Contents

History of Animal Behavior Research

-Comparative Psychology, Ethology, Sociobiology

-Differences in these fields were all large enough to create criticisms and misunderstandings among the disciplines

-most of these differences are gone now, as the field has become united and interdisciplinary

Comparative Psychology

-evolved from being comparative animal behavior to comparative learning psychology

-focus on reinforcement, stimuli, punishment

-all species have a basic law of learning, so it doesn't really matter what species is studied

-observations limited to stimulus and response, no subjectivity

-originally studied only laboratory species, but broadened over time

-eventually developed to include study of:

- -development of behavior
- -genes and environmental interactions
- -hormones and behavior

Ethology

-branch of zoology that studies the behavior of animals in their natural habitats

-European ethologists described many different types of behaviors in many different species without manipulation

- -not much theory involved, except evolutionary history/phylogeny

-Duck Courtship

- -in three different species of ducks, they all have this "grunt-whistle"
- -the order of displays are similar, but the specific postures are different
- -in closely related species, these differing postures may serve as reproductive isolating

mechanisms, really differentiating the species

- -similar behaviors suggest recent shared evolution

-Lorenz' Fixed Action Patterns

- -all members of the species show it, without experience
- -think of the mother duck pushing her egg back into the nest example
- -behavior goes to completion
- -"supernormal stimuli" can exaggerate the behavior (an oversized egg, for example)

Critiques of Fields

-Comparative Psychology's Critique of Ethology

- -lack of scientific control

-just animal lovers that like to watch and describe nature
-no quantification of behavior or statistical tests
-no explanation for expression of species-typical behaviors

-Ethology's Critique of Comparative Development
-the topic of study, animal learning, was too limited
-ignore species differences without justification
-there is no reason to assume the same process underlies learning in all species
-ignore evolutionary history of animal
-need to study range of species in natural environments

Sociobiology

-also known as "evolutionary social biology" or "behavioral ecology"
-emphasis on the "why" explanations for behavior
-like ethology, uses evolution and natural selection
-but unlike ethology, function (current adaptiveness) is emphasized over evolutionary history
-predictions rather than post-hoc explanations
-def: the systemic study of the biological basis of all social behavior, using evolutionary theory as an explanatory tool
-started with Darwin's *The Origin of Species*

The Sociobiology Controversy

-relationship between genes and behavior
-"lock and key, robot-like control, predetermined" (?)
-biological determinism-if you're born with it, you can't improve people or societies for the better
-to its critics, sociobiology was another attempt to invoke genetic determinism to explain human behavior
-but scientists would never say that there is a "gene for" altruism or homosexuality, just as they wouldn't say there is a "gene for" toes and fingers.
-they would say that because of evolution there might be genetic effects on behavior
-evolution applied to human behavior
-humans DID evolve
-critics say it ignores cultural processes unique to humans
-but if evolution influences our physiology and morphology, then why not our behavior?

Comparison of the Three Fields

	Comparative Psychology	Ethology	Sociobiology
Research Environment	Lab	Field	Field and lab
Methods	Experiments	Observations	Experiments and observations
Questions	Learning	"Innate" behavior, phylogeny of behavior	Reproductive success; function
Species	Few (rats, pigeons, etc.)	Diverse	Diverse
Theory	Learning theory	Little: some evolution	Darwinian evolution

Tinbergen's Framework for Behavioral Studies

-a methodological and theoretical approach to the study of behavior

-What to Do?: observe and describe

-ethogram

-sit and watch unobtrusively, record what is seen without interpreting

-record the form and the consequence

-two types of way to describe behavior, without interpretation:

-1. Motor pattern: describe actual pattern of body's movement (flap wing, lick fur, etc.)

-2. Description by consequence: describe how the environment is affected by the behavior (displacement,

grooming, nest building, etc.)

Tinbergen's 4 Questions

-ABC's: Animal Behavior = Causation, Development, Evolution, Function

-asked four classes of questions or explanations about behavior

-1. Immediate Causation

-neural or physiological explanation for individual's behavior

-ie: hormones, learning, hunger

-2. Development

-change in individual's behavior with age or experience

-ie: ontogeny of avoidance behavior, hunting skills in lions

-3. Evolutionary History

-changes in species' behavior over many generations

-ie: phylogeny of group size, communication behaviors

-can involve more than one species (comparative approach)

-4. Function

-adaptive significance or reproductive consequences of an individual's behavior

-namely, how behavior increases chances of passing on genes

-ie: male traits and mate choice, anti-predator behavior

-think of the experiment where the birds hard their tails lengthened and shortened

Levels of Analysis of the 4 Questions

-proximate; "how?" questions

-immediate causation, development

-within a generation

-ultimate; "why?" questions

-evolutionary history, function

-across generations

-based on time scales

-individuals develop, species evolve

-levels are not mutually exclusive or competitive

-they should be viewed as complimentary alternatives, not right vs. wrong

-there may be multiple proximate or ultimate explanations for a particular trait

Darwin's Theory of Evolution by Natural Selection

-*On the Origin of Species*

-convinced skeptics that evolution occurred

-presented a process for evolution (natural selection)

-all aspects of life were natural phenomena, not divine intervention, and were subject to scientific study

-forced the reconsideration of human origins

-definition of evolution or evolutionary change: change in gene frequency across time within a taxonomic group that results in changes in anatomy, physiology, or behavior

Darwin's Observations

-1. Variation

-each trait varies among members of a species

-individuals differ in structure, physiology, or behavior

-2. Parent-offspring resemblance

-offspring resemble their parents more than their offspring

-3. Reproductive potential

-it's enormous in most species