



“Timing” the Human Race

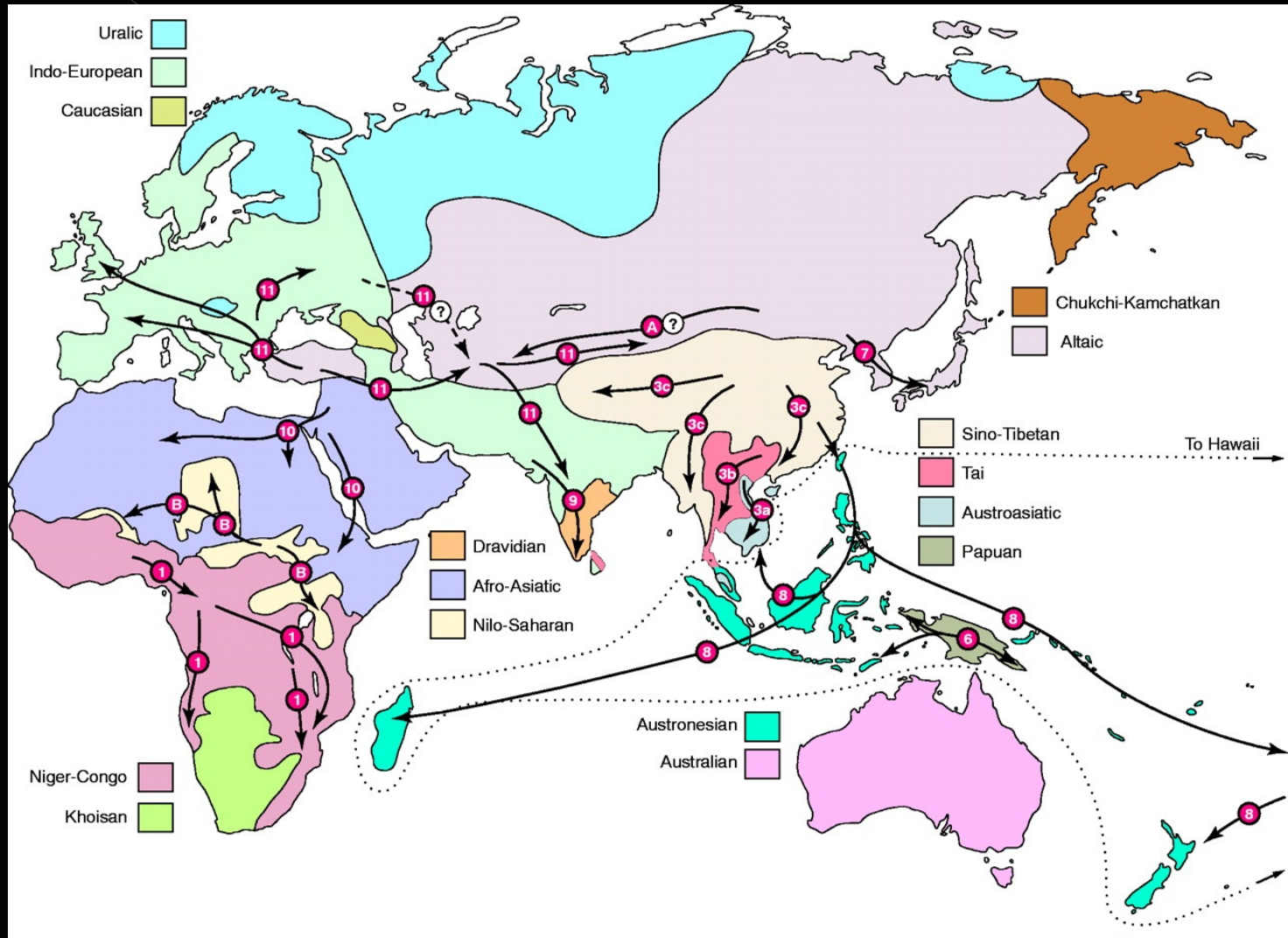
Mutation,
Migration,
& Diversity

Diversity Theories: Myths

“Go to, let us go down, and there confound their language, that they may not understand one another's speech.”

