

HEAD AND FACE MEASUREMENTS IN CHILDREN LIVING IN THREE MAIN REGIONS OF SZABOLCS-SZATMÁR COUNTY: RÉTKÖZ, NYÍRSÉG AND SZATMÁR-BEREG PLAIN

K. Nyilas

Department of Zoology, "Bessenyei György Teachers" College, Nyíregyháza, Hungary

Abstract: The author carried out a cross-sectional growth study in children of three geographical units of Szabolcs-Szatmár County (North-East Hungary): Rétköz, Nyírség, Szatmár-Bereg Plain. Samples (N = 12 000) were chosen in the general schools and studied by Martin's anthropometric technique. The aim of this paper is to demonstrate the relative importance of different children's head size and to make a comparison between the three regions visited as well as with other Hungarian data.

Key words: Head length, Head breadth, Bizygomatic Diameter, Morphological Face Height.

Introduction

In Hungarian literature of anthropology we can often find publications dealing with the body-growth of children, but data on head measurements of children can only be rarely found. In the last decades Rajkai (1967), Eiben (1967), Dezső (1967), Eiben–Pantó (1984), Nyilas (1980, 1982) have been extensively studied the head dimensions of children in a few region of Hungary, but there was no publication concerning the data of Szabolcs-Szatmár county.

This paper presents anthropological examinations in three regions of Hungary: Rétköz, Nyírség, and Szatmár-Bereg plain).

Material and Method

The anthropological examinations were carried out between 1976–1979 in Rétköz and 1980–1982 in Nyírség, Szatmár-Bereg plain taking the head and face measurements of children living in this area. The studies basically were conducted by the methods of Martin–Saller (1957–1966) taking into consideration of the IPB and the Hungarian researcher's recommendations (Farkas, 1973). The age of pupils has been determined by decimal table forming half a year age groups. The computer derived data were calculated in the Laboratory of Cybernetics of József Attila University, Szeged.

The examinations are represented by the analysis of mean-values of the county. The differences between geographical regions are noted in the text.

Results

The distribution of the samples investigated according to age groups, sex, and geographic regions are presented in Table 1. Mean-values of different measurements (Table 2–5) prove to be increasing, but as a consequence of the special character of cross-sectional examinations there are some age-groups with a little decreasing mean-values comparing to the previous ones. In some cases the negative difference can be taken into contact with the decrease of elements in the sample, but in another case the smaller average cannot be explained in this way. It is a fact that negative difference can almost always be found for small number of cases.

This results can be interpreted by two reasons: 1. Character of cross-sectional examinations; 2. The growth-rate/dynamism of two age-groups are different.

The *head length* (g-op) in boys proves to grow up 9.83 mm and in girls 6.29 mm for nine years of age-period investigated. The intensity of growth is characterized by the fact that the changes of age-groups are hardly 2 mm higher for half a year.

Table 1. Distribution of Szabolcs-Szatmár boys and girls according to geographical regions, sex, and age

Age (year)	Rétköz		Nyírség		Szatmár-Bereg Plain		Szabolcs-Szatmár County together	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
6	12	13	15	11	9	6	36	30
6.5	81	65	60	63	66	38	207	166
7	203	183	106	86	66	69	375	338
7.5	167	157	94	67	89	85	350	309
8	186	214	102	126	85	92	373	432
8.5	167	170	102	92	85	83	354	345
9	179	181	82	89	79	87	340	357
9.5	146	187	72	75	84	95	302	357
10	184	199	83	89	96	85	363	373
10.5	156	189	85	105	94	88	335	382
11	239	246	119	103	89	103	447	452
11.5	174	176	101	103	89	74	364	353
12	219	233	115	121	89	71	423	425
12.5	170	191	128	112	75	95	373	389
13	220	188	101	97	88	82	409	367
13.5	182	175	105	102	77	102	364	379
14	197	213	113	115	98	73	408	401
14.5	111	101	73	61	42	30	226	192
15	27	14	21	7	11	4	59	25
Sum total	3021	3095	1677	1624	1411	1362	6109	6081

The boy's means are always larger than the girl's ones, the differences are between 1.69 and 4.23 mm.

