

# Prosocial behavior: Kin selection (cont.)

Lecture 10  
9-25-07

# Announcements

- Research Opportunity #1!!
- Sign Up After Class
- Exam scores
  - Average: 82
- Readings:
  - Chapter 13 pages 535-549

# From last time

- Definition of altruism
- Why is the evolution of altruism problematic?
- What do the examples of the indiscriminate altruists and the green beards show?
- What are the 2 ways a gene can spread?
- Who is likely to share the same gene for altruism as you?
- What is Hamilton's equation?
- What is an ESS?
- How do we detect kin?

# How do we know “r”?

## Kin Detection

How do we know who counts as a mother,  
father, sibling, or offspring?

What are the cues we use?

mother?

father?

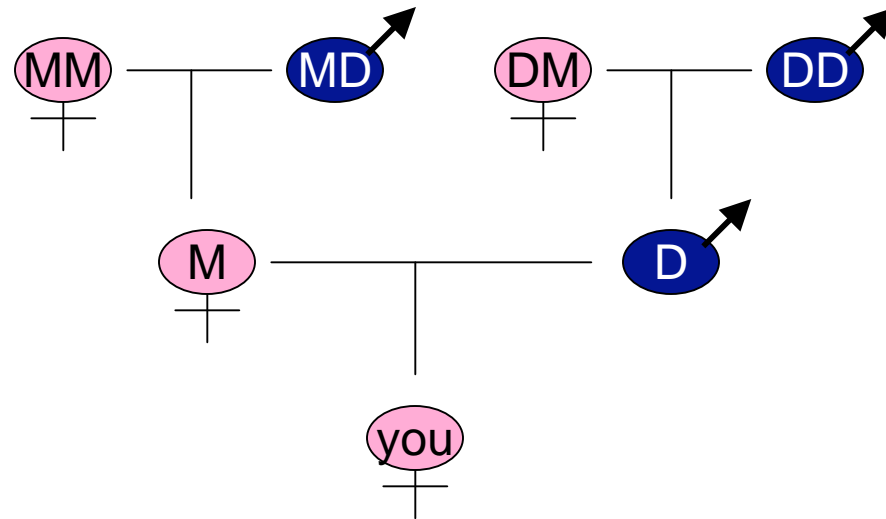
offspring?

sibling?

# Cues to kinship and altruism

- Which relationships are more certain?
- Which is the least certain?
- How does paternity certainty affect altruism?

# Studies on kin-directed altruism



Of your grandparents, who has the highest certainty of relatedness?

Of your grandparents, who has the lowest certainty of relatedness?

# Studies on kin-directed altruism

- DeKay (1998) and Euler & Weitzel (1996)
  - Maternal grandmothers invest more than paternal grandfathers.
  - The maternal grandmother was the most caring, followed in order by the maternal grandfather, the paternal grandmother, and the paternal grandfather.

# Studies on kin-directed altruism

- Does facial resemblance influence altruism?
- Composite = avg of 20 faces.
- Other sex transforms: 50% shape difference b/n participant's face and same sex composite and applying this to other-sex composite.

Click on the face:

You find more trustworthy.

You find more attractive for a short term relationship.

You find more attractive for a long term relationship.

Preference score = # time selected own  
face - avg # times others chose face

If = 0 then no preference

If > 0 then + preference

If < 0 then - preference

Problems with study?

