

The Frequency of Eye and Hair Colours in some Hungarian Populations

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The colour of the eye and hair, that is, their pigment content is characteristic of both the individual and the population. It is a feature deemed significant from a taxonomical point of view. Today, a knowledge of the normal characteristics of populations has an importance beyond that concerning typology. By the ever increasing spreading of fission materials, the so-called background radiation (VÁRTERÉSZ, 1965) shows an also increasing rate. This may lead not only to considerable genetical changes and mutations, but, in the case of polygenic features, as is also the colour complexion, we may anticipate the occurrence of finer modifications. This is why informations on the frequency and distribution of as much normal features as possible in the given populations are important.

From Hungary, we have but a meagre amount of sporadic data available today. Notable investigations have been made by BARTUCZ (nationwide in character), MALÁN (the Székelys), NEMESKÉRI (in the village Ivád, the Hajdus), FARKAS & LIPTÁK (Orosháza), FARKAS (Comitat Csongrád). This latter is especially important, since it is representative of a larger area (2792 boys and 2421 girls). The present paper attempts to submit some data to our present day knowledge.

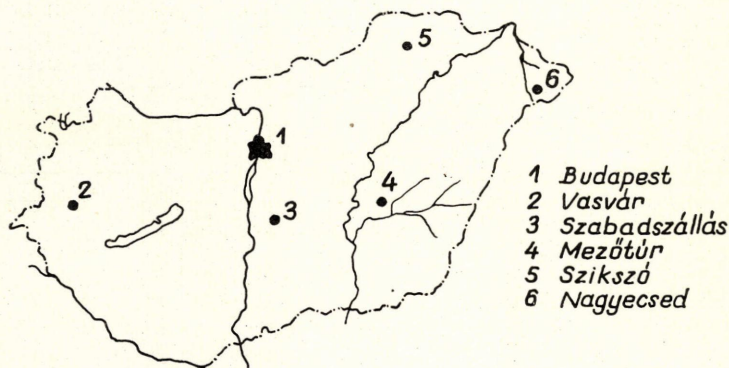


Fig. 1. Localities of sampling

In our investigations, samples have been taken from small towns (pop. 8000—10,000) of five Hungarian territories, as well as from the Capital (representing a mixed population). Fig. 1 is indicative of the sampling localities.

Material and method

The examined individuals comprised school-children aged 12–18 years, born in the town investigated, their parents and at least one grandparent coming from the same locality or its immediate neighbourhood.

It is well-known that pigmentation changes with age, and also that these changes are significant only in the first three years of life. STEGGERDA (1941) showed slight differences during puberty in Dutch children living in the United States; before puberty the boys are lighter coloured than the girls, while around 14 years of age the boys become darker. In his paper cited above, FARKAS reported that the eye and hair colours of children aged 3–18 in Com. Csongrád do not change significantly from the seventh year onwards. He presumed therefore that the data derived from the examination of school-children may, with some limitations, be applicable for an evaluation of also the adult population.

Eye-colours have been determined by the SCHULTZ colour-table, hair-colours by the FISCHER—SALLER table. With regard to the eye, the entire pigmentation of the iris, and concerning the hair, the hue of the deeper stratum at the nape, have been considered. For each individual, I have determined the corresponding grade of scale, but in the course of evaluation I used the following grouping:

Eye: 1–1b poor in pigment, 3–6 weakly pigmented, 7–11 medium pigmented, 12–16 rich in pigment.

Hair: A whitish blond, B–E light blond, F–L blond, M–O dark blond, P–T brown, U–Y blackish brown, I–VI red.

The per cent frequencies of these groups for every sample have been calculated, as well as a total mean by summarizing all samples. On the basis of the combined material, correlations in both sexes were also calculated with respect to the common occurrence of the two features.

Results

Eye-colour: medium pigmentation shows the greatest per cent value in all samples. This is followed by the weakly pigmented — poor in pigment — rich in pigment groups, except for the towns Mezőtúr and Szabadszállás where those rich

Table I. Frequency of eye-colours in the localities examined

Locality	Budapest		Vasvár		Szabadszállás		Mezőtúr		Szikszó		Nagyecsed		Nationwide	
	♂ %	♀ %	♂ %	♀ %	♂ %	♀ %	♂ %	♀ %	♂ %	♀ %	♂ %	♀ %	♂ %	♀ %
1a - 2b	12.4	14.7	12.8	17.4	7.4	14.3	14.4	11.9	19.1	9.0	19.7	20.6	14.3	14.8
3 - 6	24.3	26.2	25.5	23.8	25.2	28.5	28.0	20.6	27.8	21.6	24.4	26.5	25.5	24.5
7 - 11	51.7	46.9	53.2	50.0	56.1	45.4	37.9	42.1	35.7	47.3	44.9	44.7	46.6	46.3
12 - 16	11.5	12.1	8.5	8.7	11.2	11.7	19.7	25.4	17.4	22.2	11.0	8.2	13.5	14.3
Total	234	149	47	172	107	119	132	126	115	167	127	170	761	901

