, B = 24–25, C = 26–27, D = 28–29). In addition height and weight was measured and psychomotor status was assessed by age specific tasks (one test for each year from six years to eleven years) according to Ozjerezki Guilman (in Vayer 1974). These tests increase in difficulty from the simple task for six years old: walk two meters with open eyes in a straight line putting heel to toe, to the most complicated one for eleven years old: jump flinging your legs backwards and at the same time touch your heels with your hands. For positive performance one out of three tries

has to be successful. If the child performs well with its age-specific test, that for the subsequent age is tried, if it fails that for the preceding age is tried.

The sample was divided according to the region of birth and comparison was made between the children of the South and those of the North and Center combined. Slightly varying numbers of individuals in some compilations result from the fact that some individuals could not be investigated for all tasks.

Results and Discussion

Body height and weight

Anthropological studies carried out in Italy in the sixties and in the seventies showed a marked difference in body height between North and Center and the South of Italy (De Toni 1968, Muzzolon 1979), and that was also the case in our series. Yet the significant differences by analyses of variance between regions in boys and girls (boys $F = 4.52$, $p < .035$; girls $F = 11.57$, $p < .001$) as well as those in weight in females ($F = 5.87$, $p < .017$, this was not significant in boys), are partly due to the differences in age between the two regions so that regression analysis was necessary.

Comparison of regression analyses gave significant F values with height on age for girls only (Figure 1b; girls $F = 5.54$, $p < .020$) but these were not significant for either sex with weight on age (Fig. 1a). The significant equation with only height in the girls is interesting in that this difference points to a different growth rate in the two parts of Italy in females but not in boys.

The rather impressive high weight for height of the girls in the South however, resulting from the regression of weight on height compared to that of the girls from the North and Center (Figure 1c) may also reflect the still traditional way of living in rural areas as cited by D'Amicis et al. (1985) who reported significantly higher weight of girls from an area 200 km South of Naples on the Tirrenian coast (+ 0.8 Kg, $p < 0.05$ compared to NHCHS Growth standards).

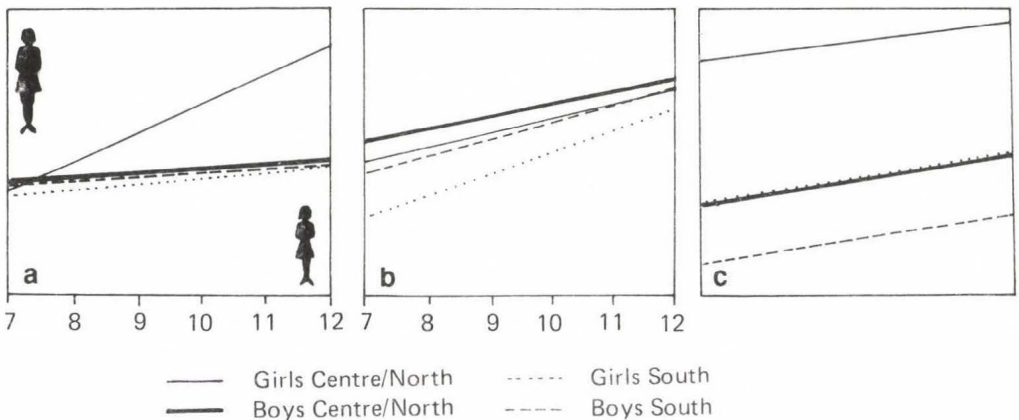


Fig. 1: a) Regression of $\sqrt[3]{\text{Weight}}$ on Age in Italian Schoolchildren; b) Regression of Height on Age in Italian Schoolchildren; c) Regression of $\sqrt[3]{\text{Weight}}$ on Height in Italian Schoolchildren

Table 1. Significantly different variables for verbal knowledge of the body between the two regions (N+C North+Center) of Italy in the two sexes

