H66 Craniometric Variation in South African and American Blacks

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After attending this presentation, attendees will understand patterns of craniometric variation in two disparate populations with African ancestry and implications for individual identification.

The presentation will impact the forensic community by emphasizing the morphological diversity in continental and regional samples.

The estimation of ancestry is an important part of the biological profile, and in most cases up to the present, race or continental ancestry has been used to narrow down possible identifications. With increasing human rights work and the spread of forensic techniques to more parts of the world, finer-grained analyses will no doubt become important. The Rwandan genocide involving Hutu and Tutsi ethnic groups is a recent example of the need for data specific to a particular forensic challenge. All human populations are relative, are often locally specific, and can be qualified in numerous ways. Spradley et al (2008) illustrated the value of regionally specific population samples in their analysis of ninetenth century enslaved Africans from Cuba.

South Africa is a linguistically and ethnically diverse country, with eleven official languages and a history of immigrants from Europe, India, Indonesia, and Malaysia. Dark-skinned South Africans (blacks) are from many different indigenous groups and comprise approximately eighty percent of the total population, whites are about nine percent of the population, and people of Indian/Asian ancestry are about 2.5%. The other major ethnic group is the Coloreds, persons of mixed ancestry and lighter skin, who are descendants of slaves brought in from East and Central Africa, the indigenous Khoisan, and South African blacks and whites. Black Americans originated predominantly from West Africa and came to America through the slave trade, and show significant admixture with white Americans. Given their different origins and disparate histories, how does morphological variation in South African and American Blacks compare?

The South African sample consists of 64 males and 27 females from the Department of Anatomy at the University of Pretoria, and the American samples of 61 males and 54 females come from the Forensic Data Bank. Virtually all individuals were positively identified and were born after 1930. Most crania were digitized using a Microscribe and Howells standard cranial measurements were calculated from the interlandmark distances, otherwise measurements were collected using craniometric instruments. Discriminant function analysis (DFA) was performed on the data using Fordisc 3.0 (Jantz and Ousley 2005) and all reported classification percentages were cross-validated.

In a four-way DFA for country and ancestry using 22 variables, seventy one percent were correctly classified, and using nine stepwise- selected variables, seventy-seven percent were correctly classified, indicating significant differences among all groups. South African blacks have relatively shorter and wider noses, longer, lower, and narrower crania, and wider interorbital breadths. Additionally, sexual dimorphism is lower in South Africans because South African black males are on the whole relatively smaller, and South African black females are relatively larger, compared to American blacks. However, despite their larger overall size, South Africans have remarkably smaller mastoid processes, with the South African male mean mastoid height lower than the American female mean. When American white males and females were added in a six-way DFA using eight variables, they were classified with seventy-two percent accuracy and the South African means were intermediate between the means for South African blacks and American whites. These results are not unexpected, given the documented gene flow between white and black Americans, though South African and American blacks originate from different regions in Africa.

Sex-specific analyses also illustrated differences between the American and South Africans blacks. In males, ninety one percent were correctly classified by country using just three measurements (NLH, NOL, and OBB) and likewise in females, eighty five percent were correctly classified using BBH, NLB, and ZMB.

These results illustrate the inherent diversity in samples grouped into traditional races, and complement studies of other Africans, Chinese, Native Americans, and Southeast Asians. The identification of ancestry is relative to the forensic questions asked, and fine-grained estimation of ancestry will likely be successful in many cases. Further, the South African sample itself is ethnically diverse, and with a large enough sample, the recorded ethnic groups can be studied separately. These results also highlight the usefulness of diverse reference samples, which will unfortunately be needed in the future.

Craniometrics, Ancestry, Discriminant Function Analysis

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