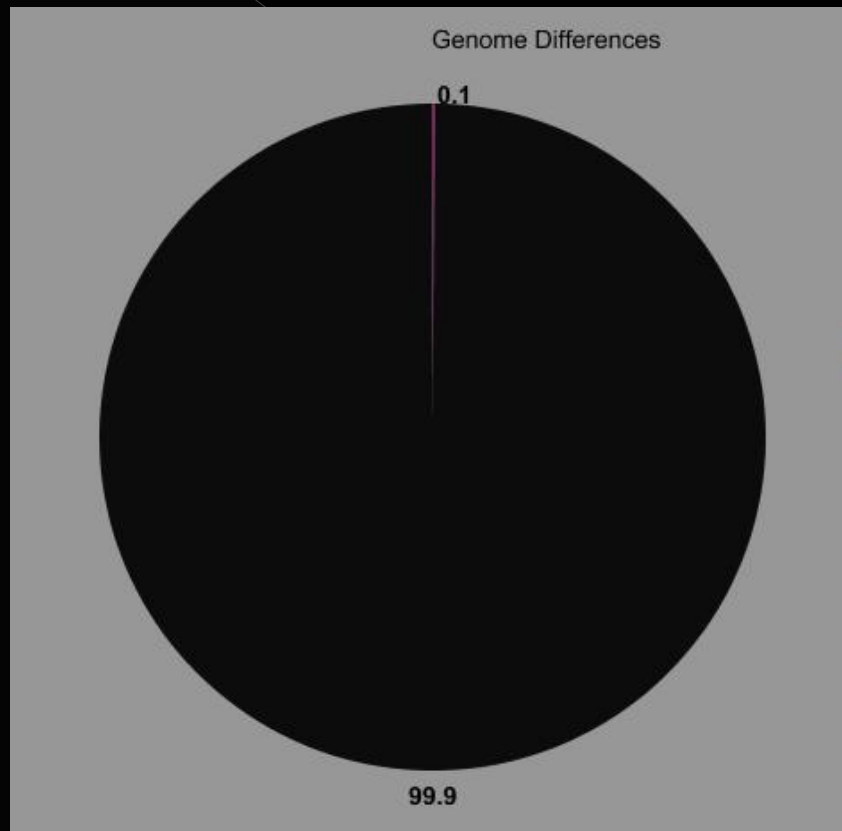


Diversity Theories: Language

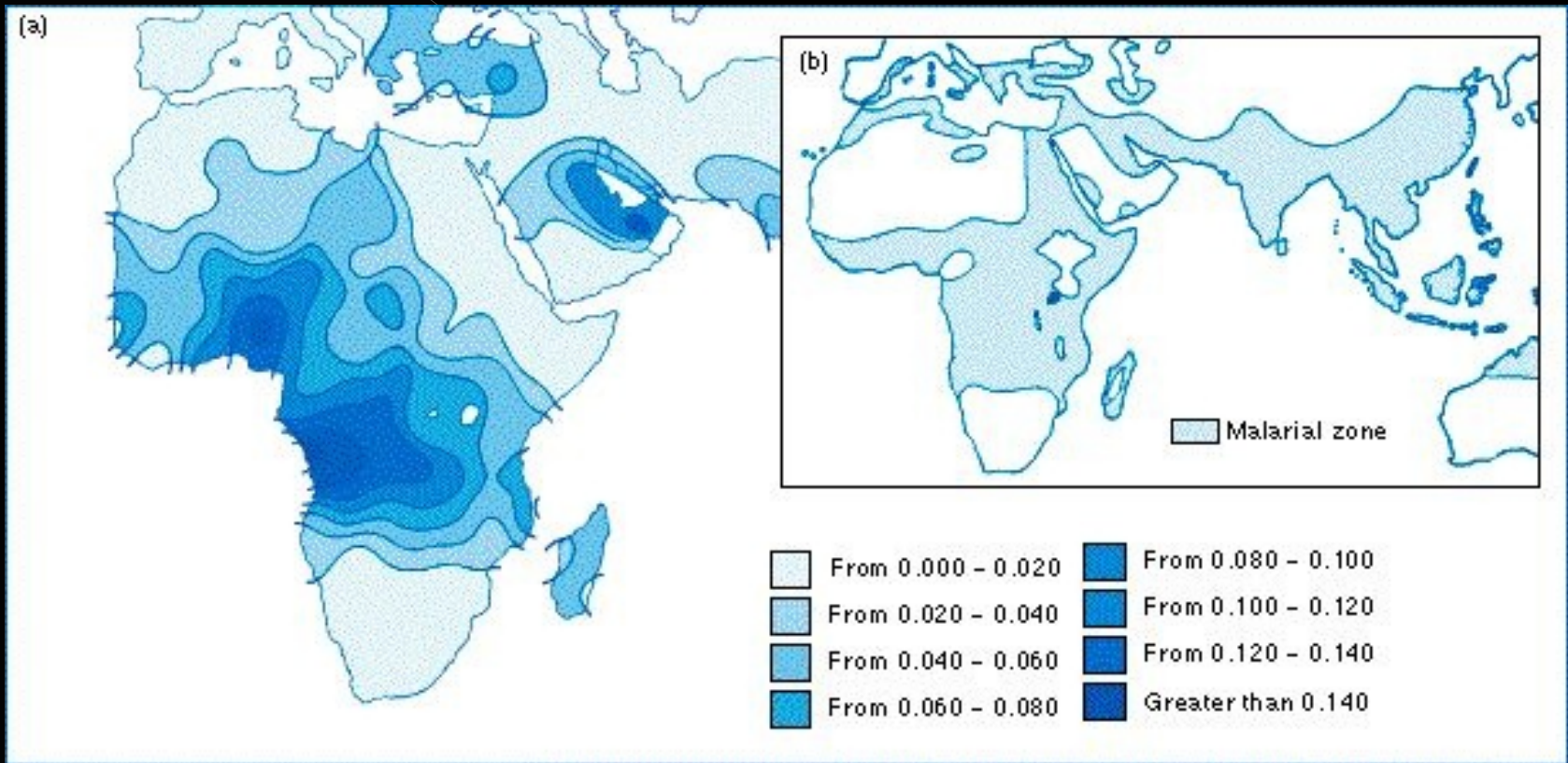


How different are we?

- ◉ .1% difference between two individuals

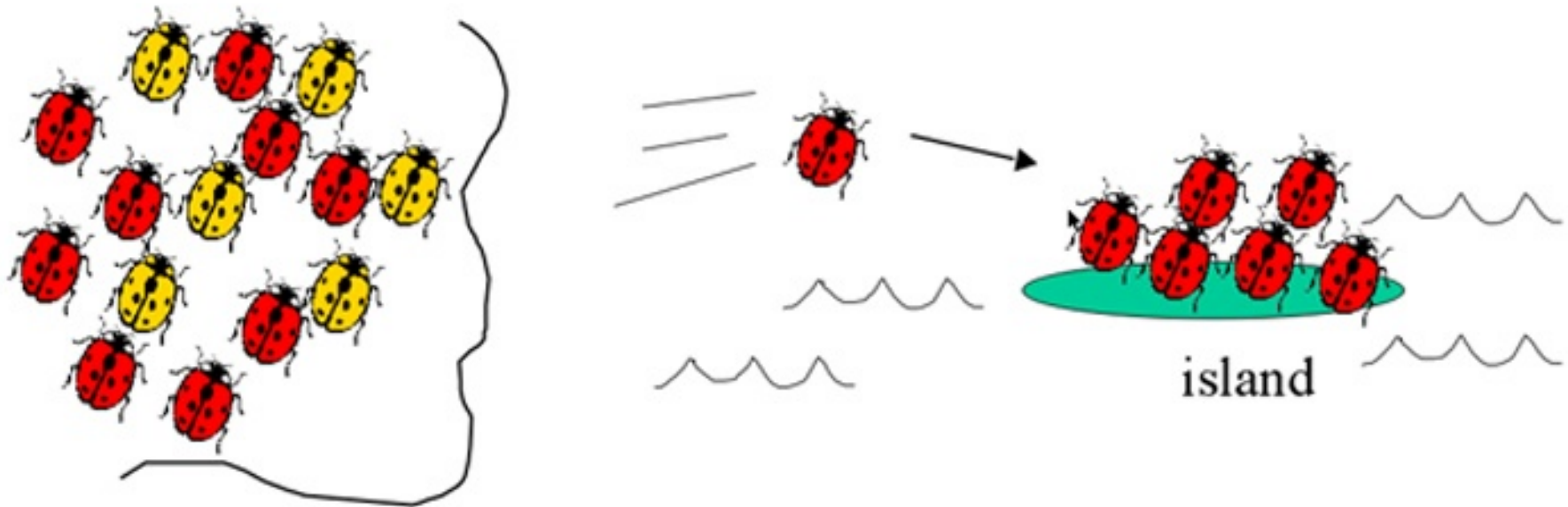


The Origin of Variation – Natural Selection



The Origin of Variation – Founder Effect

- **founder effect:** a few individuals from a population start a new population with a different allele frequency than the original population