Girls	N+C		South	p	Boys		p
	N+C	South			N+C	South	
Chin	+ 59	50	p < .014		+ 91	44	p < .00065
	- 1	8			- 4	13	
Elbow	+ 60	51	p < .0057		+ 94	52	p < .028
	- 0	7			- 1	5	
Cheek	not significant				+ 95	52	p < .0066
					- 0	5	
Shoulder	not significant				+ 94	52	p < .028
					- 1	5	
Lashes	not significant				+ 91	44	p < .00065
					- 4	13	
Buttocks	not significant				+ 45	15	p < .016
					- 50	42	
Ancles	not significant				+ 87	39	p < .0006
					- 8	18	

Verbal knowledge of the body

When variables are taken one by one there are some significant differences in knowledge of body names in males and less marked also in females between the two areas (Table 1), children in the South being consistently less knowledgeable. With the

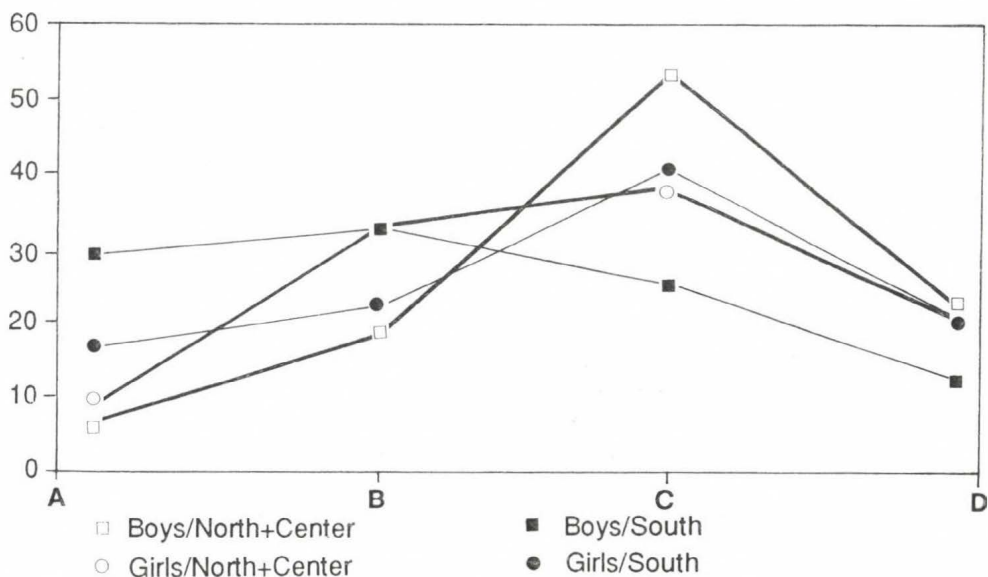


Fig. 2: Cognitive test responses in Italian Schoolchildren (North+Center 94 boys, 58 girls; South 55 boys, 54 girls) A = 18-23, B = 24-25, C = 26-27, D = 28-29 correct responses