Table II. Frequency of hair-colours in the localities examined

A	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.3
B - E	0.8	0.0	0.0	1.2	0.0	0.0	0.8	0.8	0.0	1.2	0.8	0.0	0.5	0.6
F - L	6.0	2.7	2.1	4.1	5.6	10.9	7.6	4.8	7.8	4.8	7.9	7.7	6.6	5.7
M - O	19.2	10.7	25.5	12.2	15.9	7.6	3.8	4.8	11.3	8.4	17.3	14.9	14.8	10.1
P - T	46.5	42.3	34.0	38.4	53.3	43.7	33.3	33.3	37.4	29.9	39.4	38.1	41.9	37.2
U - Y	26.1	44.3	38.3	41.3	22.4	33.6	53.0	52.4	42.6	53.3	33.1	39.1	34.7	44.2
I - VI	1.3	0.0	0.0	1.7	2.8	4.2	1.5	3.2	0.9	3.2	1.6	1.2	1.4	2.0
Total	234	149	47	172	107	119	132	126	115	167	127	170	761	901

in pigment precede the pigment-poor groups. A certain difference is discernible between the boys and the girls per the investigated area, but the combined material still reveals that there is no essential sexual difference in eye-colours. A χ^2 test was accordingly made, resulting in $\chi^2_{[5]} = 0.3938$ $P > 0.95$; the detailed data are given in Table 1.

Hair colour: brown and blackish-brown hues are the most frequent in all samples. The proportions of the two are different for all investigated areas. The nationwide average shows the predominance of brown, followed by the dark blond, and at a significantly smaller rate (preponderantly below 1 per cent) the light blond. Whitish blonds occur in traces only. The occurrence per samples of red hair is varying: the nationwide mean in the boys is 1.4 per cent, in the girls 2.0 per cent. Its frequency is higher than that of the whitish - light blond hues. Concerning hair-colour, the sexual difference is significant: $\chi^2_{[5]} = 16.571$ $P < 0.5$. This difference derives from the difference between the brown - blackish brown, more frequent in the girls. The detailed data are given in Table 2. The frequencies per group of both the eye and hair colours and the sexual differences for the combined nationwide material are shown in Fig. 2.

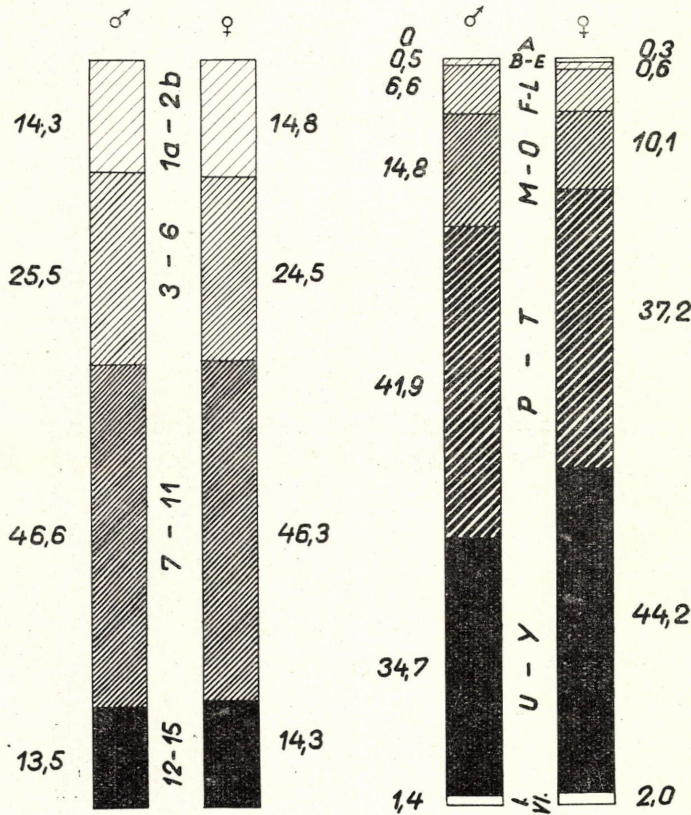


Fig. 2. Per cent group-frequency of eye and hair colours.