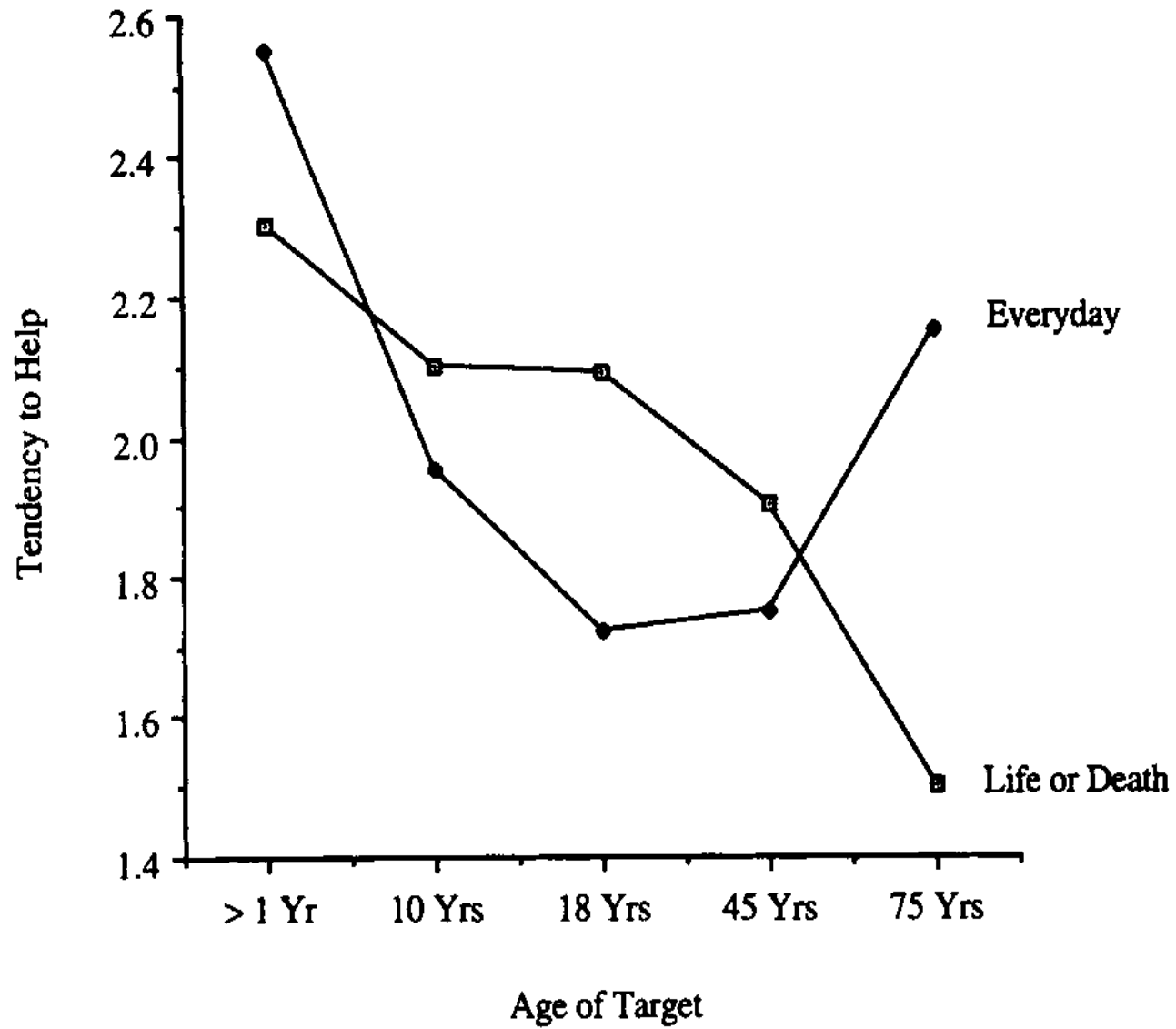
# Studies on kin-directed altruism

- Does coresidence duration influence altruism?
  - Two cues to siblingship. Should predict altruism.
  - Predictions
  - With MPA, coresidence should not predict altruism
  - Without MPA, coresidence should predict altruism

