Lecture 3: Social Dilemmas, Cultural Evolution, and Social Institutions

- Part I: Social Dilemmas
- Part II: Resolving Social Dilemmas
- Part III: The Evolution of Institutions

The Main Idea

- In this lecture, we will attempt to understand the problem of cooperation. In some books, scholars talk about the “free-rider” problem.

- The main idea is that although individuals are often “self-interested”, their interests or goals can be similar. In other words, groups of individuals working together can do what one or two individuals cannot do alone.

- Irrigation projects, family defense, and whale hunting require cooperation. As we will see, individual and group-interests can come into conflict.

Part I: Social Dilemmas

- *Social Dilemma* - A situation in which an individual profits from selfishness unless everyone chooses the selfish alternative, in which case the whole group loses.

Defining Social Dilemmas

- A simple two-person prototype of a social dilemma is the prisoner's dilemma:
- **Imagine you're a thief, and you and a partner in crime have just been arrested;**
- **You're being held for trespassing and suspicion of a string of burglaries.**
- **You face the choice of confessing or keeping silent.**

Prisoner B faces the same choice

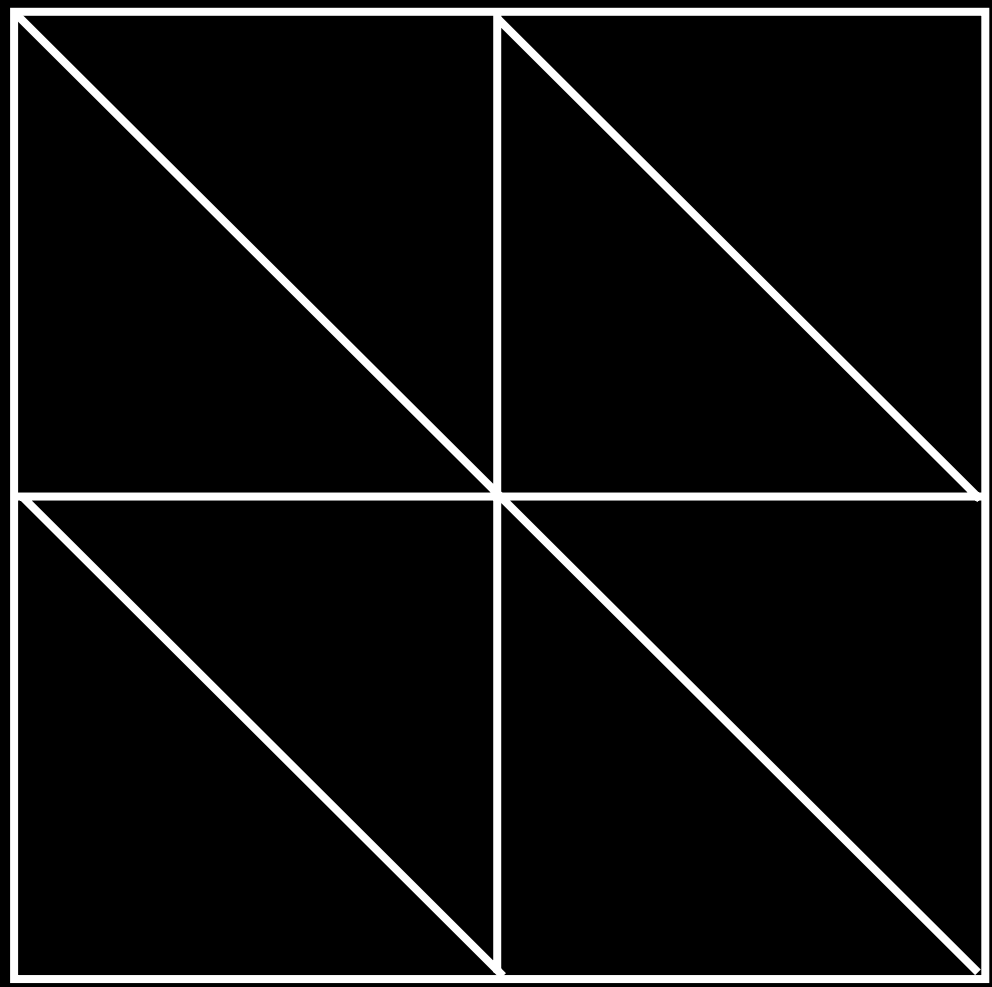
Your options:

Don't confess **Confess**

Prisoner B's options

Don't confess

Confess



The best choice for each of you depends on what the other does

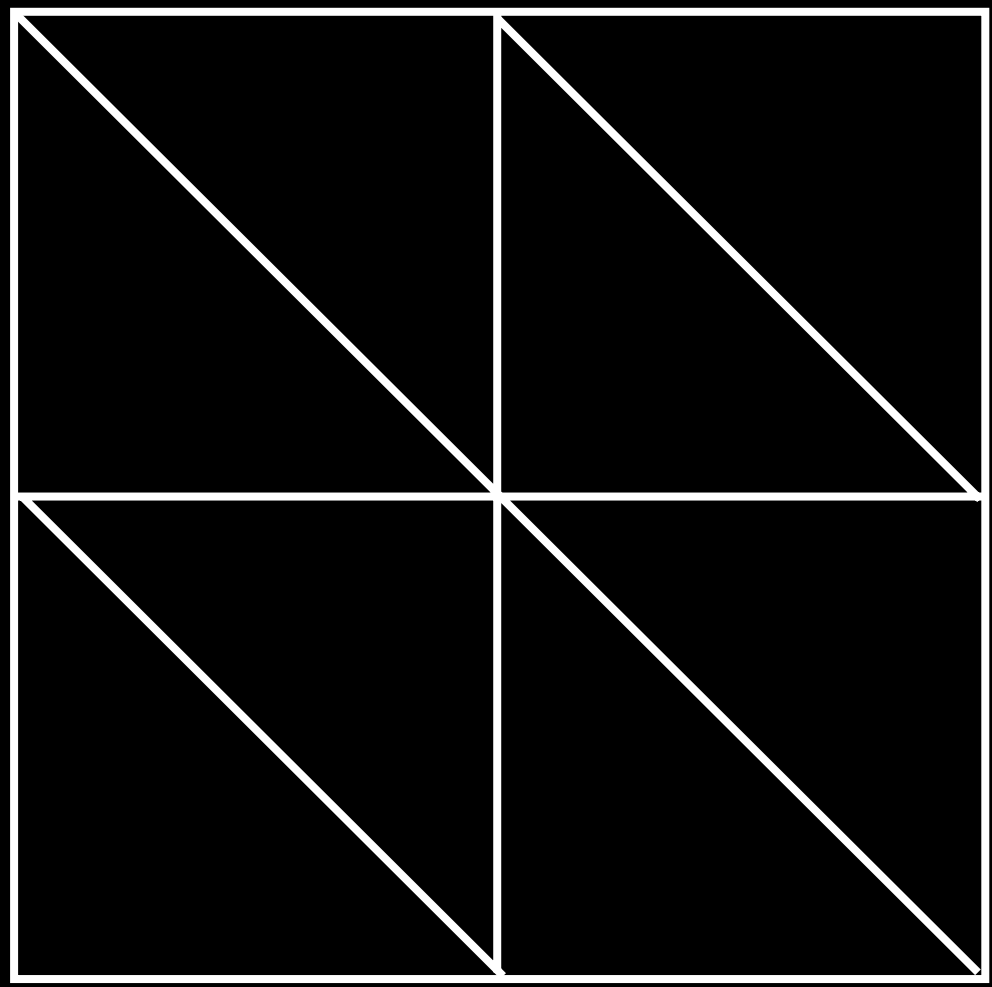
Your options:

