

BODY DEVELOPMENT OF MENTALLY RETARDED BOYS – A MIXED LONGITUDINAL STUDY

J. Buday and Ilona Kaposi

Training College for Teachers of Handicapped Children, Budapest, Hungary;
Central Research Institute for Physics, Budapest, Hungary

Abstract: Body size of moderate and severe mentally retarded boys have been studied for 12 years in an institution of Hungary. Twelve body measurements of 220 pupils were measured year by year but the body height and weight twice a year.

The average age of peak height velocity (PHV) was found at 13.5 year and the peak weight velocity (PWV) one year later. There were remarkable differences in individual growth curves either in PHV or in PWV. Heath-Carter somatotypes of the mentally retarded boys are presented.

Key words: Mentally retarded boys, Somatotype.

Physical development of mentally retarded children has been reported by several publications. All of them are based on cross sectional studies. These studies have clarified that the mean of body measurements of mentally retarded children are less than that of the normal control (Culley et al. 1963, Moiser et al. 1965, Buday 1974, Buday et al. 1977).

All kind of groups of mentally retarded children have been selected from educational viewpoints, so the aetiological factors are different. Therefore these groups are not homogeneous from biological point of view. It can be recognized from the high level of standard deviation of body measurements. Disregarding the studies of some special groups or particular type of analysis, no further results can be obtained from the cross-sectional studies; whether when the number of measured children is extremely high. No longitudinal studies have been known in this field.

Material and Methods

Pupils from one of the largest Hungarian institutions for mentally retarded children have been measured over a 12 year-period. The institution is at the village of Homok, Szolnok county. All the children are from this county. There are 220 mild and moderate mentally retarded boys aged from 5 to 18 years in the institution. However, there are only few patients aged under 6 and over 17 years of age in this study.

Twelve body measurements were measured year by year. Ten measurements gave the anthropometric somatotype and two the breadth. Height and weight were measured twice a year. The children were not grouped for this study according to their IQ. Children with genetical disorders e.g. Down's syndrome were excluded. Therefore the time of the subjects' damage was after the conception.

The control was chosen from the Nation-wide Growth Study of Hungarian Children and Youth by the random number generator of an IBM computer. We wish to thank to Prof. O. G. Eiben for these data.

The results were also compared with a relatively large sample of children with Down's syndrome.

We agree with the opinion of Roche (1968) on choosing the control for studies of mentally retarded. Our control groups are probably not the best ones. For example we have to take into consideration their cross sectional character.

