H88 Craniometric Assessment of Modern 20th-Century Black, White, and "Colored" South Africans

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After attending this presentation, attendees will obtain knowledge of human variation among modern Black, White, and "Colored" South Africans and will understand the statistical framework used to describe similarities and differences among these groups.

This presentation will impact the forensic science community in contributing to the knowledge of human variation in modern South Africans as well as the impact of forced segregation on cranial plasticity in different ancestral populations occupying the same geographic space.

While South Africa is not unique in its rate of violent crime or in its large number of unidentified persons, this poly-linguistic society with over 49 million people is an ideal country in which to evaluate human variation. Within the last 500 years, various population groups, such as Dutch, French, Malaysian, and Indian, have migrated to South Africa. Social behavior and 20th-century segregation laws affected gene flow among indigenous and migrated groups and contributed to distinct social/political designations which include Black, White, "Colored," and Indian South Africans. Approximately 80% of the population identifies themselves as Black, 9% "Colored," 8% White, and 3% Indian. "Colored" refers to a social group primarily from the Western Cape who are descendants of slaves brought from Indonesia, India, Malaysia, and Asia and who mixed with Europeans and the indigenous Khoi and San.[1]

The purpose of this study was to use craniometrics and Discriminant Function Analysis (DFA) to evaluate ancestral variation and sexual dimorphism among White, Black, and "Colored" groups as a means to explain current variation and to more accurately identify unidentified remains as to social group.

A total of 351 crania of Black (49 F, 110 M); White (45 F, 64 M); and "Colored" (29 F, 54 M) groups were used from the Pretoria Bone, Raymond A. Dart, and Kirsten skeletal collections. One-hundred and seven standard landmarks were digitized to generate various linear measures, fractures, angles, and subtenses.[2] Discriminant function analysis was employed and South African groups were tested against themselves to test classification accuracies. All accuracies were cross-validated.

In a three-way DFA for ancestry using 11 stepwise-selected variables, 82% classified correctly using cross-validation, indicating significant differences among all groups. Black South Africans classified 80% correctly, "Coloreds" classified 84% correctly, and Whites classified 83% correctly. In a six-way DFA for sex and ancestry using ten stepwise-selected variables, 63% classified correctly on the whole. Black females classified 76% correctly, Black males classified 74% correctly, "Colored" females classified 24% correctly, "Colored" males classified 41% correctly, White females classified 69% correctly, and White males classified 66% correctly.

Each ancestral group demonstrated comparable correct classification accuracies when tested for ancestry alone. Of the three groups, Black and White groups were least likely to misclassify as each other. For ancestry and sex, "Colored" groups demonstrate considerably lower classification accuracies than either Black or White groups. "Colored" males misclassify into Black or White groups, whereas "Colored" females misclassify more often as Black females than themselves and only twice as White females. The abovementioned results corroborate with nasal aperture research on South Africans which concluded that while Black and White groups were distinctly different, no clear discrimination could be made between Black and "Colored" groups.[3] Low classification accuracies for sex and ancestry were also observed and may be attributed to low sexual dimorphism among "Colored" and Black groups, despite strong separation of the groups in a three-way DFA.[3]

Diverse cultural/sociopolitical histories are reflected in variation among these modern social groups. Few studies have examined morphological variation within "Colored" groups in comparison to White and Black South Africans. While Black and White South Africans show roughly the same level of homogeneity, "Coloreds" are much more heterogeneous. Current variation in South Africa needs to be addressed to assist forensic anthropologists in accurately estimating ancestry from unknown remains.

References:
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2. Howells WW. Cranial variation in man: a study by multivariate analysis of patterns of difference among recent human populations. Cambridge (MA): Peabody Museum of Archaeology andEthnology, Harvard University, 1973;163-90.
3. McDowell JL, L'Abbé EN, Kenyhercz MW. Nasal aperture shape evaluation between black and white South Africans. Forensic Sci Int 2012;222(1-3):397.

Ancestry Estimation, DFA, Sexual Dimorphism