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](image1)

Diana monkey

![Red colobus](image2)

Red colobus

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Ground predators

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
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)
Multi-male, multi-female groups

Ring-tailed lemurs

Savanna baboons
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

Clumped Foods → Contest Competition → Dominance Hierarchy

Value of Alliances
Female Relationships
Dispersal Patterns

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.

- Clumped Distribution of food
- Contest Competition
- Dominance Hierarchy
- Female Alliances
- Close Bonds
- Female Philopatry

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