



[Lack of] Human Diversity

Debriefing

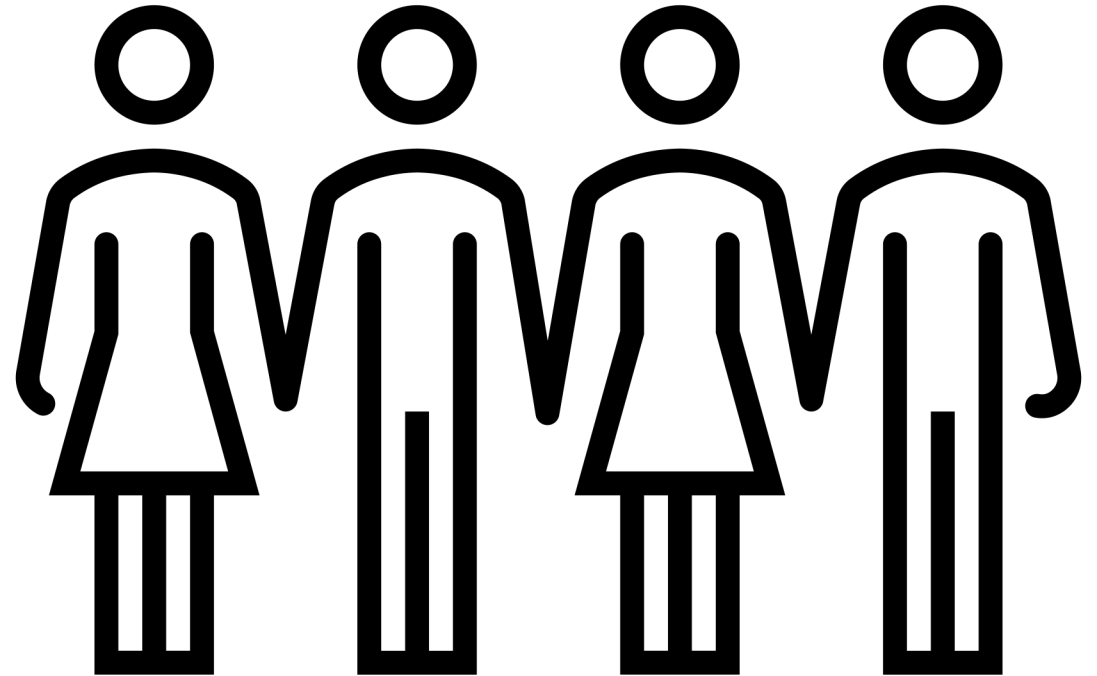
BE KIND

BE RESPECTFUL

EXERCISE EMPATHY

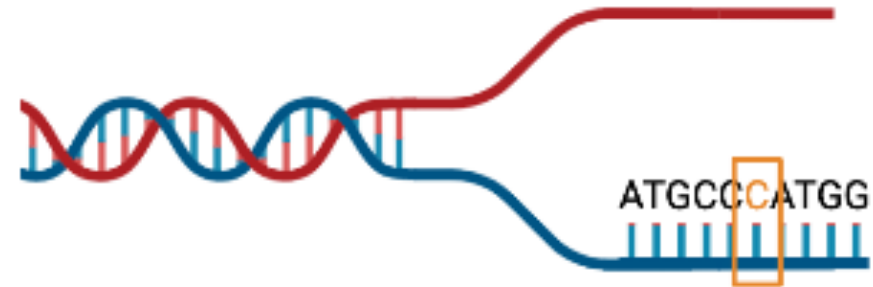
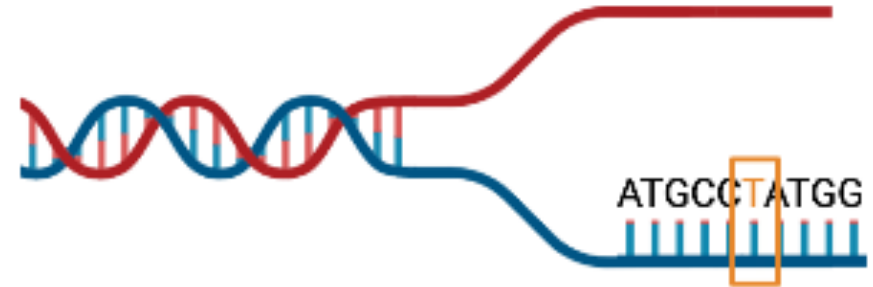
Modern Humans

- 170,000 years
- Least amount of genetic variation (0.1%)
- Most Genetic Variation:
 - Split Gill Mushroom – 20% variation
- Mutations are initial source of variation



