

**Bio. 3302 Introduction to Evolution**  
**Study Guide**  
**Evolution of Social Behavior**

**Important terms and Concepts**

Actor/instigator  
Altruistic social behavior  
Bees  
 $B_r - C > 0$   
Castes  
Coefficient of relatedness "r"  
Cooperative breeding  
Cooperative social behavior (mutualism)  
Dominance hierarchy  
Eusociality  
Full Siblings  
Group living  
Half Siblings  
Hamilton's Rule  
Haplodiploidy  
Inclusive Fitness  
Inbreeding  
Kin Selection  
Naked mole rats  
Parental-Offspring conflict  
Recipient  
Reciprocal altruism  
Selfish social behavior  
Siblicide  
Social interactions  
Spiteful social behavior  
Termites  
Wasps

**Discussion Questions**

1. Many animals display social behavior. What are some benefits of cooperative behavior?
2. What are the four general types of social interactions? Give examples.
3. Why is altruistic behavior difficult to explain by natural selection? Do humans display this behavior?
4. Some animals cry out and warn others when they see a predator approaching. In some cases this can be dangerous, so why would they sacrifice themselves this way?
5. What is Hamilton's rule? What are its three mathematical terms, and how are they calculated?
6. Should sibling rivalry be more or less common in species that are monogamous or polygamous? Why?
7. What is meant by the statement "I'd jump in a river to save two brothers, or 8 cousins?"

8. Describe inclusive fitness and give examples of animal behaviors that seem to be operating under this principle.
9. What is meant by the term "eusociality"? What are some examples of eusocial animals? What do they have in common?
10. Why did Darwin find it difficult to explain the evolution of insect castes, workers who sacrifice their own reproduction for others?
11. What is haplodiploidy, and why was this seen as a possible mechanism for the development of eusociality? How closely are haplodiploid ant, bee, and wasp workers related to each other? What are some problems with this hypothesis?
12. What about the case of naked mole rats? What kind of social behavior do they exhibit? Unlike bees and wasps they are diploids. How might their society develop?
13. Are humans eusocial to any extent? Can you think of any cultures that might fit the description (non-reproductive worker castes)?