

Pigmentation of the Skin, Hair and Eyes during the Growth Period between 7 and 13 Years

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The results presented constitute a part of a longitudinal anthropological study on children and adolescents from the city of Sofia. The age-related changes of the pigmentation of the skin, hair and eyes in 7- to-13-year-old children have been traced. During this period children with fair skin, brown and brown-black hair and black-brown eyes are prevalent. During the growth period the changes of the skin, hair and eye pigmentation take place with a varying intensity. The age-related differences are statistically insignificant in all three cephaloscopic features in both sexes. The sexual differences are statistically significant only with respect to the skin and only in the contingent of the 9- to 11-year old children.

Key words: pigmentation, cephaloscopic features, age-related alterations, sexual differences.

Introduction

Pigmentation of the skin, hair and eyes though being genetically predetermined undergoes specific age-related changes in the postnatal period. These basic cephaloscopic features are often included in program of broad anthropological studies since they bring about to the clarification of the anthropological characteristics of a given population [2, 3, 5].

The aim of the present study is to trace the dynamics of age-related changes of the skin, hair and eye pigmentation at the time of growth between the age of 7 to 13 and to look for sexual differences.

Material and Methods

A longitudinal investigation on 109 boys and 121 girls aged between 7 and 13 from three Sofia schools was carried out after the conventional methods [1, 6]. The age-related changes of three main cephaloscopic traits – skin hair and eye colour were followed and analyzed and the sexual differences were looked at. The combinations between the colour of the eyes and hair were explored in the 7- to-13-year-old children. The statistical significance of the age-related and sexual changes in the incidence of each feature separately was checked by the χ^2 -test at $P < 0.005$.

Results and Discussion

The skin colour has been recorded in three categories for the fair skin typical of the European race [6]: fair, light mat and mat. Between the years 7 and 13 in both sexes the fair skin is predominant its incidence being higher for the boys. Second in frequency comes the light mat skin which is higher in girls. During that period the light mat skin is more frequent at the expense of the fair skin whose incidence remains highest in all age groups in both sexes [Table 1]. The skin grows darker more slowly and evenly until the 11th year of age especially with the boys (0.9%). Between the years 11 and 13 this process is more intense especially with the boys (by 6.5 to 11%). At the age of 7 only one boy is with mat skin while in the girls such a case is found at the age of 11 years. The observed age related differences are statistically insignificant ($P > 0.05$). The sexual differences are statistically significant only in the case of the 9- to-11-year-old children ($P < 0.05$) since at that time the skin gets darker more intensively with the girls.

The hair colour is assessed after Fischer-Saller scale which combines the following categories: white-blond, light-blond, blond, dark-blond, brown, brown-black and reddish. Between the years 7 and 11 brown hair is predominant in both sexes, its incidence being higher with the boys. With the 12-13-year-old boys and girls the brown-black hair is dominant with very close incidence rates (Table 2). The changes in the group of the brown and brown-black hair are most intensive throughout the entire period under study. The blond hair incidence is rapidly decreased and as early as the age of 8 until the age of 11 where there is not a single boy found with blond hair. At the age of 13 this hair is only recorded in 0.8% with the girls. The dark-blond hair frequency diminishes more intensively as early as the age of 8 especially in the girls. The darkening of the blond and dark-blond hair leads to augmentation of the frequency of brown hair at this age. In the gap between 8 and 11 years of age the blondest hair undergoes slight changes and at the age of 12-13 years its incidence remains constant. The reddish hair is only found in 1 to 2 children. The age-related and sexual differences observed are statistically insignificant ($P > 0.05$).

The eye colour has been investigated after a 12-step scale incorporating the following groups: black-brown and brown eyes which form the category of the "dark" eyes; brown-green, green-brown and grey-brown forming the category "motley" and

Table 1. Skin colour

Age (years)	Sex	Total	Categories					
			fair		light mat		mat	
			n	%	n	%	n	%
7	♂	109	92	84.4	16	14.7	1	0.9
	♀	121	94	77.7	27	22.3	—	—
8	♂	109	91	83.5	17	15.6	1	0.9
	♀	121	91	75.2	30	24.8	—	—
9	♂	109	90	82.6	18	16.5	1	0.9
	♀	121	84	69.4	37	30.6	—	—
10	♂	109	89	81.7	19	17.4	1	0.9
	♀	121	82	67.8	39	32.2	—	—
11	♂	109	89	81.7	19	17.4	1	0.9
	♀	121	81	66.9	39	32.2	1	0.8
12	♂	109	82	75.2	26	23.9	1	0.9
	♀	121	74	61.2	46	38	1	0.8
13	♂	109	70	64.2	38	34.9	1	0.9
	♀	121	70	57.9	50	41.3	1	0.8