Don't confess **Confess**

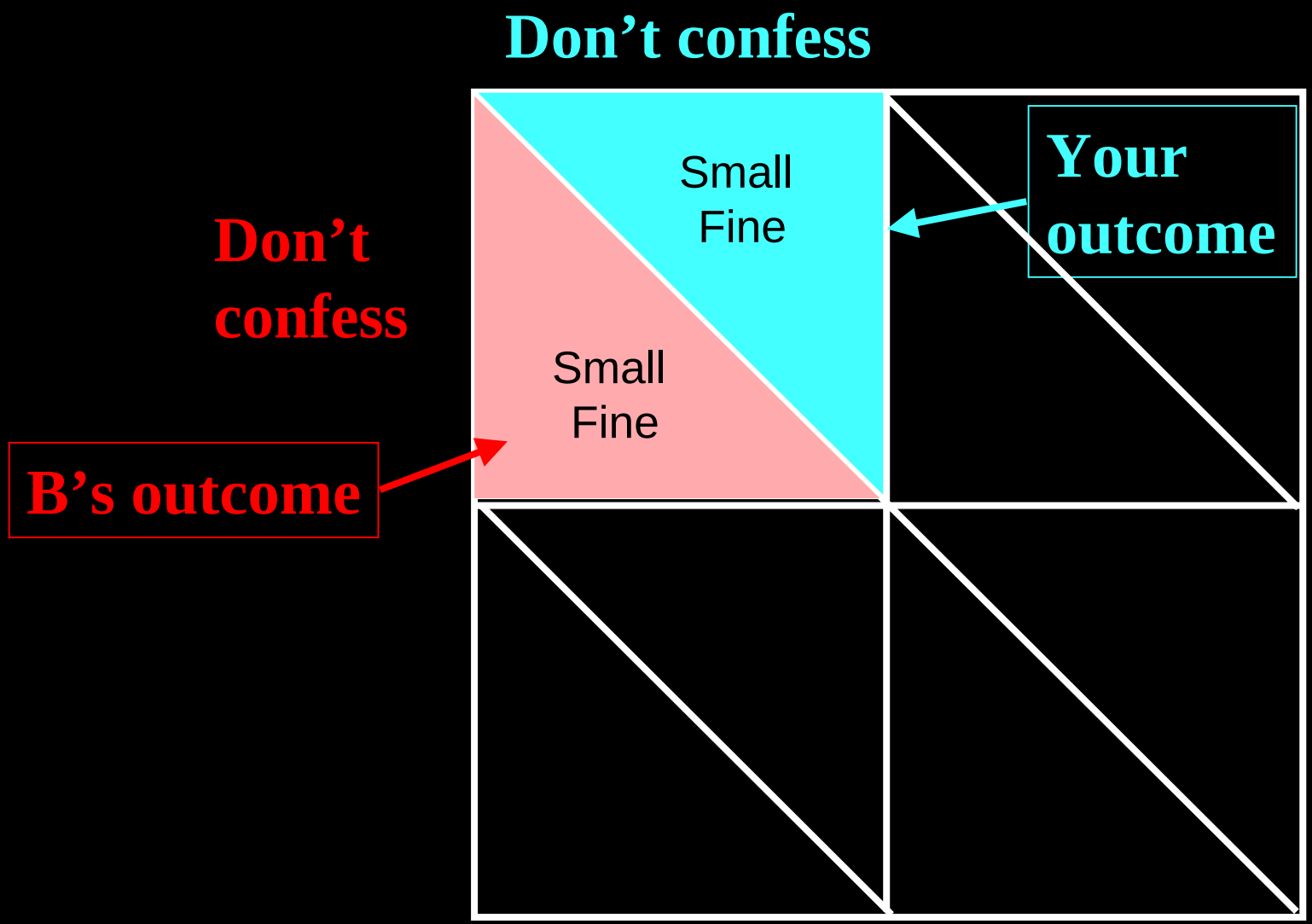
Prisoner B's options

Don't confess

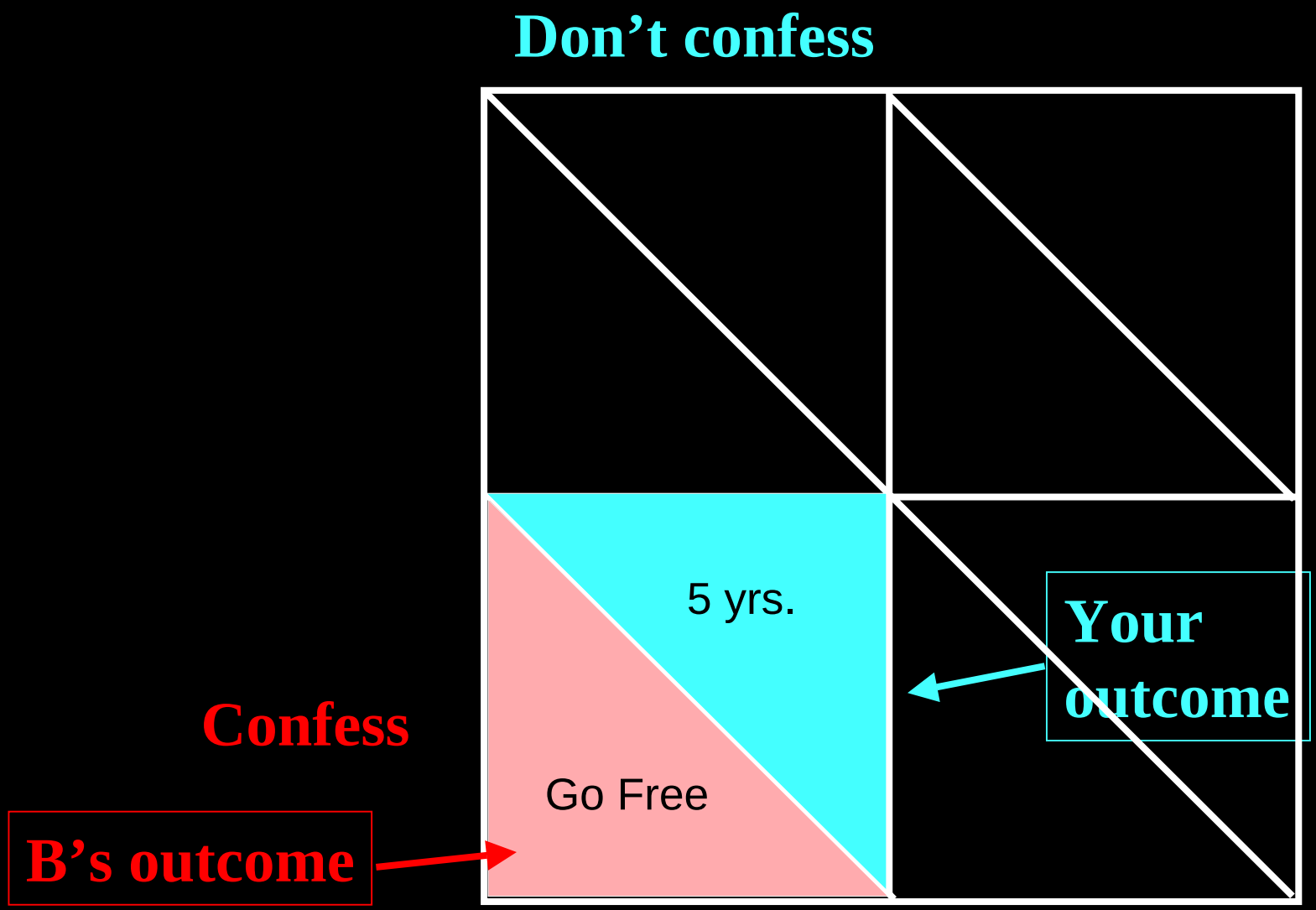
Confess



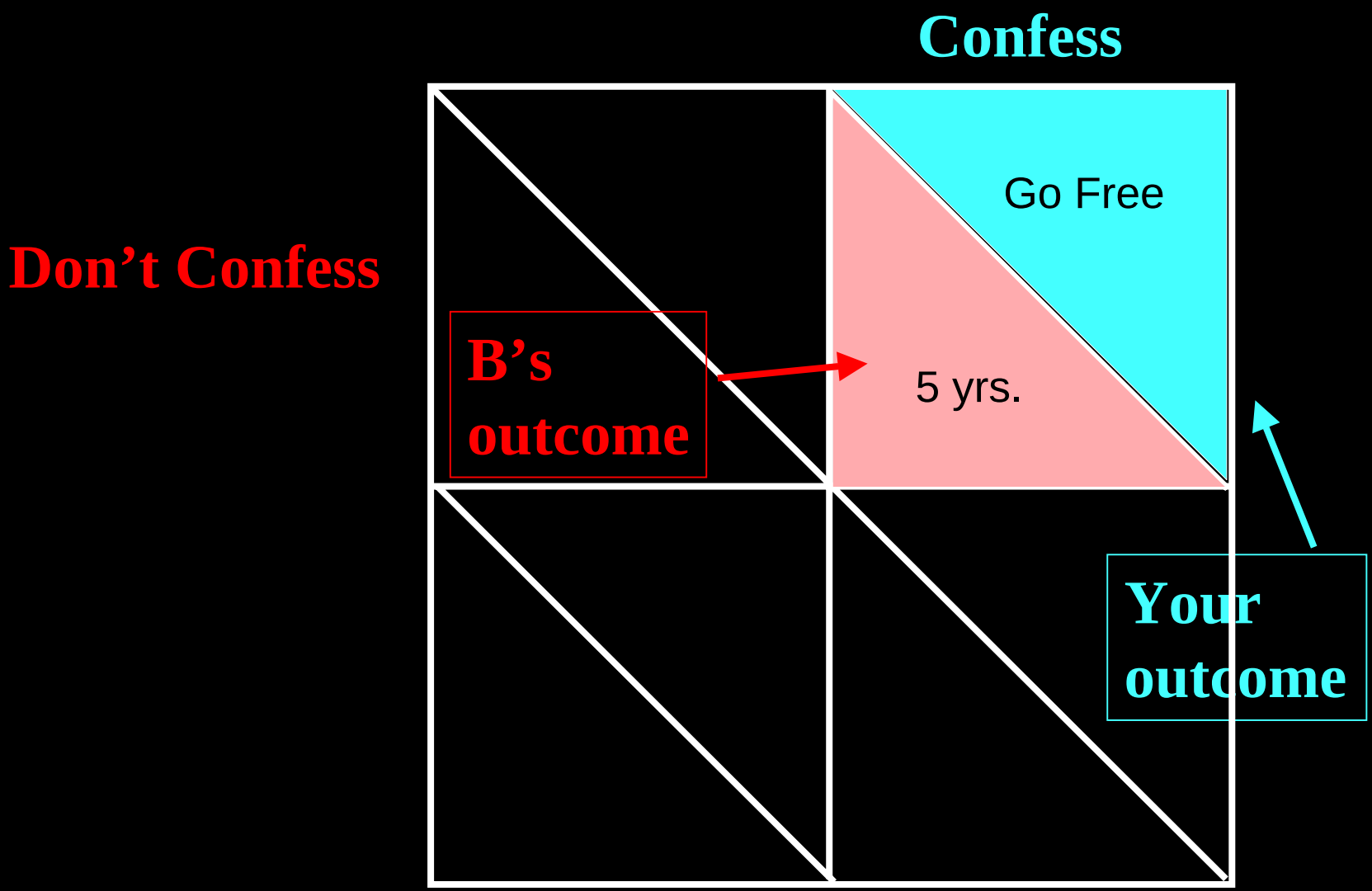
If you can count on one another not to confess, you'll both get off with a small penalty



