

Anthro 101:
Human Biological Evolution

Lecture 9: Primate Behavior - Ecology

Prof. Kenneth Feldmeier

feldmekj@lavc.edu

Reminders

- Mid- Terms are graded
- Some people still need to turn them in!
- Five Week Left

Why do primates live in groups?

- Benefits of group life
 - Costs of group life
 - Why do primates live in so many kinds of groups?
 - Balancing costs & benefits
 - What is the influence of
 - Resources (diet), predators, climate, “conspecifics” on these groups?
- = Socioecology



1. Why do primates live in groups?

- Most mammals are solitary
- Many prosimians solitary
- Why are diurnal primates social?



Major benefits of group life

- Protection versus predators
- Better access to resources
- Access to potential mates

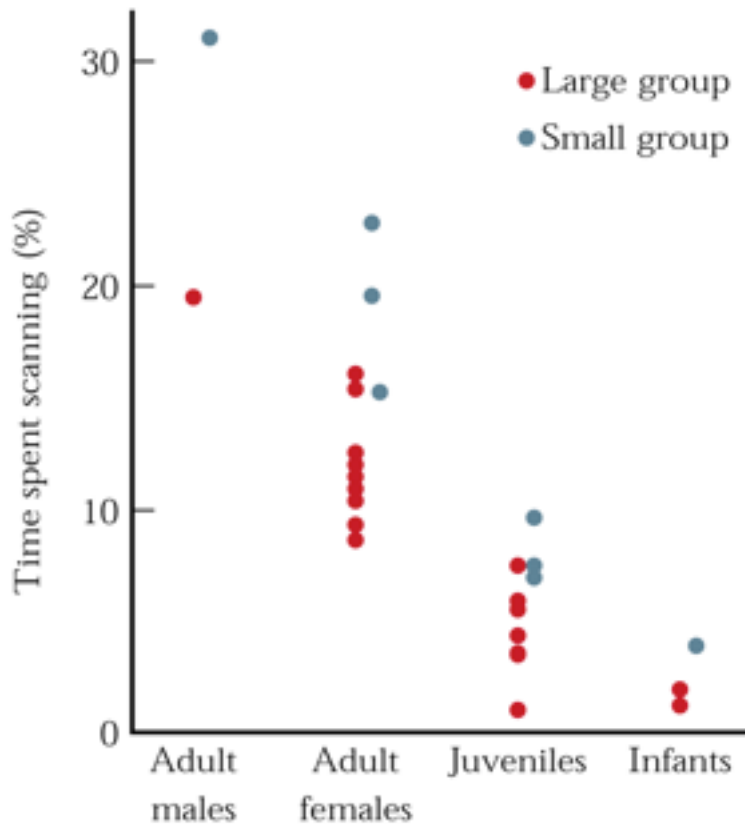


For diurnal primates, living in groups is an effective anti-predator strategy
= the Predation Model

