

ON THE MAIN DIMENSIONS AND CEPHALO-FACIAL CONFORMATIONS OF TEENAGERS FROM THE URBAN AND RURAL AREAS OF IAȘI, AND THEIR TIME-INDUCED MODIFICATIONS

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The material under study is represented by two groups of teenagers, with ages between 11 and 16 years. The former groups, formed of 1,262 persons (598 boys and 664 girls) comes from the city of Iași, while the latter one, of 1,459 youngsters (739 boys and 720 girls), is from the rural area of the Iași district.

Starting from the analysis of the main dimensions and cephalo-facial ratios, the growth rates from one class of age to the other, alongwith the conformational modifications of the cephalic brain pan and of the facial massif, respectively, have been calculated. The observation was therefore made that the growing ratios are distinctly higher for facial sizes, comparatively with the cephalic ones, in both sexes and in both (urban and rural) series, the differences being generally slightly higher in boys than in girls. Equally, sexual and urban-rural differences have been observed in both growing ratios and cephalo-facial dimensions. Generally, the sexual differences are manifested by boys' macrodimensions, comparatively with the girls, while the urban-rural differences are usually in favour of the urban environment, in both boys and girls.

A comparison between the actual results and the ones obtained on two groups of teenagers, of the same origin and of similar ages, investigated in 1985, permitted to evidence the modifications having occurred in time.

The sexual and the ecological differences, as well as those observed from one generation to another, are reduced or even absent – by their relative values – at the level of bodily sizes.

Indeed, from a conformational viewpoint, the cephalic brain pan is brachi-cephalic, its values ranging from the inferior limit up to the superior limit of the category, while the facial massif is mesoprosop, with values ranging from the mesoprosop and euriprosop categories, up to between the mesoprosop and leptoprosop categories, respectively.

Key words: Anthropologic; Dimensions; Conformation; Modification.

INTRODUCTION

On the one hand, the present study enriches the existing works on the growth and development of the teen-agers from the urban and rural medium of Iași with a new aspect – the one devoted to the cephalo-facial segment – and, on the other, it resumes the investigation of this aspect from the 7–10 year up to the 11–16 year categories of age.

MATERIALS AND METHOD

The working material is formed of two groups of youngsters with ages between 11 and 16 years, coming from two different ecological environments, as follows: a first group, including 1,262 teenagers (598 boys and 664 girls) from the city of Iași, and a second one, of 1,459 persons (739 boys and 720 girls), coming from some rural communities in the vicinity of the city.

The investigation method applied was the transversal one. The urban group was analyzed between 1998–1999, while the rural one, along the year 2003.

For each subject, the cephalic and facial total indices have been calculated on the basis of absolute data, which were followed by the calculation of the average values and of standard deviation, for both absolute and relative dimensions, for each sex and each class of age.

However, the present study is not limited to the analysis of the data obtained from the groups of actual youngsters, being extended, as well, to the teenagers groups investigated – by the same authors – in the year 1985. In this respect, mention should be here made of the fact that the results recorded in 1985 have been never published up to now.

RESULTS AND DISCUSSION

If first considering the **cephalic** segment, it is seen as increasing slightly, from one class of age to another, in both its length and width. The average growing increase, recorded from 11 to 16 years, is slightly higher in boys *versus* the girls, in both urban and rural media. The differences observed between the average growing increase between the urban and the rural series are negligible, varying between 0.03 (the difference in the length of the brain pan in favour of the girls from the urban series) and 1.66 mm, respectively (the difference – again in the brain pan's length – in favour of the boys from the rural medium).

One should nevertheless observe that, comparatively with the 7-10 year stage, the average growing increase of the cephalic brain pan is, generally, slightly higher (Cristescu M. *et al.* 1976: 26; Știrbu M. *et al.* 2006).

