The Historical Origins of Scientific Racism

David Gresham
New York University
Discussion

1. How should we address the history of racism in science as scientists and educators?

2. Is there a meaningful way to classify people on the basis of their genetic relatedness?

3. How can we account for genetic differences without perpetuating biased and harmful practices?

4. What is the impact of the lack of diversity in the sciences on inequities and bias in biomedical research?
You have successfully activated your box!
You will receive a confirmation email or text. If you do not, please check your account settings and contact support.
Which of the following best describes your ethnic group? *

- Hispanic or Latino
- Not Hispanic or Latino
- Other / Unknown / Prefer not to answer

Which of the following best describes your race? Please select all that apply. *

- Native American
- Alaska Native
- Asian
- Black or African American
- Native Hawaiian
- Other Pacific Islander
- White
- Other / Unknown / Prefer not to answer
A minority group is a readily identifiable subset of the U.S. population that is distinguished by racial, ethnic, and/or cultural heritage.

Principal investigators should assess the theoretical and/or scientific linkages between sex/gender, race/ethnicity, and their topic of study.

The following definitions apply for ethnic categories.

- Hispanic or Latino - a person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race. The term "Spanish origin" can also be used in addition to "Hispanic or Latino."
- Not Hispanic or Latino

The following definitions apply for racial categories.

- American Indian or Alaska Native - a person having origins in any of the original peoples of North, Central, or South America, and who maintains tribal affiliations or community attachment.
- Asian - a person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam. (Note: Individuals from the Philippine Islands have been recorded as Pacific Islanders in previous data collection strategies.)
- Black or African American - a person having origins in any of the black racial groups of Africa. Terms such as "Haitian" or "Negro" can be used in addition to "Black or African American."
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NIH Policy and Guidelines on The Inclusion of Women and Minorities as Subjects in Clinical Research

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What is race?
What is race?

- American Association of Physical Anthropologists. 1996.

“...race has been accepted by academics as a social reality, not a biological one. Race affects how we live, but not who we are genetically.”

-Angela Saini
Lecture Overview

Race originated as scientific concept.

- 18th century - typological classification
- 19th century - justification for European superiority
- 20th century
  - Early 20th Century - rationale for discrimination and oppression though eugenics movement
  - Mid 20th Century - scientific justification for the Holocaust
  - Late 20th Century - refutation of scientific basis of Race
- 21st century - continued inclusion of race and ancestry in biomedical studies

Continuing appropriation of science for racist agendas

Current issues in the incorporation of genetic ancestry in biomedical studies

Discussion
Lecture Overview

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Appropriation of science for racist agendas and perpetuation of stereotypes

Current issues in the incorporation of genetic ancestry in biomedical studies

Discussion
Lecture caveats

- Archaic terminology
- The history of racism in science is abhorrent
- Focused on Europe and North America
- Information is reliant on primary and secondary sources
- Limited historical information on scientists who opposed scientific racism
- History of scientific racism is intertwined with social milieu
The Great Chain of Being and European Exploration
CAROLI LINNAEI
EQUITIS DE STELLA POLARI,
ARCHATRI REGII, MED. & BOTAN. PROFESS. USUAL.;
ACAD. USUAL. HOLMENS. PETROSEL. BEROL. IMPER.
LOND. MONTI. TOLOS. FLORENT. SOC.

SYSTEMA
NATURÆ
PER
REGNA TRIA NATURÆ,
SECUNDUM
CLASSES, ORDINES,
GENERA, SPECIES,
CUM
CHARACTERIBUS, DIFFERENTIIS,
SYNONYMIS, LOCIS.

TOMUS I.

EDITIO DECIMA, REFORMATA.

CUM PRIVILEGIO SUI REX ETI. SVEIN.

