Models of Cultural Diversity

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Overview—Three Lectures

1. Theories about the origins of cultural diversity (and what is culture?)
2. Simple models of social learning
3. Cultural evolution at the group level

Overview—Recurring Questions

- What generates observed patterns of cultural diversity?
- Social learning
  - When does it make sense to learn from others?
  - How do different learning rules affect the distribution of behaviors and ideas in a population?
  - How does community structure affect the transmission and maintenance of cultural knowledge?
  - What can explain the human capacity for cumulative social learning?
- Cultural evolution at the group level
  - To what degree are human cultural groups subject to selection?
  - What are the appropriate units for describing cultural change?
  - Are extant patterns of cultural diversity a result of branching with isolation or long-term mixing between groups?
  - Is the cultural history of human groups adequately represented by trees?
- What models and data exist to answer these questions?

Lecture 1: Overview

- What is culture?
- What theories can account for cultural diversity?
- Are observed patterns of cultural diversity the result of Darwinian processes?

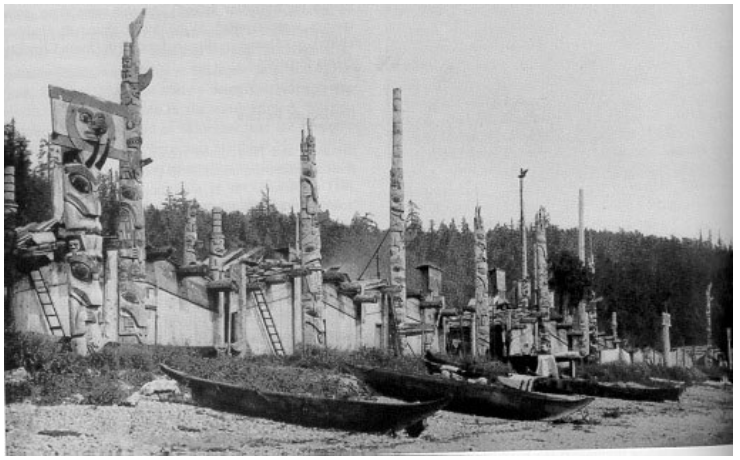
Overview: Defining Culture

- Human communities are complex
- Human communities are flexibly complex
- A working definition of culture

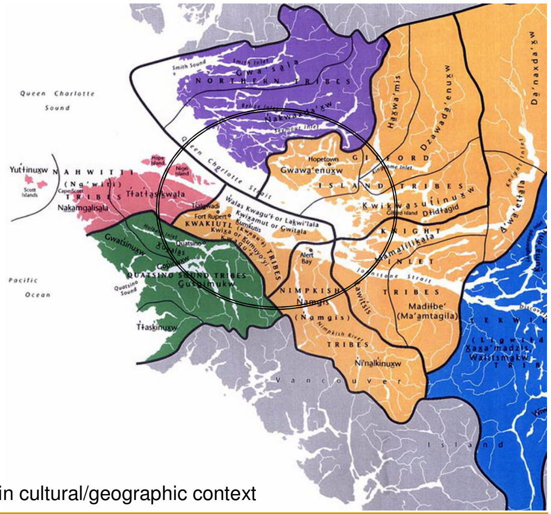
Human communities are complex

- Multiple elements (people, material artifacts, animals, ideas)
- Actions and consequences are dependent on the actions of others.
- Defining human communities as societies, cultures, or ecologies depends on your point of view
  - *Society:* People in social interactions (exchanging, dominating, communicating)
  - *Culture:* Focus on ideas, symbols, material artifacts, and language.
  - *Ecology:* Focus on human interactions with environment—animals, plants, physical world

Kwakiutl throne room



Kwakiutl Village, British Columbia, Canada

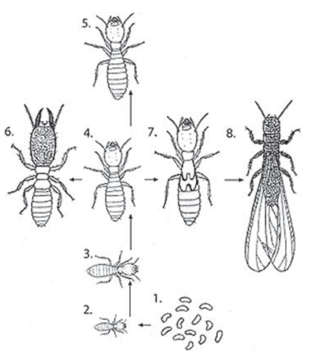


Kwakiutl territory in cultural/geographic context

Human communities are flexibly organized

- Humans, as a species, are unique in the diverse ways that they can be re-assembled into novel complex systems.
- Compare this with termites.