1. Detection
2. Dilution
3. Defense

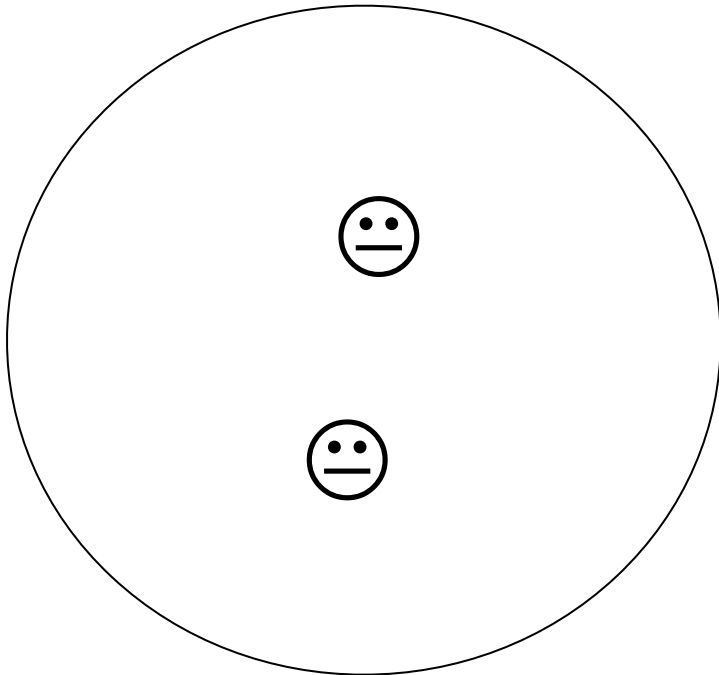


Detection: In larger groups, there are more eyes to watch out for predators

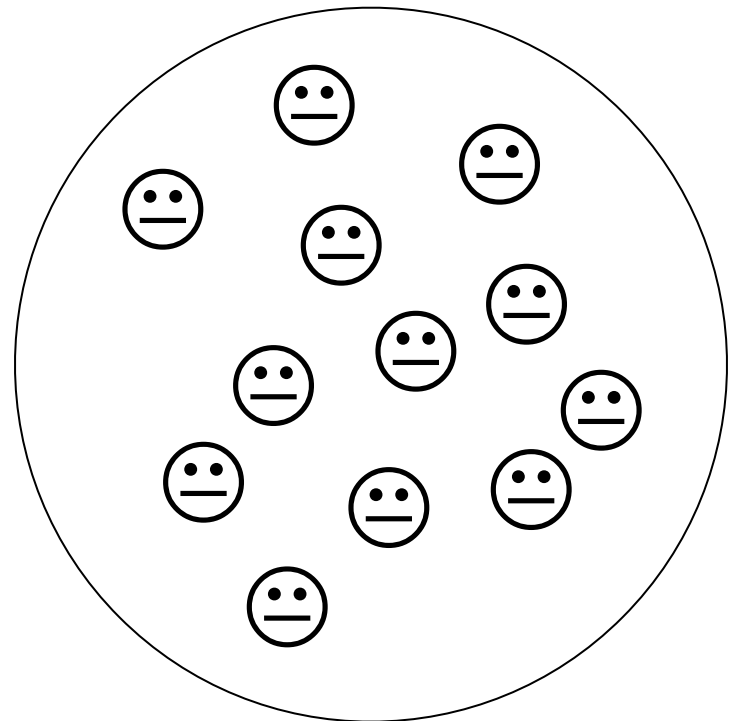


Dilution: In groups, any particular individual less likely to be caught by predator

Imagine chance of being caught = $1/n$, where n = group size



risk = $1/2$



risk = $1/12$

Defense: Many strategies for diurnal primates

- Sleep in trees, cliffs
- Defensive weaponry
- Large body size
- Vigilance
- Alarm calls
- Mobbing
- Interspecific associations



Two or more species may associate to reduce predator risk: **Interspecific Associations - 3D's**



Diana monkey



Ground predators



Red colobus



Eagles

Nocturnal primates use different strategies

- Hide during day
- Park infants while feeding
- Solitary
- Quiet
- Cryptic



Living in groups also has costs

1. Competition
2. Contagion
3. Cuckoldry
4. Inbreeding
5. Cannibalism
6. Infanticide

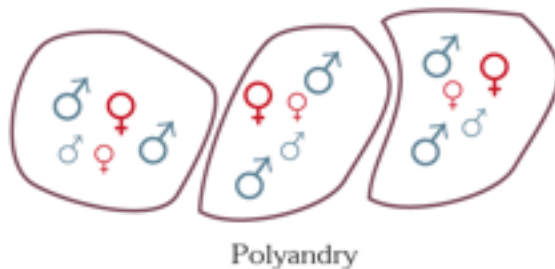
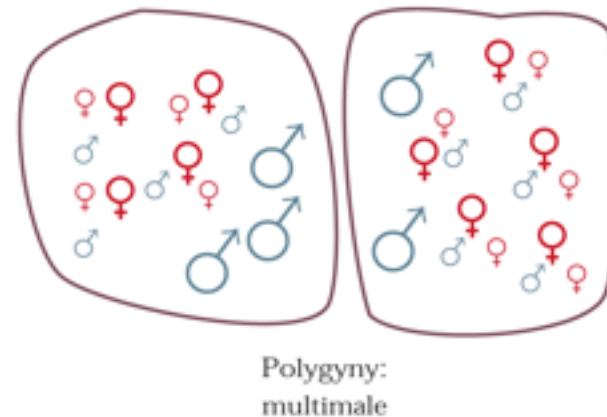
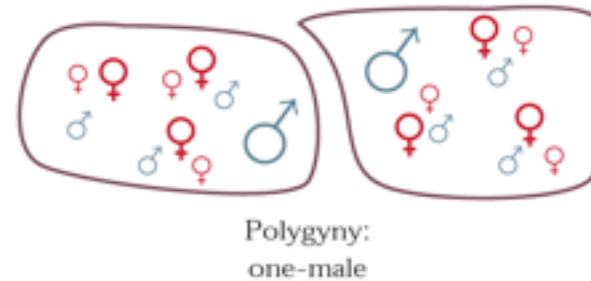
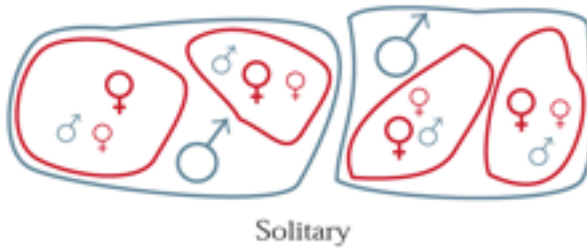