Comparing to Eiben's (1967) data of average zone, neither in girls nor in boys could be seen any differences, the means of both groups suit into average zones. There is no considerable difference between the means and dispersion of the three regions and the means of the county (Table 2).

The *head breadth* (eu-eu) grows 5.64 mm in boys and 9.47 mm in girls. The differences prove to be greater in boys than in girls in all cases of age groups. Comparing the data of both sexes to Eiben's average zones the means approach at the low values. Regional groups have not shown significant differences in head breadth (Table 3).

Bizygomatic width in boys (zy-zy) grows from 120.36 to 129.48 mm. The bizygomatic width in boys are always higher than in girls. Between the means of the two sexes the smallest differences can be found at the age of 12.5–13. The increasing tendency is rather similar in the three geographic regions, the mean value approaches to the averages of Eiben's normal zone (Table 4).

The *morphological face height* (n-gn) have been examined more frequently because of specific characteristic. Between 6 and 15 years of age growth of morphological face height was 16.53 mm in boys and 12.59 mm in girls. The differences between sexes are changing from 1 to 5 mm. Comparing morphological face height of children to the sample of Nyírség and Rétköz they are 1–2 mm lower than in Szatmár (Table 5).

In the majority of cases these means are near to the low value of Eiben's average zones. In some cases negative value of 0.5–1.5 mm can be found which is in connection with the half a year apportionment of age. (Eiben investigated one year age-groups.) Comparing to the possible Hungarian data, there is a significant difference from Rajkai's (1967) longitudinal sample but there is no significant difference from data given by Eiben in Körmend (1967) and Dezső in Budapest (1967).

Table 2. Head length

Age (year)	Rétköz				Nyírség				Szatmár-Bereg Plain				Szabolcs-Szatmár County			
	Boys		Girls		Boys		Girls		Boys		Girls		Boys		Girls	
	\bar{x}	s	\bar{x}	s	\bar{x}	s	\bar{x}	s	\bar{x}	s	\bar{x}	s	\bar{x}	s	\bar{x}	s
6	170.08	7.35	162.38	4.51	169.00	7.98	163.64	5.51	163.78	7.12	167.33	11.50	168.06	7.78	163.83	6.72
6.5	169.68	5.69	166.03	4.67	167.83	6.04	164.32	5.84	167.50	8.21	163.45	7.44	168.45	6.73	164.79	5.90
7	169.49	5.56	166.20	6.12	167.54	5.40	164.06	5.26	170.91	6.86	166.12	6.83	169.19	5.87	165.64	6.12
7.5	170.50	4.84	168.16	5.17	169.59	6.08	166.37	5.69	170.19	5.91	167.59	5.62	170.17	5.47	167.61	5.44
8	170.64	4.98	168.09	5.30	170.58	5.18	166.64	6.02	169.56	6.59	167.43	5.82	170.38	5.44	167.53	5.65
8.5	170.69	5.52	169.95	4.98	168.53	6.15	166.59	6.88	169.46	6.49	167.94	7.98	169.77	6.00	168.08	6.39
9	171.87	5.27	168.76	4.10	170.63	5.54	166.89	5.46	169.24	6.18	168.53	6.03	170.96	5.64	168.24	5.02
9.5	172.58	4.89	169.50	4.83	171.69	5.13	168.77	6.45	171.10	6.88	170.63	6.59	171.96	5.59	169.65	5.72
10	172.97	5.24	170.32	6.42	172.57	6.65	168.15	7.58	171.94	7.21	170.18	7.30	172.60	6.14	169.77	6.96
10.5	173.26	5.39	170.23	5.93	172.86	6.48	169.07	6.18	171.97	6.35	170.15	6.17	172.80	5.96	169.89	6.06
11	173.78	5.69	171.28	5.25	172.48	5.87	169.52	5.72	173.55	6.97	171.84	5.68	173.39	6.02	171.01	5.51
11.5	174.28	5.99	172.91	5.32	174.58	5.91	172.28	5.61	174.56	6.22	172.61	5.55	174.43	6.01	172.66	5.44
12	175.46	4.89	172.74	5.57	175.31	6.17	172.57	5.17	175.70	6.69	173.18	7.25	175.47	5.66	172.77	5.77
12.5	175.29	5.85	173.39	4.94	175.23	6.68	173.02	5.74	174.88	7.18	172.27	5.90	175.19	6.41	173.02	5.41
13	175.75	5.29	173.62	5.79	175.61	6.16	173.55	5.80	174.85	6.20	174.27	6.15	175.52	5.71	173.75	5.87
13.5	176.60	6.24	173.15	6.50	176.16	5.51	174.02	6.65	176.88	6.45	173.57	5.41	176.49	6.07	173.50	6.26
14	177.61	7.20	173.35	6.20	176.98	6.59	173.43	6.29	177.20	6.77	174.07	6.33	177.34	6.92	173.50	6.24
14.5	178.55	5.55	175.04	4.91	178.41	6.43	174.31	6.16	176.67	4.92	173.44	6.10	178.15	5.76	174.56	5.53
15	179.07	3.42	175.21	3.84	177.53	4.61	174.86	4.70	181.00	6.69	175.25	4.50	178.88	4.67	175.12	4.01