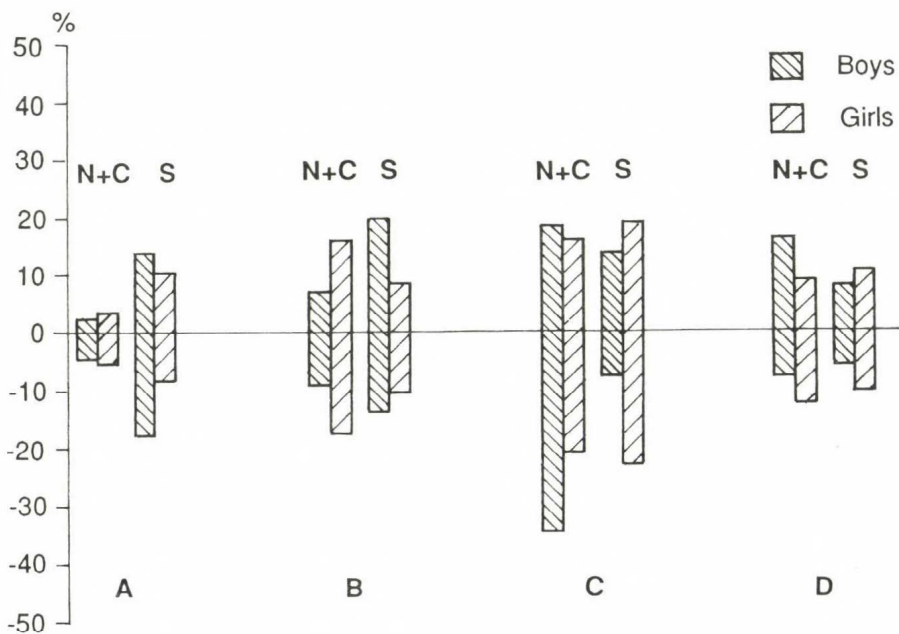


Fig. 3a: Cognitive test results. Knowledge of names of body parts of Italian schoolchildren Classification by regression residuals $\sqrt[3]{\text{Weight on Age}}$

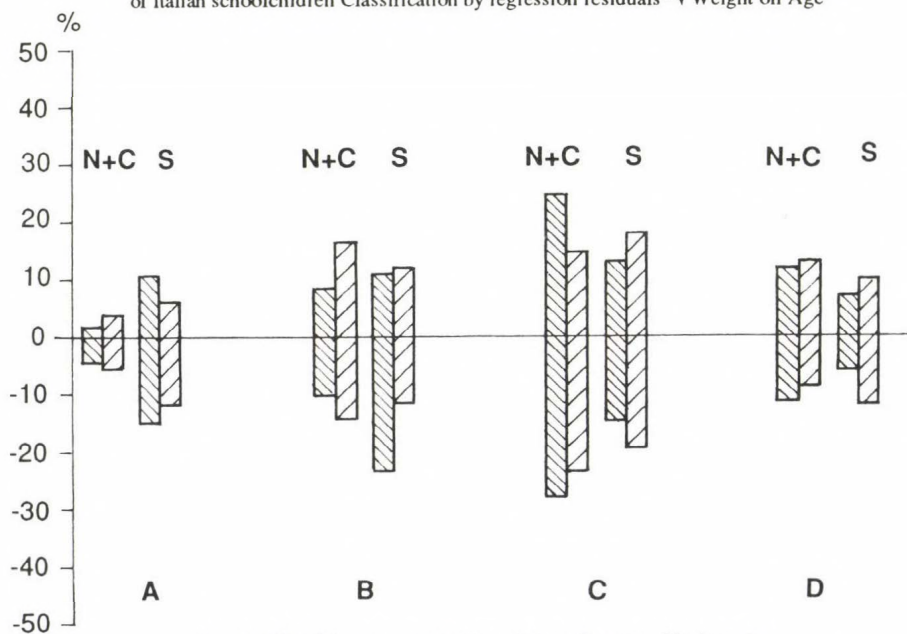


Fig. 3b: Cognitive test results. Knowledge of names of body parts of Italian schoolchildren Classification by regression residuals $\sqrt[3]{\text{Weight on Height}}$

boys this is clearly evident also for the four groups (correct responses pooled according to increasing knowledge; A minimum, D maximum), but only tendencies in girls (Figure 2).

However, when these four groups of cognitive test results are differentiated by their position above and below the regression line fitted for the third root of weight on age (Figure 3a) and by their position above and below the regression line fitted for the third root of weight on height (Figure 3b) no significant differences in knowledge of names of body parts are verified neither between sexes in each region nor between regions in each sex. The only significant results, observed for boys with weight on age ($\chi^2 = 4.78$) indicating that more boys who are heavy for their age knew more body parts is best interpreted as an artefact due to the number of tests done.

Psychomotor achievement

Pooling all the children into three groups: (1) achievement in psychomotor tasks one or more years ahead of its age, (2) achievement according to its own age, and (3) achievement one or more years behind its age and differentiating by sex and the two regions a significant excess of over achievers is observed in the North and Center by comparison with the South in both sexes (girls $\chi^2 = 22.6$; $p < .0001$; boys $\chi^2 = 6.78$, $p < .034$; Figure 4).

