

Animal Behavior

- Action or re-action to stimuli
- Happens in the brain (non-motor) and can be manifested through muscular response, but often involves both
- There can be a temporal component to the actual behavior (learning)
- Short-term trigger for behavior, or effect on the organism
- Long-term evolutionary significance/adaptation: behavior is selected for.
- Animals behave in ways that maximize their fitness

Genetic vrs environmental factors

- **Nature/nurture? On-going debate**
- **Behaviors have phenotypic variation: studies on problem solving**
- **Due in part to genetic propensity: 'ability' to learn**
- **Due in part to environmental pressures and variability**
- **The two: genes and environment, work in concert**
- **Innate behavior: less subject to environmental variation. Developmentally fixed**

Fixed Action Patterns

Fixed Action Patterns: stereotypical innate behavior. The organism will carry it out almost no matter what, even if it doesn't seem appropriate. These are all part of a category of behaviors very important to survival and/or fitness.

Fixed Action Patterns

- **Sign stimulator**
- **Wing folding and dropping in moths**
- Male three spined stickleback: attacks other males with red bellies – attacks anything red
- Baby birds begging
- Ground nesting geese – retrieve egg if it rolls away. Will sit on any round object for awhile. Will retrieve a non-round object, but will realize its not right after sitting on it.

Innate behavior

- Brood parasitism is a classical example of innate behavior: the cuckoo
- Parasitic cuckoo baby will push other eggs and young out of the nest (this is an innate behavior)
- Some birds will recognize and remove the egg, but will feed the baby parasite if it hatches
- Ability to confront novel stimuli, learn about them and adjust behavior is indicative of intelligence and self awareness. Intelligence is 'costly': brain development, parental investment etc.

Learning

- **Change in behavior based on experience**
 - Maturation is behavior change based largely on ability due to development (eg. Flying in birds)
- **Habituation**
 - Loss of responsiveness due to repetition
- **Imprinting**
 - Learning in a critical time period (tightly correlated with innate behavior)
- **Conditioning: Pavlov**
 - Associating a stimulus with punishment or reward (can also be trial and error)

Associative learning/conditioning

- Associating one stimulus with another
- Pavlov: **classical conditioning**. Associating an arbitrary stimulus with reward or punishment
- **Operant conditioning**: learning through trial and error. BF Skinner's experiments. This has formed the basis for much animal training.
- Classical and operant conditioning often work together

Cognition

- **Problem solving studies**
- **Consciousness and awareness**
- **The connection between nervous system function and behavior**
- **Spatial orientation and mapping**
 - Migration: Piloting, orientation (directional headings), navigation (relative location)
 - The role of learning in migration

Migration

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Behavioral ecology

- Animals behave in ways that maximize their fitness
 - Reproductive behavior = more successful offspring
 - Feeding behavior = maximum energy gain
- Research examples:
 - Sparrows and cuckoldry
 - Cheetahs and prey selection
 - Elephant seals and polygyny
 - Humpback whale songs

Reproductive behavior

- Sexual selection
 - Courtship
 - Female choice
 - Male aggression
- Leks
- Humpback whale song
- Elephant seals

Mating strategies

- Promiscuous
- Monogamous
- Polygamous: polygynous, polyandrous

- Certainty of paternity matters!

Cuckoldry: when to cheat?

Dangers and benefits

Foraging: optimizing energy gain

The role of learning: sea otters

Optimal foraging: bluegills and cheetahs



Inclusive fitness

Why do some animals 'help' even at their own expense?

- Altruism
- Reciprocal altruism

Some Key Points

- Behavior is how an animal reacts to stimuli or 'situations'. It can have a temporal component.
- Behavior is selected for and has important implications for the overall fitness of an animal.
- The field of genetics has allowed researchers to progress in the field of behavior
- Animals learn, and learning can occur over an extended period of time, or a short time, and in many cases occurs during a critical period.
- Animals can learn through conditioning