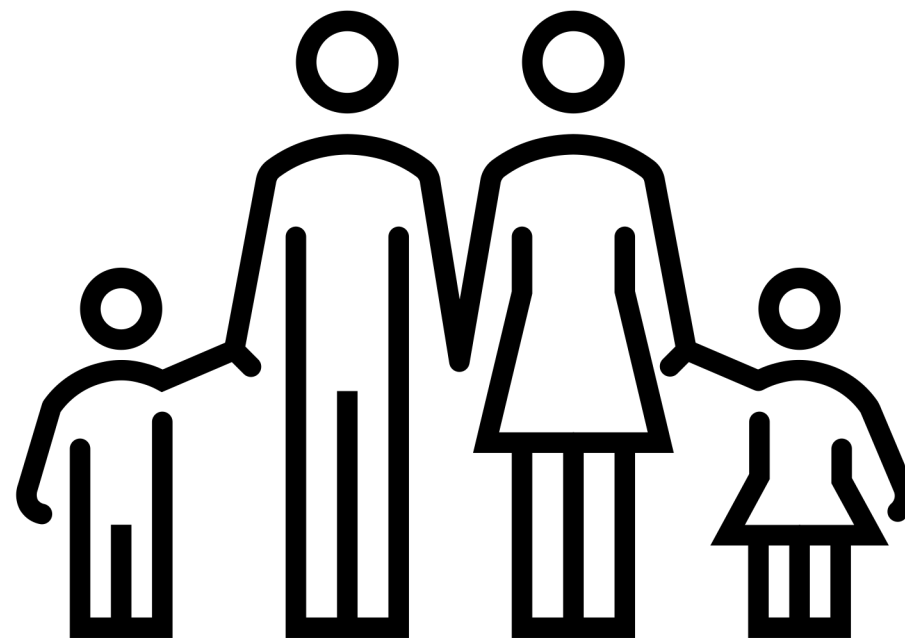
SNPs

- **Single** nucleotide changes
- 23 & me uses ~690,000
- Ancestry.com > 700,000
- 4-5 million SNPs in human genome
- >3,200,000,000 bases in human genome

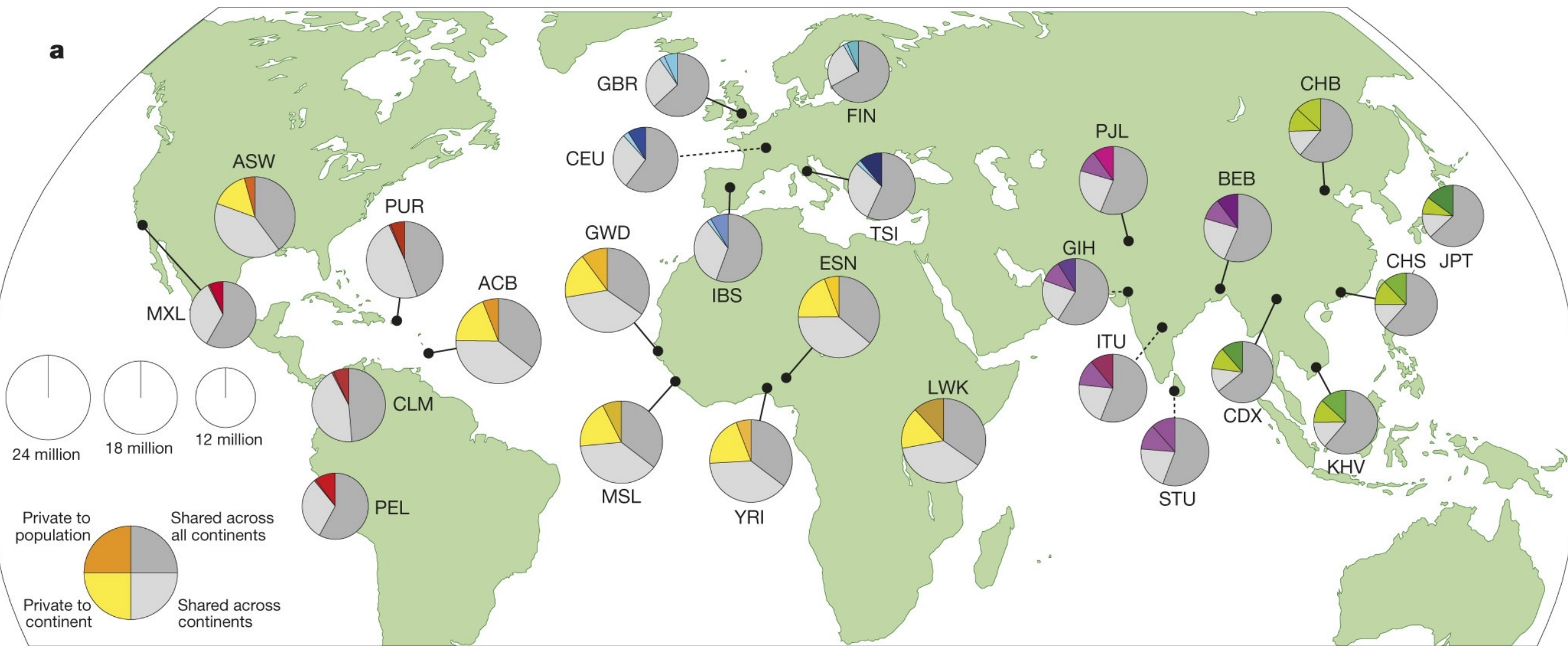


Of the Little Human Variation

- Most – neutral
- Some – affects phenotype
- Other – Ancestry informative markers
- More Variation within Populations than Between Population



