H8 The Effects of Size in Craniometric Discriminant Functions

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After attending this presentation, attendees will be able to recognize of the effects of size in craniometric discriminant functions designed for sex determination. An approach is recommended that mediates size effects.

This presentation should lead to an improved understanding of the discriminant function, and its use for sex determination of skeletal remains. The presentation offers an alternative approach to sex determination when the case involves large females or small males.

Forensic anthropologists have been employing discriminant functions to classify crania for decades. The classic papers by Giles and Elliot provided numerous functions that permitted anthropologists to address questions of population affinity (i.e., race) and sex using cranial measurements. The discriminant function approach was attractive because it enjoyed error rates similar to those of experienced anthropologists rendering subjective judgements, but was clearly more objective. More recent years have seen the development of the software package FORDISC (Ousley and Jantz 1996), which uses reference data from numerous human populations to calculate custom discriminant functions suited to a specific case. This study explores the effects of size on discriminant functions designed to determine the sex of a specific cranium. When presented with a case specimen from an apparent male who was of relatively small size, the authors subjected the 16 cranial measurements from the case specimen to a discriminant analysis in FORDISC, which indicated that the individual was female. We hypothesized that this result was due to the small size of the cranium. To address our hypothesis, we calculated C-scores (Howells 1995) for the 16 measurements using the craniometric data in FORDISC (black and white, males and females) and calculated a new discriminant function. The new function classified the individual as male, but not convincingly, as the discriminant score was close to the sectioning point. Finally, we selected a set of 6 measurements that contributed strongly to the first C-score discriminant function, and calculated a second function based on these. This second function classified the case specimen unequivocally as male. This study highlights the fact that discriminant functions derived for sex determination and based on raw measurements will key on the size differences between males and females. Thus, large females and small males will systematically misclassify. For cases where such circumstances are suspected, we recommend the calculation of functions based on C-scores as an alternative approach.

Craniometrics, Discriminant Functions, Sex

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