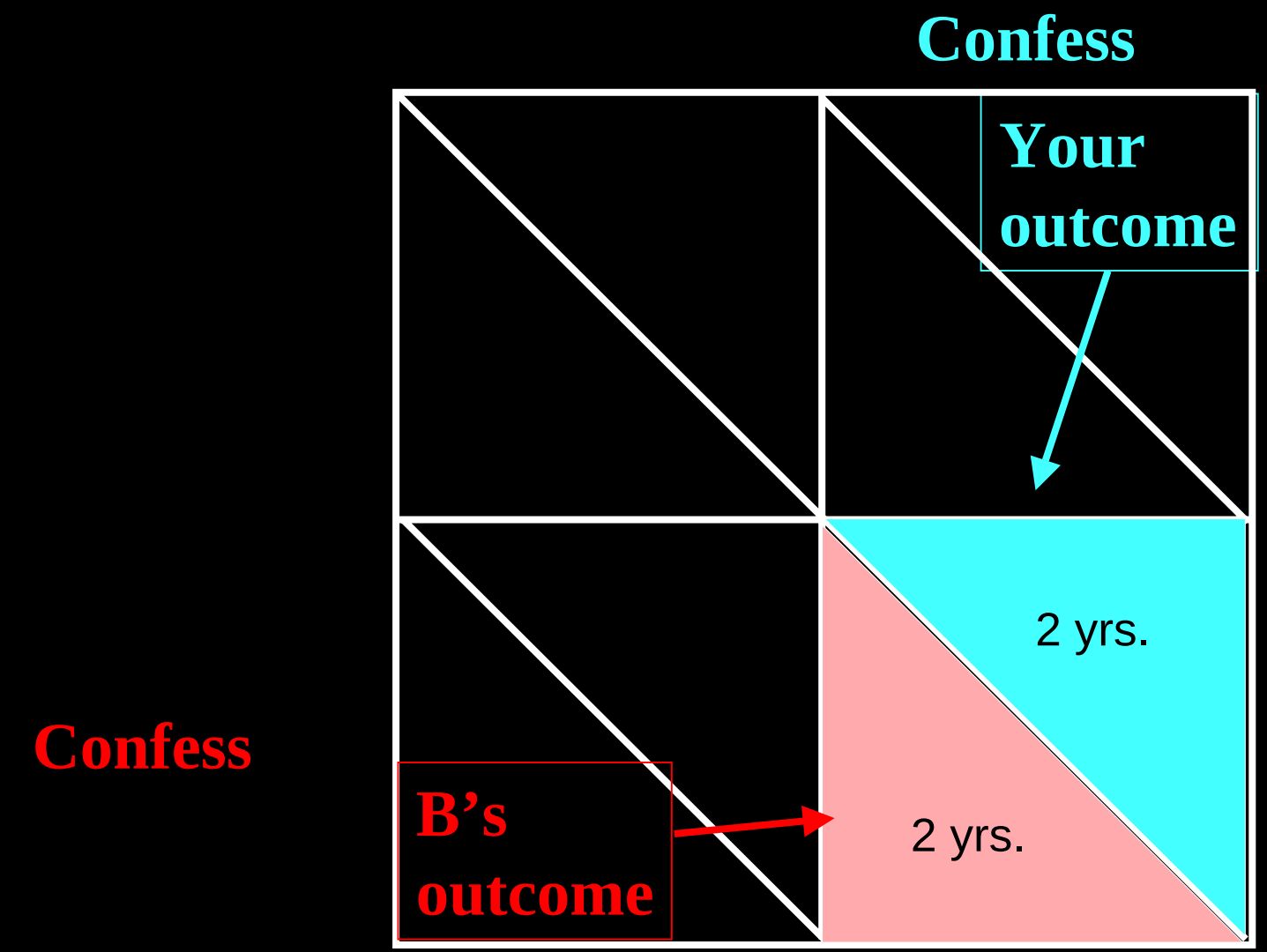
But if B confesses, and you don't, the police will throw the book at you, and B will get off scott free



Of course B knows that the D.A. has offered you the same deal.



If you both confess, as the D.A. hopes, you'll both get a moderate sentence.