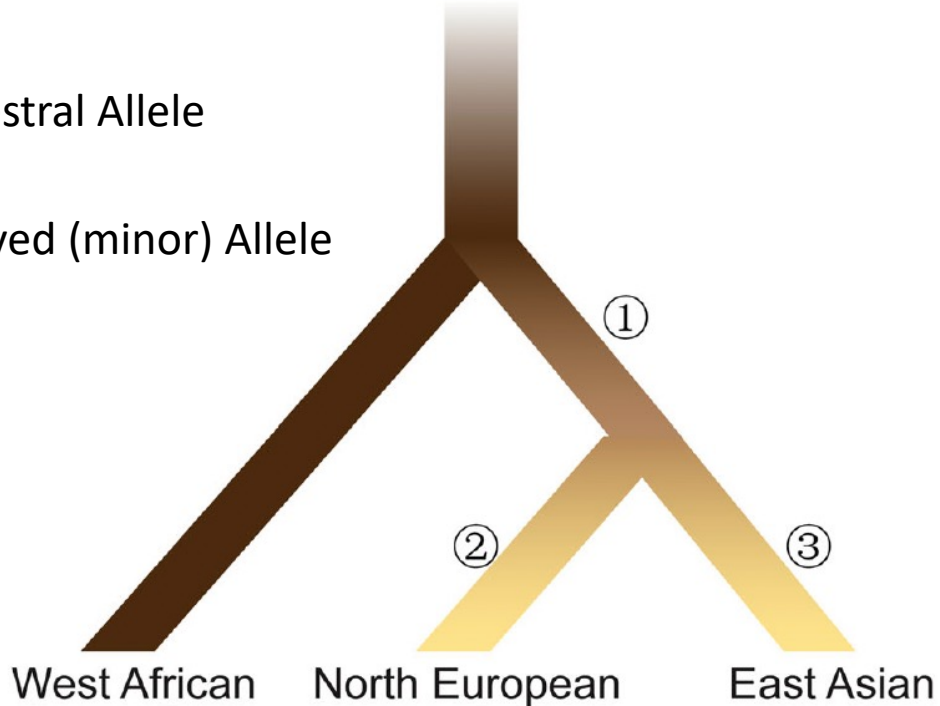
a



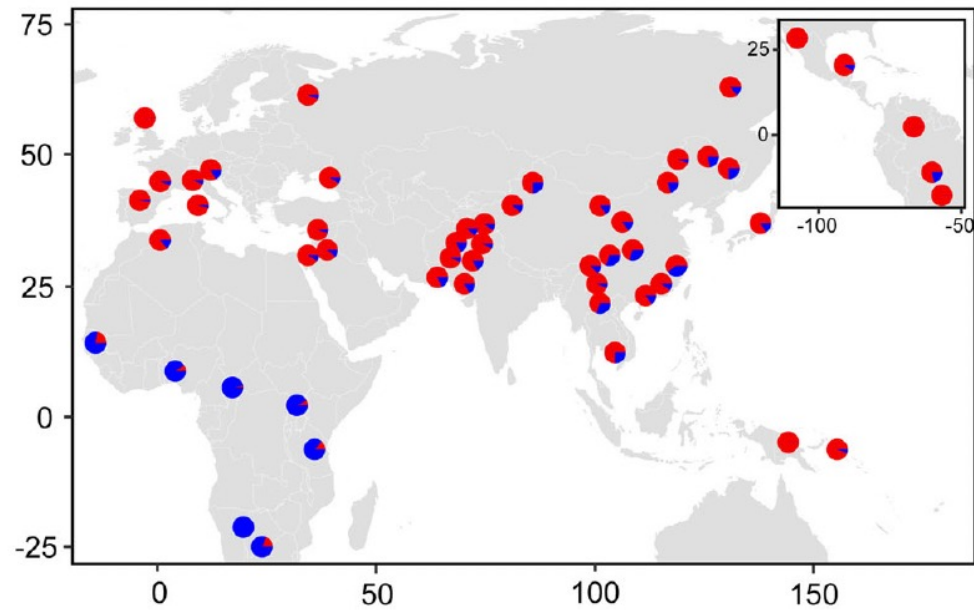
Which two populations are the most similar genetically?

1. Italians and Swedes
2. Italians and Ethiopians
3. Saudi Arabians & Ethiopians
4. Senegalese and Kenyans
5. Chinese and Lakota (Sioux)

