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THE MEANING AND CONSEQUENCES OF MORPHOLOGICAL VARIATION

ABSTRACT

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Variation in cranial morphology has been controversial for a century or more, because of its historical connection to race. Boas's classic immigrant study conducted for the U.S. Immigration Commission in 1910 brought about the realization that cranial morphology is not stable and forced anthropologists to accept phenotypic plasticity as a component of human morphological variation. Many recent scholars, and Boas himself, have exaggerated the differences between immigrants and their American born children. The differences, although statistically significant, are small in relation to ethnic variation and do not obscure it. Moreover, the causes are more complex than simple exposure to an American environment, possibly including nutrition, break down of breeding isolation, and cultural factors such as treatment of infants.

Dramatic changes in the American environment since Boas's study provide anew the opportunity to examine environmental influences on morphology. Environmental changes include increase in nutritional quantity, reduced infant mortality and childhood disease, breakdown of breeding isolation, and reduced activity levels. Secular changes in cranial morphology were examined using over 1000 crania from individuals of known birth years, ranging from 1850 to 1975. Changes in cranial morphology in both American Whites and Blacks are profound, the cranium becoming higher and narrower. These changes are likely attributable to changes in growth of the cranial base, perhaps acting through timing of maturation. However, the changes do not erase or substantially alter Black-White differences, indicating that genetic variation is maintained. We cannot at present apportion causes between plasticity and genetic causes, but it is likely that both are involved.