Defining Social Dilemmas

- What makes this a dilemma is that there is no perfect choice.
- The best group outcome comes if both individuals cooperate with one another, and do not confess.
- But the best individual outcome for each one comes from confessing.
- **Many social dilemmas pit individual against group interest.**

Cooperative behavior is a social dilemma:

- Increases the average payoff of group, but...
- Decreases payoff of individuals.

Many examples in which humans DO cooperate! How?

- Food sharing
- Participation in warfare
- Trade and division of labor
- Enforcement of moral rules

Part II: Resolving Social Dilemmas

- How do we explain how humans seem to be good at resolving social dilemmas?
- Examples are abound:

  voting, managing natural resources, political activism, helping out the community

Example: Why would a person sacrifice their life in war?

- Imagine storming the beach at Normandy, walking towards enemy canon at Gettysburg, or doing your duty as a soldier in Iraq.
- Clearly there are individual-level explanations for such risky behaviors (money, status, being a hero)
- However, armies often focus on patriotism, and doing something for one's group.

EXAMPLE from the movie BRAVEHEART.

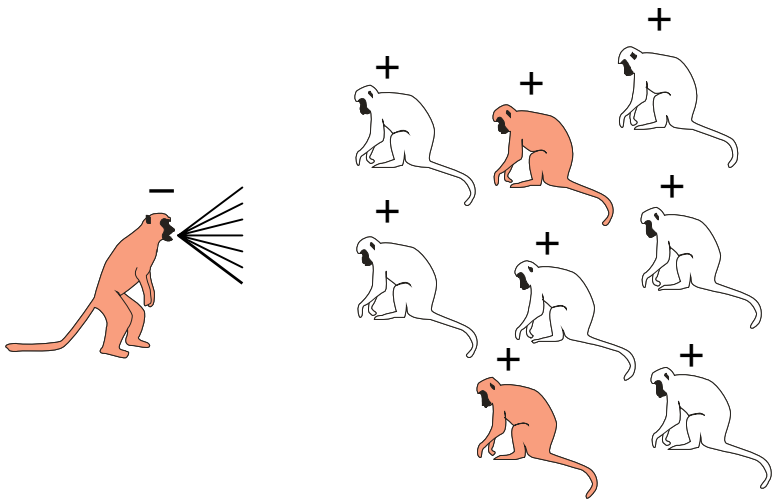
In most animals, cooperation is limited to small groups

- Most animals species show little cooperation
  - No division of labor
  - No delayed exchange
  - No group defense
- A few species show extensive cooperation among large groups of relatives
  - Social insects
  - Naked mole rats
- Many primate species show cooperation, but limited to small groups of relatives or reciprocators

Individually costly group beneficial behavior will not evolve if groups are formed at random

- Assume individuals live in groups of nine individuals
- Two genetic variants
  - Altruists give alarm calls when they see a predator
  - Non-altruists don't give alarm calls
- Population is 25% altruists and 75% non-altruists
- **Alarm calls**
  - **increase the fitness of those who hear them because they are more likely to escape the predator, but**
  - **decrease the fitness of the caller because the predator's attention is drawn toward them**

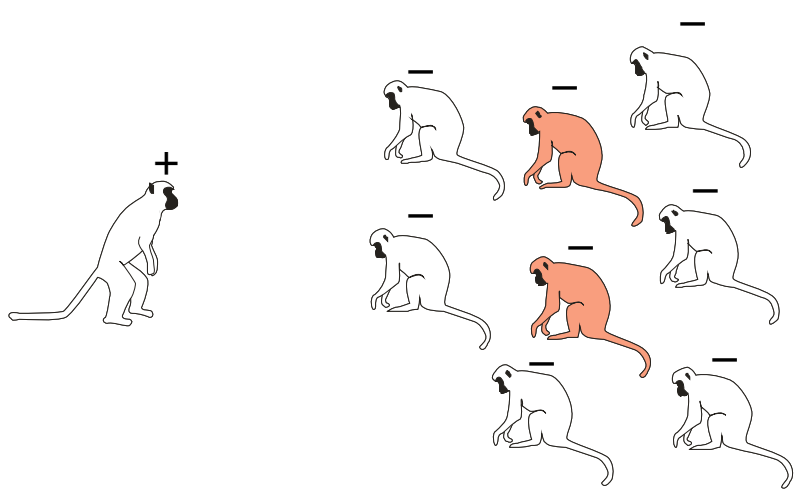
Altruist gives alarm call



↓ Actors fitness

↑ Recipient fitness

Non-altruist doesn't give alarm call



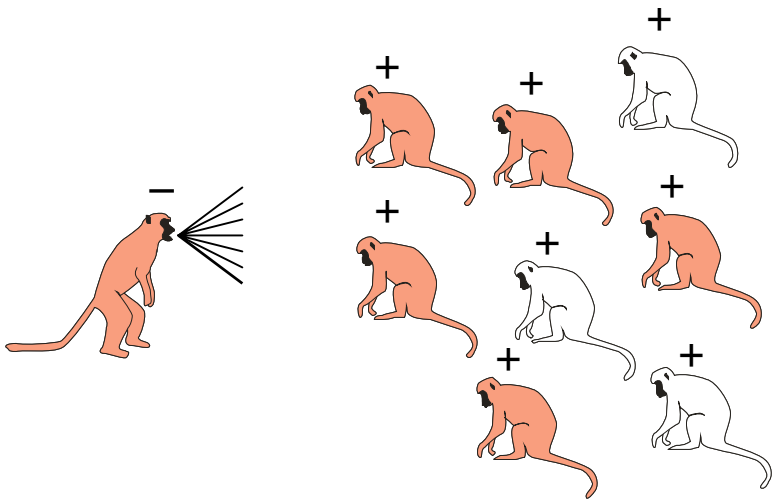
↑ Actors fitness

↓ Recipient fitness

- **Random interaction ⇒ 25% of recipients are altruists in both groups**
- Hearing call has no effect on relative fitness of the two behaviors
- Calling reduces relative fitness of altruists

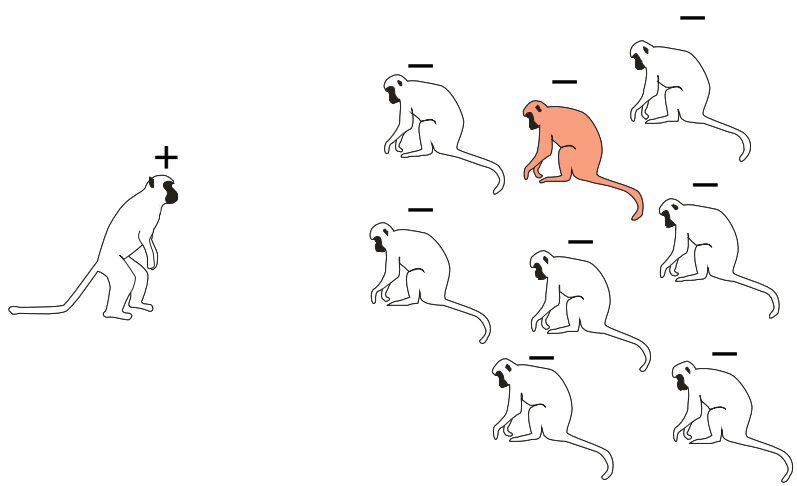
⇒ Altruists are selected against

Altruist gives alarm call



- 4 altruists by **descent**
- 1 altruist by chance

Non-altruist doesn't give alarm call



- 4 non altruists by descent
- 1 altruist by chance

- Nonrandom interaction ⇒ altruists benefit more than non-altruists
- Hearing call increases relative fitness of altruists
- Calling reduces relative fitness of individual altruists

⇒ Altruists are selected for if the costs of giving the alarm are outweighed by the **benefits** that relatives receive.