Table 2. Hair colour

Age (years)	Sex	Total	Categories									
			blond		dark blond		brown		brown-black		reddish	
			n	%	n	%	n	%	n	%	n	%
7	♂	109	5	4.6	16	14.7	60	55.0	26	23.9	2	1.8
	♀	121	9	7.4	17	14.0	57	47.1	37	30.6	1	0.8
8	♂	109	2	1.8	12	11.0	63	57.8	30	27.5	2	1.8
	♀	121	6	5.0	10	8.3	64	52.9	40	33.1	1	0.8
9	♂	109	2	1.8	12	11.0	62	56.9	32	29.4	1	0.9
	♀	121	5	4.1	9	7.4	61	50.4	45	37.2	1	0.8
10	♂	109	1	0.9	11	10.1	55	50.5	41	37.6	1	0.9
	♀	121	3	2.5	8	6.6	58	47.9	51	42.1	1	0.8
11	♂	109	–	–	10	9.2	54	49.5	44	40.4	1	0.9
	♀	121	2	1.7	8	6.6	56	46.3	54	44.6	1	0.8
12	♂	109	–	–	8	7.3	45	41.3	56	51.4	–	–
	♀	121	1	0.8	9	7.4	46	38.0	64	52.9	1	0.8
13	♂	109	–	–	8	7.3	44	40.4	57	52.3	–	–
	♀	121	1	0.8	9	7.4	44	36.4	66	54.5	1	0.8

Table 3. Eye colour

Age (years)	Sex	Total	Categories													
			dark				motley				light-coloured					
			black - brown		brown		brown - green		green - brown		gray - brown		gray		blue	
			n	%	n	%	n	%	n	%	n	%	n	%	n	%
7	♂	109	35	32.1	30	27.5	2	1.8	14	12.8	3	2.8	16	14.7	9	8.3
	♀	121	51	42.2	28	23.1	1	0.8	12	9.9	5	4.1	16	13.2	8	6.6
8	♂	109	36	33.0	27	24.8	5	4.6	12	11.0	5	4.6	14	12.8	10	9.2
	♀	121	51	42.2	23	19.0	6	5.0	12	9.9	6	5.0	16	13.2	7	5.8
9	♂	109	38	34.9	22	20.2	9	8.3	10	9.2	7	6.4	14	12.8	9	8.3
	♀	121	51	42.2	18	14.9	10	8.3	13	10.7	7	5.8	15	12.4	7	5.8
10	♂	109	34	31.2	25	22.9	9	8.3	11	10.1	9	8.3	12	11.0	9	8.3
	♀	121	50	41.3	19	15.7	11	9.1	12	9.9	9	7.4	13	10.7	7	5.8
11	♂	109	33	30.3	26	23.8	10	9.2	10	9.2	8	7.3	14	12.8	8	7.3
	♀	121	50	41.3	19	15.7	11	9.1	13	10.7	7	5.8	13	10.7	8	6.6
12	♂	109	32	29.4	27	24.8	8	7.3	12	11.0	8	7.3	14	12.8	8	7.3
	♀	121	49	40.5	19	15.7	12	9.9	13	10.7	7	5.8	14	11.6	7	5.8
13	♂	109	32	29.4	27	24.8	8	7.3	12	11.0	8	7.3	14	12.8	8	7.3
	♀	121	49	40.5	19	15.7	12	9.9	13	10.7	7	5.8	14	11.6	7	5.8

grey and blue eyes – in the category of the “light” eyes. Between the years 7 and 13 the dark eyes are prevailing in both sexes, their incidence being higher with the girls. The black-brown eyes are the prevalent ones of them and again with priority in the girls (Table 3). In the age period between 7 and 9 the dark eyes frequency drops more intensely especially with the girls (by 4.2%). This brightening is more strongly pronounced in both sexes in the group of the brown eyes. Between the age of 10 and 13 years the incidence of the dark eyes does not change in both sexes. Motley eyes rank second in frequency with exception for the 7-year-olds where the light eyes are prevailing with a predominance of the boys. The incidence of the motley eyes grows more intensely till the age of 9 in both sexes and is better pronounced in the case of the brown-green eyes (by 3.3 to 4.2%). After the age of 10 motley eyes are found with almost equal frequency in both sexes and do not undergo ostensible changes. The changes in the case of the light eyes are most insignificant with incidence remaining constant after the age of 10. The age-related and sexual changes are statistically insignificant ($P > 0.05$).

