

# The use of race, ethnicity, and ancestry in genomics research

National Academy of Sciences

March 11, 2022

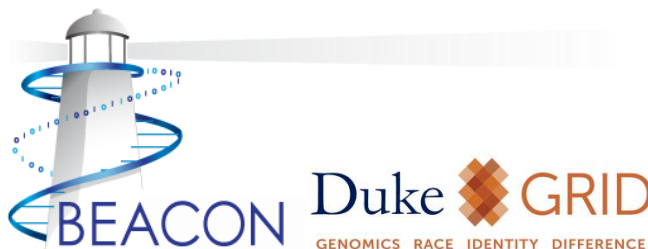
Dr. Joseph L. Graves Jr.\*

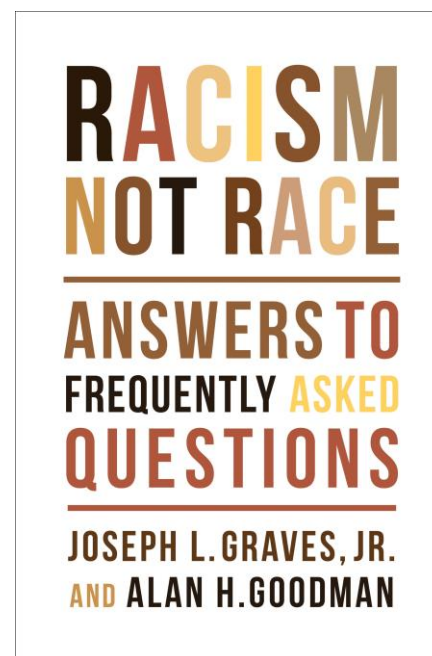
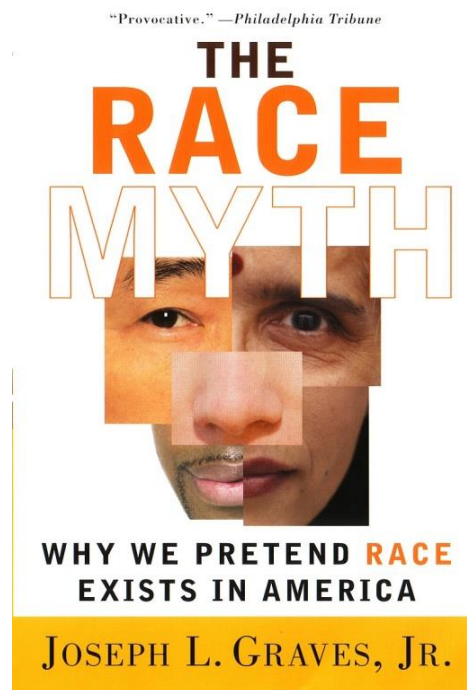
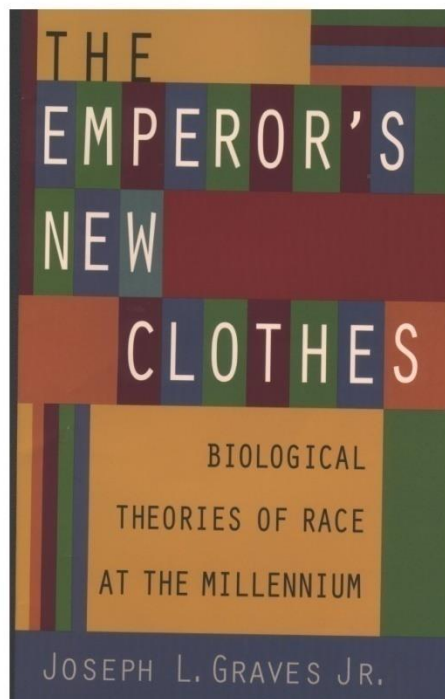
Professor of Biological Sciences

Department of Biology

North Carolina A&T State University & UNC Greensboro

\*Fellow, American Association for the Advancement of Science: Section G: Biological Sciences





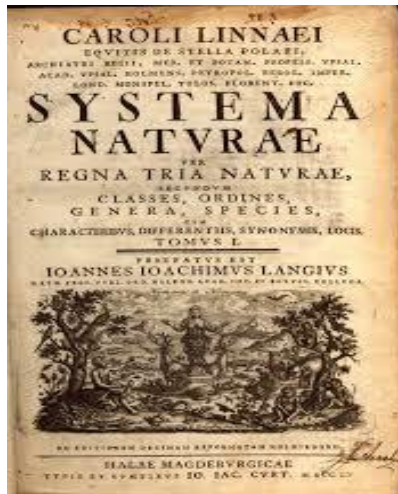
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- **Graves JL.** *A Voice in the Wilderness: A Pioneering Biologist Explains How Evolution Can Help Us Solve Our Biggest Problems* (NY: Basic Books), 2022 (In Press).
- **Graves JL,** Out of Africa: Where Faith, Race, and Science Collide, in *Critical Approaches to Science and Religion* (Myrna S., Rahgeb A. and Keel T. eds), Columbia University Press, 2022 (in press).
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- **Graves JL** and Goodman A. *Racism Not, Race: Answers to Frequently Asked Questions*, Columbia University Press, 2022, (December 7, 2021; <https://cup.columbia.edu/book/racism-not-race/9780231200660>).

# Race is not a scientific concept...

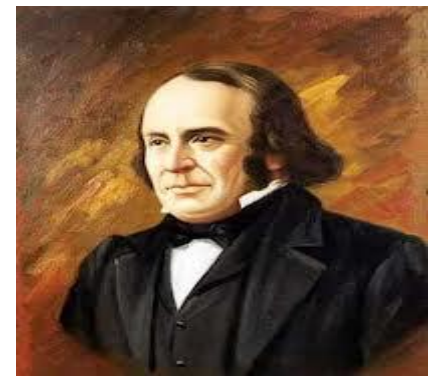
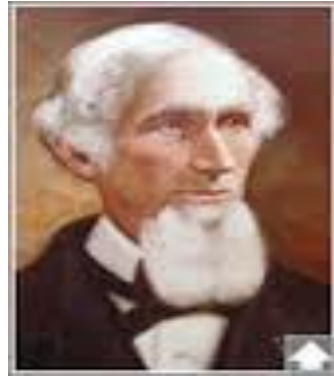
- This claim has become a platitude among humanities and social science scholars. It fails because it conflates two different concepts:
- **Biological Race Concept**
- Morphology (phenotype)
- Geographical location
- Population based (frequency of genes)
- Cladistic race (unique evolutionary lineage)
- ***Socially Constructed/Defined Race***: Arbitrarily utilizes aspects of morphology, geography, culture, language, religion, etc. in the service of a social dominance hierarchy.
- **Merrill 2017: *Introduction to Epidemiology* 7<sup>th</sup> Ed.** “Race is a socially constructed variable based on the idea that some human populations are distinct from others according to external physical characteristics or places of origin.”

# Carolus Linnaeus - 1735



- Introduced binomial classification system for organisms in *Systema Naturae* (1735.) In the 10<sup>th</sup> edition of this work (1758) he described four subspecies of humans: *Homo sapiens americanus*, the Americas; *Homo sapiens europaeus*, Europeans; *Homo sapiens asiaticus*, Asians; and *Homo sapiens afer*, Africans.
- He did not explain how or why these groups were different. He relied on morphological/behavioral features: Europeans are gentle, optimistic and inventive, while Asians are stiff and greedy.
- Linnaeus never left Europe; thus his judgments were based on information he received from traveler's reports.

# Four Horsemen of American Polygeny



- The major figures were **Samuel G. Morton**, **Josiah Nott**, **George R. Gliddon**, Charles Pickering, and **Louis Agassiz** advocated forms of pre-Adamism, or polygenism, for anthropological and archaeological reasons.
- Agassiz was the chief theorist (“zones of creation.”)
- Morton was the chief empiricist (craniometry measurements.)
- Nott (South Carolina, physician) and Gliddon (son of English businessman) were its chief propagandists (*Types of Mankind*, 1854; *Indigenous Races of the Earth* in 1857.)
- Nott was acclaimed throughout the south for his lectures on “niggerology.”



