

SOCIOECONOMIC DIFFERENCES IN HEAD MEASUREMENTS IN HUNGARIAN UNIVERSITY STUDENTS

G. Gyenis and K. N. Gonda

Department of Physical Anthropology, Eötvös Loránd University, Budapest, Hungary

Abstract: Four head measurements (head length, head breadth, morphological facial height and bizygomatic breadth) as well as two indices (cephalic and morphological facial index) were analysed in a sample of 6894 male and 1386 female university students who were measured between 1976–1985 at the Polyclinic of the Technical University, Budapest. Differences were found in the data according to the place of birth and according to the educational level of the parents of the students, too.

Key words: Hungarian university students; Socioeconomic factors; Head measurements

Introduction

The effects of the socioeconomic factors to the body measurements is a well-known phenomenon all over the world. However, concerning the effects of these factors to the head measurements there is much less data in the literature. Some authors found relationship between the head form and climate (Beals 1972) or with the inbreeding (Schwidetzky 1973) or with the urbanisation (Pálsson – Schwidetzky 1973) which shows that several factors may influence the head measurements.

The aim of this paper is to provide some data about the connection of the head measurements and two socioeconomic factors.

Material and Methods

First year students from ten successive classes were investigated between 1976–1985 at the Polyclinic of the Technical University Budapest (6894 male, 20 year old, and 1386 female, 19 year old). Head length, head breadth, morphological facial height and bizygomatic breadth were measured and two indices, the cephalic and the morphological facial index were calculated. Among the several socioeconomic factors only the birth place of the students and the educational level of their fathers were taken into consideration.

According to their birth-place the sample was divided into two groups: born in Budapest and born out of Budapest. According to the educational level of their fathers the sample was divided into three groups: 1. fathers with elementary schooling; 2. fathers with secondary schooling; 3. fathers graduated in college or university.

The measurements were taken by Martin's technique (Martin–Saller 1957) and the statistical analysis of the subgroups was made by Students's test, variance analysis and chi-squared test.

Results

Corresponding to the sexual dimorphism, the measurements of the male students are with 7–9 mm larger, than that of the female students (*Table 1*). At the same time we found no differences in the classes of Lebzelter and Saller classifications between the two sexes except of the bizygomatic breadth, where the males belong to the medium broad, while the females belong to the broad category.

According to the *birth place of the students* the values of the breadth measurements are higher among the students born out of Budapest, while the values of the head length and the morphological facial height are higher among the students born in Budapest. Therefore the values of the cephalic index are also higher among the students born out of Budapest, and their face are wider, than the face of the students born in Budapest. The majority of the differences is significant (*Table 2*).

The distribution of the categories of the *cephalic index* in the students according to their place of birth shows significant differences between the two subgroups in both sexes. It is caused by the different frequencies of the brachycephaly, which is much more higher among the students born out of Budapest, than among the students born in Budapest. All the differences are significant (*Table 3*).

The distribution of the categories of the *morphological facial index* of the students shows that the frequency of leptoprosopy is higher among the students born in Budapest, than those of the students born out of Budapest both in male and female students and the differences are significant (*Table 4*).

According to the *educational level of the fathers of the students* the lower the educational level of the fathers the smaller the values of the head length, morphological facial height, and morphological facial index; in the case of head breadth, bizygomatic breadth and cephalic index can be seen the opposite tendency. The differences are significant (*Table 5*).

The distribution of the categories of *cephalic index* of the students shows that the higher the educational level of the fathers the higher the frequency of dolichocephaly, and the lower is the frequency of brachycephaly. The students with fathers of lower educational level show the opposite tendency (*Table 6*).

The distribution of the categories of *morphological facial index* is also similar to the distribution of the cephalic index. The higher the educational level of the fathers the larger the frequency of leptoprosopy and the lower the frequency of euryprosopy. The differences are significant (*Table 7*).