Termite life course



Larvae (2): Just hatched (small size, soft head & mouth parts, no coloration). Depend on worker termites to feed them.
Workers (5): Most common—consume wood, feed & groom others, build & repair tunnels (white and soft bodied, darker head, hard mouthparts). At maturity, workers molt regularly w/o size increase. If isolated, may molt into reproductive stage (tertiary reproductive).
Soldiers (6): Rare—defend colony. Enlarged heads and mandibles adapted to plug holes in tunnels and inflict a painful bite on invading enemies. Depend on workers to feed them.
Nymphs (7): Preparing to molt into fully winged termites (8) and leave the nest to start new colonies. If isolated, may become capable of reproduction (secondary reproductives).

Termite Mound

Northern Territory, Australia

Diversity in human re-assembly

- **Spatial patterns**
- **Residential construction**
- **Life history**
- **Food extraction and preparation**
- Language and symbol systems

Spatial: Bororo, Brazil

- Hunting/fishing/maize
- Now, pop.=700 in 9 villages
- At contact pop.=~15000
- Move frequently (5 yr)
- 2 moieties
- 8 matrilineal clans
- Clans define:
  - Village layout
  - Marriage and incest
  - Godparents
  - Sources of cultural info

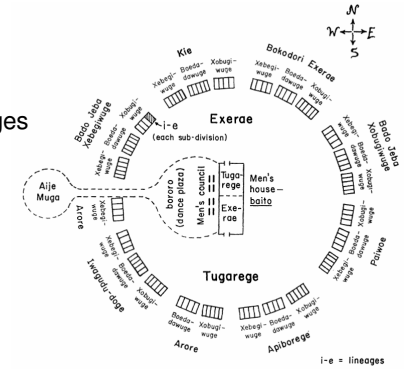
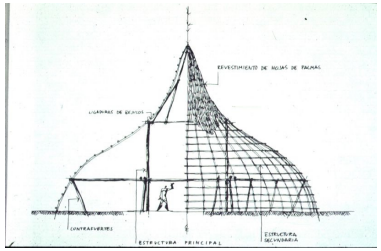
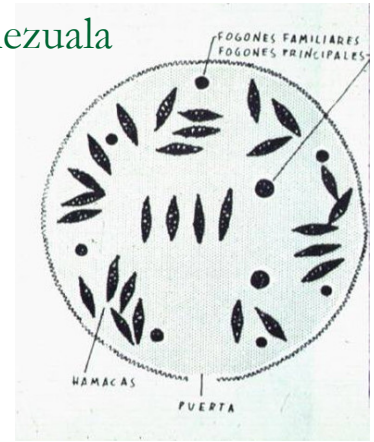


FIGURE 1. Bororo village model (after Albisetti & Venturelli 1962: 436).

Ideal Village Plan: any real village only approximates this

Spatial: Piaroa, Venezuala





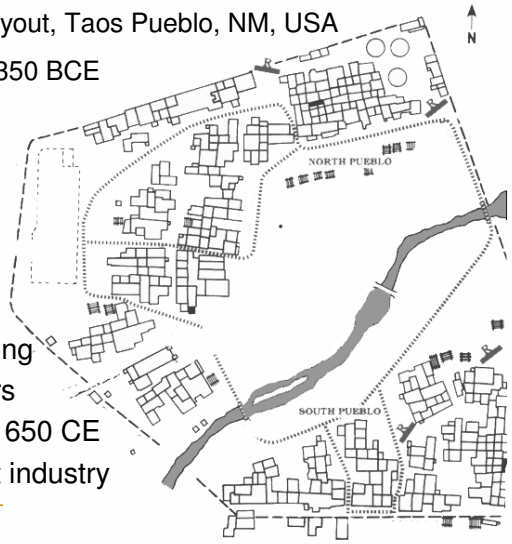
- Shifting cultivation, hunting, gathering
- 10-70 in a single house, or *isode*

Spatial: Taos Pueblo, USA

North Pueblo, Taos. The governor stands on the uppermost roof making an announcement to the people.

Main Buildings Layout, Taos Pueblo, NM, USA

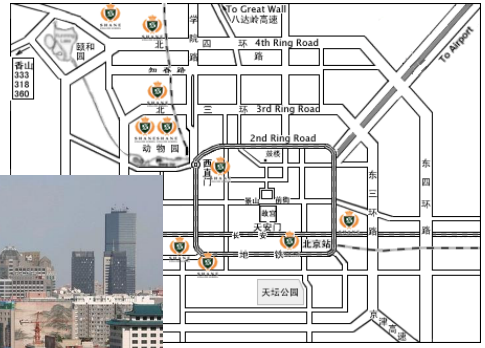
Occupied since 1350 BCE

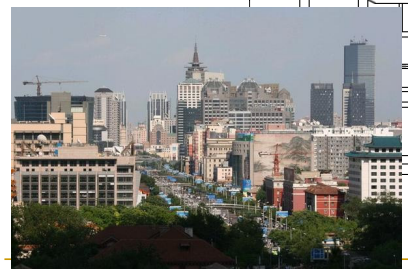


- Agriculture/hunting
- Trade with others
- Pop.=~2000 in 1650 CE
- Now 150, tourist industry