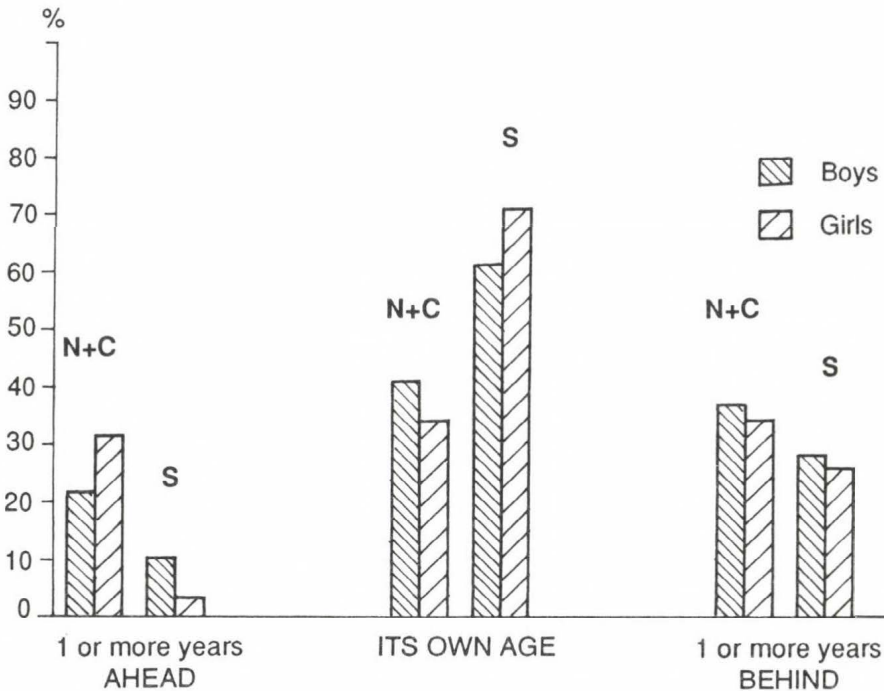


Fig. 4: Achievement in psychomotor tasks adjusted for age (Boys: 105 North + Center, 57 South; Girls: 73 North + Center, 58 South)

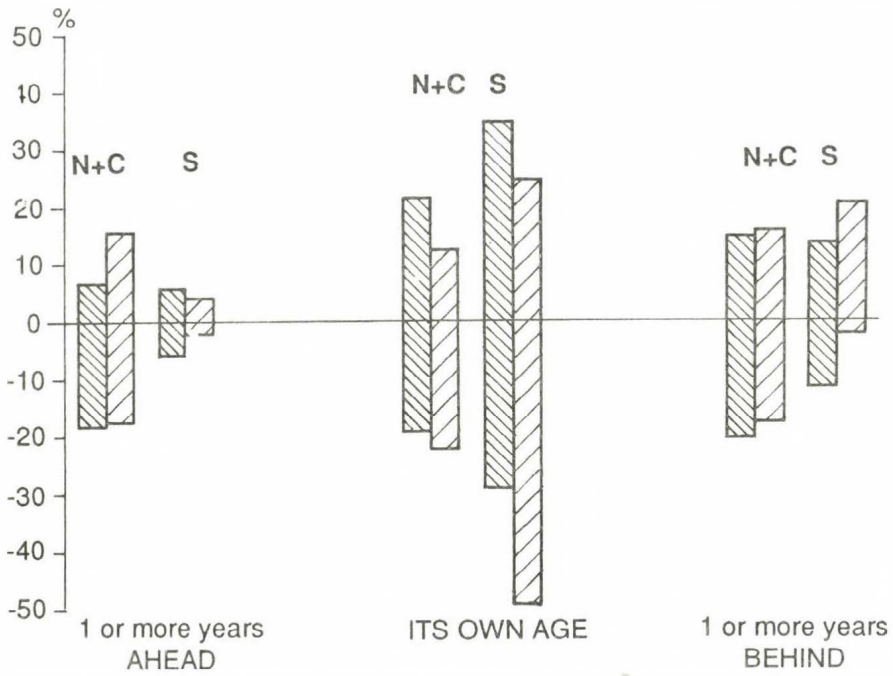


Fig. 5a: Achievement in psychomotor tasks. Classification by regression residuals $\sqrt[3]{\text{Weight on Age}}$ (Boys: 89 North + Center, 52 South; Girls: 64 North + Center, 49 South)