Group Questions

- What the benefits/Costs for Primate Group Life?

2. Natural selection shapes social organization to balance the costs & benefits of group living

- Socioecology = study of how ecological forces shape the size and structure of social groups



Solitary (but differentiated social relationships)

- each individual lives alone, occasionally meet up for mating
- may choose to neighbor with kin, meet more often



Orangutan

Loris

Monogamous (territorial pairs + offspring)



Titi monkeys

Gibbons

One-male, Multi-female groups (polygyny)



Black and white colobus



Mountain gorillas

One-female, two-male groups (Polyandry)



Pygmy marmoset



marmoset

Callitrichids

Multi-male, multi-female groups



Ring-tailed lemurs

Savanna baboons



©2001 Charlotte L. Richardson. All Rights Reserved

Communities (fission-fusion social organization)



Spider monkeys



Chimpanzees

Some argue that primates live in groups to better compete for resources

= Resource Defense Model

→ Between group competition

To understand competition you need to understand:

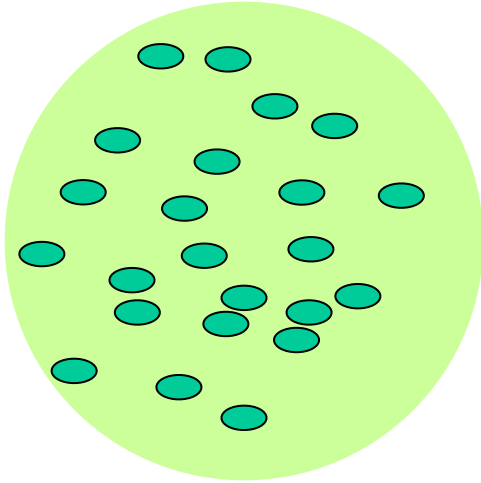
- **Diet** – How big is the species? How much space is needed to find enough food?
- **Food distribution** –Where & how does the food grow?
- **Female reproduction** – Timing & Frequency?
- **Protection** – Are males a threat to females & infants? Are males needed for protection?
- Affect what kinds of groups primates will form and when

Body size affects required quality & amount of food in diet

- Larger bodies need more food, but less energy per pound
 - can get enough by eating lots of lower quality leaves
- Smaller bodies need less food, but more energy per pound
 - To get enough need smaller amount of high quality insects, fruit

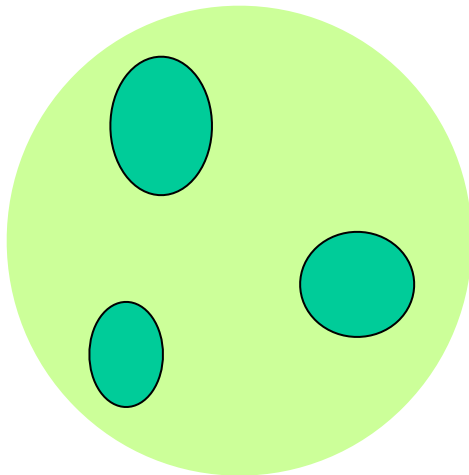


The distribution of food affects the type of competition



- Dispersed --> ***scramble competition***

- Food is distributed evenly
- Food items not worth fighting over
- Scramble to get enough food
- no direct competition