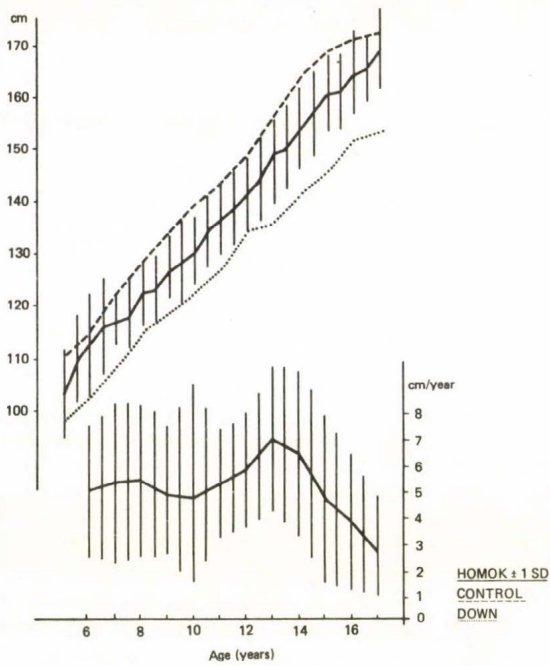


Fig. 1: Height in mentally retarded boys

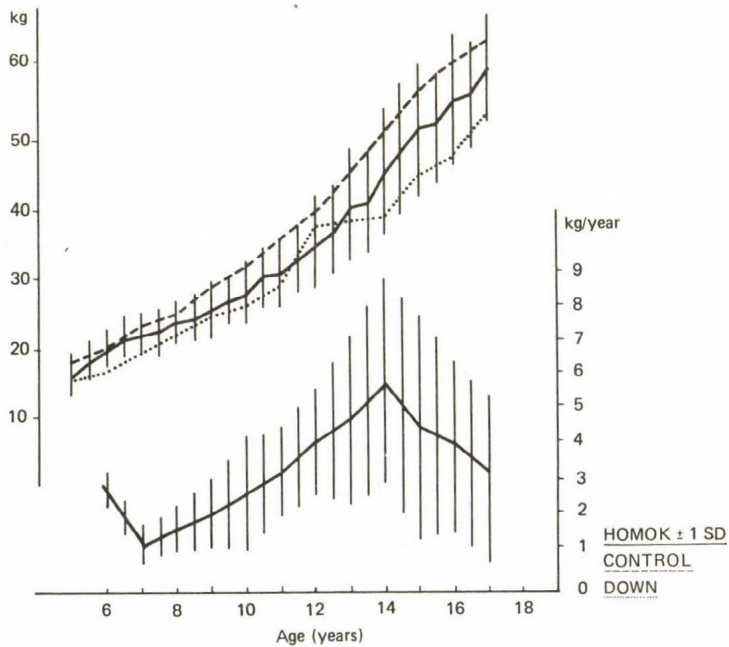


Fig. 2: Weight in mentally retarded boys

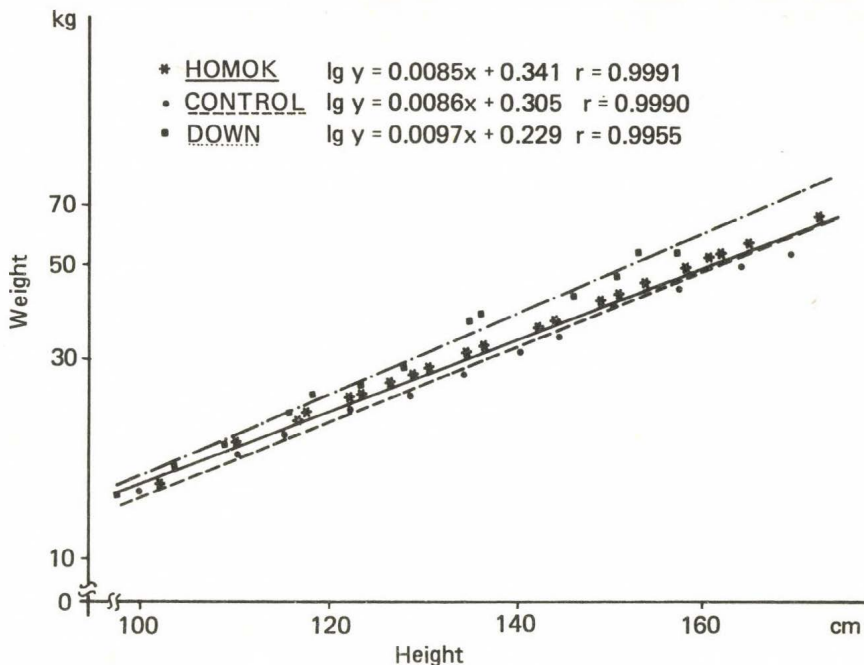


Fig. 3: Weight-for-height of the three groups

Results and Discussion

Growth of the body height can be seen in Fig 1. Considering the limited number of our patients the centiles were not computed. The shadowed areas show the mean \pm 1 SD. The control's curve falls into this area but the Down's one is below the shadowed area.

Some computed parameters of the velocity curve: the minimal prepubertal height velocity was 4.6 cm/year at 10 years of age with 130.8 cm corresponding average of body height. Peak height velocity is 6.9 cm/year at age 13 with 149.0 cm corresponding average of body height. The total adolescent gain is 31 cm.