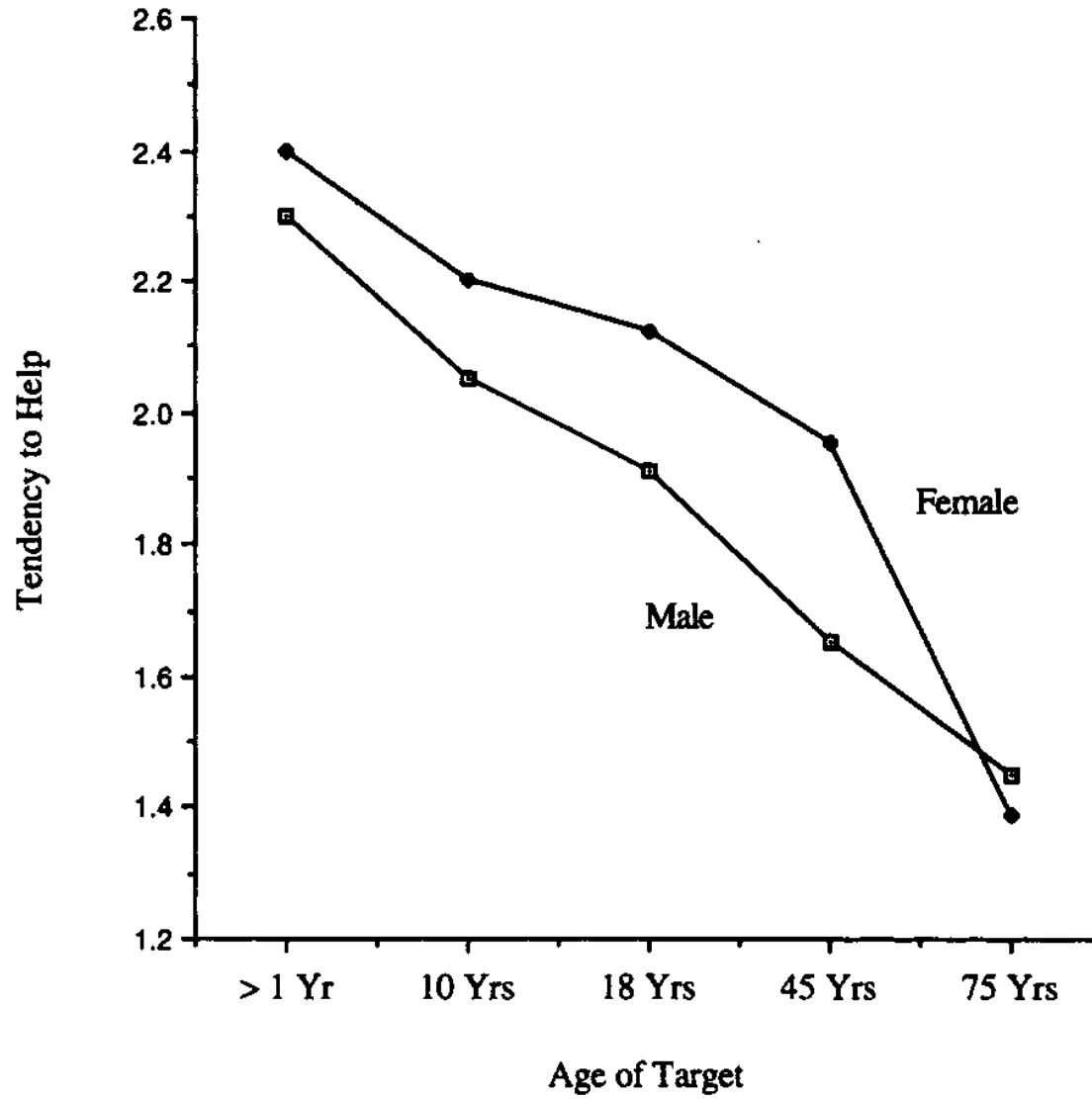


# Studies on kin-directed altruism

- Does it only matter how the person is related?
- How does age and health and situation factor in?
- Burnstein, Crandall, and Kitayama (1994)
  - found that it matters if it is a life or death situation.



*Figure 3.* Tendency to help as a function of the recipient's age under life-or-death versus everyday conditions.



*Figure 4.* Tendency to help as a function of target's sex and age under life-or-death condition.