HOLMIAE,
IMPENSIS DIRECT. LAURENTII SALVII,
1735.
<table>
<thead>
<tr>
<th>Variety</th>
<th>Skin colour</th>
<th>Physical traits</th>
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<tbody>
<tr>
<td>Americanus</td>
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<td>Straight, black and thick hair; gaping nostrils; [freckled] face; beardless chin</td>
<td>Unyielding, cheerful, free</td>
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**Homo sapiens** are animals and comprise a single species

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[God] created one human, as the Holy Scripture teaches; but if the slightest trait [difference] was sufficient, there would easily stick out thousands of different species of man: they display, namely, white, red, black and grey hair; white, rosy, tawny and black faces; straight, stubby, crooked, flattened, and aquiline noses; among them we find giants and pygmies, fat and skinny people, erect, humpy, brittle, and lame people etc. etc. But who with a sane mind would be so frivolous as to call these distinct species? [3]
By 10th edition, Linnaeus’s categories became hierarchical and incorporated sociocultural factors and bias.

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https://www.linnean.org/learning/who-was-linnaeus/linnaeus-and-race
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10th edition included two additional human varieties

Homo monstrous - the Patagonian giant, the dwarf of the Alps, cone-headed Chinese and flat-headed Canadians

Homo Ferus - the wolf-boy of Hesse (*juvenis lupinus hessensis*), Peter of Hanover (*juvenis hannoveranus*), and the wild girl of Champagne (*Puella campanica*)
I. PRIMATES.

Their fore teeth are wedge-like, intended for cutting; those in the upper jaw are parallel, and four in number.

They have two paps situated on the breast.

1. MAN—H O M O.

Know thy self ῆ.

Sapiens Man.—1.—H. Sapiens.

Man forms a native of the countries within the Tropics, and dates were probably his original food. He has, however, become accustomed to the ills genial climates without the Torrid Zone, and now supports his existence by means of agriculture, adding animal food to that intended him by Nature.

This is the only species; he is endowed with wildom so superior to, or rather in exclusion of, all other animals. He varies from climate, education, and habits. Linnæus enumerates the following varieties.

Wild Men.—2.—H. Feri.

Walk on all fours, are dumb, and covered with hair ῆ.

1. A youth found in Lithuania, in 1761, resembling a bear.
2. A youth found in Hesse, in 1544, resembling a wolf.

* The name of this order may be translated Cetacea, as being the principal animals; hence it contains Man, and their animals which resemble him, especially in the circumstances of the teeth and manner, or teeth— ῆ.

† This noted Goring of Solomon is the first step towards the attainment of true wildom, and was formerly written, in letters of gold, on the temple of Dionysus.

‡ Their actions of wild men, and their destinies, are partly to be attributed to impulses, and in part to exaggration. Most probably ideas who had stayed from their friends, and who resembled the above animals only in imitating their voices— ῆ.

MAMMALIA.

PRIMATES.

Man. 45

5. A wild youth found, in 1724, in Hanover.
6. Wild boys found, in 1719, in the Pyrenees.
7. A wild girl found, in 1717, in Overolt.
8. A wild girl found, in 1711, in Champagne.

American.—9.—H. Americani.

Of copper coloured complexion, choleric constitution, and remarkably erect.

Their hair is black, long, and coarse; their limbs are wide; their features hasty, and the chin is firmly supplied with beard. Are obstinate in their temper, fierce, and finished with their condition; and are regulated in all their proceedings by traditional customs.—Paint their skins with red streaks.

European.—7.—H. Europæi.

Of fair complexion, fagous temperment, and brawny form.

The hair is flowing, and of various shades of brown; the eyes are mostly blue.—Of gentle manners, acute in judgment, of quick invention, and governed by fixed laws.—Dread in close settlements.

African.—1.—H. Africani.

Of fiery complexion, melancholic temperment, and rigid fibre.

The hair is fiery, black, and lank; the eyes dark brown.—Of grave, lavish, and constant manners. Governed by opinions.—Dread in loose settlements.

