- **Male Competition**
- Because male success is dependent upon access to females, not food, males compete for mates in a number of ways
  - By being more attractive
  - By beating up the competition
  - Not all male-male competition is physical violence
    - Ex: sperm competition in multi-male, multi-female social groups
- One-male multi-female groups
  - intense competition and infanticide
  - Males compete with each other for access to groups of females
  - Tenure of resident males in groups is often very short
  - When males join groups, they often commit *infanticide* (kill infants)
- Infanticide (killing infants)
  - Selection favors this strategy because natural selection usually acts on individuals and on relative fitness
  - sexually-selected male reproductive "strategy
    - Lactation inhibits female cycling
    - Unweaned infants death makes females available for reproduction sooner
    - Because male tenure is short (-2 years), infanticide enhances male's reproductive opportunities in the context of one-male, multi-female groups
  - If infanticide is a sexually-selected male reproductive strategy, then we would predict and some empirical data (observations) show:
    - Infanticide will be linked to changes in male residence or status
    - Males will kill unweaned infants only

    - Males won't kill their own infants
    - Infanticidal males will gain reproductive benefits from their actions

Primate Behavioral Ecology II: Evolution of Cooperation

Outline

- *Different types of social interactions*
- *The problem of altruism*
- *The solutions*
    - *Kin selection*
    - *Multilevel selection*
    - *Reciprocal altruism*

Different types of social interactions

- Strategies used during social interactions can incur costs or impart benefits to the fitness of those involved
    - GRAPH from book- cases between actor and recipient with a positive or negative fitness effect
        - **+-** Selfish: improves its own fitness at the detriment of someone else
        - **++** Mutualistic: both parties cooperate to get mutual benefit
        - **-+** Altruistic: the actor does something that decreases its own benefit, to do someone else a favor
            - Highlighted to show cooperation that we will be focusing on
                - Calling reduces relative individual fitness of altruists if it increases chance of being eaten
        - **--** Spiteful: ill go out of my way to knock you down, when in turn they pay a cost as well, both worse off

The Problem of Altruism

- Presence of altruism poses an evolutionary problem
- Altruistic acts are costly to self and beneficial to the fitness of others
- So how can altruistic behaviors, like alarm calling, evolve by natural selection?
- And yet, altruism occurs in nature
    - Alarm calls
    - Territorial defense
    - Food sharing
    - Communal care of young

- **The Solution for Altruism**
    - How can altruism evolve: how can the frequency of altruists ever increase?
        - Here's the trick:
        - Social interactions must be nonrandom (assortative) such that altruists interact with other altruists more than with non-altruists
        - Altruistic acts must be "directed" at other altruists.
        - How do primates do this?
- Kin selection (Hamilton 1964)
    - Assumes that altruism is underwritten by genes.
    - We know close relatives share genes through common descent
    - Altruists that selectively aid kin will tend to aid those who carry same gene for altruism (creating positive assortment).
    - Hamilton's Rule: Altruistic acts will be favored by selection when: