

## Last time

- What are the sources for human variation?
- How do humans vary across geography?
- What is a cline?

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## Last Time

- What forces have been responsible for shaping modern human variation?
- What have humans adapted to?
- How has culture impacted adaptation and vice versa?
- What are the different ways of adapting to an environmental stressor?

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## Adaptation

- What is adaptation?
  - What is genetic adaptation?
  - What is acclimatization?
- How do these shape human variation?

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## Studying Human Variation - a Biocultural approach

Biology is intertwined with human cultural behavior and both shape human diversity

We have evolved through the 4 forces of evolution intertwined with cultural behavior

Can you give an example of how culture has created a selective force in human evolution?

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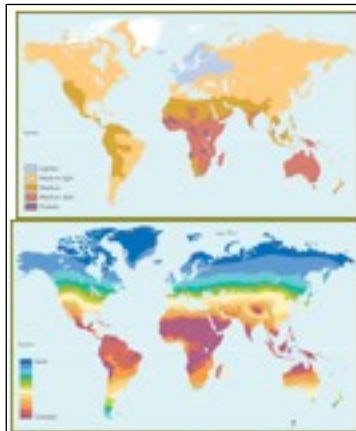
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## What do humans need to adapt to?

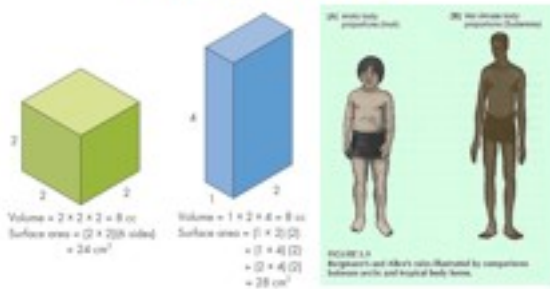
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- Solar Radiation
  - too much or too little
- Heat and Cold
  - Bergmann and Allen rules
- Altitude / Humidity
- Disease
  - sickle cell anemia
- Diet
  - Lactose tolerance
- What else?



Skin color and solar radiation

## Heat and Cold



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## What is Race?

- Biological?

- Cultural?

## Linnaeus



*Homo sapiens afer*  
*Homo sapiens americanus*  
*Homo sapiens asiaticus*  
*Homo sapiens europaeus*  
*Homo sapiens ferus*

## Blumenbach



Even while saying all this was arbitrary...

"There is but one species of man...

...All these differences, run so insensibly, by so many shades and transitions one into the other, that it is impossible to separate them by any but very arbitrary limits"

# Ten Facts about Human Variation

Jonathan Marks

<http://personal.uncc.edu/jmarks/pubs/tenfacts.pdf>

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**FAHV 6:**  
There is much more variation within groups as between groups (polytypy)

**FAHV 9:**  
Humans have little genetic variation

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## Biological?

- Measure biological difference between populations? How different are human populations?
- $F_{st}$  = statistical measure of the fraction of variation found between human samples
- $F_{st}$  0 means no difference,  $F_{st}$  1 and the two populations are completely different at the locus or loci

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## $F_{st}$

- Biological subspecies require  $F_{st}$  of at least 0.25
- Looking at multiple human loci,  $F_{st}$  ranges from 0.03 - 0.17

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Between 83-97% of our genetic variation is found within populations, and only between 3-17% between populations

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### Yanomamo v. Lapplander



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**FAHV 1:**  
Human Groups Distinguish Themselves Principally Culturally

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### Cultural?

Races are social categories whose members *are believed* to share a common "biology"

Members are believed to share features or character traits due to a unique common ancestry

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# British Census Form

- White
  - British, Irish, other
- Mixed
  - White and Black Caribbean
  - White and Black African
  - White and Asian
  - Other Mixed
- Asian or Asian British
  - Indian, Pakistani, Bangladeshi
  - Other
- Black or Black British
  - Caribbean, African, other
  - Chinese or other

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