* English translation 1792 using genus - species - sub-species trinomial nomenclature entrenched sub-species concept
Johann Blumenbach, founder of comparative zoology and anthropology
“On the Natural Variety of Mankind” (1795)

Typology of human races
- the Caucasian or white race
- the Mongolian or yellow race
- the Malayan or brown race
- the Ethiopian or black race
- the American or red race
Blumenbach’s classification was hierarchical and he advanced the degenerative hypothesis.

Typology of human races
- the Caucasian or white race
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“I have allotted the first place to the Caucasian...[as I]...esteem it the primeval one. This diverges in both directions ...into the Ethiopian, and...Mongolian. The remaining two occupy intermediate positions between the primeval one and these two extreme varieties.”
Blumenbach introduced the term “Caucasian”

“Caucasian variety: I have taken the name of this variety from Mount Caucasus...[because]...it produces the most beautiful race of men, I mean the Georgians...the greatest probability to place the autochthones of mankind.”

“That stock displays...the most beautiful form of the skull...it is white in color...the primitive color of mankind...easy for that to degenerate into brown, but much more difficult for brown to become white, when the secretion and precipitation of this carbonaceous pigment...has once deeply struck root.”

Blumenbach, “On the Natural Variety of Mankind”
On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life - 1859
"But the most weighty of all the arguments against treating the races of man as distinct species, is that they graduate into each other, independently in many cases, as far as we can judge, of their having intercrossed"
"But the most weighty of all the arguments against treating the races of man as distinct species, is that they graduate into each other, independently in many cases, as far as we can judge, of their having intercrossed"

At some future period, not very distant as measured by centuries, the civilized races of man will almost certainly exterminate, and replace, the savage races throughout the world. - Darwin, Descent, vol. I, 201.
Francis Galton introduced the concept of eugenics.

What nature does blindly, slowly and ruthlessly, man may do providently, quickly, and kindly. As it lies within his power, so it becomes his duty to work in that direction.
RELEASE THE STRANGLE-HOLD OF HEREDITARY DISEASE AND UNFITNESS

A Eugenics Society poster (1930s). Image from the Wellcome Library.
“I shall make frequent use of the law of deviation from an average…I shall assume the intervals between the grades of ability are the same in all races...

...a result which again points to the conclusion, that the average intellectual standard of the negro is some two grades below our own.”

“The ablest race of whom history bears record is unquestionably the ancient Greeks”
Eugenics rapidly developed in US academic institutions in the early 20th century

“Positive” eugenics - the promotion of marriages and matings that would result in children with desirable traits

“Negative” eugenics - called for preventing the reproduction of genetically unfit, possibly by state-enforced sterilization.

If the state had the right to take away life, why shouldn’t the state have the right to prevent undesirable births.
Eugenic scientists advanced racist ideas

“One often sees in mulattos an ambition and push combined with intellectual inadequacy which makes the unhappy hybrid dissatisfied with his lot and a nuisance to others…

Miscegenation commonly spells disharmony.

A hybridized people are a badly put together people and a dissatisfied, restless, ineffective people.”

-Davenport 1917

“The effects of race intermingling”
Eugenics was taught as cutting edge science in academic institutions providing scientific rationale for racist policies.

Chapter XIV: The color line

“Relative intelligence of Negroes and Whites (1916 study by Ferguson)”

- pure Negros scored 69.2% as high as whites
- Mulattoes scored 81.2% as high as whites
- Quadroons obtained 91.8% of white score

“The negro is out of his environment...[i]n the United States he is much less “fit”, in the Darwinian sense...[and is] eugenically inferior”

“Society - white society - long ago reaches the instinctive conclusion...that it must put a ban on intermarriage between the two races”
Eugenics in the USA

Certificate awarded to `meritorious exhibits' at the Second International Congress of Eugenics, held in 1921 at the American Museum of Natural History in New York.