Table 3. Head breadth

Age (year)	Rétköz				Nyírség				Szatmár-Bereg Plain				Szabolcs-Szatmár County			
	Boys		Girls		Boys		Girls		Boys		Girls		Boys		Girls	
	\bar{x}	s	\bar{x}	s	\bar{x}	s	\bar{x}	s	\bar{x}	s	\bar{x}	s	\bar{x}	s	\bar{x}	x
6	147.50	7.39	139.54	5.82	147.60	4.27	141.64	4.31	146.00	6.76	141.83	9.45	147.17	5.94	140.77	6.08
6.5	146.93	6.56	143.14	5.16	146.17	6.08	142.32	6.26	147.29	6.21	142.00	4.41	146.82	6.30	142.57	5.44
7	147.25	5.46	142.76	5.31	146.28	5.35	142.43	5.42	145.98	7.26	142.86	6.47	146.75	5.80	142.70	5.58
7.5	148.01	5.25	144.85	5.74	146.84	5.62	143.96	5.68	146.76	5.59	143.55	6.01	147.38	5.46	144.29	5.81
8	148.37	5.01	144.72	5.19	147.25	3.97	143.72	4.82	146.38	5.89	142.50	6.66	147.70	6.24	143.96	5.49
8.5	148.65	6.33	144.81	5.44	147.32	5.62	143.76	5.05	145.47	7.94	142.12	7.82	147.50	6.67	143.88	6.09
9	149.59	5.81	144.90	6.06	147.99	4.62	144.64	3.92	146.30	7.43	144.70	7.28	148.44	6.12	144.79	5.93
9.5	150.01	4.43	146.37	5.01	148.28	6.19	145.73	5.26	149.71	5.69	145.73	5.74	149.52	5.28	146.07	5.26
10	149.88	4.93	145.97	4.96	150.16	6.05	146.57	6.49	149.35	6.48	145.81	6.44	149.80	5.63	146.07	5.70
10.5	149.54	7.00	146.76	6.87	151.08	6.05	145.99	5.49	148.52	7.41	144.82	8.90	149.65	6.94	146.10	7.08
11	150.65	6.45	146.64	5.63	150.92	6.20	146.79	4.90	148.04	9.95	146.48	6.79	150.21	7.29	146.64	5.75
11.5	150.95	5.84	147.87	4.17	151.33	4.90	147.54	5.22	148.02	7.56	146.70	7.29	150.34	6.20	147.53	5.27
12	151.32	5.64	147.64	5.35	151.08	5.75	148.91	5.89	149.94	8.17	144.85	8.92	150.97	6.29	147.53	6.35
12.5	151.99	5.85	148.30	6.37	152.27	5.97	148.63	5.10	150.67	6.27	146.03	7.72	151.82	5.99	147.85	6.47
13	151.35	5.76	147.32	5.17	152.54	5.36	148.57	5.92	150.17	8.67	146.89	7.78	151.39	6.44	147.71	6.05
13.5	151.03	7.20	147.79	7.31	152.17	5.98	149.99	5.38	151.08	7.85	147.71	7.07	151.37	7.02	148.36	6.83
14	152.08	7.20	147.69	6.93	153.22	5.48	149.61	6.20	152.66	6.50	148.00	7.33	152.53	6.60	148.30	6.84
14.5	154.93	4.79	150.16	4.28	154.62	5.30	149.80	4.86	153.31	5.70	150.40	5.39	154.53	5.15	150.08	4.63
15	153.22	4.32	151.64	3.71	151.57	5.73	147.71	5.82	154.18	4.28	146.00	6.68	152.81	4.88	149.64	5.21

