

BEHAVIOR (Ch. 13)

1. INTRODUCTION

behavior - another type of adaptation

- evolved under natural selection
- feeding, space, mating, movement

evolution

1. variation in individual behavior
2. some behavior due to genes
3. some better adapted for survival or reproduction
4. genes for behavior spread thru population

anthropomorphism - attribute human motivation, emotion, morality, intellect to animals

2. ETHOLOGY

behaviorism - animal psychology in lab, testable

ethology - animal psychology in natural environment

FAP - fixed action pattern, one specific reflexive behavior

releaser - stimulus that triggers FAP

sign stimulus - significant aspect of releaser

supernormal stimulus

- exaggerate sign stimulus to increase FAP

drive - motivation to perform FAP

innate releasing mechanism

- nerve circuitry that releases FAP

3. MOVEMENTS

kinesis - non-directed movement

taxis (plural taxes) - directed movement (like tropism)

- negative vs positive
- photo, geo, chemo, hydro, thigmo, ameno

navigation - follow course using cues

- food, home, seasonal migration

- sun, stars, geography, magnetism, light

biological clocks - keep track of time

- daily, lunar, annual

4. INSTINCTS & LEARNING

instinctive behavior - innate, reflexive, stereotypic

- most behavior (esp. vital to survival)
- behavioral patterns stored in genes

learned behavior - modified with experience

- vary with circumstance & individual
- ability to learn stored in genes

imprinting - critical age for learning

conditioning - reward & punishment, trial & error

habituation - ignore constant stimulus

nature vs nurture - extremes in wide range of behavior

5. SOCIAL BEHAVIOR

social behavior - versus solitary behavior

advantages

- reproduction - finding mates, intercourse
- defense - warning, attack, schooling
- feeding - finding & sharing food
- parenting - care of offspring, promote learning
- division of labor

disadvantages - increased predation & competition

communication - transfer of information

- visual, auditory, tactile, chemical (pheromones)
- displays (symbolic behavior)

sociobiology - evolution & genetics of social behavior

- cooperation, altruism, selfish, spite
- equate animal behavior to humans

6. MATING

sexual selection

- evolve to maximum reproduction (not survival)
- dimorphism unrelated to gonads

females - cryptic & inconspicuous

- large investment in fertilized egg
- goal to select 'best' male for reproduction

males - larger & colorful, contribute only sperm

- goal to reproduce with many females
- outcompete other males, also attract predators

monogamy - form a single pair bond

- all males reproduce, dimorphism reduced

polygyny - only a few males reproduce

- dimorphism pronounced

polyandry - female mate many males

- reversal of sex roles & sexual dimorphism

7. AGGRESSION & DOMINANCE

aggression - fighting behavior

- compete for food, space, or mates
- reduced by display, dominance, territory

submission - weaker individual backs off

dominance hierarchy - pecking order

- fighting reduced by displays
- dominant male gets first choice
- subordinates get only leftovers

evolution - helps to limit population size

- insures sufficient food for dominant male to reproduce & feed offsprings

8. TERRITORIALITY

home range - entire region visited during year

territory - subregion defended for exclusive use

- fittest individuals in prime habitats
- less fit settle for marginal outskirts
- owner always dominates inside territory through displays, always ignores intruders outside territory

evolution - helps to disperse population size

- prime territory contains sufficient food
- insures fittest male reproduces successfully
- less fit pushed into poor territories so can't reproduce

9. INSECT SOCIETIES

honeybees - complete division of labor

- 'super-organism analysis'

workers/soldiers - sterile females

- many thousands in hive, do all the work

queen - single fertile female

- sister to workers, reproduces for entire hive

drones - 1000 males, only for producing sperm

- developed from unfertilized eggs
- haploid (only half-set of chromosomes)

spring - queen & half workers depart to new hive

- first female to hatch consumes royal jelly to become new queen, produces pheromone to sterilize sisters

10. INCLUSIVE FITNESS

inclusive fitness

- defined in terms of genes surviving (not offsprings)
- example: mother sacrifices herself to save child (yet only share half genes)

kin selection

- help siblings reproduce to increase shared genes
- normal relatedness = $\frac{1}{4} + \frac{1}{4} = \frac{1}{2}$

honeybees - workers & queen are sisters

- same mother, so share $\frac{1}{4}$ genes
- same haploid father, so share $\frac{1}{2}$ genes
- total relatedness = $\frac{3}{4}$

selfish gene - gene as significant unit of life & evolution

- infanticide & siblicide, bacteria