Eugenics in the USA

Fitter Families contestants at the 1924 Georgia State Fair in Savannah. American eugenicists used state fairs as a venue for popular education, and judged “human stock” to select the most eugenically fit family in contests such as this one. (Credit: American Philosophical Society. Noncommercial, educational use only.)
Eugenics in the USA

Justification for:

- Immigration restrictions
- Anti-miscegenation laws
- Compulsory Sterilization
  - African American
  - Latina
  - Native American

“State executive agency for carrying out eugenic sterilization,” circa 1935. (Credit: The Harry H. Laughlin Papers, Truman State University)
The Nazi incorporated eugenic ideas in racial hygiene

“Rassenhygiene” - the scientists who provided the scientific backing were respected university professors ...of the Kaiser Wilhelm Society (KWS), the predecessor of the Max Planck Society.
The USA eugenics movement inspired and informed Nazi policies.
Scientists and science provided justification for Nazi atrocities
Anti-racist scholars, Franz Boas and Ashley Montagu, spearheaded the 1950 UNESCO Statement on Race

The importance which the problem of race has acquired in the modern world scarcely needs to be pointed out. Mankind will not soon forget the injustices and crimes which give such tragic overtones to the word “race”.

The original statement was drafted at Unesco House, Paris, by the following experts:

- Professor Ernest Beaglehole, New Zealand
- Professor Juan Comas, Mexico
- Professor L. A. Costa Pinto, Brazil
- Professor Franklin Frazier, United States
- Professor Morris Ginsberg, United Kingdom
- Dr. Humayun Kabir, India
- Professor Claude Levi-Strauss, France
- Professor Ashley Montagu, United States (Rapporteur).

The text was revised by Professor Ashley Montagu, after criticism submitted by Professors Hadley Cantril, E. G. Conklin, Gunnar Dahlberg, Theodosius Dobzhansky, L. C. Dunn, Donald Hager, Julian S. Huxley, Otto Klineberg, Wilbert Moore, H. J. Muller, Gunnar Myrdal, Joseph Needham, Curt Stern.

https://unesdoc.unesco.org/ark:/48223/pf0000128291
The committee asserted human equality based on four premises:

1. the mental capacities of all races are similar,
2. no evidence exists for biological deterioration as a result of hybridization,
3. there is no correlation between national or religious groups and any particular race, and
4. “race was less a biological fact than a social myth,” and that biology proved the “universal brotherhood of man.”
The Apportionment of Human Diversity - Richard Lewontin 1972

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<th>Locus</th>
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<tr>
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<td>Tamils-Lacandon</td>
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<td>Lipoprotein</td>
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6-Phosphogluconate Dehydrogenase (6PGD)  
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 Duffy (Fy)  
 Lewis (Le)  
 Kell (K)  
 Lutheran (Lu)  
P  
MNS  
Rh  
ABO

Inclusive List of All Populations Used For Any Gene in this Study by the Racial Classification Used in this Study

<table>
<thead>
<tr>
<th>Caucasians</th>
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<table>
<thead>
<tr>
<th>Black Africans</th>
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<table>
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<tr>
<th>Mongoloids</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Aino, Bhitane, Bogobos, Blondes, Burutis, Chinese, Dyaks, Filipinos, Ghanaian, Indonesians, Japanese, Javanese, Khitais, Koreans, Lappis, Makays, Senoy, Siamese, Taiwanese, Tatars, Thais, Turks</td>
<td></td>
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</tbody>
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<table>
<thead>
<tr>
<th>South Asian Aborigines</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Andamanese, Badagas, Chechu, Irala, Marathas, Nairs, Orons, Onge, Tamils, Todas</td>
<td></td>
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<table>
<thead>
<tr>
<th>Amerinds</th>
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<table>
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<tr>
<th>Oceania</th>
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<table>
<thead>
<tr>
<th>Australian Aborigines</th>
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</thead>
<tbody>
<tr>
<td>Amerinds, Australia, Australia, Toda</td>
<td></td>
</tr>
<tr>
<td>Oraons, Toba</td>
<td></td>
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</tbody>
</table>
The results are quite remarkable. The mean proportion of the total species diversity that is contained within populations is 85.4%, with a maximum of 99.7% for the Xm gene, and a minimum of 63.6% for Duffy. Less than 15% of all human genetic diversity is accounted for by differences between human groups! Moreover, the difference between populations within a race accounts for an additional 8.3%, so that only 6.3% is accounted for by racial classification.
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It is clear that our perception of relatively large differences between human races and subgroups, as compared to the variation within these groups, is indeed a biased perception and that, based on randomly chosen genetic differences, human races and populations are remarkably similar to each other, with the largest part by far of human variation being accounted for by the differences between individuals.