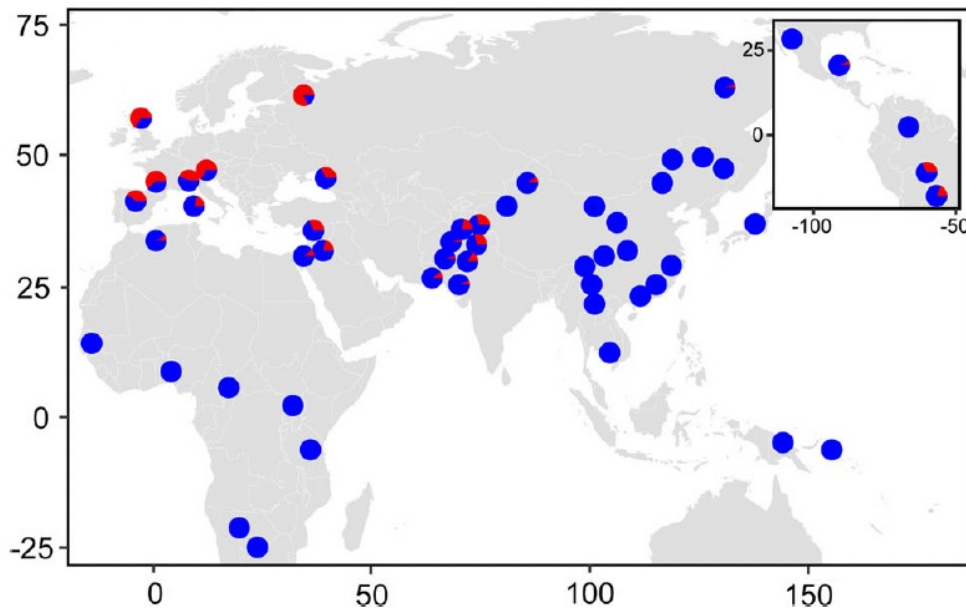
- Ancestral Allele
- Derived (minor) Allele



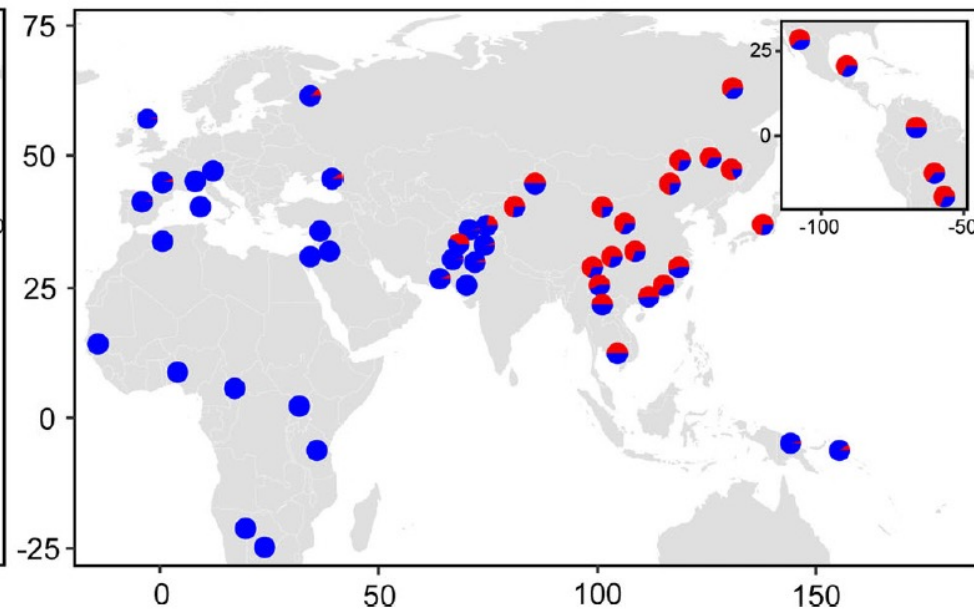
① *KITLG* (rs1881227)



② *OCA2* (rs12913832)



③ *MC1R* (rs885479)



Skin Pigmentation

- Determined by Melanin
- Eumelanin (brownish black pigment)
- Pheomelanin (Reddish-yellow pigment)
- More melanin = Darker skin
- UV protectant
- Unsure of what caused skin pigmentation evolution
 - Theory: Darker skin protects from UV rays
Lighter skin allows for more vitamin D