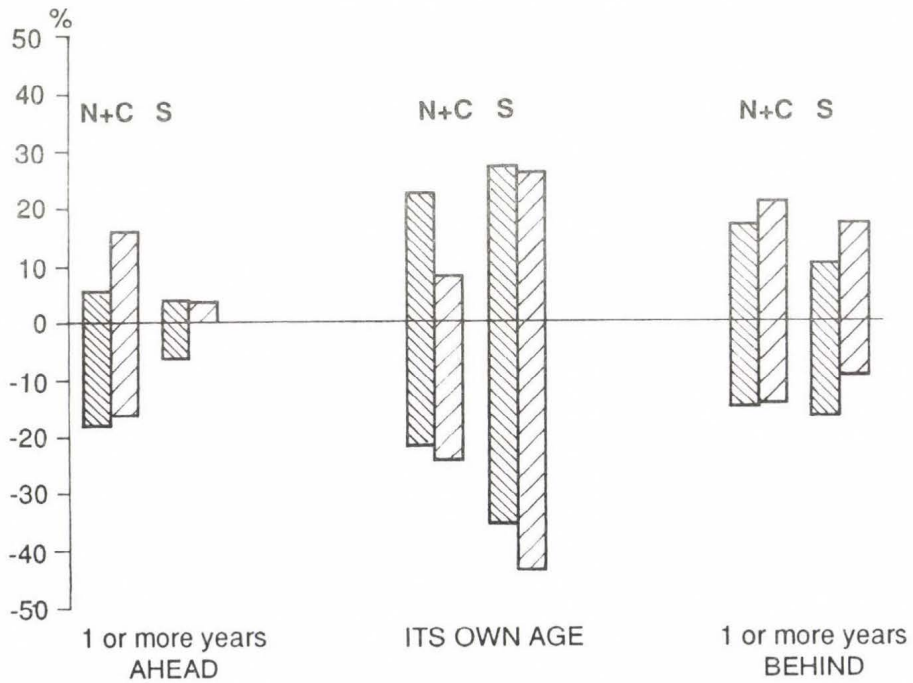


Fig. 5b: Achievement in psychomotor tasks. Classification by regression residuals $\sqrt[3]{\text{Weight on Height}}$ (Boys: 88 North + Center, 48 South; Girls: 62 North + Center, 53 South)

On account of these marked regional differences in psychomotor achievement and in growth association with physique was investigated within regions and sexes. Regressions were fitted of third root of weight on age, and third root of weight on height for each sex and region and the residuals calculated for each child. Achievement was classified by whether the residual was positive or negative. As shown in *Figure 5a* in the North and Center more boys who overachieve are light for age but not significantly while with girls there is no association of over- or underachievement with weight for age but a tendency for those who achieve as expected to be light for age. In the South there is no difference in boys but with girls significantly more underachievers are heavy for their age ($\chi^2 = 7.92$) and more who achieve as expected are light for age ($\chi^2 = 11.56$).

The picture is similar with regressions fitted for the third root of weight on height. With girls in both areas there are tendencies for those who achieve as expected for age to be slender and those who underachieve to be plump but not significantly; with the boys in the North and Center overachievers tend to be slender but there is not even a tendency in the boys from the South (*Figure 5b*). These observations, though not directly comparable on account of different tests applied are of general accordance with those reported by others (Welton & Sekita 1975, Malina 1984) stating that considerable subcutaneous fat in a child is associated with less agility and power, i.e. excess weight may function as a handicapping factor.

For a long time it has been known that there are biological differences between different areas of Italy ranging from genetic markers (Piazza et al. 1989) to body dimensions (Ente Italiano della Moda 1979). The present study confirms the latter but also suggests that similar differences may exist in general dynamic coordination and cognitive knowledge of the body. The extent to which these differences are intrinsic or results of environmental differences remains to be determined.

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