Human racial classification is of no social value and is positively destructive of social and human relations. Since such racial classification is now seen to be of virtually no genetic or taxonomic significance either, no justification can be offered for its continuance.
Genetic Structure of Human Populations


We studied human population structure using genotypes at 377 autosomal microsatellite loci in 1056 individuals from 52 populations. Within-population differences among individuals account for 93 to 95% of genetic variation, differences among major groups constitute only 3 to 5%. Nevertheless, without using prior information about the origins of individuals, we identified six main genetic clusters, five of which correspond to major geographic regions, and subclusters that often correspond to individual populations. General agreement of genetic and predefined populations suggests that self-reported ancestry can facilitate assessments of epidemiological risks but does not obviate the need to use genetic information in genetic association studies.
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Major population genetic studies to characterize genetic diversity within and between populations

1990s - Human Genome Diversity Project (HGDP)
2000s - Haplotype map (Hap Map)
2010s - 1000 genomes (1KGP)
Terminology in late 1900s/early 2000s scientific studies reflects attempt to distance research from race science

Geographic populations

Continent of origin

Biodiversity

Admixed populations

Ancestry

Genetic ancestry

Ethnic groups

Self-reported race
Racism in science has persisted since WWII
How does contemporary culture appropriate scientific findings related to human genetic variation?
Racist ideologies are informed by scientific discoveries

Identification of a variant associated with adult-type hypolactasia

A SNP in the gene encoding lactase (LCT) (C/T-13910) is associated with the ability to digest milk as adults (lactase persistence) in Europeans.

Enattah et al., 2002 *Nature Genetics*
Racist ideologies are informed by scientific discoveries

Convergent adaptation of human lactase persistence in Africa and Europe

Tishkoff et al., 2007 Nature Genetics
Ancestry.com advertisement: Winter Olympics February 2018

Discover where your family is from without even leaving your living room.

Only $99

Buy now
Impact of the COVID pandemic highlights racial health disparities

Nationwide, Black people have died at 1.4 times the rate of white people.

Deaths per 100,000 people by race or ethnicity through March 7, 2021

- Black or African American: 178
- American Indian or Alaska Native: 172
- Hispanic or Latino: 154
- Native Hawaiian or Other Pacific Islander: 144
- White: 124
- Other: 97
- Asian: 95
- Two or more races: 18

https://covidtracking.com/
What is the impact of ignoring differences in human genetic variation?
People of European ancestry comprise 90% of genome-wide association studies (GWAS) subjects.
The promise of personalized medicine is negatively impacted by biased sampling of GWAS study participants.
Summary

- Race originated as a scientific concept
- Science was used as justification for racist policies for several hundreds of years
- Scientists played a key role in advocating and advancing racist policies
- Following WWII scientists rejected the biological concept of race
- Race is now considered a social construct
- The classification of humans based on a conflation of ancestry, physical characters, genetics, and social factors remains an unresolved issue in science and medicine
Disproportionate representation of racial groups in academic sciences

Tilghman et al., Science 2021
Acknowledgement

Graduate Biology Group (GBG)
Biology Department Anti-racist Reading Group
NYU Biology staff, postdocs and students
Wei Ji Ma
Discussion

1. How should we address the history of racism in science as scientists and educators?

2. Is there a meaningful way to classify people on the basis of their genetic relatedness?

3. How can we account for genetic differences without perpetuating biased and harmful practices?

4. What is the impact of inadequate diversity in the sciences on inequities and bias in biomedical research?