Fig. 2 shows the growth of body weight. Both the curves of the control and the Down's deviate from the mean of the mentally retarded, but they are in the range of \pm 1 SD. Peak weight velocity is 6.0 kg/year at the age of 14, one year later than the peak of height one.

Range of both velocity curves is wide which corresponds to one of the previous suppositions on the puberty of the mentally retarded (Rundle and Sylvester 1973, Buday 1981).

Previously, analysis of the distribution of body height and weight of mentally retarded adolescents led us to the conclusion that the period of puberty is longer than that of the control (Buday 1979). Many kinds of individual variation were found including the pathological ones.

The weight-for-height curve was evaluated by the logarithmic model of regression analysis. In spite of the fact that our sample is not large enough significant correlations were found between the data pairs. The three regression lines are not parallel (Fig. 3).

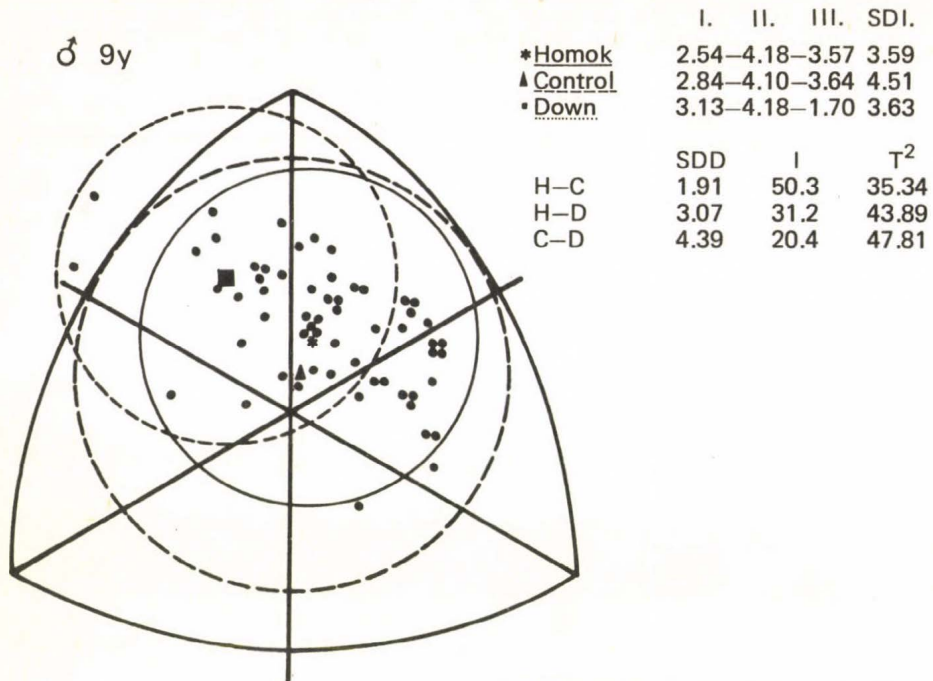


Fig. 4: Somatochart of the 9 year-old boys

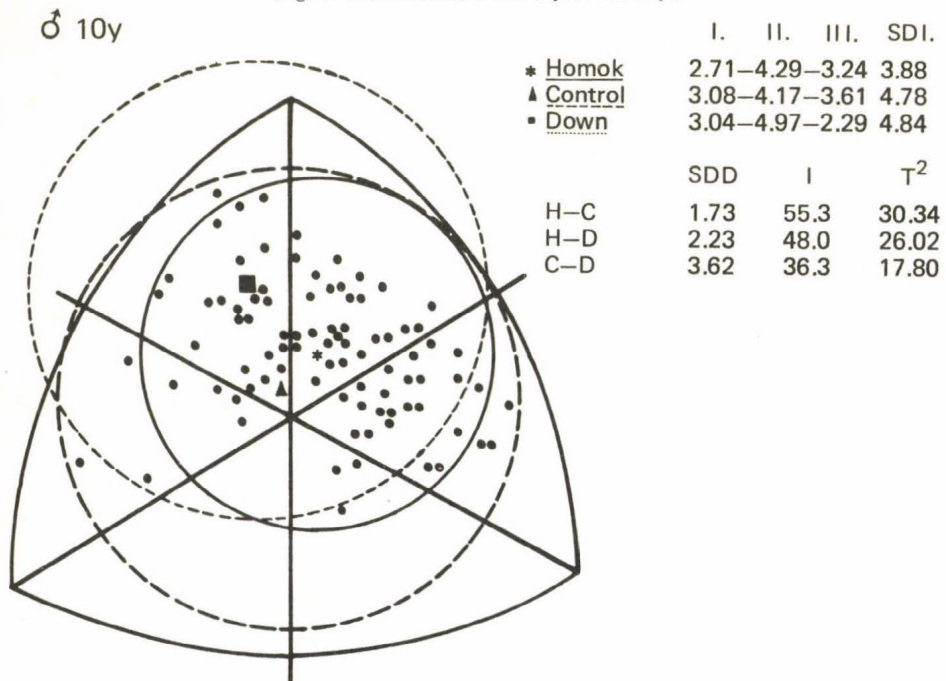
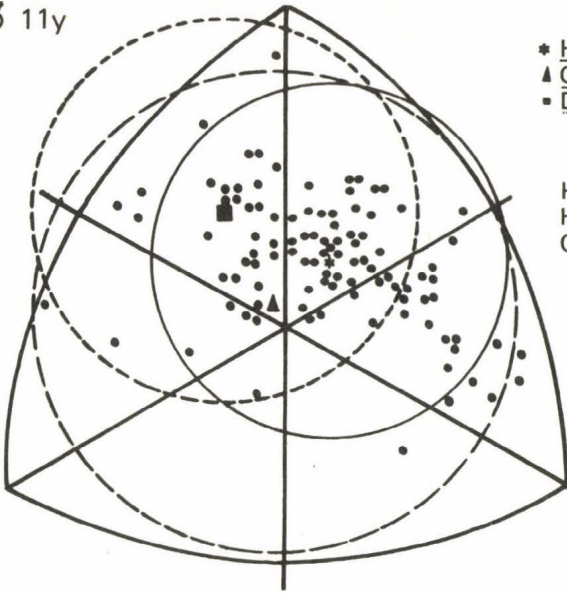


Fig. 5: Somatochart of the 10 year-old boys

♂ 11y

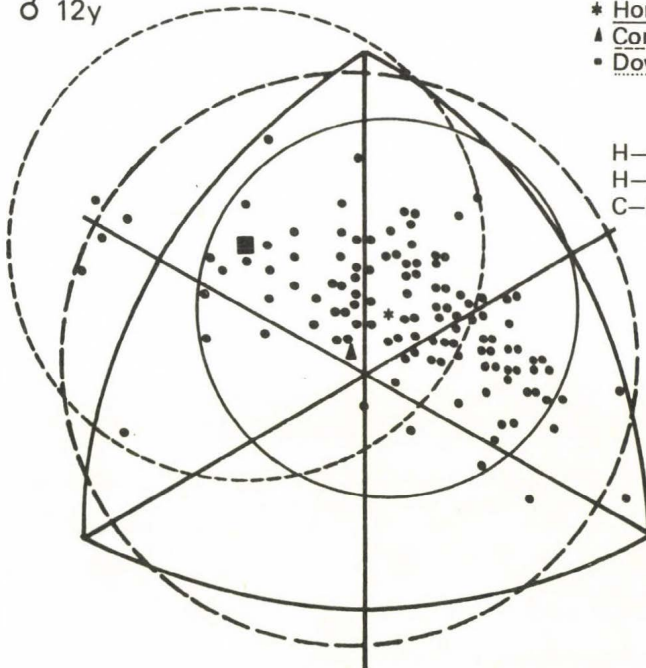


	I.	II.	III.	SDI.
* <u>Homok</u>	2.56	4.15	3.38	3.73
▲ <u>Control</u>	3.35	4.09	3.64	5.15
■ <u>Down</u>	3.30	4.77	2.14	4.06