Table 1. Data of head measurements and indices in Hungarian female (n = 1386) and male (n = 6894) university students investigated between 1976–1985

Measurements and indices	Female students			Male students		
	Means	SD	Categories*	Mean	SD	Categories*
Head length	181.29	6.37	long	190.57	6.63	long
Head breadth	151.74	5.46	broad	158.67	5.99	broad
Bizygomatic breadth	135.50	4.80	broad	142.94	5.07	medium broad
Morphological facial height	112.76	5.75	medium high	121.05	6.39	medium high
Cephalic index	83.81	4.32	brachycephalic	83.34	4.18	brachycephalic
Morphological facial index	83.28	4.57	mesoprosopic	84.74	4.83	mesoprosopic

*According to Lebzelter and Saller

Table 2. Head length (M.1), head breadth (M.3), bizygomatic diameter (M.6), morphological facial height (M.18), cephalic index (M.3:1) and morphological facial index (M.18:6) of the 19 year old female and the 20 year old male university students investigated between 1976–1985 according to their place of birth

Martin's No.	Female students						Male students				
	Born in Budapest (n = 645)			Born out of Budapest (n = 741)			Born in Budapest (n = 2749)		P	Born out of Budapest (n = 4145)	
	M	SD	P	M	SD	M	SD	M		SD	
M.1	182.04	6.73	+	180.59	5.98	191.65	6.88	+	189.87	6.35	
M.3	150.28	5.44	+	153.01	5.15	157.04	6.06	+	159.77	5.67	
M.6	134.63	4.80	+	136.28	4.66	142.18	5.05	+	143.48	5.03	
M.18	112.90	5.70		112.62	5.78	121.39	6.36	+	120.85	6.40	
M.3:1	82.67	4.46	+	84.82	3.94	82.04	4.32	+	84.21	3.85	
M.18:6	83.92	4.40	+	82.70	4.62	85.44	4.82	+	84.28	4.78	

*Significant at the P < .001 level of probability

Table 3. The frequency of the categories of the cephalic index in the 19 year old female and 20 year old male university students investigated between 1976–1985 according to their place of birth

Categories of the cephalic index	Female students						Male students					
	Born in Budapest ¹		Born out of Budapest ²		Altogether		Born in Budapest ¹		Born out of Budapest ²		Altogether	
	n	%	n	%	n	%	n	%	n	%	n	%
Dolichocephalic	66	10.2	17	2.3	83	6.0	210	7.6	73	1.8	283	4.1
Mesocephalic	230	35.7	159	21.5	389	28.1	955	34.7	747	18.0	1702	24.7
Brachycephalic	349	54.1	565	76.2	914	66.0	1584	57.6	3325	80.2	4909	71.2
Total	645	100.0	741	100.0	1386	100.1	2749	99.9	4145	100.0	6894	100.0

1, 2 Differences between the birth-places are significant at the $P < .001$ level of probability *in all cases*

Table 4. The frequency of the categories of the morphological facial index in the 19 year old female and 20 year old male university students investigated between 1976–1985 according to their place of birth

Categories of the morphological facial index	Female students						Male students					
	Born in Budapest ¹		Born out of Budapest ²		Altogether		Born in Budapest ¹		Born out of Budapest ²		Altogether	
	n	%	n	%	n	%	n	%	n	%	n	%
Euryprosop	159	24.6	261	35.3	420	30.3	1074	39.1	1975	47.7	3049	44.3
Mesoprosop	232	36.0	262	35.4	494	35.6	836	30.4	1267	30.6	2103	30.5
Leptoprosop	254	39.4	218	29.4	472	34.0	839	30.5	903	21.7	1742	25.3
Total	645	100.0	741	100.1	1386	99.9	2749	100.0	4145	100.0	6894	100.1

1, 2 Differences between the birth-places are significant at the $P < .001$ level of probability *in all cases*

Table 5. Head length (M.1), head breadth (M.3), bizygomatic diameter (M.6), morphological facial height (M.18), cephalic index (M.3:1) and morphological facial index (M.18:6) of the 19 year old female and the 20 year old male university students investigated between 1976–1985 according to the educational level of their fathers