- Clumped --> ***contest competition***

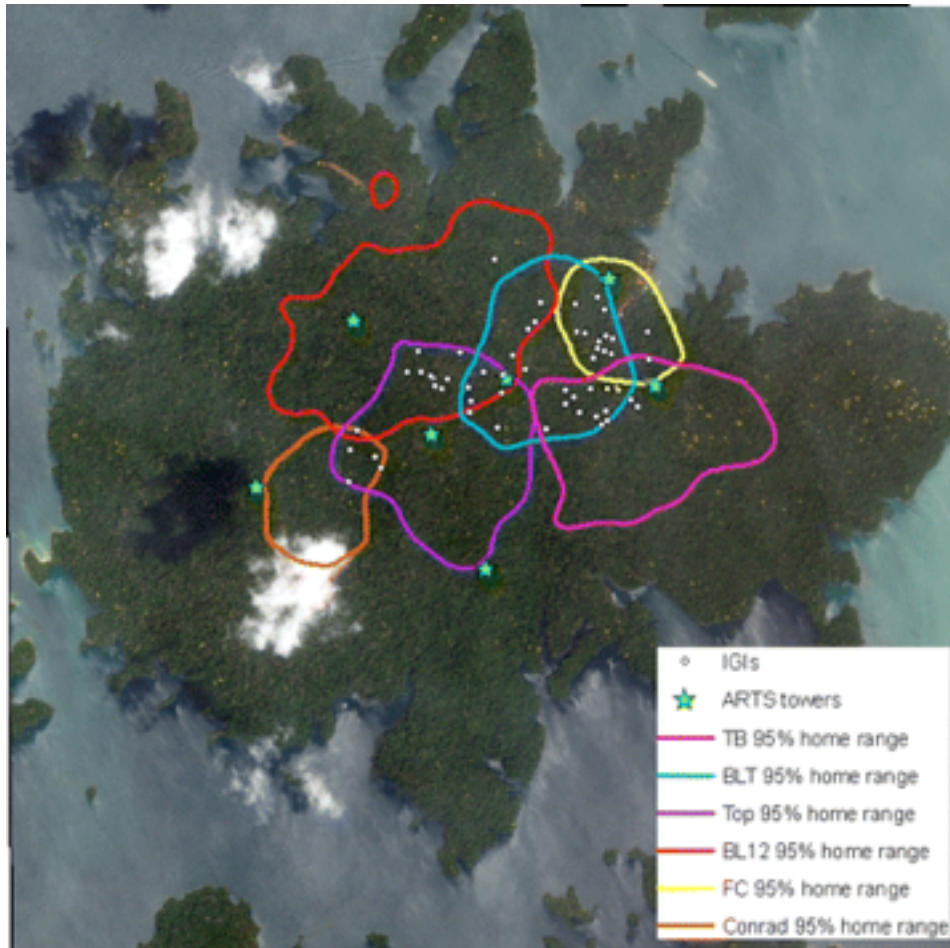
- Resources are scarce & valuable
- Resources are worth fighting over
- Contest access to particular resources