In the actual series, the values of the average growing increase, for all the 6 classes of age, are more reduced than in the 1985 series, the most significant differences being recorded in the boys of the urban medium (Tables 1–2). In both its length and width, the cephalic brain pan is slightly macro-sized in boys, comparatively with girls, both in the urban and the rural groups, as well as both in the actual and the 1985 series, the situation underlining too of the speciality literature (Glavce C. 1985: 28-29; Glavce C. *et al.* 1988: 56-57; Țarcă A. *et al.* 1988: 24). The sexual differences are slightly more obvious in the urban group, comparatively with the rural one, and also larger in the present group *versus* the 1985 one – especially in the youngsters coming from the rural medium (Tables 1–4).

As to the urban-rural differences, they appear – in both the present and in the past group – in favour of the urban series, the differentiations being higher in boys than in girls. More than that, mention should be made of the fact that the urban-rural differences are higher in the boys of the 1985 group, comparatively with the actual one while, in

the case of girls, the differences are either negligible (14.49 in the present series *versus* 15.27 mm in the past one, for g-op), or slightly higher in the present group (13.17 *versus* 10.30 mm for eu-eu).

The cephalic brain pan is longer in the actual series than in the one of 1985, with the exception of the 16 year old boys of the urban medium, yet narrower – with the exception of the boys of the rural medium and of the 11 and 13 year classes of age, in boys, and of the 13 year class, in girls, respectively, of the urban medium.

Actually, the differences between the two sexes, between the urban and the rural series and, finally, between the actual and the past ones are illustrated, as well, by the distribution of the average values on the adults' classical scale, with the observation that the differences are more pronounced for the antero-posterior diameter than for the transversal one (Table 5).

Indeed, by the average values of its antero-posterior diameter, the cephalic brain pan ranks, in the boys of the actual urban series, within the limits of the medium category, up to the age of 13, after which it is shifted to the long category, while the colleagues of the 1985 generation show a long brain pan only at ages of 15 and 16 years.

In the girls of the actual series, the brain pan is average in length only at the age of 11 while, in those of the 1985 series, at 11 and 12 years, after which it comes to belong to the category: long.

In the actual group of the rural medium, the length of boys' brain pan ranks it in the average category, for all ages while, in the 1985 series, in the category: short, for ages of 11 and 12 years, after which it enters the average category.

In the case of girls, the brain pan has an average length in the first three classes of age, after which it enters the category: long, for the actual series and, respectively, average – at ages between 11 and 14 years, and long, at 15 and 16 years, for the 1985 series.

If considering the width of the brain pan, no sexual differences were recorded in the actual group of the urban series, it belonging to the average category, for both sexes and for all groups of age. In the 1985 group, the brain pan has an average width, with the exception of the 16 year old boys and 15 and 16 year old girls, whose brain pan is large. In the rural – both actual and past – groups, the brain pan has an average width, with the exception of the 11 and 12 years old boys, the brain pan of whose is narrow.

The ratio between the length and width of the brain pan, expressed by the cephalic index, shows that, according to its conformation, it is brachicephalic in both boys and girls, in both the actual and the past series.

Mention should be nevertheless made of the fact that, generally, the values of the cephalic index are larger in the 1985 series, comparatively with the actual ones. More than that, in the actual group, in the 13 year old girls of the Iași city and in the 15 year old ones of the rural zones, the cephalic index records values ranging between the upper limit of the mesocephalic category and the inferior limit of the brachi-cephalic category.

The **facial** sizes increase at more than double ratios, comparatively with the cephalic ones. A more important increase of the size comparatively with the sizes of the skull has been evidenced not only by the authors but also by the literature of the field (Glavce C. 1985: 28; Glavce C. *et al.* 1990: 14; Meredith H. 1960: 133-135; Știrbu M. *et al.* 2006). Indeed, the average growth increase between 11 and 16 years is of 12.31 mm for the height of the face and of 13.41mm for the width of the face in the boys of the urban medium, and of 11.56 and 12.40 mm, respectively, in those of the rural one. In the series of girls, the average growth increase for all the six groups of age is more reduced than in the case of boys, although both parameters grow at practically equal ratios between 11 and 16 years (*i.e.*, with 7.12 – the height of the face and 7.27 mm – width of the face, in the girls of the Iași city and, respectively, with 8.29 and 8.41 mm, in the girls of the rural series).