Genetic Distance

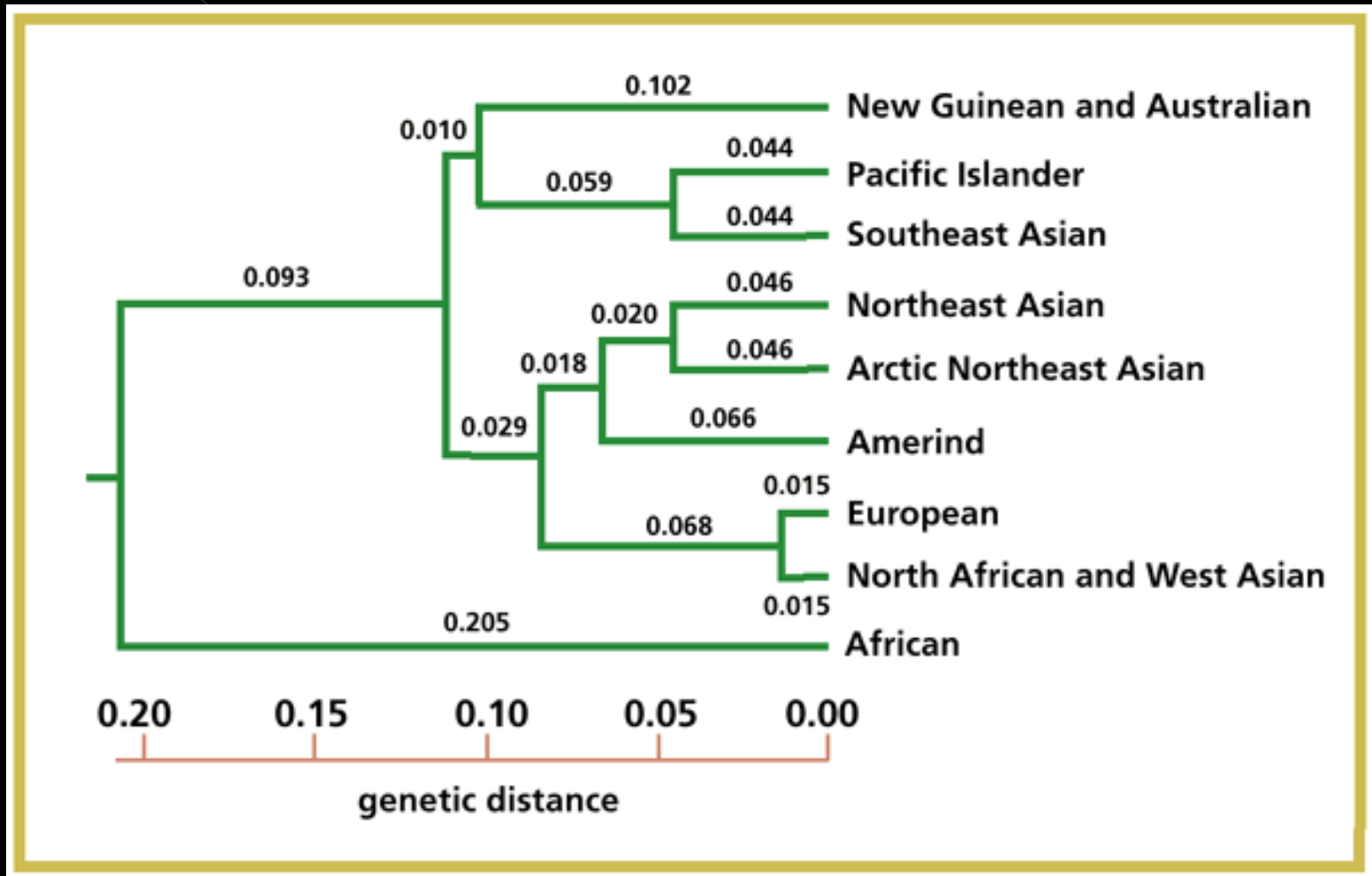
- ◉ aka, fixation index
- ◉ “comparison of genetic variability within and between populations”

$$F_{ST} = \frac{\Pi_{\text{Between}} - \Pi_{\text{Within}}}{\Pi_{\text{Between}}}$$