Skin Pigmentation

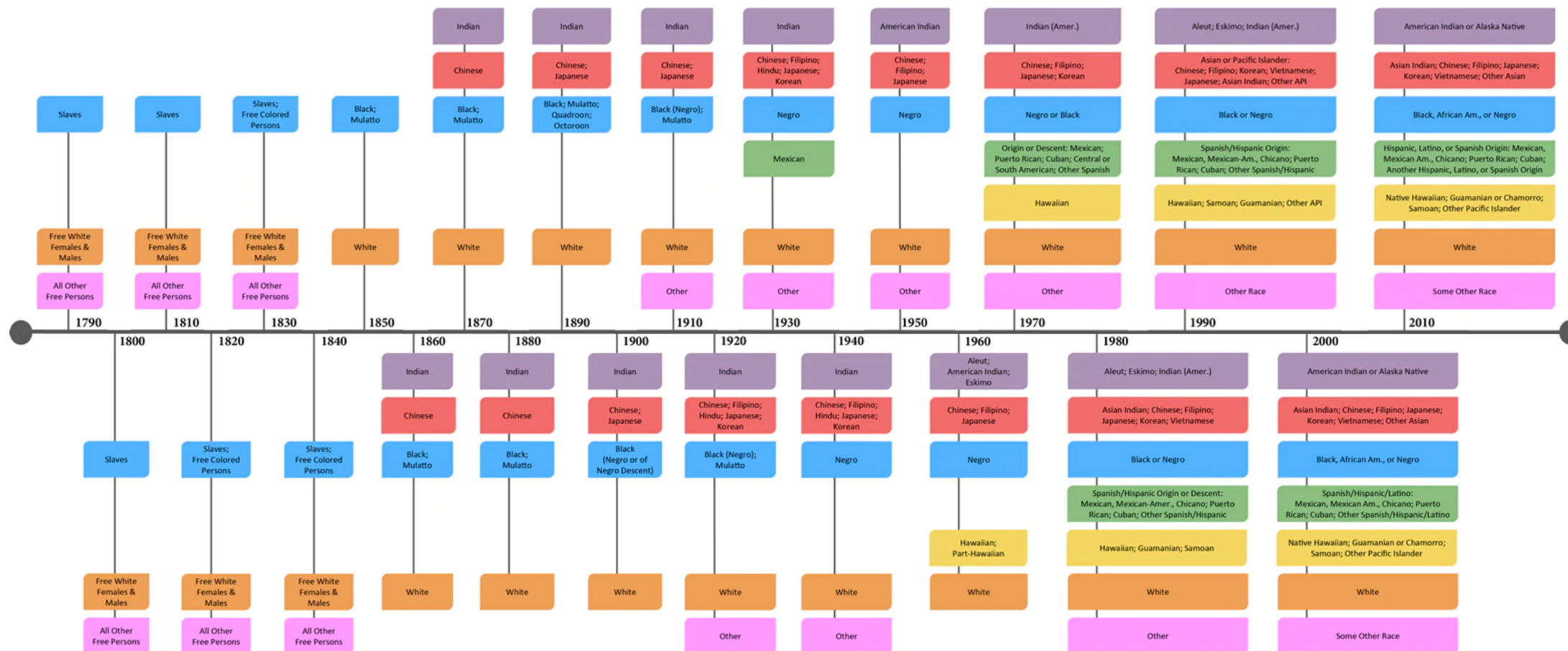
- Unknown how many SNPs are involved
 - Meta-Analysis Study found more than 543 published SNPs
- Many SNPs in noncoding regions have a regulatory effect
- Dozens of genes control how much and what type
- Complex system not fully understood
- Skin color is not an indicator of any other genetic trait

History of RACE

- Polygenists – Races are different Species
- Attempt to use biological features
 - Skull
 - Blood type
 - Skin color
 - Other genetic markers
- All failed to separate humans by race

Measuring Race and Ethnicity Across the Decades: 1790–2010

Mapped to 1997 U.S. Office of Management and Budget Classification Standards



Gibson, Campbell, and Kay Jung. 2002. "Historical Census Statistics on Population By Race, 1790 to 1990, and By Hispanic Origin, 1790 to 1990, For The United States, Regions, Divisions, and States."

Humes, Karen, and Howard Hogan. 2009. "Measurement of Race and Ethnicity in a Changing, Multicultural America."

Humes, Karen R., Nicholas A. Jones, and Roberto R. Ramirez. 2011. "Overview of Race and Hispanic Origin: 2010."

Office of Management and Budget. 1978. "Statistical directive no. 15: Race and ethnic standards for federal agencies and administrative reporting."

Office of Management and Budget. 1997. "Revisions to the standards for the classification of federal data on race and ethnicity."

U.S. Census Bureau History Questionnaires. (2014, March 31).

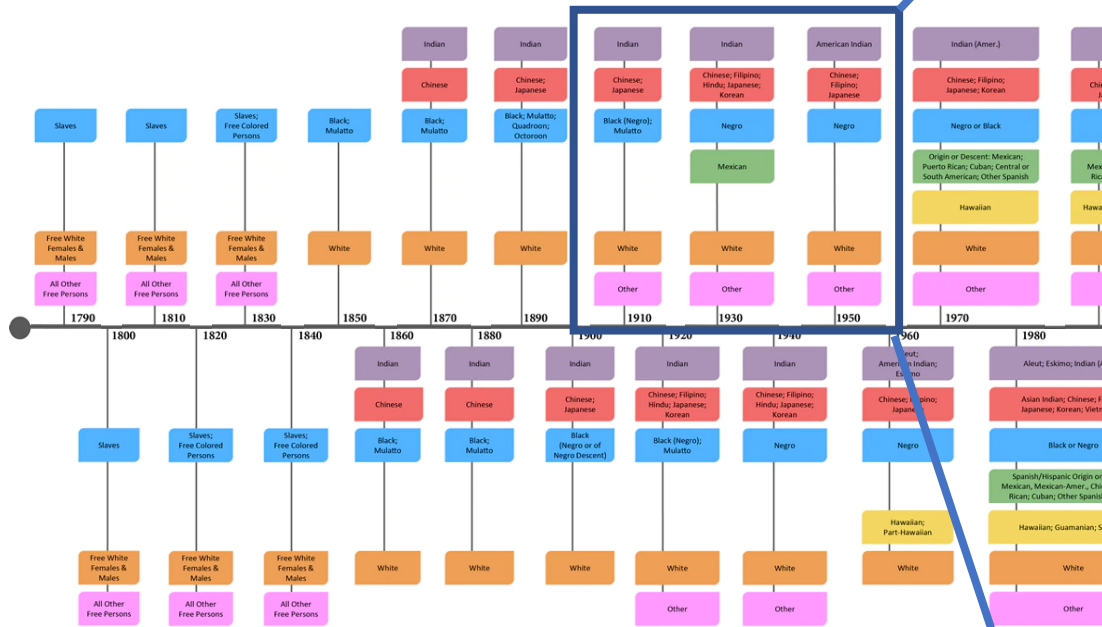
Authors:
Beverly M. Pratt, Lindsay Hixson, and Nicholas A. Jones
Population Division | U.S. Census Bureau

