



## Physical Anthropology Section – 2009

### H102 Estimating Ancestry Through Nonmetric Traits of the Skull: A Test of Education and Experience

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After attending this presentation, attendees will understand the effects that education, experience, and the geographic region in which one works have on the accuracy of nonmetric ancestry determination. Statistical research results pertaining to the nonmetric method of determining ancestry will also be presented.

This presentation will impact the forensic community by making the forensic anthropological community aware of the effects that education and experience in forensic anthropology have on the accuracy of ancestry estimation using nonmetric traits.

The identifying characteristics of any unknown skeleton are age, sex, height, and ancestry. Among these four biological identifiers, ancestry is possibly the most difficult to assess. There are two main ways of estimating the ancestry of a skull: metric and nonmetric. The metric method involves twenty-one standard measurements that are entered into a computer based program (FORDISC 3.0). The program compares the measurements to those in a database containing measurements of known skulls from twenty eight populations. The program then classifies a particular skull into a population group. The nonmetric method involves a visual assessment of the skull, using the overall structure of the skull to classify it into an ancestral group. These two methods are often used together to determine the most precise ancestry of a skull.

Many of the methods used for ancestry determination are considered subjective, especially methods of nonmetric visual assessment. Therefore the nonmetric method should be tested not only for the precision of each trait (intra- and inter-observer error), but also for the accuracy of these commonly utilized nonmetric traits among forensic anthropologists.

This study used three blind tests presented to professional forensic anthropologists as well as students of forensic anthropology. These three tests were conducted in different geographic regions of the country. A total of twenty-seven people participated in the study. Of the twenty-seven participants, six were in the PhD level, nine in the Master's level, ten in the Bachelor's degree level and two were currently in their undergraduate year studying physical anthropology. A questionnaire presented to each participant was used to determine a variety of things such as level of experience in forensic anthropology, level of education, familiarity with nonmetric traits, and estimated number of forensic anthropological cases on which the participant has worked. Eight complete skull casts of known ancestry and identity were used to obtain a broad number of responses. The skull casts consisted of four Asian skulls, two European skulls, and two African skulls. Each skull was placed next to a poster that listed nonmetric traits for the three main ancestral groups: European, African, and Asian. Each participant determined the ancestry of all eight skulls and classified each into one of the three ancestral categories. If the participant could be more specific in determining ancestry (narrowing the ancestry down from Asian to Native American), they did so. Also, each participant listed the nonmetric traits he/she used to determine the ancestry of each skull.

The results of this study indicate there is no correlation between education level and/or professional expertise in the accuracy of using nonmetric skull traits to estimate ancestry. Based upon regression analysis, there is no significant difference between the accuracy rates of professional forensic anthropologists with a high level of experience and those with a low level of experience in determining the ancestry of a skull. Despite the fact that there is no difference in accuracy rates, those with higher levels of education were able to narrow down the ancestry of a skull more than those with lower levels of education. The first group, comprised of individuals with a PhD, correctly identified 68% of Asians, 64% of Africans and 75% of Europeans. The second group, consisting of individuals with MA degrees, correctly identified 76% of Asians, 61% of Africans and 76% of Europeans. The third group, consisting of students with a BA degree and students pursuing a BA degree, correctly identified 71% of Asians, 58% of Africans and 83% of Europeans. Overall, participants were able to correctly identify 79% of the Europeans, 72% of the Asians and 60% of the African skulls. This study is ongoing and an increase in participant sample size will further refine these results.

#### **Ancestry Determination, Nonmetric Traits, Biological Profile**