Spatial: Beijing, China

- Population > 15,000,000





Los Angeles, USA, July 2004

Life course: Maasai

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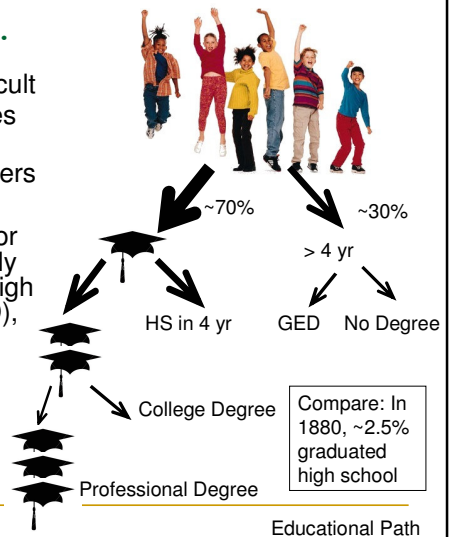
- Non-reproductive: girls work at home, boys herd
- Women
  - married (15-20 y)
  - Widows may not remarry
- Men
  - (15-25 y) Warrior (*moran*)—protect cattle of father and steal those of other communities. Marked by long hair, can carry spears. Must remain unmarried.
  - become elders and can marry (25-35 y).
- Pattern is accompanied by polygyny and large populations of widows

Photo Credits: Pu Chen

Life Course: U.S.

- A diagram is more difficult
- Many occupational roles
- Relatively same age at marriage for both genders
- Monogamy
- Approx. 1% in military or law enforcement, mostly from those who have high school degree (or GED), but no college degree.



Compare: In 1880, ~2.5% graduated high school

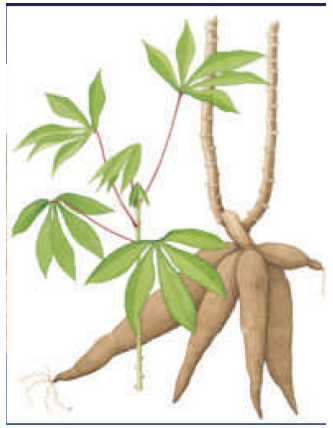
Educational Path

Preparation of Food and Drink

- Preparing Cassava
- Preparing Maize
- Preparing Ayahuasca

Cassava

- Dietary staple in many societies
- Cassava can be highly toxic in raw state (cyanide)



Preparing cassava root

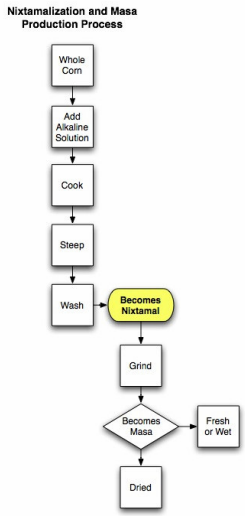
- Outer peel is removed
- Roots washed and grated to watery mash
- This frees cyanide which leaches into water
- Mash separated into three parts: liquid, starch, fiber
- Starch and fiber stored 24-48 hours
- Recombined and baked

Corn

- High reliance on corn in many American cultures
- Low availability of vitamin niacin→
- *Pellagra*
  - Diarrhea
  - Dermatitus
  - Dementia
  - untreated can kill in 4-5 years

Preparing Corn

- Mixing with alkali (lime or ashes) releases niacin
- Nixtamalization: Nextli = ash, tamalli = corn dough
- It took modern science many decades to understand how this process works



Ayahuasca

- Hallucinogenic drink
  - Visual illusions
  - Feeling "peaceful"
- Boil or soak bark & stems of plant (Banisteriopsis caapi)
- Combined with leaves of another plant (Psychotria viridis)
- Combination necessary for the psychoactive effect

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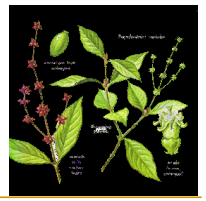


McKenna (1999)

Conclusion: Not only complex

- Human communities are also highly flexible
  - Social organization
    - Number/types/and chronology of social roles
    - Residential patterns
    - Population size
    - Kinship
  - Ideas and Practices
    - Food extraction and preparation
    - Mythology
    - Food taboos and preferences
    - Preferences for fairness and justice

A working definition

- Culture is the observed differences that exist between human communities in practices, ideas, or social organization.
- Contrast with other definitions: "Information that people acquire from others by teaching, imitation, and other forms of social learning" Boyd and Richerson 2005.