One may therefore observe from here that, while, in boys, the growth increase is slightly higher in the urban series, comparatively with the rural one, the situation is reverse in the case of girls.

Generally, the average growth increase, between 11 and 16 years, of the two facial dimensions, is slightly higher in the actual series, comparatively with the past ones, with the exception of the girls from the urban group, in whom the growth increase for the height of the face is double in the actual series, comparatively with the past one (7.12 *versus* 3.27 mm).

Both the height and the width of face record average values, on classes of age, which are higher in boys than in girls, both in the urban and in the rural series, in both the present and the past ones. Nevertheless, if, in the actual series, sexual dimorphism is manifested at practically equal intensities in the two ecological media, in the past ones, it had been more intense in the teen-agers of

the urban series than in those of the rural one (Tables 1-4).

As to the urban-rural differences, in the actual series, all of them recorded both in boys and in girls, for all classes of age, are in favour of the teen-agers from the urban medium, appearing higher for height than for the width of the face. In the series investigated in 1985, the urban-rural differences are much more reduced, with the exception of face's width, in the case of boys. More than that, if this parameter is larger in the urban series, comparatively with the rural one - for all classes of age -, the height of the face is practically the same for the 15 and 16 year old boys and 13 and 14 year old girls. Moreover, the face of the 15 and 16 year old girls from the rural medium is even higher than that of their colleagues from the urban batch. Mention should be also made of the fact that the differences recorded in the width of the face are double in boys *versus* girls, at the level of all the 6 classes of age under analysis. Nevertheless, comparatively with the actual series, the differences observed in the 1985 ones are higher in boys and lower in girls.

In both the boys and girls of the urban group, the face is higher in the actual series, comparatively with the 1985 ones, but not larger – in all classes of age. Thus, the 11, 12 and 13 year old boys and the 11 and 13 year old girls of the actual series have a narrower face than those of similar classes of ages, investigated in 1985. In the teen-agers of the rural medium, the girls of the actual series have a lower and narrower face, in all classes of age, than their colleagues of 1985 while, in the case of boys, a similar situation is recorded for the height of the face at 11, 15 and 16 year ages and, respectively, for its width, at 11, 12 and 13 year ages.

Actually, the small dimorphic, urban-rural differences, as well as those between the actual and the past group are also evidenced by the distribution of the average values of the two diameters on the classical scales for adults (Table 5). Indeed, in the actual series, in the boys of the urban group, the height of the face may be considered very low at 11 and 12 years, low at 13 and 14 years and medium at 15 and 16 years while, in the case of girls, it is low at 11 years, after which it becomes medium up to the last class of age taken into study. In the boys of the rural medium, the height of the face is very low in the first three classes of age and low in the last three ones while, in the girls of the same medium, it is very low at 11 years, low at 12 and 13 years and medium in the last three classes of age.

Between the actual and the past series of the urban medium, only one difference may be observed, namely that, in boys, the average height of the face appears only at 16 years. For the rural groups, the differences recorded between the present and the past series refer to the following aspects:

- the 16 year old boys of the 1985 generation have an average type face, if considering its height, and not low, as the ones of 2003;
- in the case of the girls of the 1985 series, the face is low and not very low at 11 years while, at 13 years, it is medium and not low, as in the girls of the 2003 series.

If considering its maximum width, the face at the group actually of the boys from the urban medium is very narrow at 11 and 12 years, narrow at 13 and 14 years and medium at 15 and 16 years, respectively. In the case of girls, it is narrow at 11 years and medium at all the other categories of age.

The present rural series is different from the present urban one, in the case of boys, only at 15 years, when their face is narrow and not medium, and, in the case of girls, at 12 and 13 years, when the face is also narrow and not medium. The differences recorded in time, for both the urban and the rural series, are weak and negligible.