Groups will form based on the species' diet

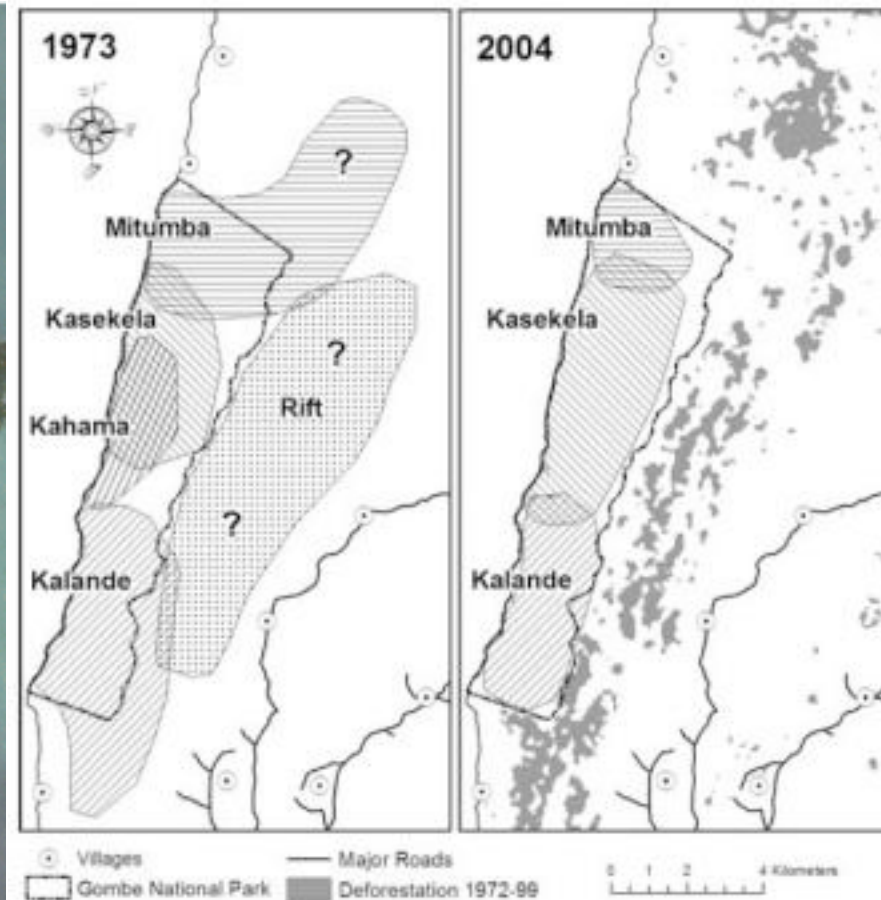
- Is a food defensible? If yes, then species will form groups that cooperate to defend food resources.
- Larger groups will defend more successfully than small groups
- Larger groups need more resources than small groups
- Defend territories
- Defend resources within home-range

