

TEMPORAL CHANGES OF CEPHALOSCOPIC TRAITS IN SCHOOL AGE BOYS AND GIRLS FROM CENTRAL GREECE

Magdalena Pirinska-Apostolu

Department of Zoology and Anthropology, Faculty of Biology,
Sofia University "St. Kliment Ohridski", Bulgaria

Abstract. Conducting cephaloscopic studies in order to obtain the characteristics of ethnic groups inhabiting a particular geographical region not only helps to understand the frequency of distribution of human morphological traits, but also provides a basis for comparison between different populations. A sample of 2683 individuals of school age (12 to 17 years) of both sexes, divided into smaller groups according to age, sex and origin was analyzed in terms of 7 cephaloscopic traits. This contingent originates from the districts of Thessaly and Epirus-Central Greece, which represent about 10.1% of the population of Greece. During the study, standard anthropological equipment of Siber Hegner Maschinen AG - Zurich was used, according to the classical methodology of Martin & Saller (1957). A cluster analysis revealed two main branches, dividing the compared groups by the chronology of the studies, as well as smaller branches, according to their sex. These results suggest a significant change in the frequencies of occurrence over time, with the territorial factor prevailing over gender in the present study. Available data obtained during the 1980s prove the opposite. A comparison of the percentages of occurrence of some scopic traits in boys and girls from Thessaly and Epirus according to bibliographic and current data demonstrates declining temporal deviation: differences between genders were higher 20 years before the present study.

Key words: anthropology, cephaloscopic traits, human ecology, schoolchildren

Introduction

Conducting cephaloscopic studies in order to obtain the characteristics of ethnic groups inhabiting a particular geographical region not only helps to understand the frequency of distribution of human morphological traits, but also provides a basis for comparison between different populations (Gyula Henkey, 2002; 2002; Okupe et al., 1984; Kasai et al., 1993; Rexhepi, 2008; Mcculloch, 2007; Golalipour et al, 2003; 2005; Golalipour, Heydari 2005; Golalipour, Heidari et al, 2006; Del Sol, 2005; Shah, Jadhav 2004; Ilayperuma Isurani, 2011; Oladipo, 2009; 2010; Loukopoulou, Pentzos-Daponte, 1999).

Studies which identify the factors influencing the variations in facial morphology are also related to the impact of the environment, socioeconomic status and eating habits of the population (Farkas et al., 2005).

The nasal shape and size are important traits which characterize the human face, therefore they are of particular interest in children and adolescents (Brůžek, Hajniš, 1976; Jasicki, 1966; Martin, Saller 1957; Štefančič, 1981; Štefančič, Leben - Seljak, 1996; Miklashevskaya, Solovieva, Godina, 1988). Detailed study of the auricular morphology and the ratio of our from an anthropological point of view can be incorporated in a good description of human populations (Dharap, Than, 1995; Bozic-Krstic, 1991 Loh, Cohen, 2016, Rubio et al., 2015;

Loh , Cohen, 2016; V. Todorov, 1990; Gurbuz et al., 2005; Driessen et al., 2011; Taura et al., 2013).

The aim of the study is to trace the morphological diversity of the main cephaloscopic features of schoolchildren from Central Greece in different aspects, as well as to establish possible changes in these features over time.

Material and Methods

A sample of 2683 individuals of school age (12 to 17 years) of both sexes, divided into smaller groups according to age, gender and origin was analyzed in terms of 7 cephaloscopic traits. This contingent originates from the districts of Thessaly and Epirus-Central Greece, which represent about 10.1% of the population of Greece. During the study, standard anthropological equipment of Siber Hegner Maschinen AG - Zurich was used, according to the classical methodology of Martin & Saller (1957). The significance of the differences between groups concerning the studied traits was checked using the χ^2 criterion. For better illustration, these were plotted using also principal components analysis (PCA).

Results and Discussion

Form 6 of the auricle occurs with the highest frequency in both sexes in the whole population and this percentage is higher for the sample from Epirus. Forms 4 and 5 occur with a slightly higher frequency in the groups from Thessaly. The highest occurrence of Darwinian tubercles is noted in the group from Thessaly compared to that from Epirus. Darwin's tubercle occurs with the highest frequency when auricular form is 5.

Schoolgirls from the Thessalian islands and villages have a higher percentage of straight nasal form, while in cities males showed a predominance of straight form. When comparing the territorial - geographical principle, individuals from Thessaly have a slightly higher percentage of straight form concerning both genders. The comparison shows a slightly higher percentage of concave nasal for individuals of both genders in Epirus.

According to chin shape, form 2 has almost the same frequency in the contingent from both Thessaly and Epirus, while form 4 has a higher frequency in Thessaly.

The majority of the population is characterized by brown - black hair color, but this percentage is higher for boys and girls from Thessaly; brown hair is found in a higher percentage in Epirus.

Dark eyes predominate for both genders in Central Greece, but their percentage is higher in Epirus, while intermediate and light eyes show a higher percentage in Thessaly.

Regarding the hair form, wavy hair is most common, and with a higher frequency in girls.

In the studied schoolchildren contingent 12 to 17 years of age from Central Greece, no individuals with epicanthus were detected.