Whence such diversity?

Deterministic explanations

- *Race:* Early attempts to describe cultural diversity in terms of inherited biological differences.
- *Rational choice in context:* "This is what any rational person would do in this ecological setting."

R. W. Shufeldt, "Comparison of the physiognomy of a Congo Negro and Caesar," 1915

Problem: "Race" is poor predictor of any kind of ability

Ecological Explanations: Culture is an epiphenomenon

- Rational individuals behaving in a rational way according to their context
- *Problem:* the variety of ecological contexts is too great

Task 1: Get out of here alive

Task 2: Live here

Sonora Desert

The Result of Darwinian Processes?

- Criteria
  - Something begets something
  - Modification of the new something
  - This creates variation and some variants are better at begetting than others

To borrow John Pepper's formulation in terms of "somethings"

What are the somethings?

- People?
- Communities?
- Ideas?
- Behaviors?
- Functional complexes (i.e. blacksmithing)?

Like Begets Like

Modification when begotten

Some variants have selective advantage

Some case studies

- Words
- Clans
- Greek City-States

A Word: 'Television'

- First public demonstration in 1926 in Scotland.
- a blurry reddish-orange picture about half the size of a business card

A Word—'TV'

- Variants—'TV', 'Television', 'Television Set'
- 'Television' (1907, Scientific American)
- 'Television receiver' (1927), 'Television screen' (1927), 'Television apparatus' (1930), 'Television supper' (1931), 'Television box' (1932).
- 'TV' (1948, Fortune Magazine)
- 'TV reciever' (1964)
- British National Corpus: 'TV' (6475 occurrences), 'Television' (9773 occurrences).
- Thought experiments: 'T', 'A machine that receives moving pictures'.

Dates from Oxford English Dictionary

Four principles of selection in words

- Reduction of effort
- Ability to discriminate
- Frequency dependence
- Rules of formality

Meme

- Definition: Any unit of cultural information, such as a practice or idea, that is transmitted verbally or by repeated action from one mind to another. Examples include thoughts, ideas, theories, practices, habits, songs, dances and moods.
- The definition focuses on replication from "one mind to another."

Wiktionary

More than memes?—Clans

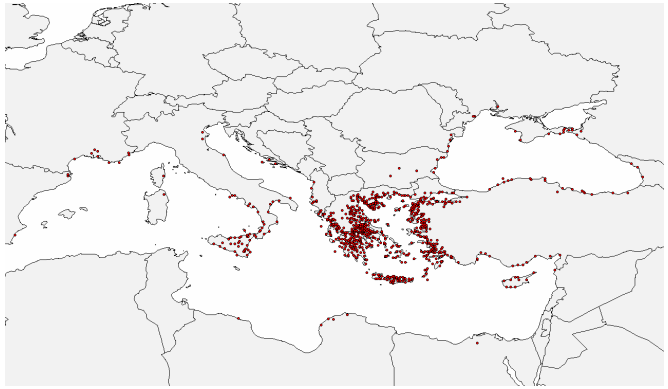
- Membership based on father's membership
- Could include > 1000 members
- Centered on hall of ancestors
- Functions for members:
  - Ran schools
  - Governed communal land
  - Extended cheap credit
  - Protect property of members
  - Resolved conflicts
  - Punished violators
- Other effects:
  - Pressured members to have children

Peng (2004). American Journal of Sociology

A Darwinian process?

- Division of clans during migration & when clans become too large
- Were their functional differences in clans that would make some more likely to produce daughter clans?
- Did clans pass on the practices to daughter clans with sufficient fidelity to maintain functional differences?

More than memes?—City-states



800-400 BCE: more than 500 Greek city-states founded by ~20 "mother-cities"

Different laws, decision-making bodies, military organization.

So far, four possibilities

- Biological differences
- Rational behavior in context
- Darwinian processes
  - Changing frequencies of ideas and practices over human substrate
  - Changing frequencies of social units (clans, greek city-states) with functional differences in customs & social organization

A final possibility

- Observable variation is the result of random change and descent
- We'll also review evidence for this in the next two lectures

Next Steps

- Lecture 2: How does cumulative social learning lead to change in the frequency of practices and ideas within communities?
  - Read Henrich & McElreath (2003).
- Lecture 3: Cultural evolution at the group level.
  - Read Soltis et al. (1995).

Next Steps

- Describe current approaches to answer questions about what generates cultural diversity
- What models and data are currently available?