

# 01/13/15 History of Animal Behavior

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## Scientific Method

1. Observation
2. Hypothesis
3. Experiment
4. Communication → synthesis (theory which helps with observation)

## Limitations

- Nothing is ever established
- Assumption of regular causality
  - Exclude exceptional events (is not repeatable and therefore cannot be studied)

## Scientific Claims

1. Background
  - a. What were known at the time
  - b. What different hypothesis were offered at the time
2. Design and Methods
  - a. Design: how distinguish between 2 claims
    - i. Given multiple hypotheses, design an experiment different from the given hypotheses
  - b. Method: come up with methods to design the experiment
    - i. How to measure outcome, etc
3. Interpretation
  - a. Taking data and making conclusions from it
  - b. Come up with a way to account for error
  - c. What hypothesis and alternative methods are not being considered?
  - d. What are the limitations of the framework?
4. Synthesis
  - a. MULTIPLE INDEPENDENT CONFIRMATION
  - b. Typically at end of research paper
  - c. Take results collected, compare interpretation with interpretations of other similar experiments

Observation: behaviors that are a key component that is repeatable

- observable
- quantifiable
- (hammer)

Processes: mental time travel, spatial reasoning

Chimpanzees:

- Explanation: same reasoning
- Explanation 2: trial and error

One shot learning

- Latency as a function of trials: sharp curve down

Trial and Error

- Linear downward

What is intelligence?

1. Is it discrete?
  - a. You have it or you don't
2. Is it one thing or many things?

Try to avoid in the field

- Human exceptionalism
  - Claim that only humans do certain things
    - Language
    - Tools
- Anthropomorphism
  - Imputing subjective mental states to animals when we don't really know anything about that
  - Darwin raised point that animals are intelligent
- Scala naturae
  - All lifeform are arranged on a linear scale
  - Inanimate matter → plants → soft animals → crustaceans → insects → fish/cetaceans (whales, etc.) → amphibians and reptiles → birds → mammals → MAN
  - Blood and how many legs
  - Rank on brain size, etc.
  - Human tendency to want everything to be linear

Theory of Evolution

1. Common descent
2. Heritable individual variation
3. Selection
  - Primarily natural selection

Phylogenetic tree

Homology (Same word, same concept)

- Have trait because inherited from a common ancestor
- Example: arm; bone structure is remarkably similar

Homoplasy (same form)

- Same trait, but not because of same ancestor
- Wing in birds and insects
- Maybe environment produced similar constraints

## MAP OF COURSE

2 big schools after Darwin

1. Ethology
  - a. Primarily by people in Europe
  - b. Natural behavior
  - c. Adaptation
  - d. Strong connection to evolution
  - Behavioral ecology
  - Neuroethology
    - Focus on neural mechanisms that implement the behavior
    -

### \*\*Merge of Ethology and Comparative Psychology

- Animal Cognition
  - Complex and comparative processes (compared to comparative psychology)

2. Comparative Psychology
  - a. Primarily in US
  - b. Looking at rats and pigeons
  - c. How does the animal learn and change behavior?
  - d. Simple general processes