The location where groups live will depend on a species' diet

- Home ranges



- Territories

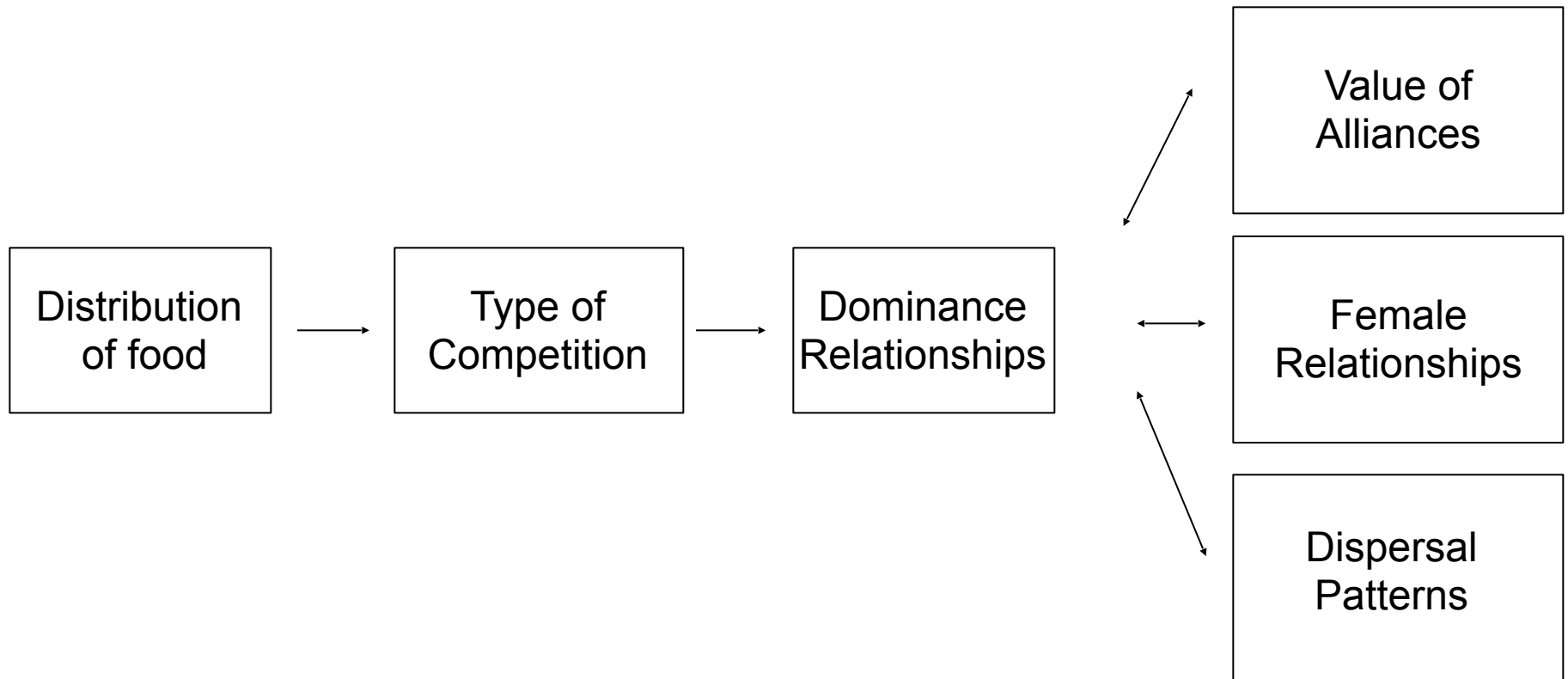


Competition for food very important for females

- Food affects:
 - Ability to conceive
 - Viability of pregnancy
 - Lactation
- Male reproduction is more influenced by access to females than by nutrition

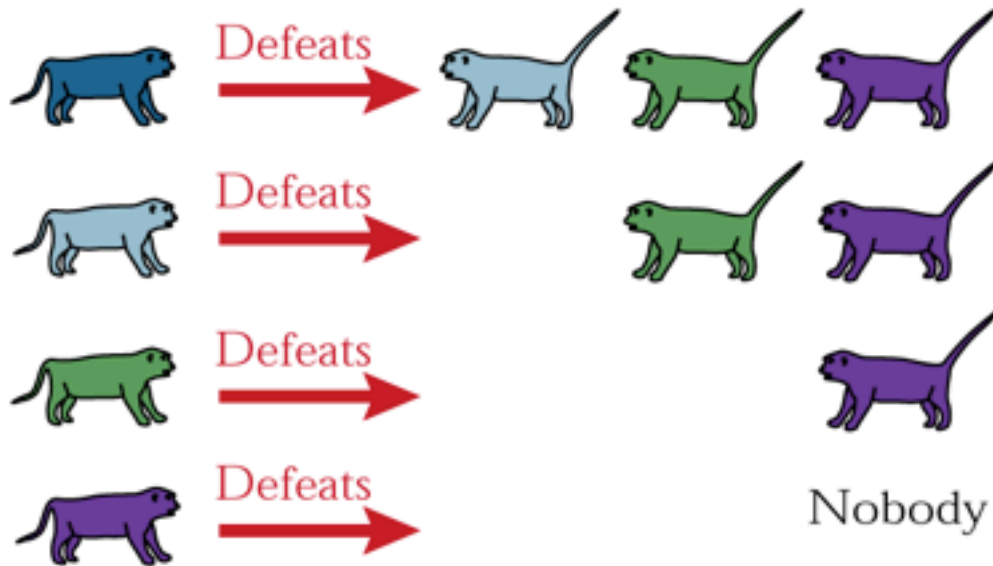


Food, competition, and social behavior are thought to be linked → Within group competition