Infographic:
"MEASURING RACE AND ETHNICITY
ACROSS THE DECADES, 1790-2010"

https://www.census.gov/data-tools/demo/race/MREAD_1790_2010.html

Measuring Race and Ethnicity Across the Decade

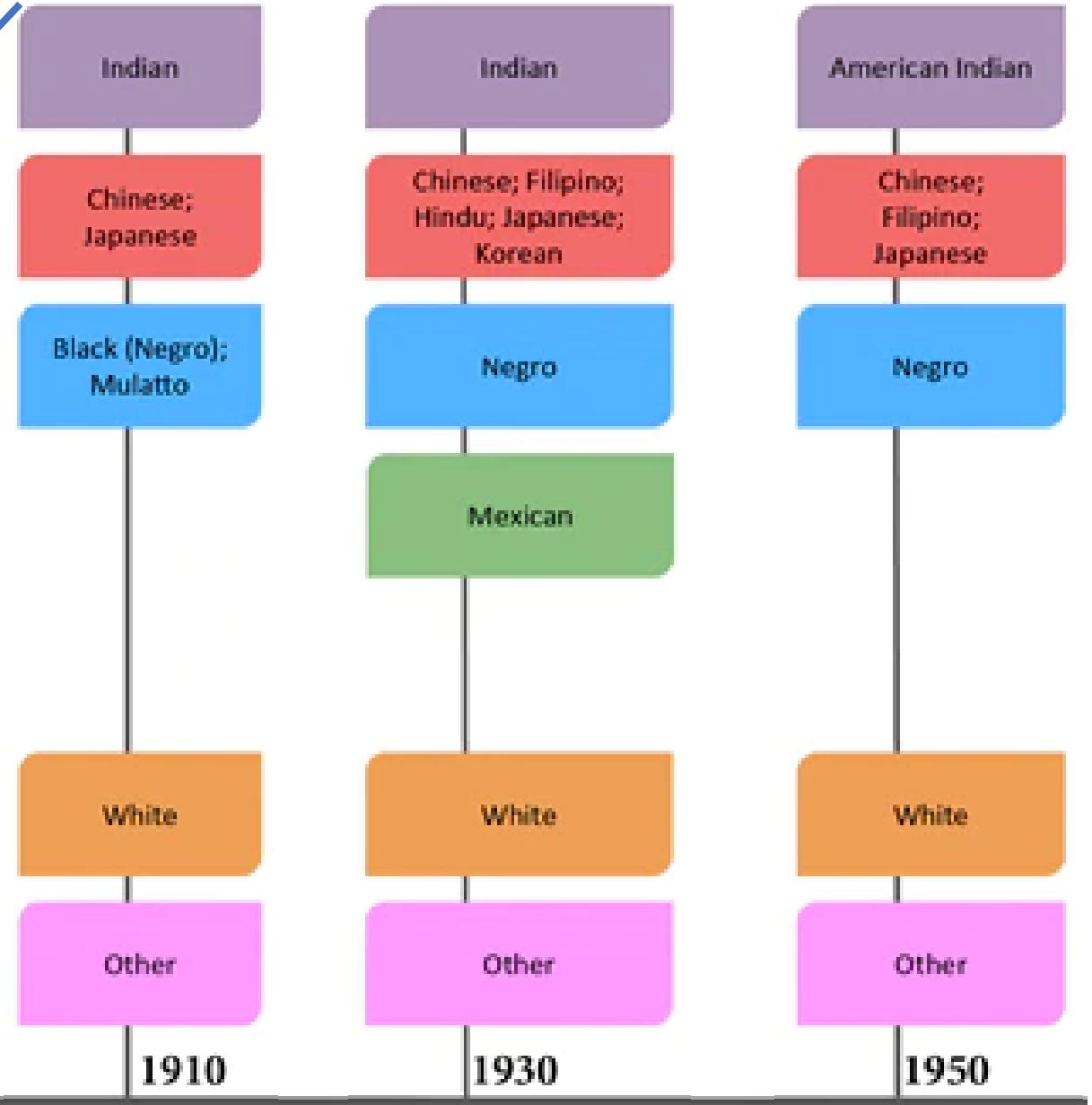
Measuring Race and Ethnicity Across the Decades: 1790-1990
 Mapped to 1997 U.S. Office of Management and Budget Classification Standards



Gibson, Campbell, and Kay Jung. 2002. "Historical Census Statistics on Population By Race, 1790 to 1990, and By Hispanic Origin, 1790 to 1990, For The United States, Regions, Divisions, and States." [Humes, Karen, and Howard Hogan. 2009. "Measurement of Race and Ethnicity in a Changing, Multicultural America."](#) [Humes, Karen R., Nicholas A. Jones, and Roberto R. Ramirez. 2011. "Overview of Race and Hispanic Origin: 2010."](#) Office of Management and Budget. 1978. "Statistical directive no. 15: Race and ethnic standards for federal agencies and administrative reporting." Office of Management and Budget. 1997. "Revisions to the standards for the classification of federal data on race and ethnicity." U.S. Census Bureau History Questionnaires. (2014, March 31).