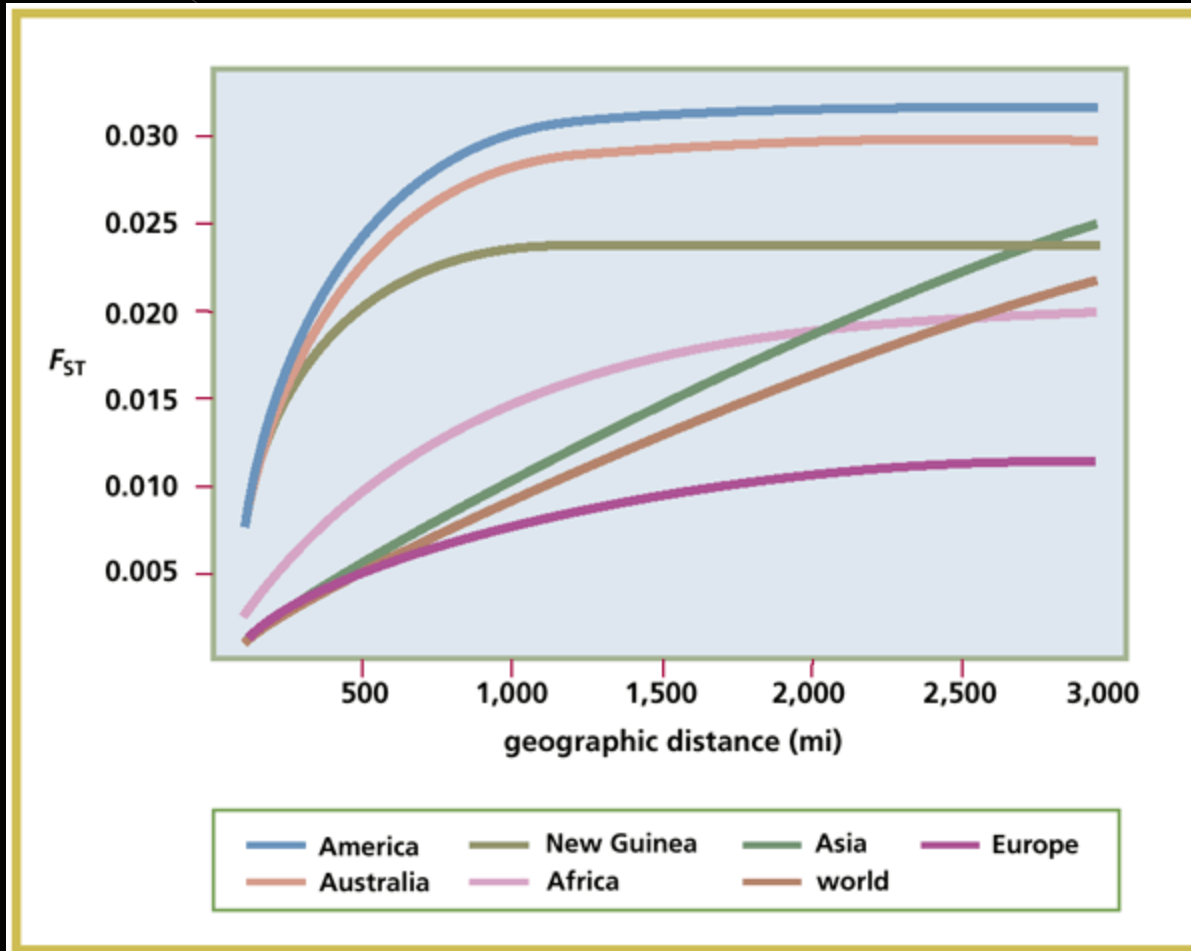
Genetic Distance

	Europe	SS Africa	East Asia
Europe		.1530	.1100
SS Africa	.1530		.1900
East Asia	.1100	.1900	