Contest competition can produce a dominance hierarchy

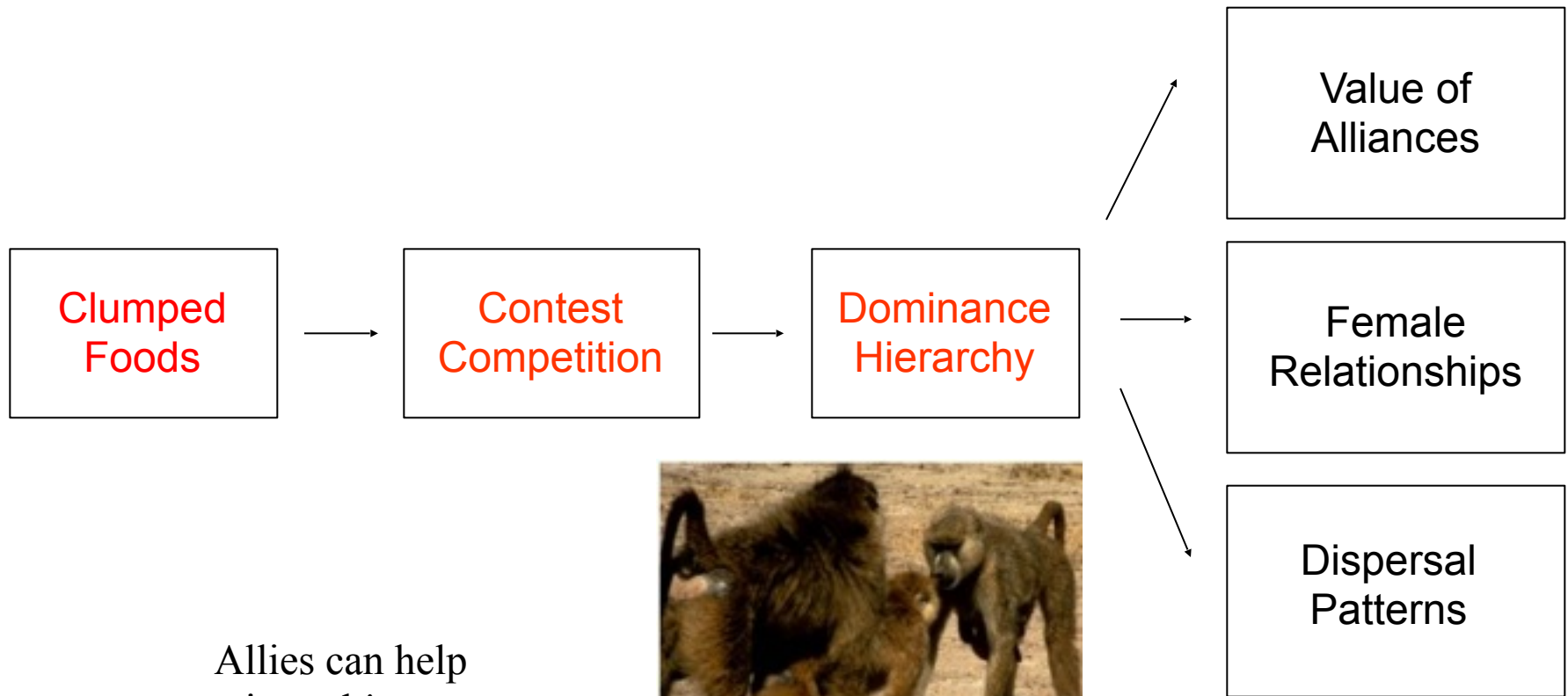
- If A always beats B & C, and B always beats C
= dominance hierarchy



(a)



Food, competition, and social behavior are thought to be linked



Allies can help win rank!



If females benefit from alliances...

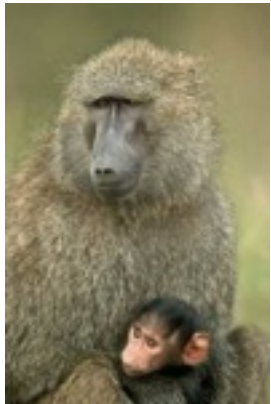
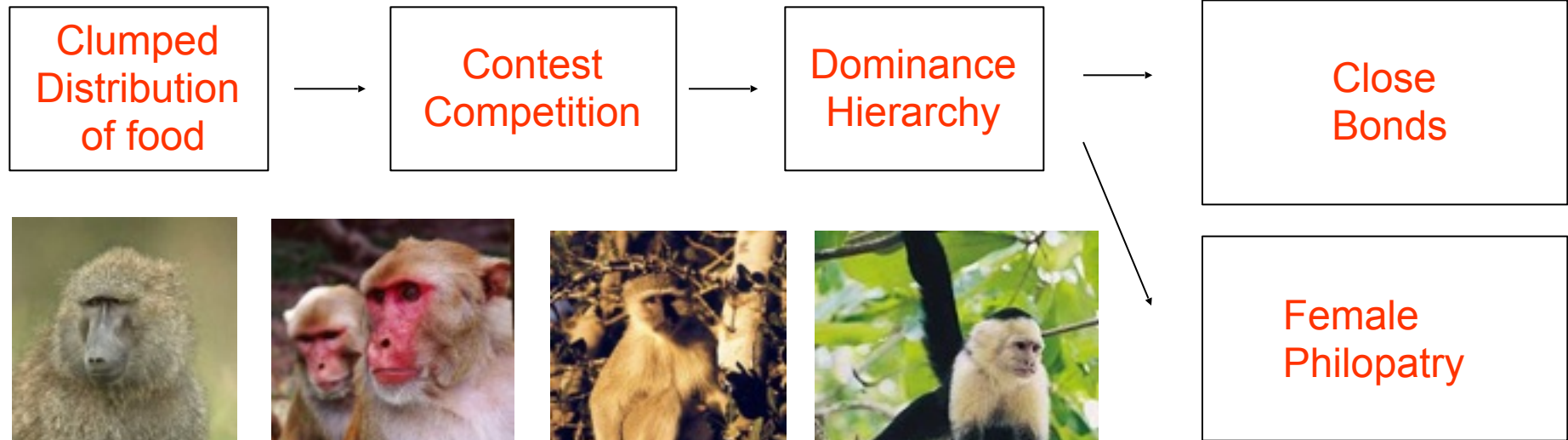
- Will develop relationships with allies
 - Hang out together
 - grooming
- May prefer kin as allies
 - Kin share genes = **kin selection**
- Will remain with allies/kin for life
 - Females will be **philopatric**
 - **Matrilineal dominance hierarchies**
 - Males will disperse to prevent inbreeding



