

Science, Race and Politics

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Glance at any crowd, or watch people passing in the street. It is immediately apparent that people look different from one another. These differences beckon comparison and lead us to wonder how the amazing array of human features can be explained. Scientific efforts through the mid-twentieth century were grounded in the traditions of Linnaeus's taxonomy and when applied to human biological differences lead to formulating the concept of "race". However, we also know that scientists prior to the 1850s did not distinguish cultural practices from biologically inherited characteristics. Thus with the rise of genetics in the 1920s, scientists renewed their efforts to understand the heritability of human differences.

A variety of misperceptions of heritable characteristics persist for traits considered to be indicators of "race" in humans. Distinguishing the scientific evidence underlying human biological variation is a first step in addressing the fallacies inherent in "racial" concepts.

Most Traits Are Polygenic

Try clasping your hands. Intertwine your fingers with one thumb over the other, and note which thumb is on top. Now switch your thumbs, placing the other on top. Perhaps that feels a bit awkward? You may be surprised to learn that the position of your thumbs when you interlock your fingers is a heritable characteristic. Left thumb over right is inherited as the dominant feature controlled by a single gene loci. There are a handful of similar observable characteristics (e.g., tongue rolling, attached versus free-hanging earlobes, air whorls, earwax type) which are similarly controlled by single genes.

Such single gene characteristics tend to fall into discrete categories (e.g. you can either roll your tongue or you can't, you have either detached or attached earlobes). After nearly a century of inheritance studies, geneticists have been able to

identify very few specific biological traits which are determined by a single gene. The overwhelming major of physical traits are polygenic, that is determined by the complex interactions of multiple genetic units.

Polygenic traits also generally do not show discrete differences, rather they show continuous variation (like measuring stature). If we compare the differences in height between two human populations, we may find each population will have a different average height. However, we don't see all people over 6 feet in one population and all people shorter than 6 feet in the other. In other words, because height is measured as a continuous feature, we do not see distinct population differences (or boundaries) between biological features that are continuous. Since human biological features are overwhelmingly polygenic traits, such features do not provide us with clear ways of dividing humans into discrete groups, like races. With the recent mapping of the human genome, we are only now beginning to appreciate the levels of complexity involved in human inheritance.

Traits Are Not Linked

Lets look again at discrete traits. Say you clasp your left thumb over your right, can roll your tongue and have free-hanging earlobes. You possess the dominant trait for each of these characteristics. Now poll your family on these traits. Do both your parents show the same combination of dominant characteristics? Do your siblings? Cousins? Children? Probably not. Discrete traits are inherited independent of each other. Mendel demonstrated this as one of his basic principles of inheritance, that traits undergo independent assortment from one generation to the next. Thus, traits are not linked to each other (that is, they are not concordant). For polygenic traits, the picture is more complex since individually inherited traits form patterns of interaction dependent on which traits were inherited by a given individual. In addition, inherited traits can be greatly influenced by other factors. The complex of genes that contribute to your stature (your genotype) is also influenced by how well nourished you were in childhood. Your adult stature (your phenotype for stature), thus, is not solely a product of your inheritance.

Traits Don't Cluster into Population Categories

Biologists use a system of classification – a taxonomy – to distinguish among groups of

organisms. Cladistics is a statistical method which currently helps us to create these taxonomic distinctions statistically. However, any scheme of classification will arbitrarily formalize the distinctions between populations. “Racial” classifications fail on two major points. First, we are both unable to identify which traits create distinct classes as well as unable to identify how many traits are sufficient to distinguish biological coherent groups. Polygenic, non-concordant traits seldom create populations distributions which form readily distinguishable groups.

Second, when some trait differences are evident between groups, there is no cross-generational pattern which consistently yields statistically significantly and biologically meaningful differences. Cladistics statistically formalizes such distinctions between species; however, these distinctions are arbitrary boundaries which shift from one population study to the next. Well-bounded intra-species groups, especially for greatly morphologically variable species such as Homo sapiens, cannot be consistently identified.

Within Group Variation is Greater than Between Group Variation

We can choose a wide array of traits to compare human populations – e.g. simpler genetic traits such as hemoglobin variants and DNA markers, or complex traits such as environmental adaptations and anthropometric variation. Empirical studies of human diversity conducted since the 1970s consistently show that approximately 86% of the observed human variation occurs within groups. In other words, most of the biological variation we observe in humans occurs within a given population. Only 8% of the total observed variation occurs between groups and only 6% of the observed variation can be attributed to supposed “racial” distinctions. There is greater diversity within human groups than exists between any major geographic divisions of humans. For example, there is greater diversity within European populations or within African populations than exists when these groups are compared geographically.

In addition, empirical population studies indicate there are no sets of traits which distinguish one population from another. When we individually examine each studied trait, the observed “racial” distinctions cross-cuts the

study groups in different ways. In other words, no coherent array of traits allows us to consistently assign a person to one race or another. In addition, some individuals simply do not meet any “racial” criteria. Racial categorizations consistently fail to account for generationally shifting, nuanced differences in human biological diversity.

Skintone

Skintone remains the single human characteristic most identified with “racial” classifications. Studies since the 1930s have used reflectance spectrophotometry as an objective measure of variations in the skin pigment melanin. Geographic variations in skintone show a high positive correlation with latitude and exposure to ultraviolet radiation. However, skintone varies considerably within any given population. Though hormonal differences between males and females does not appear to significantly affect skintone, some studies suggest that skintone deepens during adolescence and adulthood, particularly for females. Studies of newborns show that skintone for each individual can vary by as much as 12%.

Evolutionary models suggest that dark skintones is directly related to the greater amounts of UV radiation near the equator and the longer daylight hours of exposure. Geographic gradations of skintone of indigenous populations have been described as clines by biological anthropologists. However, it is equally evident that there is considerable variation within any particular population and no discrete boundaries which define skin color. Given the evolutionary importance of melanin, it is not surprising that skin reflectance is a high heritable trait. Current research suggests there may be three major genes which influence melanin production. Other genetic loci are known to affect human skin pigmentation, which is consistent with the best skintone heritability estimate of about 0.66.

“Race” as a Social Construct

Scientific evidence overwhelming shows that biological differences in human populations the result of continuous variations of individual characteristics which form gradations from one population to the next. There are no clusters or genetically linked characteristics which form well-bounded discrete human

groups. Characterizations of “race” are thus purely social constructs. Even these divisive social distinctions are created and perpetuated very differently by various cultural groups. Thus, the history of “race” as a concept represents the creation of social categories for purposes of cultural subjugation and are not grounded in the empirical evidence of human biological variations.

Resources

A variety of useful resources exist which describe the history and social basis of “race”. The following are a few suggestions:

Race: The Power of an Illusion
www.pbs.org/race

An important web source with historical information, interviews, and teaching materials.

Mielke, J, L. Konigsberg and J. Relethford (2006) *Human Biological Diversity*, Oxford University Press, Oxford.

A useful current summary of the scientific evidence for human variation and how it is interpreted by scientists.

Alland, Alexander (2002) *Race in Mind: Race, IQ and Other Racisms* Palgrave-McMillina Press, Oxford

Highlights the issues of race and IQ and other fallacies of racial science.