Applying Genetic Distance : Population Trees



Applying Genetic Distance: Population Trees



Haploid Genetics

- ◎ Female lineage: Mitochondria
 - > mtDNA mutation 10x nuclear DNA
 - > Repeated and reverse mutation possible
- ◎ Mitochondrial “Eve”
 - > Approx. 230,000 years

Haploid Genetics

- ◎ Male lineage: Non-recombining Y
 - > Same mutation rate as nuclear DNA
 - > Length compensates for slow mutation
- ◎ Y-chromosome “Adam”
 - > Approx. 130,000 years

Tracking Migration



Implications of Researching Ancestry?

Eugenics and Racism

⦿ Holocaust

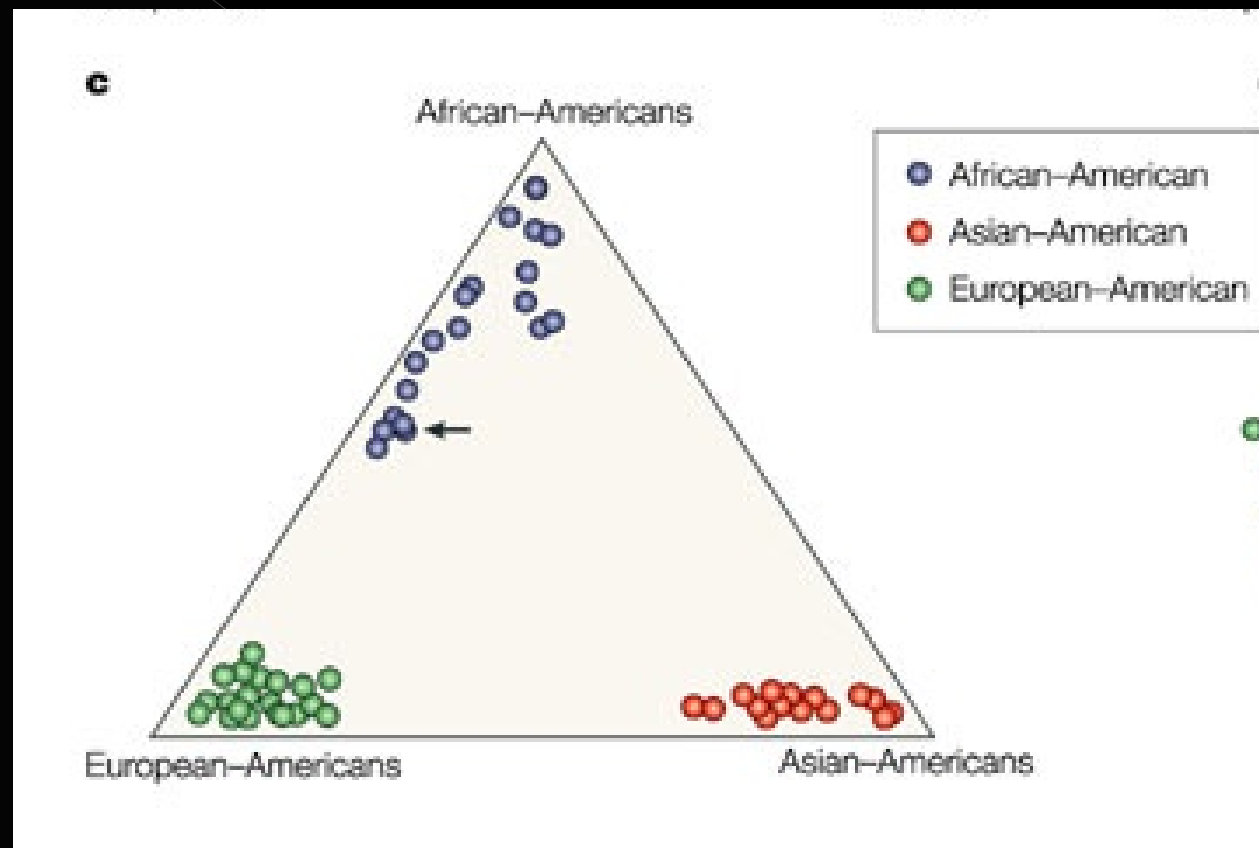


⦿ “One-Drop” Jim Crow