Table 4. Bizygomatic diameter

Age (year)	Rétköz				Nyírség				Szatmár-Bereg Plain				Szabolcs-Szatmár County			
	Boys		Girls		Boys		Girls		Boys		Girls		Boys		Girls	
	\bar{x}	s	\bar{x}	s	\bar{x}	s	\bar{x}	s	\bar{x}	s	\bar{x}	s	\bar{x}	s	\bar{x}	x
6	118.67	6.59	113.92	5.57	120.53	5.85	115.55	5.62	122.33	4.06	120.67	7.36	120.36	5.75	115.87	6.29
6.5	120.86	7.18	118.74	5.16	120.35	6.12	117.52	7.96	122.26	7.30	116.87	5.18	121.16	6.94	117.85	6.38
7	121.91	4.87	118.07	4.84	121.34	5.33	117.65	6.23	121.71	7.12	120.13	6.48	121.71	5.45	118.38	5.63
7.5	121.57	4.96	119.72	5.07	121.82	6.18	119.78	6.04	122.37	5.56	120.12	5.76	121.84	5.45	119.84	5.77
8	122.32	5.38	120.10	5.60	123.84	4.88	120.45	6.03	122.28	6.20	119.30	6.90	122.73	5.48	120.03	6.02
8.5	123.05	6.59	121.27	5.99	122.90	6.14	120.84	5.52	121.90	7.57	120.80	6.65	122.73	6.71	121.04	6.03
9	123.54	6.34	121.76	5.20	123.40	5.22	122.06	4.46	123.23	7.79	121.72	6.15	123.43	6.45	121.83	5.27
9.5	124.05	5.31	123.06	4.74	123.82	6.16	122.97	5.09	125.98	7.00	123.26	6.17	124.53	6.08	123.10	5.21
10	125.15	4.68	123.24	5.04	125.43	7.62	123.53	7.39	124.30	7.35	124.01	6.65	124.99	6.21	123.48	6.04
10.5	125.15	6.50	122.97	6.35	126.45	5.41	123.90	6.13	125.67	6.75	123.14	7.13	125.63	6.32	123.26	6.47
11	125.20	7.11	123.88	6.15	126.61	5.83	125.12	5.15	124.45	9.69	124.66	7.05	125.42	7.42	124.34	6.17
11.5	126.19	6.00	125.66	5.67	128.23	5.34	125.98	6.66	124.96	6.28	125.84	6.49	126.45	6.00	125.79	6.13
12	127.58	5.18	126.08	5.33	128.96	5.91	128.17	6.02	128.18	6.58	125.86	8.00	128.08	5.65	126.64	6.11
12.5	129.43	5.91	127.57	5.91	130.23	5.66	127.97	5.18	129.40	6.97	126.67	7.18	130.04	8.02	127.47	6.06
13	128.51	5.71	127.00	6.02	130.46	5.02	128.63	5.75	127.98	8.37	126.61	6.72	128.88	6.28	127.34	6.15
13.5	129.32	5.99	127.54	7.44	129.41	6.33	129.59	5.90	129.31	7.42	127.04	7.70	129.34	6.39	127.96	7.18
14	129.98	7.88	127.26	7.74	132.42	6.04	130.32	6.61	131.22	7.42	126.51	7.34	130.96	7.36	128.00	7.49
14.5	133.36	5.40	130.32	5.44	134.68	6.99	130.62	5.52	131.36	6.08	130.27	5.88	133.42	6.16	130.41	5.51
15	134.11	6.50	129.93	5.73	133.33	6.23	129.57	6.45	136.36	5.71	127.75	7.84	134.25	6.25	129.48	6.04