Authors:
 Beverly M. Pratt, Lindsay Hixson, and Nicholas A. Jones
 Population Division | U.S. Census Bureau

CONNECT WITH US



https://www.census.gov/data-tools/demo/race/MREAD_1790_2010.html

What is RACE?

A **social** construct that artificially divides people into distinct groups based on certain characteristics such as physical appearance, ancestral heritage, cultural affiliation, cultural history, ethnic classification

Race isn't real!

- No **genetic** basis
- Biological siblings can be described as different races
- Who is considered in race category changes over time (LOTS!)
- Used to support claims of superiority
 - * Enslavement
 - * Genocide
 - * Eugenics
- Misused with good intentions
 - Healthcare

Why is RACE Relevant?

- Racism is real
- Affects opportunities
 - Healthcare access and quality
 - Social economic status

Colorblindness

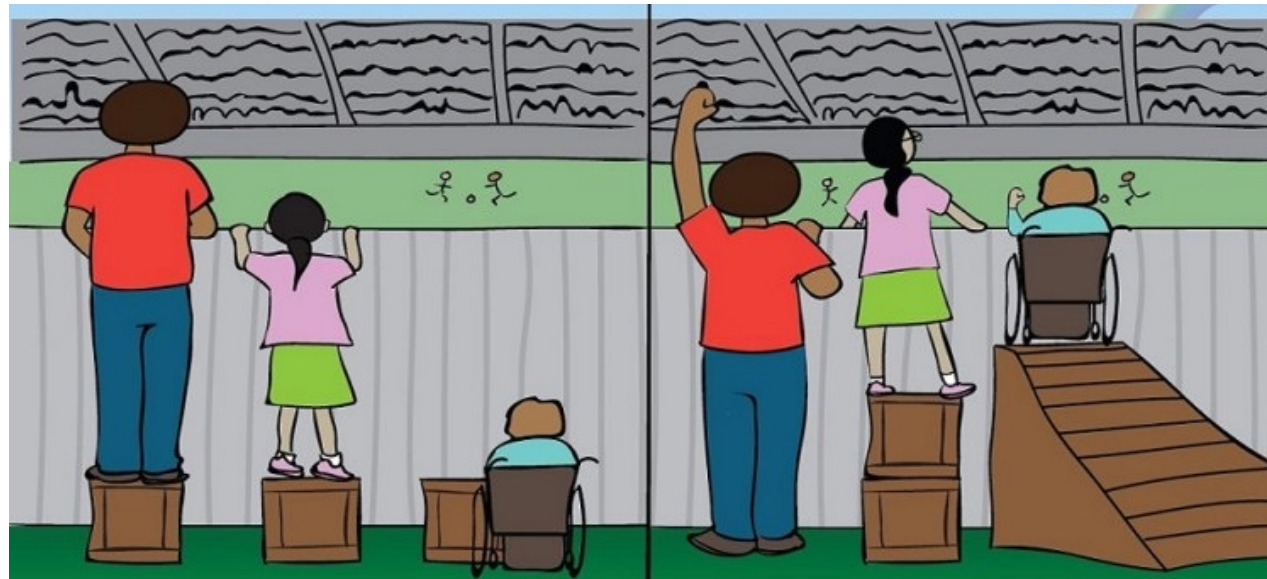
Equality

Equity

- Race should not and does not matter
- Ignores that racism still exists
- Does not yield equality or equity

- Accepts that we are different – but provides equal resources

- All given resources needed for equal outcome
- Accepts that we are different



What is Ethnicity

A **social** construct that divides people into smaller social groups based on characteristics such as shared sense of group membership, values, behavioral patterns, language, political and economic interests, history and ancestral geographical base

Why is Ethnicity Relevant?

- Discrimination
- Community with shared interests
- It contributes to your identity

What is Ancestry?

- line of descent : lineage
- Those people that share the most genetic information with you

Why is Ancestry Relevant?