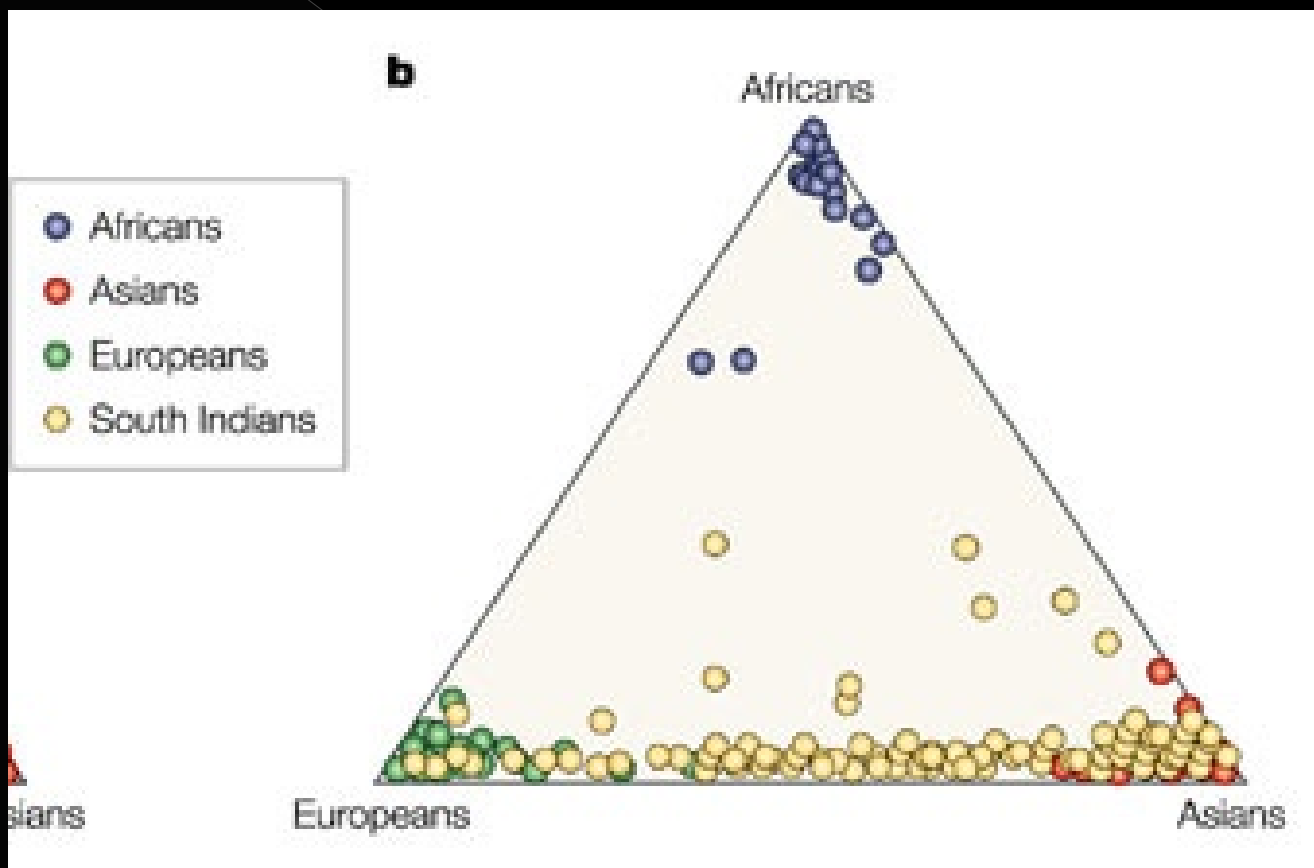
Contribution of “Racial” Differences

- ◉ Only 5-15% due to continental differences
- ◉ Most genetic diversity can be found within a population

Genetic heritage \neq Self-identified race



“Mixed” Races



Social effects

- ◉ Race is biological AND social, political, and economic
- ◉ Social solutions for social problems (wealth distribution, achievement)

Conclusion

- ◎ Implications for science
 - > Human migration and selection
 - > Diagnosis of genetic diseases
- ◎ Social concerns
 - > Lay perception of race vs. scientific reality
 - > Many differences are NOT from genetics