Kinship is one of three cues that allow nonrandom interaction

- Kinship: Individuals recognize & selectively cooperate with kin
- Past behavior: Individuals cooperate with others who they have observed cooperating in the past
- Population structure: Limited dispersal; individuals interact with neighbors

Reciprocity allows the evolution of pairwise cooperation

- Suppose pairs of individuals interact repeatedly
- During each interaction one individual can help the other
  - Share food
  - Give alarm call
- If the long run benefit of cooperation is greater than the short run benefit of cheating, selection favors reciprocating strategies
  - Nice: never the first to break off cooperation
  - Provokable: don't cooperate if other fails to help in previous interactions
  - Forgiving: Return to cooperation if other demonstrates commitment to helping

Reciprocating strategies don’t work in large groups

- Cooperation pays only if there is a significant probability that long term cooperation can be achieved.
- In pairs or small groups of a dozen, individuals can keep track of who is nice and who is a cooperator. Thus, individuals can associate ONLY with cooperators, and thus reap the benefits of associating with “nice” individuals.
- In larger groups, it becomes difficult to keep track of who is a cooperator, and who is a defector. Thus, cooperation often breaks down.

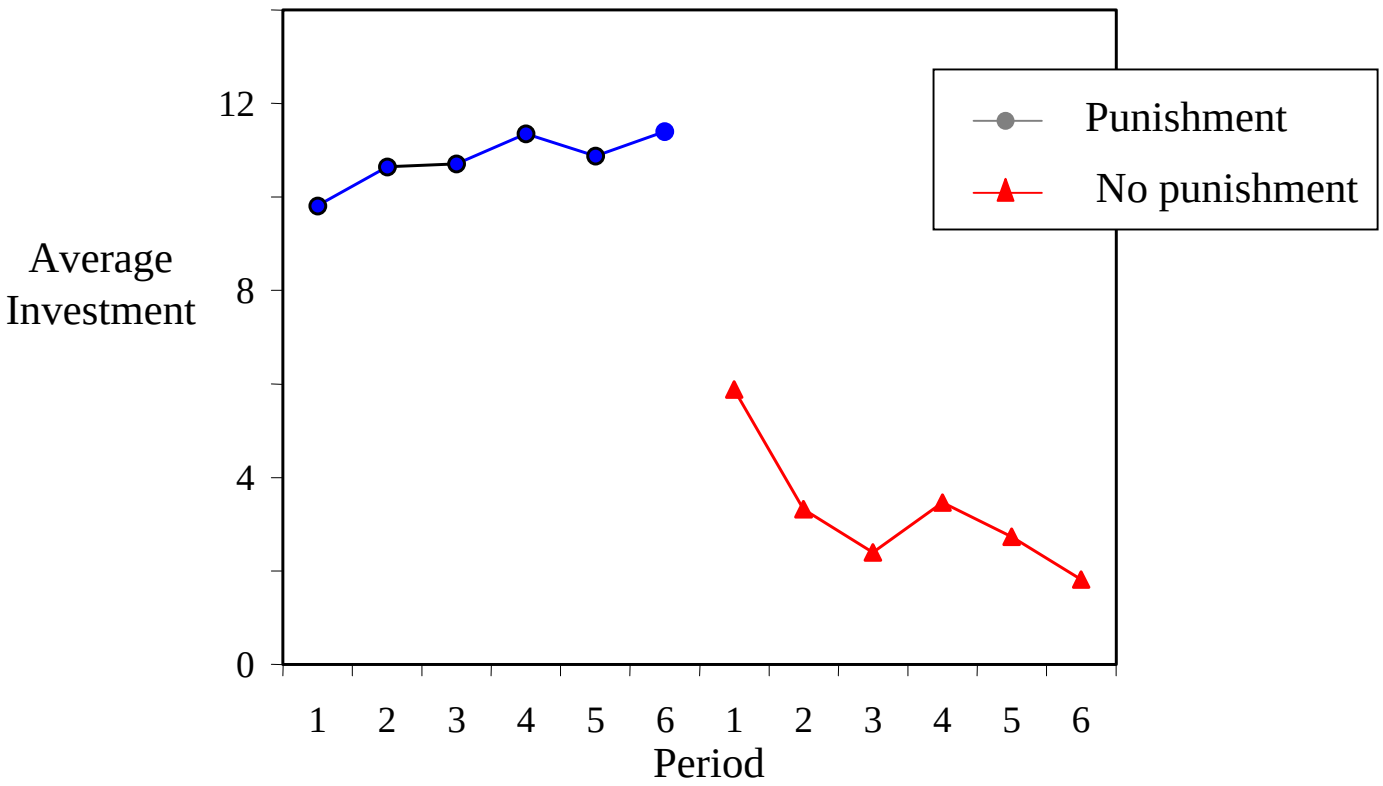
Direct **punishment** allows a minority to sanction defectors.

- Reciprocity $\Rightarrow$ defectors are punished by refusal to cooperate.
- Many forms of punishment are possible:
  - Aggression directed at defectors
  - Refusal to interact in profitable pairwise interactions
  - Banishment or ostracism
- Cooperation enforced by direct punishment does not suffer same problems as reciprocity in large groups.
  - Punishment can be directed at defectors only.
  - If being punished is sufficiently costly, small number of cooperator/punishers can induce defectors to cooperate.

However, punishment is a form of cooperation!

- Why do individuals punish? Why not let others do the punishing?
  - Punishment is costly to individual
  - Benefits the group
  - Often called the **second order free rider problem**
- Several solutions
  - Punishment "all the way down". In other words, individuals who do not punish, are punished by someone else. These secondary punishers, and in turn punished for failing to punish.
  - Conformity to group norms may stabilize punishment

Experiments indicate people punish even when it is not in their self-interest. (Fehr and Gachter)



Moralistic Punishment

- In general, many social scientists agree that rewards and punishments directed at free-riders can create cooperative outcomes.

- But WHY DO PEOPLE PUNISH ONE ANOTHER?

- Think about punishment for a minute. It is always an easy thing for an individual to do? Why do we bother to take risks and other associated costs to punish others?

Part III: The Evolution of Institutions

- We will discuss how social institutions can resolve the free-rider problem.

- But HOW DO INSTITUTIONS EVOLVE?

- We need a theory for how an institution can evolve to provide group-beneficial outcomes.

A Solution: Group selection favors altruism

- Groups satisfy Darwin's postulates
  - Groups compete
  - Groups vary in their ability to survive and reproduce
  - This variation is heritable

$\Rightarrow$ Selection among groups tends to increase the frequency of genes that increase group survival and reproduction

$\Rightarrow$ Group selection tends to increase altruism

It must not be forgotten that although a high standard of morality gives but a slight or no advantage to each individual man and his children over other men of the same tribe, yet that an increase in the number of well-endowed men and an advancement in the standard of morality will certainly give an immense advantage to one tribe over another. A tribe including many members who, from possessing in a high degree the spirit of patriotism, fidelity, obedience, courage, and sympathy, were always ready to aid one another, and to sacrifice themselves for the common good, would be victorious over most other tribes; and this would be natural selection. Charles Darwin, *Descent of Man*, 1871