The sexual and ecological differences, on one hand, and the differences recorded in time, on the other, are less striking, when expressed by the conformation of the face, as shown by the values of the total facial index. Indeed, in the actual series of the urban medium, the boys have – in all classes of age – a mesoprosopé-type face, with values attaining the upper limit of the category. In the case of girls, the face is also mesoprosopé and even incipiently leptoprosopé at 13, 15 and 16 years. In the rural series, the face is mesoprosopé in all classes of age, in both boys and girls. The difference between the urban and the rural series lies only in the slightly higher values of the former, comparatively with the latter one.

In the 1985 series, the face is also of the mesoprosopé-type, with the exception of the 11 year old boys of the rural group and of the 12 old year boys of the urban one, showing an euriprosopé type face, as well as of the 12 year old girls of the urban medium and 13 year old ones of the rural group, who have a leptoprosopé-type face.

However, the differences regarding the values of the facial index are generally in favour of the rural series. The differences recorded in time, for boys, with the exception of the 15 and 16 years,

refer to the higher values recorded in the actual series, comparatively with the past ones. In the case of girls, the situation is the same for the urban series, yet not in all classes of age for the ones of the rural medium.

CONCLUSIONS

The above analysis permits the conclusion that, in this stage of age, the average growth increase, at the level of all the six classes of age, is obviously superior for the facial dimensions, comparatively with the cephalic ones, in both the urban and the rural series. Generally, the differences are slightly higher in boys than in girls. If considering the time modifications, mention should be made of the fact that, in the boys of the urban medium, the average growth increase, for all ages, is much more important for the cephalic brain pan in the 1985 series, comparatively with the actual one, while, in the case of the face, the differences are slightly in favour of the actual series. In girls, nevertheless, it is only the height of the face that records a more intense growth in the actual series, comparatively with the one recorded in 1985. In the rural series, the differences of this type are smaller, favourizing, alternatively, either the actual or the past series.

The sexual, ecological and time-induced differences – expressed by the absolute values of the dimensions – higher in boys than in girls, higher in the urban than in the rural series, higher for the length of the cephalic brain pan and height of the face, yet smaller – in some classes of age – for the width of the cephalic brain pan and of the face, in the actual series, *versus* the 1985 ones, are reduced or even disappear through the relative values expressed by the cephalic and total facial indices. Indeed, from a conformational perspective, the cephalic brain pan is brachi-cephalic, recording more or less closer values to the inferior and superior limits of the category, while the face is mesoprosopé, with values ranging from the inferior limit (between the mesoprosopé and euriprosopé categories) up to the superior limit of the category (between the mesoprosopé and leptoprosopé category).

Special mention should be nevertheless made of the fact that some of the time-induced differences, which are not in favour of the actual series – such as, a narrower brain pan or a lower and narrower face – might be explained by the different typological structure of the present generations, comparatively with the past ones.

Table 1

Position and dispersion parameters for some cephalo-facial ratios and sizes in teenagers from the Iași city, investigated between 1998–1999

Age	11 years		12 years		13 years		14 years		15 years		16 years	
Character	Average	δ										
BOYS												
G-op	183.36	6.15	184.02	6.79	185.44	6.74	186.01	6.05	187.17	6.42	188.55	5.96
Eu-eu	150.10	5.23	150.10	6.12	152.92	5.91	153.11	5.53	154.12	5.55	155.32	5.76
Cephalic I.	81.86	3.40	81.56	3.29	82.46	3.42	82.40	3.25	82.34	3.30	82.37	3.38
N-gn	108.81	4.17	109.93	4.95	113.51	4.97	117.17	5.65	119.82	6.21	121.12	6.49
Zy-zy	125.75	3.19	127.19	2.91	131.02	4.18	134.75	6.17	138.62	5.45	139.16	4.62
Facial I.	86.52	4.15	86.42	4.32	86.63	4.15	86.95	4.25	86.43	4.28	87.03	4.00
GIRLS												
G-op	176.87	5.33	179.51	6.18	180.44	5.66	180.32	5.24	180.57	5.61	180.78	5.52
Eu-eu	146.19	5.83	147.21	4.44	147.63	5.00	148.83	5.54	149.18	4.91	148.25	4.85
Cephalic I.	82.65	3.10	82.01	3.25	81.82	3.15	82.54	3.30	82.62	3.18	82.00	3.40
N-gn	106.60	5.30	109.50	2.03	110.68	5.27	111.53	4.64	113.69	4.63	113.72	6.23
Zy-zy	125.45	4.41	128.83	3.14	129.42	4.59	131.93	3.96	132.70	3.94	132.72	4.71
Facial I.	84.97	3.70	84.99	3.48	85.52	3.78	84.53	3.95	85.67	4.15	85.68	4.10

