

Partitioning of Dental Variation Within and Among Chimpanzee, Gorilla and Baboon Taxa: Implications for Taxonomy and Hominin Models

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In order to better comprehend the taxonomic diversity of early hominins, it is important to utilize models based on extant taxa whose variation can be well understood. The question is always whether to use close relatives such as chimpanzees and gorillas, which are known today only as spatially restricted populations, or to examine more distantly related forms such as baboons, which are widespread in environments comparable to those inhabited by early humans. In this study, dental variation in baboon taxa is compared with that in chimpanzees and gorillas to see how baboon models could contribute to understanding hominin taxonomy.

Wright's (1969) F_{st} is used to study the partitioning of variance within and among six baboon varieties (guinea, anubis, yellow, kinda, hamadryas and chacma). Length and breadth dimensions of molars from 221 individuals were used in the analysis. This was compared with 235 individuals of the genus *Pan*, from four taxa (*P. t. verus*, *P. t. troglodytes*, *P. t. schweinfurthi*, and *P. paniscus*) and 204 gorilla individuals from three subspecies (*Gorilla gorilla gorilla*, *G. g. graueri*, and *G. g. beringei*).

An assumption of equal population sizes and a heritability estimate of 0.5 leads to an F_{st} of 0.19 for baboons, indicating that 81% of variance occurs within baboon taxa. By comparison, the F_{st} for the subspecies of *P. troglodytes* and *G. gorilla* was 0.10 and 0.12, respectively. When *P. paniscus* was added to the *P. troglodytes* sample, the F_{st} rose to 0.20.

Baboon taxa are considered to be biological subspecies but phylogenetic species. Within-group variance in baboons is lower than in chimpanzee or gorilla subspecies, but it is comparable to the species of *Pan*. While the designation of subspecies fits with the observation that baboon taxa interbreed at the edges of their distribution, they are nonetheless distinct from each other, comparable to allopatric species of *Pan*. Given the greater diversity of baboon taxa compared to the African apes, they can serve as valuable models for hominin taxonomy.

Wright S. 1969. *Evolution and the Genetics of Populations. Vol. 2. The Theory of Gene Frequencies*. Chicago: University of Chicago Press.