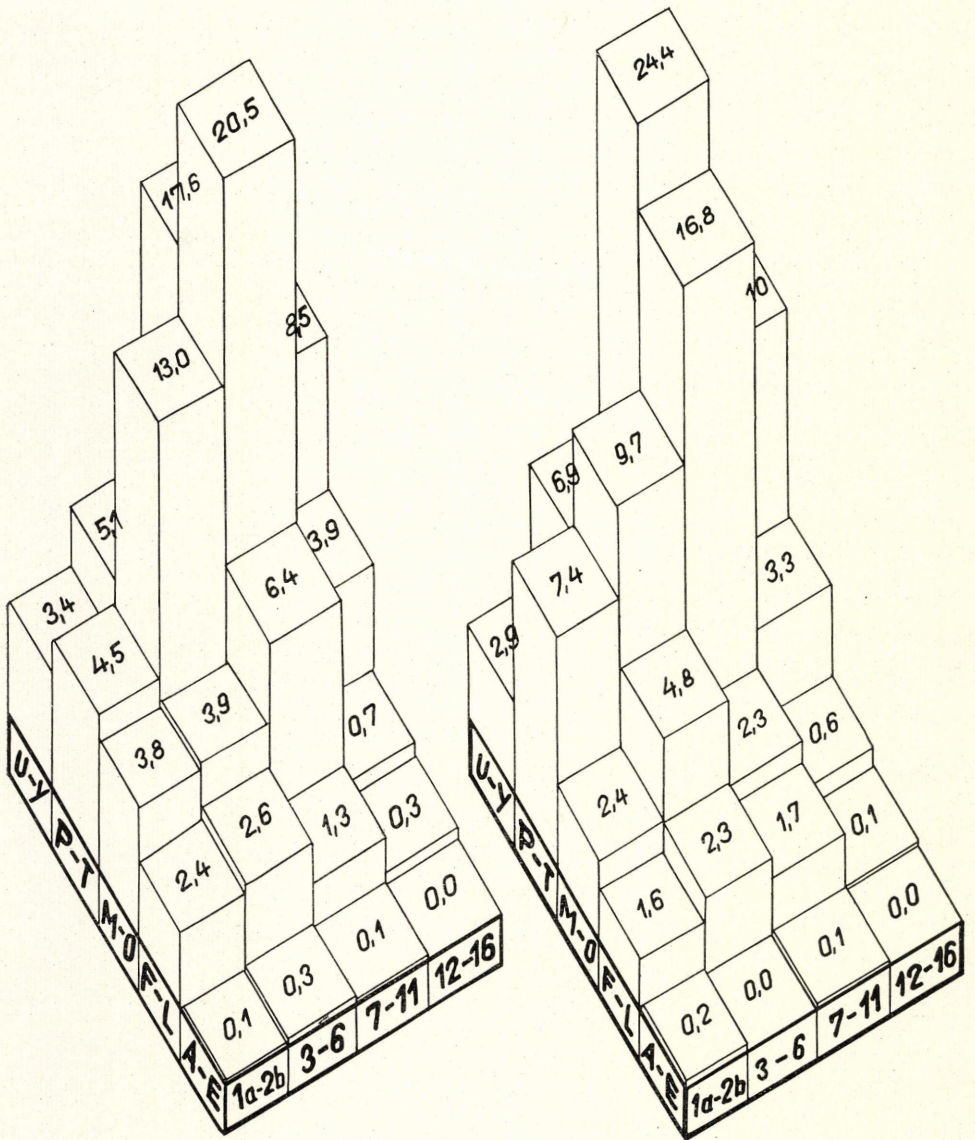


Fig. 3. Combined occurrence of eye and hair colours in men — Fig. 4. Combined occurrence of eye and hair colours in women

Correlation of eye and hair colour. A contingency table was made for the study of individual correlations of eye and hair colours. The results are summarized in Fig. 3 for men and Fig. 4 for women. As is to be seen, the combined occurrence of medium pigmented eye and brown hair colour is the most frequent one in men, and the medium pigmented eye and blackish brown hair in women.

The complete absence in both sexes of the combination light blond hair and richly pigmented eye is striking, but the combination blond hair and medium pig-

mented eye is also hardly more than 1 per cent. This phenomenon cannot be explained by the contention that light colours show small frequencies in Hungary, since the combination light eye and light hair does occur, and in accordance with its proportion also the combination light eye and dark hair.

The explanation should probably be sought for in the general regulation of the pigment material (melanin). According to the estimation of BONNER (1961) and others, the white — yellow — black colour of the skin depends on at least 80 genes. Given so many genes, it is to be expected that some of them might be linked (BONNER), and also sex-linked. This assumption would corroborate the observation that women, diploid with respect to the X-chromosome, dispose of more pigment than the men haploid (XY) for X.

Discussion

By the examination of 761 men and 801 women at puberty, attempts have been made to estimate the populations of five territorial units and the Capital, as well as the inferable nationwide means. The data essentially agree with those found by other authors, cited in the introduction, concerning adult populations. One might infer therefore that the population of Hungary is characterized by medium pigmented eyes and brown hair; the occurrence of light colours is small.

On the basis of the high-rate correspondance with the data of the adults, the examination of juveniles may be suitable for an estimation of these characteristics also in adult groups. Sexual differences were found only with respect to hair-colour — that of the women has a darker hue. The combination dark eye and light hair does not occur in our populations.

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