	SDD	I	T ²
H-C	1.99	47.9	40.82
H-D	2.62	40.5	51.81
C-D	1.73	55.3	22.99

Fig. 6: Somatochart of the 11 year-old boys

♂ 12y

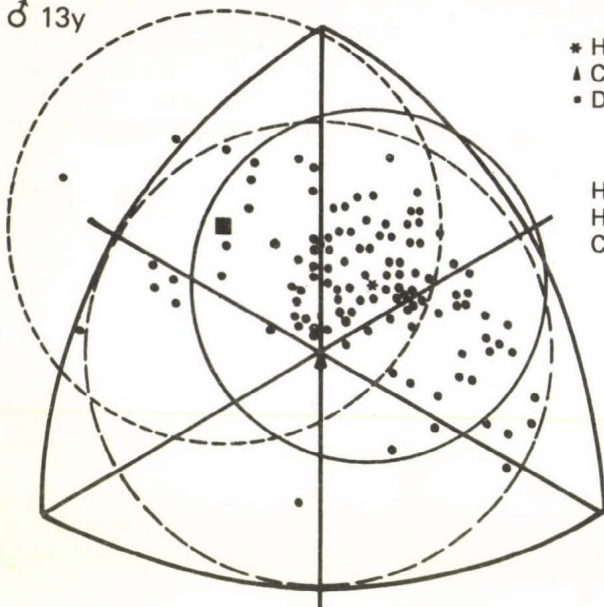


	I.	II.	III.	SDI.
* <u>Homok</u>	2.69	4.19	3.37	4.08
▲ <u>Control</u>	3.64	4.14	3.73	6.19
■ <u>Down</u>	4.27	5.32	1.69	5.03