Table 5. Morphological face height

Age (year)	Rétköz				Nyírség				Szatmár-Bereg Plain				Szabolcs-Szatmár County			
	Boys		Girls		Boys		Girls		Boys		Girls		Boys		Girls	
	\bar{x}	s	\bar{x}	s	\bar{x}	s	\bar{x}	s	\bar{x}	s	\bar{x}	s	\bar{x}	s	\bar{x}	x
6	97.25	5.15	92.92	6.87	89.80	5.58	88.27	5.62	89.11	8.97	90.50	4.67	92.11	7.27	90.73	6.21
6.5	95.37	8.98	91.52	5.49	91.47	6.80	89.19	7.12	94.19	8.02	89.36	7.35	93.85	8.21	90.15	6.64
7	94.05	5.55	92.29	6.09	91.35	5.58	89.10	5.63	95.19	6.95	91.52	6.71	93.49	5.98	91.32	6.24
7.5	95.64	5.46	94.25	6.15	93.67	5.72	91.19	5.15	94.30	5.58	92.15	6.70	94.77	5.61	93.01	6.23
8	96.71	5.30	93.85	5.53	95.27	5.44	91.65	5.26	96.11	6.40	91.75	6.15	96.18	5.62	92.76	5.68
8.5	98.12	6.53	95.84	6.16	94.65	5.91	92.38	6.01	96.60	7.62	94.18	7.78	96.76	6.78	94.51	6.69
9	99.27	6.10	96.76	5.54	96.15	5.75	93.44	5.61	97.39	6.71	96.09	6.34	98.08	6.29	95.77	5.90
9.5	100.04	6.55	97.96	5.30	96.75	5.74	95.17	6.50	98.19	6.96	97.12	5.91	98.73	6.61	97.15	5.82
10	100.65	5.56	97.88	5.72	99.37	6.35	97.27	6.58	100.02	7.09	96.38	6.91	100.19	6.18	97.39	6.23
10.5	101.31	5.97	98.55	6.36	100.64	5.33	95.92	6.36	99.68	6.92	96.98	7.12	100.68	6.12	97.47	6.62
11	102.00	6.03	100.02	6.72	100.26	6.82	98.57	6.58	102.12	6.67	99.23	7.24	101.56	6.41	99.51	6.82
11.5	102.65	6.24	101.95	5.62	101.13	5.69	100.81	5.91	101.64	6.61	100.78	6.88	101.98	6.21	101.37	6.00
12	103.15	5.99	102.01	5.43	101.97	7.25	102.45	6.35	103.28	6.80	103.38	7.17	102.86	6.53	102.41	6.02
12.5	105.29	5.90	104.28	5.86	104.58	6.95	102.45	6.34	104.07	7.79	103.13	7.35	104.80	6.68	103.49	6.41
13	105.88	5.92	103.50	6.02	105.10	6.90	102.86	6.62	104.92	7.57	104.46	7.72	105.48	6.59	103.54	6.60
13.5	107.55	6.56	105.06	7.07	107.57	6.82	104.21	6.70	106.45	6.83	105.24	5.27	107.32	6.69	104.88	6.52
14	109.05	7.30	105.44	6.46	108.94	6.82	105.00	5.87	106.68	8.20	104.18	7.02	108.45	7.45	105.08	6.40
14.5	109.22	6.24	105.71	4.84	110.05	7.21	106.28	5.67	108.52	6.31	106.90	6.38	109.36	6.57	106.08	5.36
15	109.41	6.52	103.14	7.26	108.10	8.31	102.29	6.07	107.82	5.72	105.75	5.90	108.64	7.00	103.32	6.59

Rajkai (1967) found that based on one year differences mean values increase much more equal than in case of half a year group. We showed similar results in our investigation, however, in most of the cases negative differences are not apparent. It can be demonstrated that among 181 negative difference only 16 are significant the basic of "two-samples Student t-test".

Summary

The author demonstrates four head and face measurements of children between the age of 6–15 years living in three regions of Szabolcs-Szatmár county: Rétköz, Nyírség, and Szatmár-Bereg Plain, 12190 children (6109 boys and 6081 girls). They were examined according to regions and sex, using (applying) half a year age groups. The results of the study prove to be similar to the results of the research carried out in Hungary and they suit the Eiben's mean-zones.

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Mailing address: Dr. Nyilas Károly
Bessenyei György Tanárképző Főiskola
Sóstói út 31/B
H-4400 Nyíregyháza, Hungary

