



H44 Estimation Using Postcranial Measurements: A Validation Study of Spradley and Jantz on a White Population

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After attending this presentation, attendees will better understand the results and implications of a recent test of Spradley's and Jantz's postcranial classification rates for sex determination using two North American White collections.

This presentation will impact the forensic science community by demonstrating the accuracy of select univariate and multivariate postcranial measurements when determining sex on a large, known White sample.

A recent publication by Spradley and Jantz tested the accuracy of various discriminant functions using cranial and postcranial skeletal measurements from the Forensic Databank.¹ The purpose of the current study was to verify these univariate and multivariate postcranial formulas on individuals from two regionally diverse skeletal collections.

Thirty-five postcranial measurements were taken for 139 individuals from two documented skeletal collections in Canada and the U.S. Fifty-nine individuals (24 females and 35 males) were measured from the J.C.B. Grant Collection housed at the University of Toronto, and 80 individuals (35 female and 45 males) were measured from the collection housed at the Maxwell Museum in Albuquerque, New Mexico. Individuals in this study were between the ages of 18 and 101 years. As these collections are primarily composed of White adult individuals, only this ancestry group was tested in this study. Each collection was measured independently by the authors, and intra-observer tests were conducted on randomly selected sub-samples of the individuals used in this study.

Since most of the crania available were previously sectioned, only postcranial measurements could be tested. In total, 35 postcranial measurements which yielded accuracy rates of 80% or higher in the original study were used. Sectioning points were calculated in the same manner as that used by Spradley and Jantz. Once the sectioning points for each univariate and multivariate function were gathered, they were ranked in descending order and compared to the hierarchies published in the original study for the American White population.

The current study found that overall, the classification rates for both univariate and multivariate sex estimation functions are consistent with those reported by Spradley and Jantz. Of particular note are the accuracy rates achieved by the univariate humeral epicondylar breadth and the multivariate function for the scapula. Both of these functions yielded accuracy rates of 92% or above in both collections, suggesting these measurements are reliably applied to a wider sample of White individuals. Conversely, despite the fact that the univariate calcaneal accuracy rates are high between both studies' samples (Spradley and Jantz, 76% for calcaneal length and breadth; Maxwell sample, 82% and 74%, Grant sample, 60% and 71% for calcaneal length and breadth, respectively), the accuracy rate yielded by the original study for the multivariate calcaneal function (length and breadth) was nearly twice that of the validation sample's (Spradley and Jantz, 83%; Maxwell sample, 41%; and Grant sample, 44%); suggesting that an error may be associated with the original multivariate function.

The results of the current study strongly support and validate the claim set forth by the Spradley and Jantz equations, and shows that postcranial measurements can be reliably used to estimate the sex of unidentified individuals. Given these results, this paper hopes to justify a more widespread adoption of postcranial sectioning points for sex estimation within the forensic anthropology community.

Reference:

- ¹ Spradley MK, Jantz R. Sex estimation in forensic anthropology: skull versus postcranial elements. *J Forensic Sci* 2011;56(2): 289–96.

Sex Estimation, Postcranial Elements, Sectioning Points