	SDD	I	T ²
H-C	2.09	43.4	51.66
H-D	4.02	28.6	63.78
C-D	4.76	30.3	38.45

Fig. 7: Somatochart of the 12 year-old boys

♂ 13y



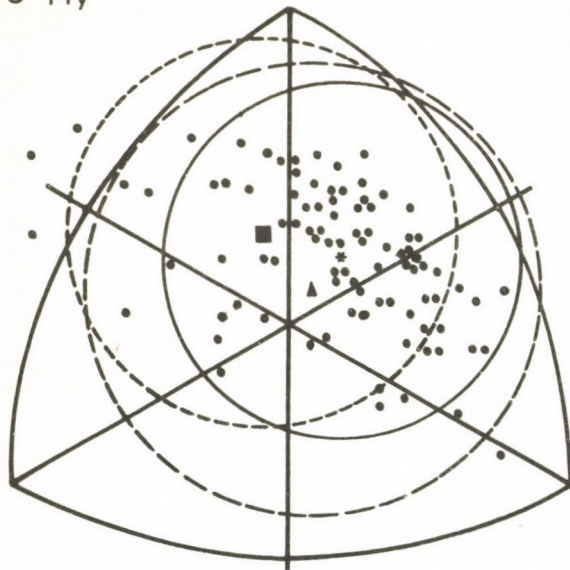
* Homok
▲ Control
■ Down

I.	II.	III.	SDI.
2.57-4.29	3.36	3.66	
3.65-3.91	3.97	5.09	
3.93-5.28	1.92	4.61	

	SDD	I	T ²
H-C	2.81	38.2	85.18
H-D	3.48	30.3	74.78
C-D	5.20	21.2	42.65

Fig. 8: Somatochart of the 13 year-old boys

♂ 14y



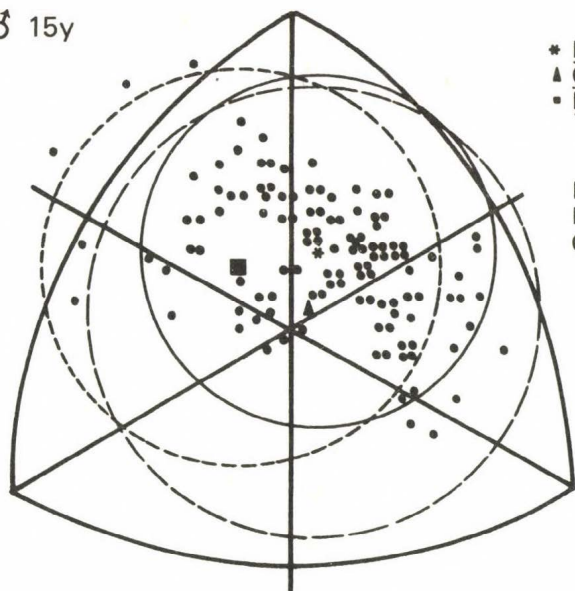
* Homok
▲ Control
■ Down

I.	II.	III.	SDI.
2.52-4.27	3.23	3.90	
3.16-4.04	3.69	4.97	
3.23-4.59	2.66	4.08	

	SDD	I	T ²
H-C	1.56	56.9	21.92
H-D	1.50	61.3	16.40
C-D	2.37	48.1	8.91

Fig. 9: Somatochart of the 14 year-old boys

♂ 15y

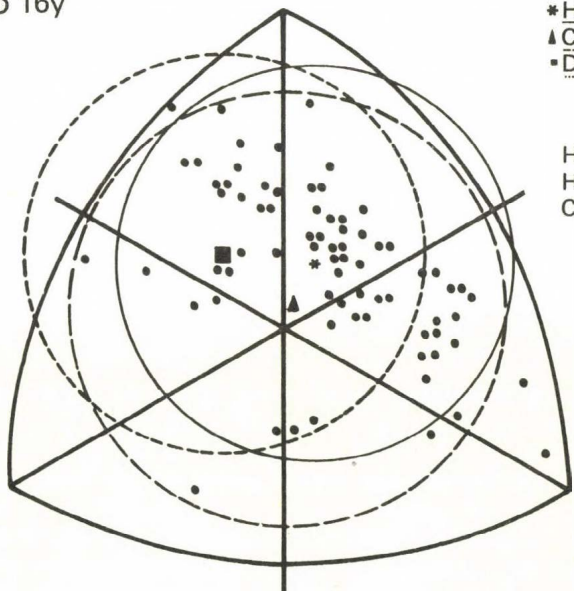


	I.	II.	III.	SDI.
* Homok	2.52	4.23	3.16	3.83
▲ Control	3.25	3.80	3.65	4.83
■ Down	3.59	4.27	2.44	4.14

	SDD	I	T ²
H-C	2.07	49.9	32.83
H-D	1.79	55.3	45.70
C-D	2.38	48.5	16.06

Fig. 10: Somatochart of the 15 year-old boys

♂ 16y



	I.	II.	III.	SDI.
* Homok	2.64	4.19	3.59	4.22
▲ Control	3.42	3.78	3.34	4.53
■ Down	3.75	4.40	2.37	4.28

	SDD	I	T ²
H-C	1.72	59.6	20.79
H-D	1.90	55.9	27.36
C-D	2.26	51.0	7.99

Fig. 11: Somatochart of the 16 year-old boys

	I.	II.	III.	SDI
* Homok	2.59	4.22	3.66	0.33
▲ Control	3.29	4.00	3.65	0.58
▪ Down	3.53	4.82	2.15	1.32

	SDD	I	T ²
H-C	1.49	0.00	24.20
H-D	2.69	0.00	28.04
C-D	3.52	0.00	18.67

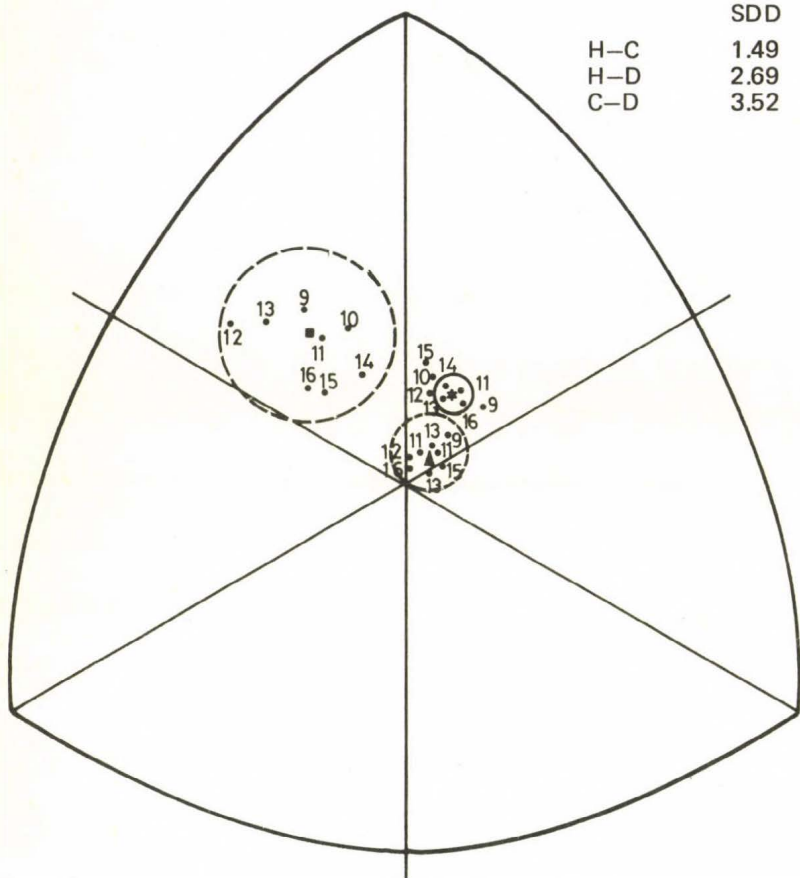


Fig. 12: A comparison of mean somatotypes of the three groups

The somatotype of our patients was evaluated by the Heath-Carter anthropometric technique. The mean somatotypes and the somatotype dispersion index (SDI) of children aged from 9 to 16 years will be shown in the next 8 figures. We have no room here to analyze these figures in