Last time

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

- What is adaptation?
  - What is genetic adaptation?
  - What is acclimatization?
- How do these shape human variation?
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?
What do humans need to adapt to?
- 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
Volume = $2 \times 2 \times 2 = 8$ cc
Surface area = $(2 \times 2)(6$ sides) $= 24 \text{ cm}^2$

Volume = $1 \times 2 \times 4 = 8$ cc
Surface area = $(1 \times 2)(2) + (1 \times 4)(2) + (2 \times 4)(2) = 28 \text{ cm}^2$

FIGURE 5.9
Bergmann’s and Allen’s rules illustrated by comparisons between arctic and tropical body forms.
Altitude

Andes

Himalayas
Disease:
Malaria + Sickle cell
Clinal map of Sickle Cell
<table>
<thead>
<tr>
<th></th>
<th>Relative fitness</th>
</tr>
</thead>
<tbody>
<tr>
<td>HbAHbA</td>
<td>0.85</td>
</tr>
<tr>
<td>HbAHbS</td>
<td>1.00</td>
</tr>
<tr>
<td>HbSHbS</td>
<td>0-0.33</td>
</tr>
</tbody>
</table>
What have humans adapted to?

- Can you name at least one environmental stressor, how it can impact fitness, and how humans adapt, culturally, behaviorally, physiologically, and genetically to that challenge?
What does all this variation add up to?
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
FAHV 6: There is much more variation within groups as between groups (polytypy)

FAHV 9: Humans have little genetic variation
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
• Biological subspecies require Fst of at least 0.25

• Looking at multiple human loci, Fst ranges from 0.03 - 0.17
Between 83-97% of our genetic variation is found within populations, and only between 3-17% between populations.
Yanomamo v. Lapplander
FAHV I:

Human Groups Distinguish Themselves Principally Culturally
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
I – Immigrant I-551 (“green card”) Date Issued: ____________

(You must provide the date issued and be prepared to submit verification.)

O – Other Visa (specify) ____________ Date issued: ____________

7b. If you were born outside the U.S., what year did you move to the U.S.?

B. Enter your ethnic identity code in box (optional). 

1 – American Indian or Alaskan Native; tribe __________________________

2 – Black, non-Hispanic, including African American

3 – Mexican American, Mexican, Chicano

A – Central American

B – South American

O – Cuban

P – Puerto Rican

4 – Other Latino, Spanish-origin, Hispanic

C – Chinese

J – Japanese

K – Korean

R – Asian Indian

5 – Other Asian

M – Cambodian

L – Laotian

V – Vietnamese

T – Thai

S – Other Southeast Asian

G – Guamanian

H – Hawaiian

N – Samoan

D – Decline to State

7 – White

F – Filipino

8 – Other

9 – No Response

The application form provides you with an opportunity to report your primary racial or ethnic identity. However, you may use the Web to provide the CSU with more complete information regarding your racial/ethnic identity, if you wish. Neither you nor others can view any data collected on the website. Any information you submit on the website will override and update any existing information. The address for the website is www.csuethnicsurvey.xap.com

Attach or send a copy of DD214 or DD295 for evaluation of academic credit to the admission office of each campus to which you are applying for admission.

9. If you have ever been on active duty in the U.S. military services, enter a Y in box. 

10. High school attended* __________________________

City and State __________________________

Graduation Date ____________ GED Date ____________

* If you have also attended a high school outside of the U.S., please attach the name and location of that high school.

Check here if you will neither graduate from high school nor receive a GED.
FAHV 2: Human Biological Variation is continuous, not discrete.

FAHV 7: People are similar to those nearby and different from those far away.
FAHV 4:
Populations are biologically real, not races

FAHV 5:
Populations also have a constructed component
FAHV 3: Clustering populations is arbitrary

FAHV 8: Racial classification is historical and political, and does not reflect natural biological patterns
FAHV 10:

Racial issues are social-political-economic, not biological
7. Is Person 1 Spanish/Hispanic/Latino? Mark \( \checkmark \) the “No” box if not Spanish/Hispanic/Latino.
   - No, not Spanish/Hispanic/Latino
   - Yes, Puerto Rican
   - Yes, Mexican, Mexican Am., Chicano
   - Yes, Cuban
   - Yes, other Spanish/Hispanic/Latino — Print group.

8. What is Person 1’s race? Mark \( \checkmark \) one or more races to indicate what this person considers himself/herself to be.
   - White
   - Black, African Am., or Negro
   - American Indian or Alaska Native — Print name of enrolled or principal tribe.
   - Asian Indian
   - Japanese
   - Native Hawaiian
   - Chinese
   - Korean
   - Guamanian or Chamorro
   - Filipino
   - Vietnamese
   - Samoan
   - Other Asian — Print race.
   - Other Pacific Islander — Print race.
   - Some other race — Print race.

If more people live here, continue with Person 2.

Note: Please answer BOTH Question 8 about Hispanic origin and Question 9 about race. For this census, Hispanic origins are not races.

8. Is Person 1 of Hispanic, Latino, or Spanish origin?
   - No, not of Hispanic, Latino, or Spanish origin
   - Yes, Mexican, Mexican Am., Chicano
   - Yes, Puerto Rican
   - Yes, Cuban
   - Yes, another Hispanic, Latino, or Spanish origin — Print origin, for example, Argentinean, Colombian, Dominican, Nicaraguan, Salvadoran, Spaniard, and so on.

9. What is Person 1’s race? Mark \( \checkmark \) one or more boxes.
   - White
   - Black, African Am., or Negro
   - American Indian or Alaska Native — Print name of enrolled or principal tribe.
   - Asian Indian
   - Japanese
   - Native Hawaiian
   - Chinese
   - Korean
   - Guamanian or Chamorro
   - Filipino
   - Vietnamese
   - Samoan
   - Other Asian — Print race, for example, Hmong, Laotian, Thai, Pakistani, Cambodian, and so on.
   - Other Pacific Islander — Print race, for example, Fijian, Tongan, and so on.
   - Some other race — Print race.

10. Rate Persons 4-4, mentioning all women who are related to Person 1.

2000

2010

Tuesday, March 8, 2011
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