- Understanding your family history
- Medical history
 - Sickle Cell – ancestors from regions where Malaria was common
 - More prevalent in Greece than South Africa

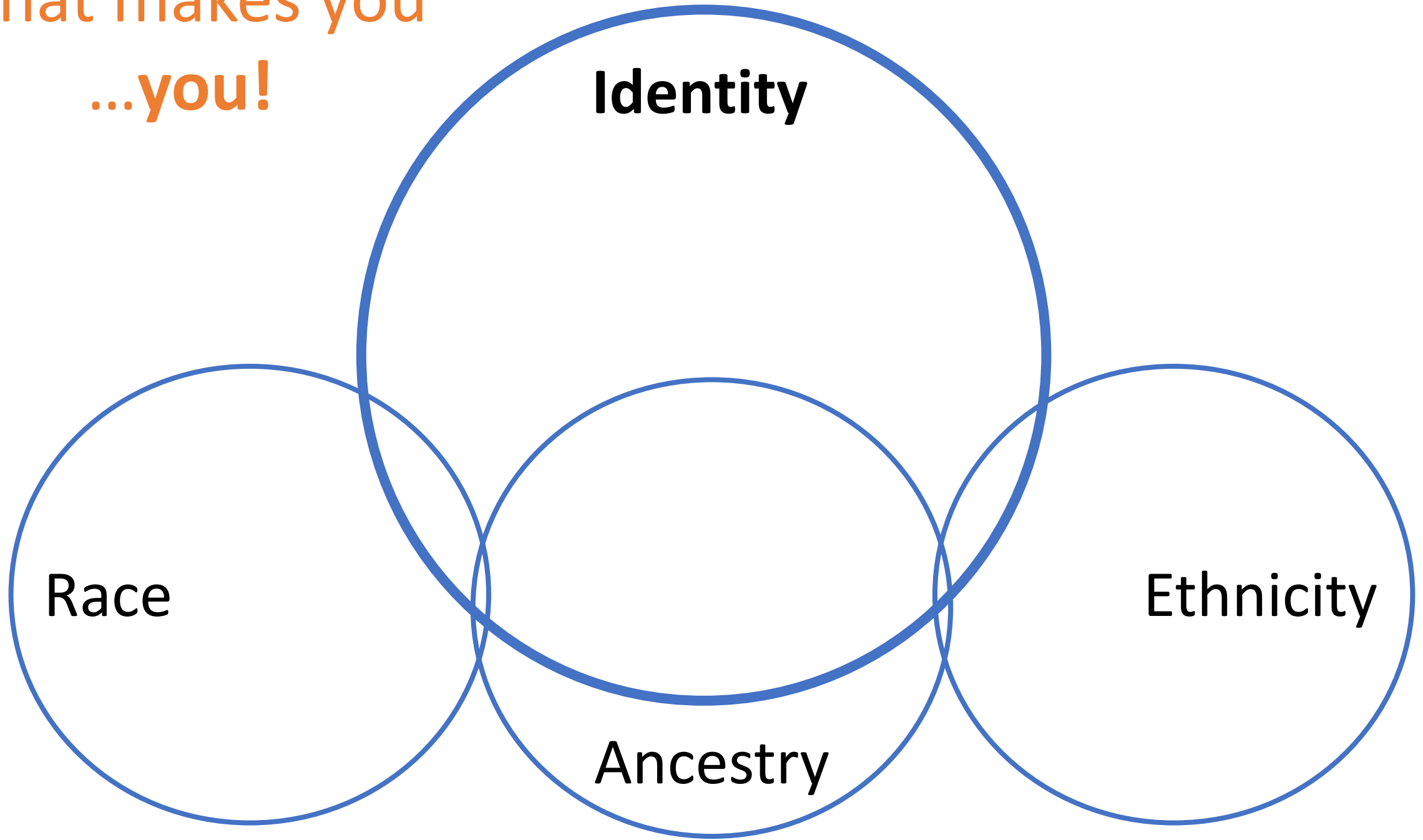
What is Identity?

The qualities, beliefs, etc., that make a particular person or group different from others

What Makes up Identity?

- Gender
- Religion
- Ethnicity
- Family
- Likes
- Dislikes

What makes you
...you!



References

- Deng L, Xu S. Adaptation of human skin color in various populations. *Hereditas*. 2017 Jun 15;155:1. doi: 10.1186/s41065-017-0036-2. PMID: 28701907; PMCID: PMC5502412.
- <https://www.ancestry.com/lp/traits/skin-pigmentation>
- <https://www.ucl.ac.uk/biosciences/departments/genetics-evolution-and-environment/research/molecular-and-cultural-evolution-lab/debunking-genetic-astrology/understanding-genetic-ancestry-testing>
- <https://www.nature.com/scitable/topicpage/dna-sequencing-technologies-key-to-the-human-828/#:~:text=Thanks%20to%20the%20Human%20Genome,pairs%20in%20the%20human%20genome>
- <https://www.livescience.com/most-genetically-diverse-species.html>
- <https://www.ashg.org/wp-content/uploads/2019/09/genetic-variation-essay.pdf>
- The 1000 Genomes Project Consortium. A global reference for human genetic variation. *Nature* **526**, 68–74 (2015). <https://doi.org/10.1038/nature15393>
- Ganguly K, Saha T, Saha A, Dutta T, Banerjee S, Sengupta D, Bhattacharya S, Ghosh S, Sengupta M. Meta-analysis and prioritization of human skin pigmentation-associated GWAS-SNPs using ENCODE data-based web-tools. *Arch Dermatol Res*. 2019 Apr;311(3):163-171. doi: 10.1007/s00403-019-01891-3. Epub 2019 Feb 13. PMID: 30756169.