# 19<sup>th</sup> century naturalists

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- Darwin described what I call “the racial multiplication problem.”
- 2 – 63 races named depending upon the criteria.
- He reasoned that these physical differences could not be of great importance otherwise NS would have eliminated them
- *The Descent of Man and Selection in Relation to Sex* 1871.



## UNESCO Race Statements 1950

- July 18, 1950, The New York Times front page article: “No Scientific Basis for Race Bias Found by World Panel of Experts.”
- They were reporting of the United Nations Educational, Scientific, and Cultural Organization (UNESCO) statement on race.
- “Racial doctrine is the outcome of a fundamentally antirational system of thought and is in glaring conflict with the whole humanist tradition of our civilization. It sets at nought everything that UNESCO stands for and endeavors to defend.”
- Prior to the war the Institute for International Cooperation attempted to draft a similar document, as to not offend Hitler.
- The 1950 UNESCO statement was immediately denounced by Hans Gunther, Eugen Fischer, and Franz Lenz (Nazi race scientists who had escaped prosecution.)
- A definitive history of the UNESCO race documents is: *Postwar Anti-Racism: The United States, UNESCO, and “Race”, 1945 — 1968*; Dr. Anthony Q. Hazard, who was my student in this class in 1997.

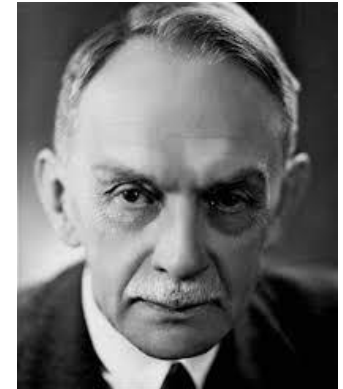


**Dr. Anthony Hazard**  
**Santa Clara University**



## UNESCO Statements 1951

- The 1950 committee had a total of 21 drafters and reviewers, none were from former Axis countries, 3 from former colonies, and 1 African American (historian E. Franklin Frazier, Duke U.)
- Several were humanists (historian, Frazier; sociologist, Gunnar Myrdal; psychologist, Otto Klinebert).
- The 1951 committee was composed of 14 anthropologists and geneticists from the USA and Europe (Dahlberg, Dunn, Montagu, Dobzhansky, and Huxley participated on both committees).
- The 1951 committee accepted the notion that humans can be arranged within biological races, but that not all human groups could be unambiguously fitted into racial classification schemes.
- Fritz Lenz stated that the 1950 UNESCO document ran against the “science of eugenics” and that the “psychical hereditary differences in between races were more important than the physical differences.” He still maintained that the Jews were a race distinguished by the former.



Fritz Lenz, Nazi race scientist.

# The Apportionment of Human Diversity

R. C. LEWONTIN

*Committee on Evolutionary Biology,  
University of Chicago,  
Chicago, Illinois*

## INTRODUCTION

groups that are genetically divergent. The alternative would be to use internal evidence only and establish the racial lines that maximize the similarity of the populations with races. The difficulty of such a procedure is that it has no end. The between-race component would be maximized if every population were made a separate race! Even a reasonable application of this method would

<https://magazine.scienceforthepeople.org/lewontin-special-issue/richard-lewontin-race-science/>

## Geographical races

- With the Neo-Darwinian synthesis (unification of NS with Mendelian genetics), evolutionary biologists questioned the origin, significance, and maintenance of geographical variation.
- Ernst Mayr noted that the term subspecies (equivalent to geographical race) had come into common usage in the 19<sup>th</sup> century replacing the notion of the variety.
- “The concept of subspecies is fallacious. Species are not composites of uniform subtypes—subspecies—but consist of an almost infinite number of local populations, each in turn (in sexual species) consisting of genetically different individuals. The difficulties of the subspecies concept are intensified if one considers the subspecies not merely as a practical device of the taxonomist, but also as a ‘unit of evolution’. The better the geographical variation of the species is known, the more difficult it becomes to delimit subspecies and the more obvious it becomes that many such delimitations are quite arbitrary.”