Cultural Group Selection: An Explanation for altruistic Punishment

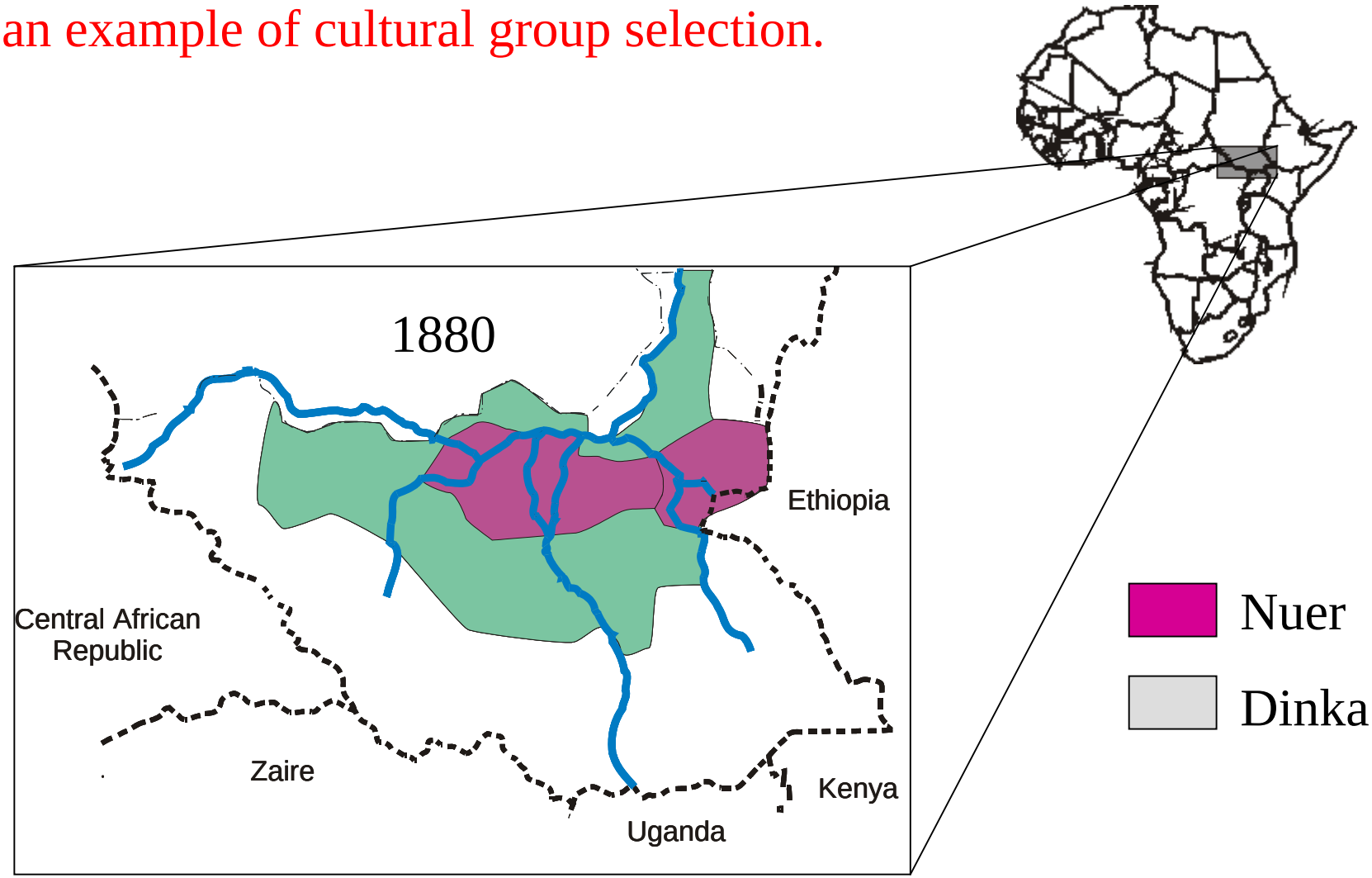
- It is plausible that some groups create rules that motivate individuals to punish free-riders and other deviants.
- If these groups do better, or out compete groups without such “institutions”, the rules can evolve by group selection.
- In other words, groups with altruistic institutions that motivate punishment, can evolve by the process of “cultural group selection”.

How Does Cultural Group Selection Work?

Different groups evolve institutions help them resolve their cooperatie problems. In addition, some of these are useful in preventing them from being conquered by other groups.

For example, groups with altruistic warriors would outlast populations of selfish individuals who would not fight for their group.

The 19th century expansion of the Nuer is an example of cultural group selection.



Drawn from data in Kelly 1985

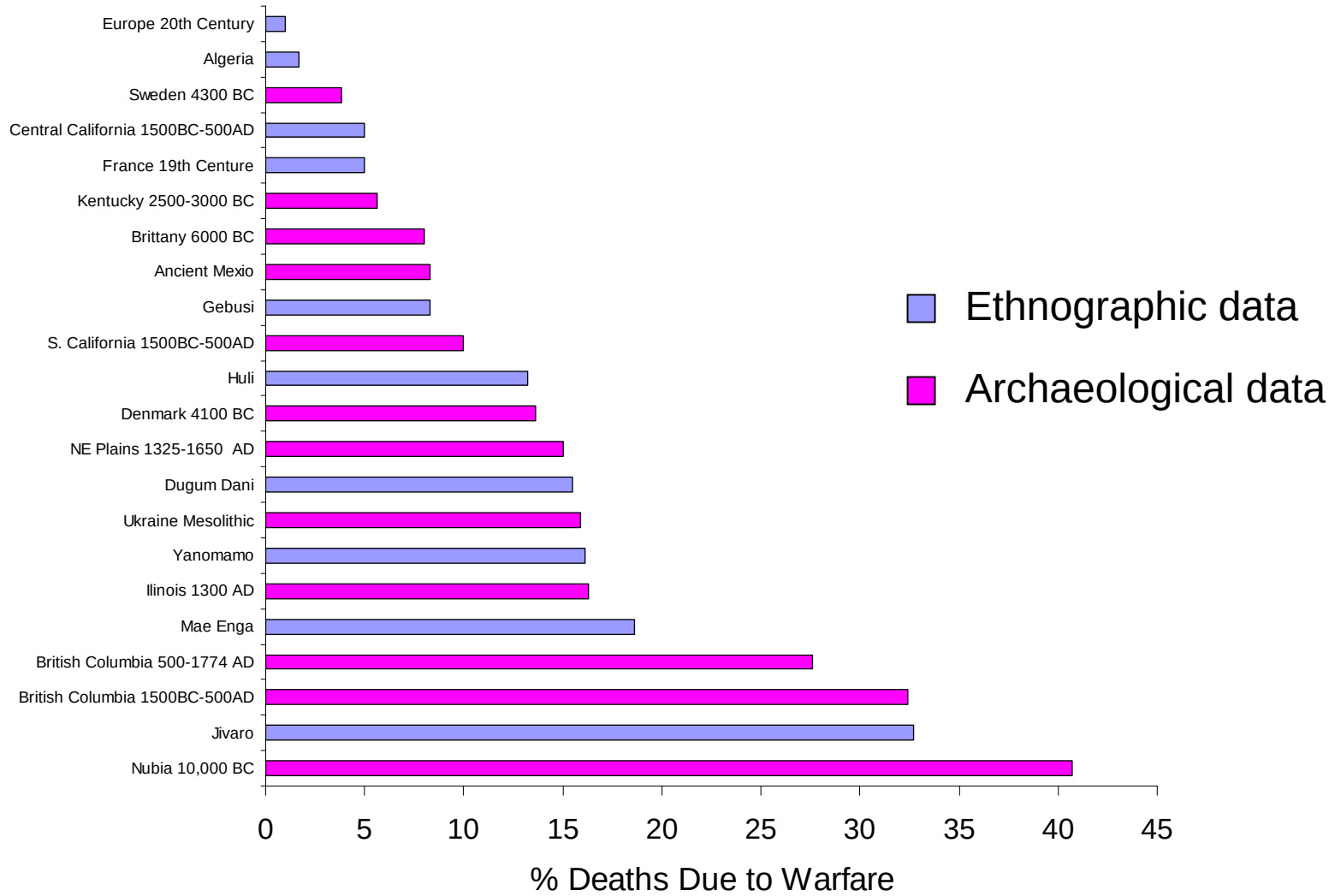
Nuer expansion resulted from cultural differences between Nuer and Dinka.