Table 2

Position and dispersion parameters for some cephalo-facial ratios and sizes in teenagers from the Iași city, investigated in 1985

Age	11 years		12 years		13 years		14 years		15 years		16 years	
Character	Average	δ										
BOYS												
G-op	179.40	6.16	181.20	6.68	182.35	6.63	184.51	6.61	187.01	6.95	190.63	6.23
Eu-eu	148.65	5.34	151.00	5.61	152.06	5.96	153.85	5.69	154.75	6.27	157.89	5.91
Cephalic I.	82.95	3.94	83.45	4.32	83.49	4.30	83.46	3.82	82.84	4.20	82.88	3.34
N-gn	108.08	6.00	109.10	5.98	112.43	6.58	113.85	6.83	116.43	6.06	118.40	5.58
Zy-zy	127.35	4.64	130.05	4.63	132.53	5.34	134.63	5.33	137.10	4.93	139.00	6.03
Facial I.	84.86	3.80	83.89	3.92	84.83	3.72	84.56	4.15	84.92	4.20	85.17	4.25
GIRLS												
G-op	175.86	6.20	176.76	6.70	179.83	6.23	179.75	6.16	179.52	6.48	179.80	5.76
Eu-eu	146.82	5.19	146.30	6.03	148.06	6.05	149.75	5.15	150.06	5.48	151.70	4.79
Cephalic I.	83.59	4.01	82.85	4.02	82.47	4.35	83.29	3.64	83.70	4.24	84.44	3.45
N-gn	106.08	4.39	108.25	5.99	108.94	4.92	110.04	5.03	110.01	5.02	109.35	5.25
Zy-zy	126.47	4.44	127.75	5.11	130.62	4.75	132.13	4.53	132.42	4.05	133.31	4.38
Facial I.	83.87	4.12	85.13	4.05	83.40	4.30	83.28	4.25	83.07	4.35	82.02	4.18

Table 3

Position and dispersion parameters for some cephalo-facial ratios and sizes in teenagers from the rural area of the Iaşi district, investigated in 2003

Age	11 years		12 years		13 years		14 years		15 years		16 years	
Character	Average	δ										
BOYS												
G-op	179.00	5.39	180.19	5.05	181.40	6.27	183.45	6.00	183.82	6.03	185.85	5.62
Eu-eu	146.50	4.79	146.96	5.24	148.65	4.79	149.59	4.98	150.40	5.29	151.44	5.10
Cephalic I.	81.83	3.30	81.45	3.31	81.94	3.31	81.52	3.33	81.81	3.24	81.68	3.35
N-gn	104.60	5.69	107.72	5.57	109.34	5.88	112.93	6.14	115.38	6.63	116.16	5.92
Zy-zy	124.10	4.36	126.67	4.82	128.44	5.54	131.18	5.16	133.80	5.74	136.50	4.79
Facial I.	84.31	4.38	84.88	3.95	85.16	4.28	86.11	4.00	86.23	4.43	85.10	4.19
GIRLS												
G-op	174.78	6.03	176.66	5.07	177.26	5.60	178.26	5.53	178.66	5.08	178.38	5.59
Eu-eu	143.59	5.72	144.81	4.36	145.73	4.71	145.97	4.18	146.91	4.45	147.11	5.14
Cephalic I.	82.22	3.39	82.32	3.08	82.21	3.33	82.34	3.34	81.83	3.23	82.50	3.78
N-gn	102.17	5.68	104.96	4.38	107.61	5.43	108.16	5.86	109.11	4.47	110.46	4.88
Zy-zy	122.49	5.18	125.09	4.83	127.35	5.03	129.00	5.04	129.55	4.28	130.90	4.29
Facial I.	83.52	3.83	84.12	3.46	84.55	3.97	84.33	4.45	84.15	4.41	84.41	4.18