Also the combinations between the hair colour and eye coloration in the groups of the 7-year-olds and 13-year-olds have been studied and distributed into four groups: dark eyes with dark hair (dd), dark hair with light eyes (dl), light hair with dark eyes (ld) and light hair with light eyes (ll) (Fig. 1). In the group of the “light” eyes the motley ones

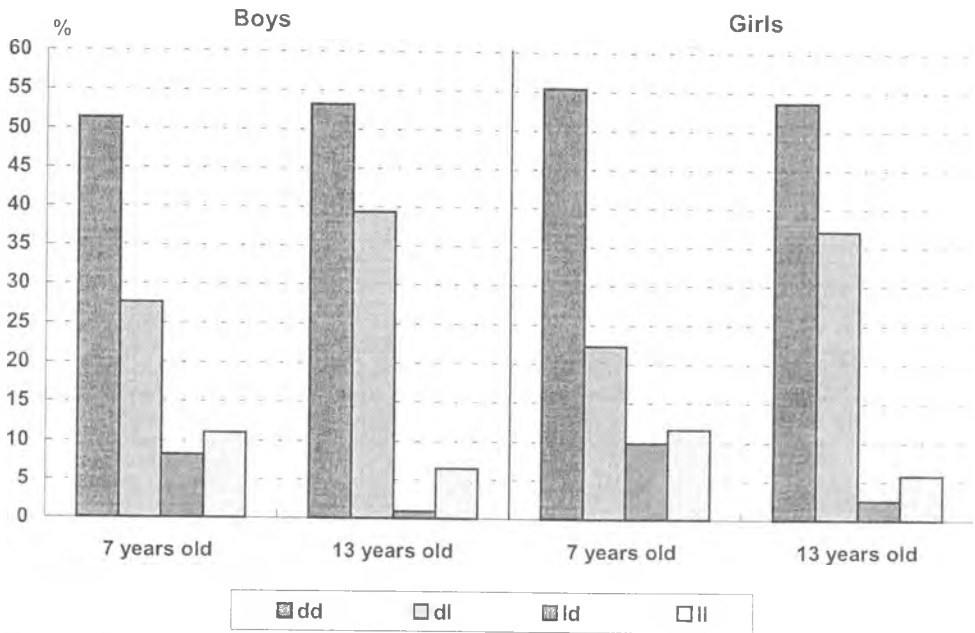


Fig. 1. Combinations of hair and eye colour

have been included. At the age of 7 years the most common combination is between dark hair and dark eyes especially in the boys. On the second place is the combination between dark hair and light eyes again with prevalence for the boys. Last ranking is the combination between light hair and dark eyes but this time with priority for the girls. In the contingent of the 13-year-olds the combinations retain their ranking positions. The incidence of the combination between the dark hair and dark eyes is very close values in both sexes. The combination of dark hair and light eyes is with priority for the boys. Last ranking in both sexes remains the combination between light hair and dark eyes whose incidence has diminished but is again with priority for the girls. The results obtained on the combinations between the hair colour and eye colour is quite close to those of V a t e v [4] about the 6-10-year old children from the towns at the beginning of the century.

Conclusion

In the period between the years 7 and 13 the children with fair skin are predominant especially with the boys. Till the age of 11 children with brown hair are most common while at the age of 12-13 years those with the brown-black are dominant. In the 7-13-year olds most common are the ones with the black-brown eyes especially girls. At the time of growth the changes in the pigmentation of the skin, hair and eyes take place with a differing intensity. The skin grows darker more intensely between 7 and 13 in the direction from fair to light mat especially with the boys. The hair gets dark from blond and dark-blond to brown most intensely as early as the age of 8. Most intensive are the changes in the group of the brown and brown-black hair throughout the entire period under study. The brightening of the eyes occurs is with the greatest intensity between 7 and years of age especially with the girls and is with a tendency from brown to brown-green coloration.

References

1. Martin, R., K. Saller. Lehrbuch der Anthropologie in sistematischer Darstellung, Bd. I. Stuttgart, Gustav-Fischer Verlag, 1957.
2. Štefančič, M. Eye colour of children in Ljubljana. – Glasnik anthropološkog društva Jugoslavie, **19**, 1982, 21-26.
3. Štefančič, M. Hair colour and combination of hair and eye colour of children in Ljubljana. – Glasnik anthropološkog društva Jugoslavije, **21**, 1984, 83-89.
4. Ватев, Ст. Антропология на българите. С., 1939, 77.
5. Миклашевская, Н. Н., В. С. Соловьева, Е. З. Година. Ростовые процессы у детей и подростков. М., Изд. Московского Университета, 1988, 145-148.
6. Попов, М. Антропология на българския народ. С., БАН, 1959, 57-60.