- Nuer and Dinka exploited same habitat using same technology.
- Each group consisted of a 10 to 30 independent polities.
- Striking cultural differences between two groups

	Nuer	Dinka
Sovereign political units	10,000 people	3,000 people
War parties	1500 fighters	600 fighters
Political organization	Segmentary lineages	Territorial groups
Subsistence	More grains and milk	More meat
Cows per capita	2.6	1.1
Bride wealth		
Ideal	32–40 cows	18–20 cows
Minimum	22 cows	None
Credit	no	yes

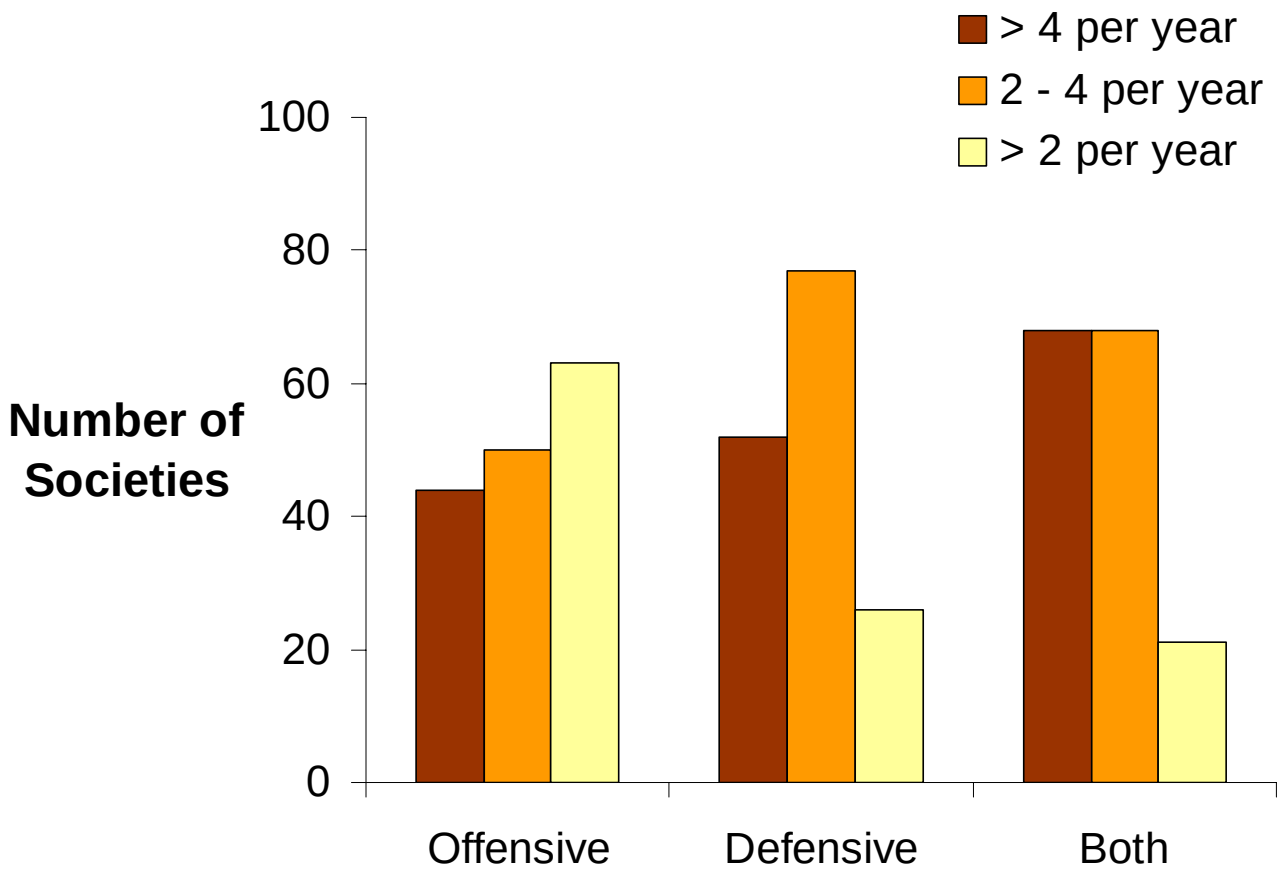
Data from Kelly 1985

Warfare is lethal in small scale societies



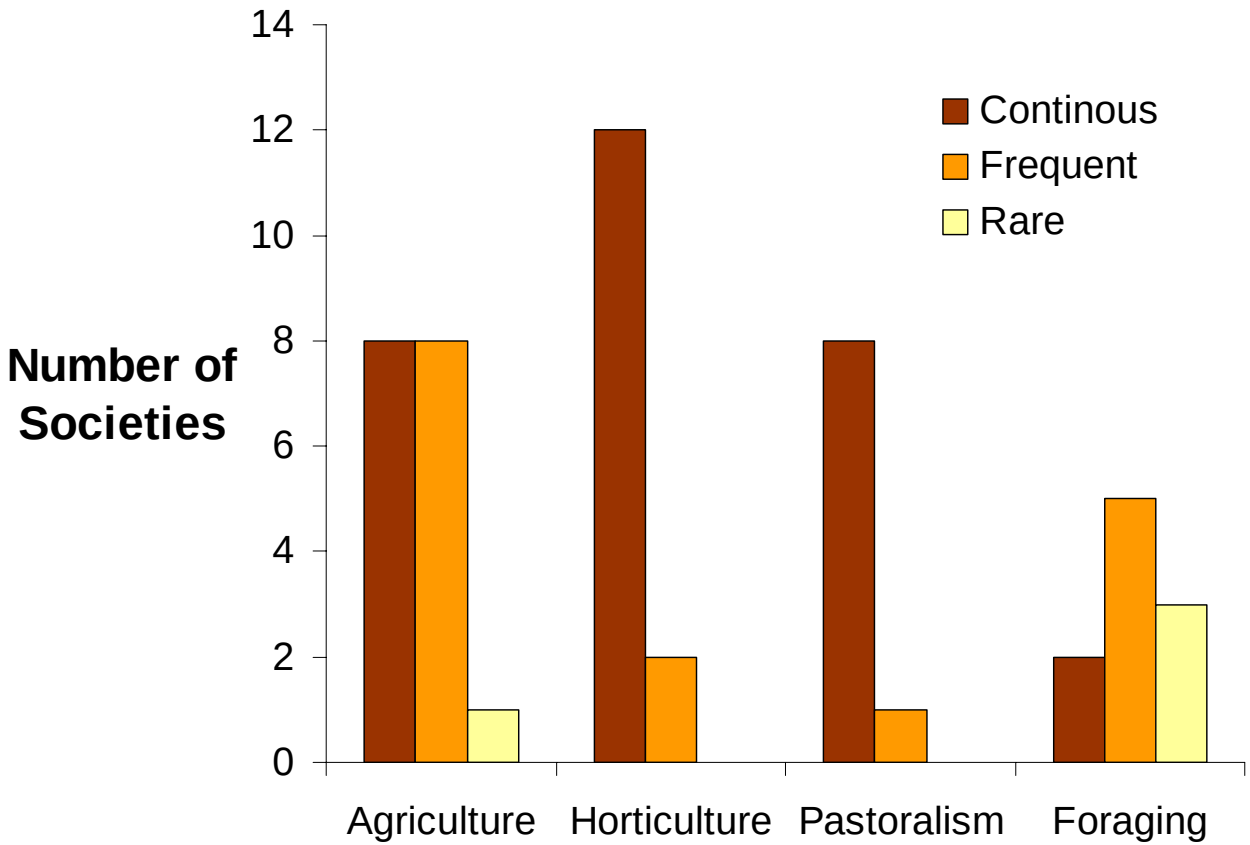
Data from Keeley 1994

War is frequent in foraging societies



Data from Jorgenson 1980

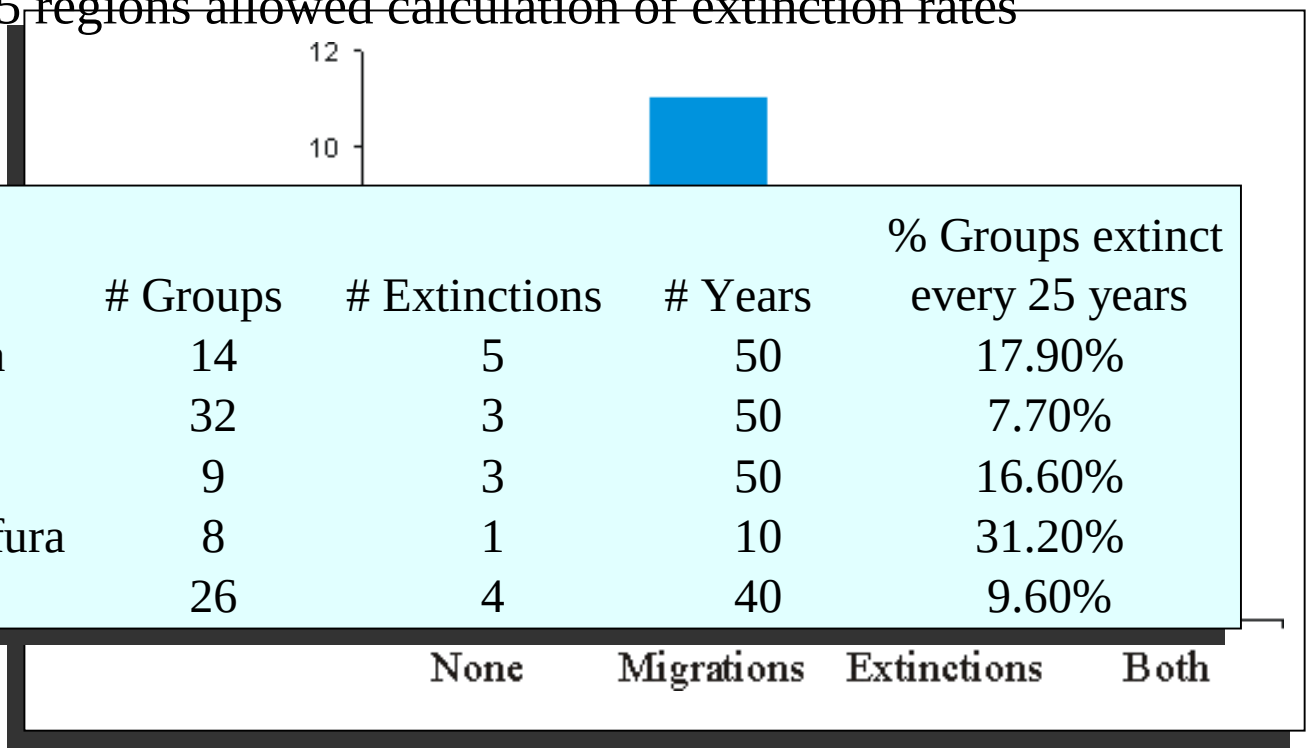
War is frequent in foraging societies



Data from Otterbein 1989

Extinctions were common in New Guinea before colonization

- Soltis et al (1995) survey 28 precolonial New Guinea ethnographies
- Mention of forced migration and extinctions common
- Data from 5 regions allowed calculation of extinction rates



Region	# Groups	# Extinctions	# Years	% Groups extinct every 25 years
Mae Enga	14	5	50	17.90%
Maring	32	3	50	7.70%
Mendi	9	3	50	16.60%
Fore/Usufura	8	1	10	31.20%
Tor	26	4	40	9.60%

In the long-run, culture shapes genetic evolution

- Culture important for at least 250,000 years
- Cultural processes create novel environments, e.g....
  - Large scale cooperation regulated by social norms
  - Extensive variation between symbolically marked groups
- Such environments lead to selection for novel genetic adaptations
  - Moral sentiments, e.g. shame, guilt

IN SUM, GENE-CULTURE CO-EVOLUTION LIKELY CREATED AN INNATE HUMAN PREDISPOSITION TO LIVE IN INSTITUTIONALIZED SOCIETIES.

Results of Co-evolution: Favoring one's cultural group members

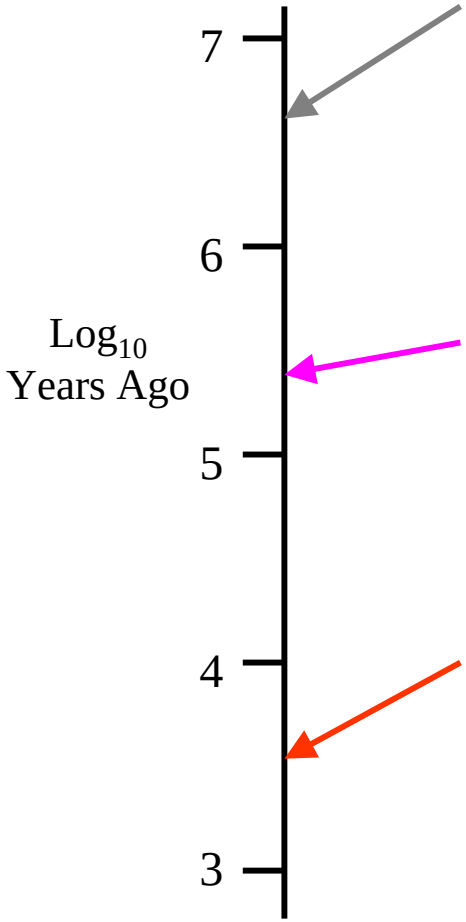
- After many generations of cultural group selection, the human gene pool shifted to support cognitive processes that pre-dispose individuals to favor members of their culturally defined groups. One outcome is the motivation to reward and punish "for the good of the group".
- In the past, the culturally defined groups were likely small bands or linguistic groups.