detail. The circles, determined by the mean somatoplots and with the SDI as radius, overlap each other. The common field is shown by the I-index. The longest radius usually belongs to the group of Down's syndrome which means that bigger differences occur between individual somatotypes and therefore they have a higher heterogeneity than normal. Frequently the control's SDIs are bigger than the group of mentally retarded ones.

The differences between the samples were tested by Hotelling T² method. The degree of freedom of denominator of the corresponding F test was more than 50. The critical

value at 0.01 probability level was less than 5.06. Accordingly we found significant differences between the free samples in all of the age groups (Figures 4–12).

Analyzing these figures the coordinates of the mean somatoplots seemed to be close to each other. So they were plotted from 9 to 16 year old as an individual somatoplots (Fig.12). The mean somatotypes of these groups and the SDI were also computed.

The previously mentioned age range is the pubertal period. The mentally retarded adolescents are in the ecto-mesomorph area, the controls are in the central, and the adolescents with Down's syndrome are far in the endo-mesomorph area. In the adult patients of the last group the extreme value of the meso-endomorph is characteristic (Buday and Eiben 1982). All the three adolescent groups are isolated from each other; they have no common fields. Moreover the small annual changes of the mean somatoplots in that period are also quite remarkable.

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Mailing address: Dr. Buday József
Gyógypedagógiai Tanárképző Főiskola
Bethlen tér 2. H–1071 Budapest, Hungary