When assessing the differences in the frequency of occurrence of the studied scopic anthropological features between the studied subgroups using the χ^2 test, it turns out that in some cases there are statistically significant differences concerning gender, socio - demographic and territorial - geographical aspect (Table 1). Considered frequencies of all traits together (in combination) enhance the differentiation between the compared groups by χ^2 . Solely no differences are observed between boys and girls from the Thessalian villages ($p = 0.603$). It is emphasized that these differences relate only to the frequency of occurrence of a particular form of a given trait and do not reflect a different form of the trait. The frequency of different shapes of ear and chin show statistically significant differences in both

sexes when comparing the samples from Thessaly and Epirus on a geographical - territorial principle. Boys differ in hair and eye color and nose shape, and girls - in hair shape - in terms of their geographical origin. Taking into account the socio-demographic factor, differences are observed in both sexes in the shape of the nose, hair color and hair shape, in girls the only trait that does not show differences from the examined is the eye color.

Table 1. χ^2 between frequencies of occurrence concerning 7 cephaloscopic traits of schoolchildren from Central Greece, compared according to social and demographic aspect

Traits		Males		Females	
		Thessalian villages/ islands/ cities	Thessaly/ Epirus	Thessalian villages/ islands/ cities	Thessaly/ Epirus
Auricular form	χ^2	54.399	28.653	28.232	21.081
	df	28	14	22	11
	p	0.002	0.012	0.168	0.032
Nasal form	χ^2	11.961	15.598	16.04	1.308
	df	4	2	4	2
	p	0.018	0	0.003	0.52
Chin form	χ^2	24.236	17.176	10.271	12.111
	df	8	4	8	4
	p	0.002	0.002	0.246	0.0165
Hair color	χ^2	32.963	16.933	12.468	7.033
	df	16	4	6	4
	p	0	0.002	0.052	0.1314
Eye color	χ^2	2	14.492	2.04	0.258
	df	4	2	4	2
	p	0.81	0.001	0.728	0.879
Hair form	χ^2	9.695	0.582	25.661	4.863
	df	4	2	4	2
	p	0.046	0.748	0	0.088
Combina-tion	χ^2	114.2	106.18	106.41	58.151
	df	66	33	60	31
	p	0	0	0	0

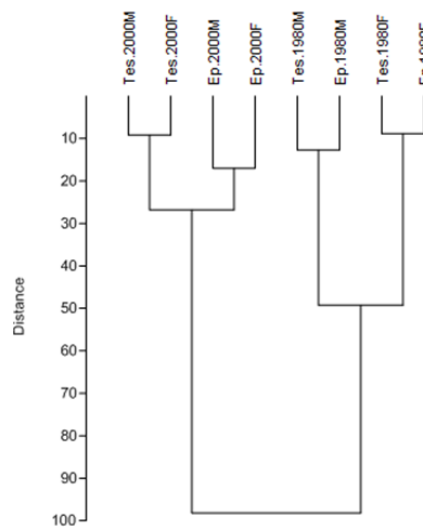
Concerning Thessaly, traits with statistically significant intergender differences are the nasal shape and the eye color, while in the population of Epirus such a feature is the auricular shape (Table 2). In the Thessalian island contingent, the only cephaloscopic features that distinguish the two genders are the auricular and hair forms. In the group of Thessalian villages, the distinguishing gender characteristics are the nasal and chin shapes.

The only available literature data about the percentages of occurrence of some cephaloscopic traits in the studied region are from Poulianos (1980). Although observed in adult individuals, they were compared with our data. Concerning boys there was an increase in the percentage of straight and concave noses at the expense of convex, while in girls there was a decrease in the percentage of straight noses at the expense of concave and convex. According to Filcheva, in 2005 there should be a change in the percentage of concave and convex noses with age. The color of the hair lightens and the color of the eyes becomes darker in both sexes. In addition to this, it is noticed that 20 years ago in both sexes the percentage of intermediate forms was higher. The change in the hair form is the most drastic, with wavy hair increasing by about 16% to 60% on average at the expense of straight hair in the groups from Thessaly and Epirus and in both genders.

Table 2. χ^2 between frequencies of occurrence concerning to 7 cephaloscopic traits of schoolchildren from Central Greece, compared according to gender

Traits		Males/females				
		Thessalian cities	Thessalian islands	Thessalian villages	Thessaly	Epirus
Auricular form	χ^2	21.456	14.854	5.429	19.209	20.356
	df	13	6	9	14	9
	p	0.064	0.021	0.795	0.171	0.016
Nasal form	χ^2	9.305	0.523	1.014	5.705	1.645
	df	2	2	2	2	2
	p	0.01	0.77	0.049	0.058	0.444
Chin form	χ^2	2.16	2.121	11.083	6.септ	7.448
	df	4	2	4	4	4
	p	0.706	0.346	0.026	0.141	0.114
Hair color	χ^2	13.536	3.243	2.168	18.615	9.553
	df	4	3	3	4	4
	p	0	0.356	0.538	0	0.049
Eye color	χ^2	3	0.384	3.45	5.886	3.284
	df	2	2	2	2	2
	p	0.213	0.825	0.155	0.052	0.19
Hair form	χ^2	7.037	26.254	0.109	11.028	17.889
	df	2	2	1	2	2
	p	0.029	0	0.742	0.004	0
Combination	χ^2	56.63	47.461	23.532	67.357	60.175
	df	32	21	26	33	28
	p	0.005	0	0.603	0	0

Cluster analysis performed on the basis of the previously available and our own data (Fig. 1), reveals two main branches, dividing the compared groups by chronology of studies, as well as smaller branches, dividing them according to gender. These results suggest a significant change in the occurrence frequencies over time, with the territorial factor prevailing over gender during the present study. For the 1980s, the available data prove the opposite. The results of the analyses show a wedging/decreasing variability over time: the intergender differences concerning the studied cephaloscopic traits were more pronounced 20 years before the present study.

**Figure 1.** Cluster analysis of % frequencies of occurrence concerning 7 cephaloscopic traits of schoolchildren from Central Greece according to previous and own data

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