- Today, culture creates social identities at much larger scales such as nations, tribes, religious groups, etc.

Culturally marked groups

- Human social groups typically symbolically marked
  - Dialect
  - Dress
  - Ritual observances
  - “style”
- These cultural or symbolic markers may favor cooperation at larger scales

Above and Opposite: A delayed burial and mourning ceremony on Goulburn Island, 1946. The bones are disposed of in a totemic coffin.

Humans cooperate in large groups of unrelated individuals.



Ape-like societies

- Cooperation limited to kin and reciprocating partners.
- Weak extra-group ties.
- Dominance important

Genetic + cultural change

Forager-like societies:

- Cooperation among sizable groups of unrelated individuals.
- Small scale ethnic groups.
- Mostly very egalitarian.

Mainly cultural change

Urban societies:

- Cooperation among vast groups of unrelated individuals.
- Large scale ethnic groups
- Mostly very hierarchical

The Tribal Social Instincts Hypothesis

- Cultural group selection for altruism, docility, institution learning
- Punishment of rule violators
- Cultural or Symbolic marking of group boundaries
- Reduces, but does not completely resolve, **conflicts** with selfish and nepotistic impulses

Are modern societies built by institutional work-arounds?

- Concept of workarounds
- Variety of workarounds
  - Coercive dominance
  - Segmentary hierarchy
  - Exploitation of symbolic systems
  - Legitimate instutions
- Modern societies both use and cope with the limitations of tribal social instincts.

World War II armies as a test

- WW II armies differed greatly in effectiveness
- Trevor N. Dupuy: 100 Germans: 120 Brits or Americans: 200 Soviets: (200 Japanese): (100 Israelis)
- Did the German army do a better job at simulating the tribe?

So it seems!

- Coercive dominance
  - Germans efficient punishers
- Segmentary principle
  - Germans obsessive about solidarity of small units up to regiments
  - Emphasized individual initiative in training and orders
  - German leadership comparatively close and prosocial
- Symbolic systems
  - Territorial recruitment of regiments
  - Nazi ideology?
- Legitimate rules
  - Conspicuous concern for individual soldiers: medals, mail, hardship leave