Table 4

Position and dispersion parameters for some cephalo-facial ratios and sizes in teenagers from the rural area of the Iaşi district, investigated in 1985

Age	11 years		12 years		13 years		14 years		15 years		16 years	
Character	Average	δ										
BOYS												
G-op	175.61	6.17	176.65	5.11	178.35	5.81	181.25	5.36	182.28	6.54	183.70	6.30
Eu-eu	146.01	4.83	146.65	5.59	148.35	5.24	149.74	6.34	150.30	5.16	151.16	5.12
Cephalic I.	83.23	3.64	83.13	3.58	83.25	3.54	82.68	3.69	82.53	3.43	82.36	3.44
N-gn	105.72	4.78	107.50	4.84	108.44	5.13	112.04	6.12	115.99	6.80	118.50	6.48
Zy-zy	125.11	4.47	127.39	5.76	129.78	5.56	131.26	5.19	132.57	5.49	135.26	5.06
Facial I.	83.85	3.93	84.41	3.98	84.12	3.78	85.70	4.41	87.46	3.65	87.63	4.18
GIRLS												
G-op	173.75	5.04	174.40	5.33	176.03	5.98	175.91	5.99	178.00	6.54	178.16	6.02
Eu-eu	144.41	4.12	146.37	4.93	146.88	5.22	148.03	5.03	148.19	4.92	148.58	4.24
Cephalic I.	83.18	3.22	83.98	3.28	83.50	3.27	84.21	3.26	83.33	3.46	83.46	3.05
N-gn	104.97	5.91	106.20	5.41	109.71	5.92	109.65	5.33	112.40	5.94	112.03	5.57
Zy-zy	124.02	3.81	126.73	4.61	127.87	5.18	130.94	4.49	132.07	4.37	132.62	4.15
Facial I.	83.16	4.31	83.97	4.00	85.67	4.45	83.83	4.55	84.59	5.65	84.57	4.46

Table 5

Distribution – on categories – of the average values of the four cephalo-facial sizes, on classes of age, sex, ecological environment and historical time

Group		URBAN				RURAL			
Series		1985		1998-1999		1985		2003	
Sex		BOYS	GIRLS	BOYS	GIRLS	BOYS	GIRLS	BOYS	GIRLS
Character	Category								
G-op	Short	–	–	–	–	11 and 12 years	–	–	–
	Medium	11–14 years	11 and 12 years	11–13 years	11 years	13–16 years	11–14 years	11–16 years	11–13 years
	Long	15 and 16 years	13–16 years	14–16 years	12–16 years	–	15 and 16 years	–	14–16 years
Eu-eu	Narrow	–	–	–	–	11 and 12 years	–	11 and 12 years	–
	Medium	11–15 years	11–14 years	11–16 years	11–16 years	13–16 years	11–16 years	13–16 years	11–16 years
	Large	16 years	15 and 16 years	–	–	–	–	–	–
N-gn	Very low	11 and 12 years	–	11 and 12 years	–	11–13 years	–	11–13 years	11 years
	Low	13–15 years	11 years	13 and 14 years	11 years	14 and 15 years	11 and 12 years	14–16 years	12 and 13 years
	Medium	16 years	12–16 years	15 and 16 years	12–16 years	16 years	13–16 years	–	14–16 years
Zy-zy	Very narrow	11 years	–	11 and 12 years	–	11 and 12 years	–	11 and 12 years	–
	Narrow	12–14 years	11 and 12 years	13 and 14 years	11 years	13–16 years	11–13 years	13–15 years	11–13 years
	Medium	15 and 16 years	13–16 years	15 and 16 years	12–16 years	–	14–16 years	16 years	14–16 years

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