# Which design feature would persist in a population?

- What other factors might affect when you should help. Is  $r$  all that is necessary?
- If  $r$  is equal for both females, would it “pay” to help a female relative who is past reproductive years or a female who is just entering fertile years?
- Which design feature would spread?
- Inclusive fitness theory suggests that helping behavior should be directed toward a person if he/she is likely to reproduce in the future. What about age?
  - menopausal aunt vs. 10 year old nephew
  - healthy, high quality, younger...

# Parent-Offspring Conflict

# Hamilton's equation revisited

- $r_B > C$
- But really
- $r_B > r_C$  !!!

# Another example

Your full sibling:

$$r = 1/2$$

$$rC < rB$$

$$1C < 1/2B \quad \text{or} \quad 2C < B$$

For natural selection to favor altruism toward your full sibling, the Benefits (B) to your sibling must be *greater than twice* the Cost (C) incurred by you.

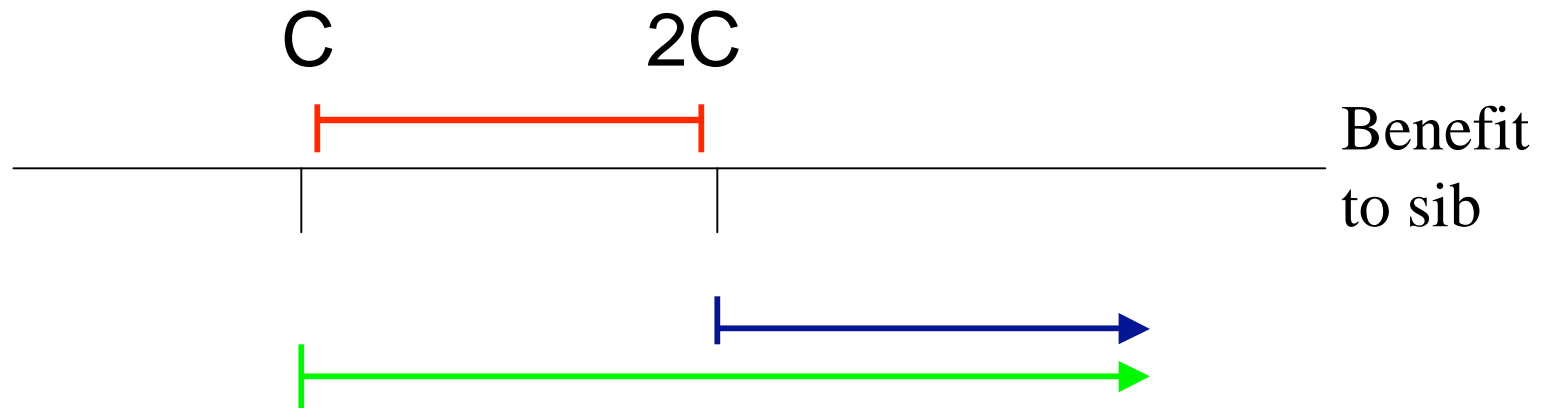
# Parent-Offspring Conflict

- Parents are selected to socialize their children to act more altruistically and less selfishly than the offspring are selected to act on their own.
- Consider a parent with two offspring.
- The first offspring is considering an altruistic act towards its sibling.
- When will it pay for the sibling to be altruistic and when will the mom want you to act altruistically?

# Conflicts over when to help!

- Your point of view:
  - You should help whenever:
    - $\_C_{you} < \_B_{brother}$
- Your brother's point of view
  - You should help whenever:
    - $\_C_{you} < \_B_{brother}$
- Your mother's point of view
  - You should help whenever
    - $\_C_{you} < \_B_{brother}$

- When will you want to act nice?  $1/2B > C$  or,  **$B > 2C$**
- However, parents are equally related to both children and should want you to be nice to your sibling whenever  **$B > C$**



- Whenever  $C < B < 2C$ , parents will be selected to socialize their offspring to act altruistically, while offspring are selected to resist this socialization.