Martin's No.	Female students									Male students					
	Elementary ¹ (n = 303)		Secondary ² (n = 317)		Coll./Uni. ³ (n = 742)			Elementary ¹ (n = 2103)		Secondary ² (n = 1711)		Coll./Uni. ³ (n = 3027)		P	
	M	SD	M	SD	M	SD	P	M	SD	M	SD	M	SD		
M.1	180.06	5.89	181.19	5.96	181.90	6.64	+	189.47	6.33	190.55	6.34	191.43	6.87	+	
M.3	153.53	4.98	151.96	4.97	150.97	5.68	+	160.19	5.73	159.01	5.79	157.47	6.01	+	
M.6	136.77	4.85	135.62	4.50	134.95	4.81	+	143.85	5.10	143.11	4.95	142.28	5.03	+	
M.18	111.90	5.77	113.19	5.76	113.02	5.66	+	120.45	6.39	121.33	6.29	121.41	6.40	+	
M.3:1	85.35	3.83	83.97	4.02	83.11	4.48	+	84.63	3.72	83.54	4.03	82.37	4.30	+	
M.18:6	81.88	4.47	83.52	4.55	83.82	4.47	+	83.80	4.80	84.85	4.70	85.40	4.81	+	

1, 2, 3 Differences according to educational level of the fathers are significant at the $P < .001$ level of probability

Table 6. The frequency of the categories of the cephalic index in the 19 year old female and 20 year old male university students investigated between 1976–1985 according to the educational level of their fathers

Categories of the cephalic index	Female students								Male students							
	Elementary ¹		Secondary ²		Coll./Unl. ³		Altogether		Elementary ¹		Secondary ²		Coll./Unl. ³		Altogether	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Dolichocephalic	7	2.3	11	3.5	64	8.6	82	6.0	31	1.5	57	3.3	194	6.4	282	4.1
Mesocephalic	49	16.1	97	30.6	241	32.3	387	28.3	316	15.0	397	23.1	985	32.4	1698	24.7
Brachycephalic	248	81.6	209	66.0	440	59.0	897	65.6	1761	83.5	1261	73.4	1860	61.1	4882	77.1
Total	304	100.0	317	100.1	745	99.9	1366	99.9	2108	100.0	1715	99.8	3039	99.9	6862	99.9

1, 2, 3 Differences according to educational level of the fathers are significant at the $P < .001$ level of probability

Table 7. The frequency of the categories of the morphological facial index in the 19 year old female and 20 year old male university students investigated between 1976–1985 according to the educational level of their fathers

Categories of the morphological facial index	Female students								Male students							
	Elementary ¹		Secondary ²		Coll./Uni. ³		Altogether		Elementary ¹		Secondary ²		Coll./Uni. ³		Altogether	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Euryprosop	137	45.1	87	27.4	184	24.7	408	29.9	1085	51.5	758	44.2	1185	39.0	3028	44.1
Mesoprosop	90	29.6	114	36.0	283	38.0	487	35.7	604	28.7	530	30.9	959	31.6	2093	30.5
Leptoprosop	77	25.3	116	36.5	278	37.3	471	34.5	419	19.8	427	24.9	895	29.5	1741	25.3
Total	304	100.0	317	99.9	745	100.0	1366	100.1	2108	100.0	1715	100.0	3039	100.1	6862	99.9

1, 2, 3 Differences according to educational level of the fathers are significant at the $P < .001$ level of probability

Discussion

Our data show characteristic differences in the head measurements of the Hungarian university students according to the investigated two socioeconomic factors. The head and face of the students born in Budapest or having father with higher educational level are longer, respectively higher and narrower, than those of the students born out of Budapest or having father with elementary or secondary schooling. The majority of these differences are significant.

The question is the reason of these differences. Our opinion is that these phenomena are caused by multiple, but intercorrelated factors, which contain not only biological, but selective cultural factors, too.

*

Paper presented at the Fifth International Symposium of Human Biology, Keszthely, Hungary, June 1991; Received 26 July, 1991.

References

- Baels KL (1972) Head form and climatic stress. — *Am. J. Phys. Anthropol.*, 87; 85—92.
Martin R & Saller K (1957) *Lehrbuch der Anthropologie*, Bd. I. — Fischer Verlag, Stuttgart.
Pálsson J, Schwidetzky I (1973) Stadt- und Landbevölkerung in Island nach anthropologischen Merkmalen. — *Homo*, 24; 154—162.
Schwidetzky I (1973) Endogamie und anthropologische Differenzierung auf den Kanarischen Inseln. — *Z. Morph. Anthropol.*, 65; 1—13.

Mailing address: Dr Gyenis Gyula
ELTE Embertani Tanszék
H-1088 Budapest Puskin utca 3.
Hungary