- E. Mayr, *Populations, Species, and Evolution*, 1974, pg. 210.



Sewall Wright in 1954; he was one of the primary architects of the Neo-Darwinian synthesis.

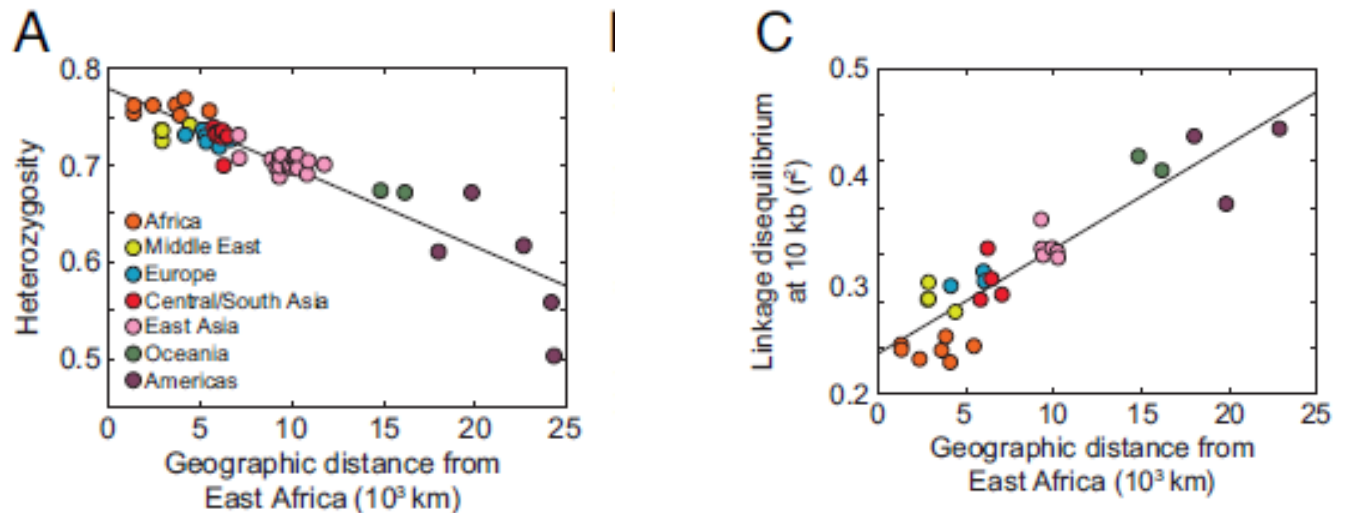
The definition of the term species in sexually reproducing forms began to shift from a designation of a kind of organism to one of a population within which there has been sufficient continuity of interbreeding so that there is intergradation of all characteristics...This is often in spite of such great morphological differences between inhabitants of remote localities as to suggest different species.

Wright S. *Evolution and the Genetics of Populations, Vol. 4: Variability Within and Among Natural Populations*, (U. Chicago Press), 1978.



# Isolation by distance

- Both the serial founder effect and Reich's local adaptation with admixture models are designed to explain the pattern of human genetic variation with geography.



More genetic variation, e.g. alleles means greater heterozygosity. This is because the HW equilibrium equation can be extended to > 2 alleles.

with 2:  $p^2 + q^2 + 2pq = 1.0$ ; with 3:  $p^2 + q^2 + r^2 + 2pq + 2pr + 2rq = 1.0$ .

DeGiorgio M, Jakobsson M, Rosenberg NA. Out of Africa: modern human origins special feature: explaining worldwide patterns of human genetic variation using a coalescent-based serial founder model of migration outward from Africa. *Proc Natl Acad Sci USA*. 2009 106(38):16057-62. doi: 10.1073/pnas.0903341106.