Food, competition, and social behavior are thought to be linked

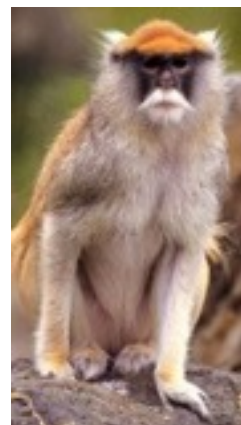
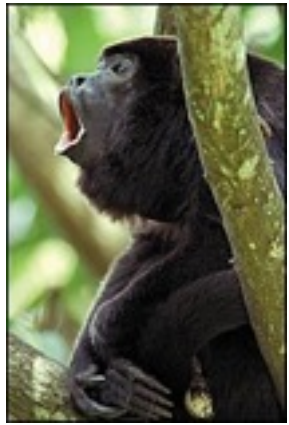
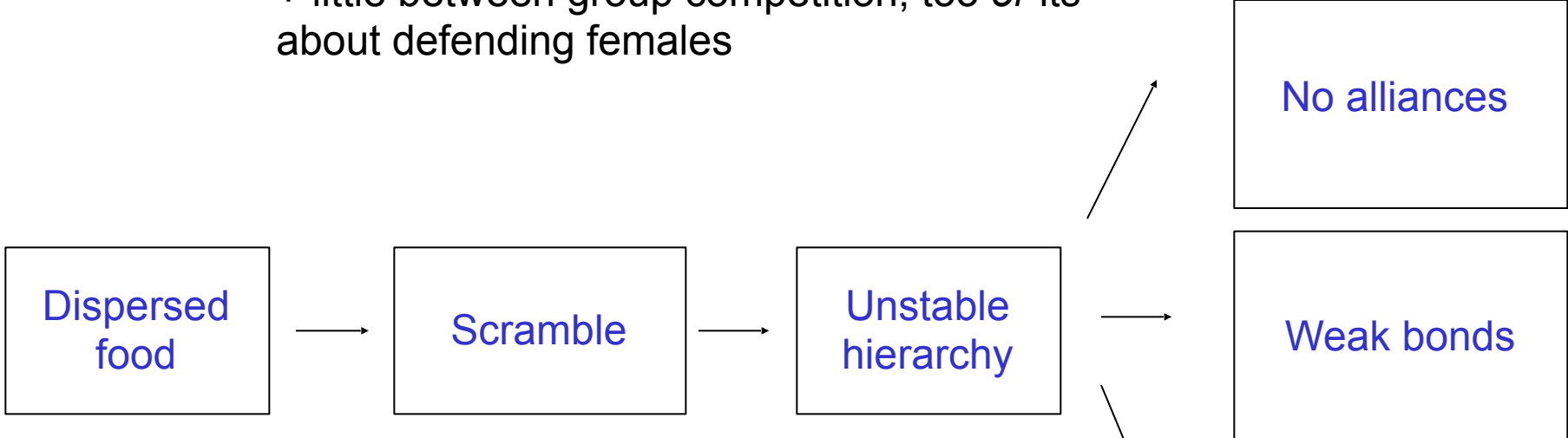
Eg: baboons & capuchins

+ Larger groups gain access to more food



If dominance does not affect access to resources, then...

Eg: gorillas & langur monkeys
+ little between group competition, too or its about defending females



Going Ape Video