

## Human Evolution and Adaptation

Evolutionary Psychology  
Bill Sellers  
W.I.Sellers@lboro.ac.uk

## Learning Outcomes

You should be able to:

- Give examples where the evolutionary approach may help us understand human behaviour
- Discuss the importance of the comparative methodology

## Quick Quiz

1. What is the process of dating a rock by matching the fossils called?
2. Which taxonomic family are humans members of?
3. What is the most important sense among primates?
4. Which group of primates live in Madagascar?
5. Which primate genus is most similar to humans (common or latin name)?

## Evolving Behaviour

- Behaviours change over time
- Natural Selection?
  - More than enough offspring
  - Struggle to survive
  - Individuals not identical
  - Differences are inherited

## Inheritance of Behaviour

- Innate versus learned behaviours
- Genetic basic of behavioural phenotypes
- Mechanisms
- Fundamental behaviours

## How to Study?

- Difficulties
  - Duration
  - Ethics
- Comparative approach
- Morphological relationships
- Modelling

## Comparative Approach

- Look at behaviours in closely related species
  - Communication
  - Social learning
  - Infant care
  - Tool use

## Morphological Relationships

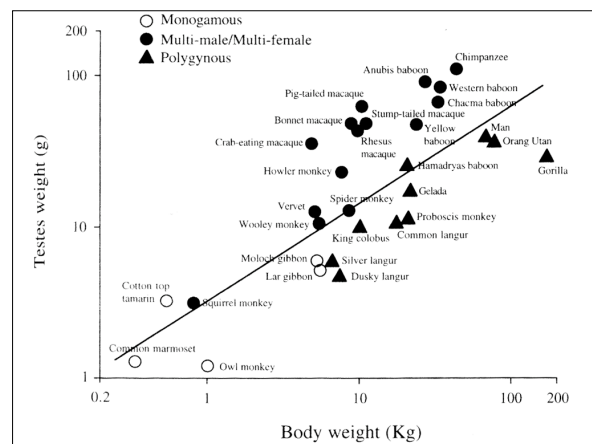
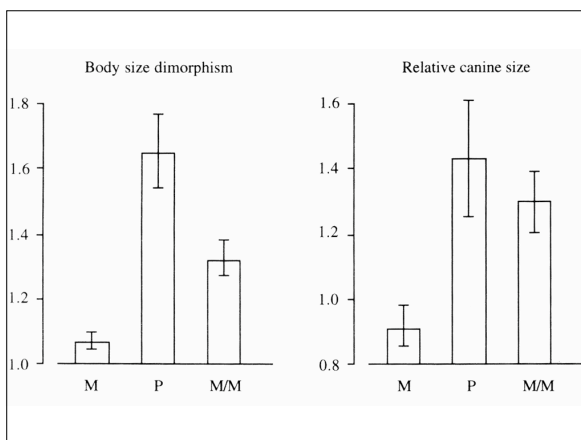
- Good for studying fossils
- Functional behaviours
  - Locomotion
  - Diet
  - Activity patterns
- Mating Systems

## Morphological Indicators

- Sexual Dimorphism
  - Body Size
  - Canine Size
- Testis Size
- Oestrus signals

## Mating Systems

- Monogamy
  - Lifelong
  - Serial
- Polygyny
- Polyandry
- Solitary
- Promiscuity



## Monogamy

- Gibbons
  - Little size dimorphism
  - Small testes
  - Male involved in infant care

## Polygyny

- Gorillas
  - Large size dimorphism
  - Tiny testes
  - Male involved in group defense
  - Male infanticide

## Polyandry

- Marmosets
  - Females slightly larger
  - Large testes (some species only)
  - Males extensively involved in infant care
  - Only one male sexually active
  - Twinning

## Dispersed

- Mouse Lemur
  - Little size dimorphism
  - Large testes
  - No male infant care
  - Nocturnal

## Promiscuity

- Chimpanzees
  - Moderate size dimorphism
  - Huge testes (sperm competition)
  - No male infant care
  - Advertised oestrus

## Humans

- Polygynous or monogamous (but examples polyandry)
- Moderate size dimorphism
- Average sized testes (similar to orang-utan)
- Very small canines

## Female Choice

- Dominant females (e.g. Ring-tailed lemur)
- Matrilines (e.g. Rhesus macaque)
- Deception
  - Sneaky rutters
  - Concealed oestrus
  - Extra-pair copulations

## Modelling

- Foraging models
- Group size
- Testable hypotheses
  - Optimal strategy
  - Invasion resistance
  - Mixed evolutionary stable strategies

## Group Size

- Important component of *Social Complexity Model*
- Varies among primates
  - Mating system dependent
  - But also variation among groups with similar mating systems
  - Suggests control by other ecological factors

## Social Complexity Model

- Big brains needed because of large, complex groups
- Other models based on foraging complexity, tool use, deception

## Advantages of Big Groups

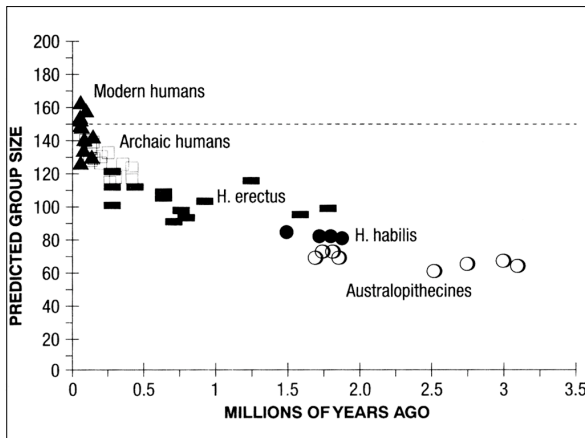
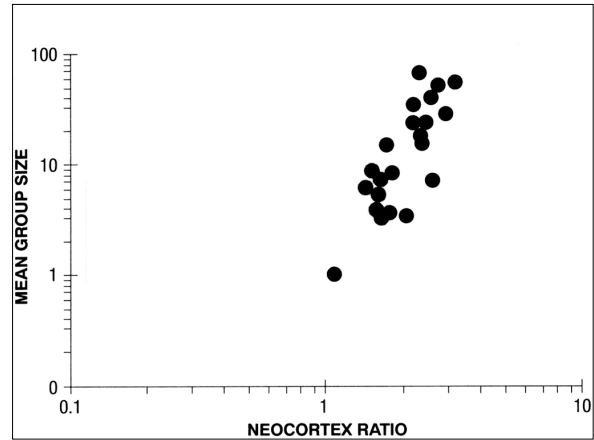
- Predator defense
  - Detection
  - Repulsion
- Resource access
  - Food
  - Mates
  - Nest sites
- Interspecific competition

## Disadvantages of Big Groups

- Disease and parasites
- Resource access
  - Food
  - Mates
  - Nest sites
- Intraspecific competition

## Evidence

- Brain size related to group size
- Ecological models relating group size to environment
- Social bond maintenance strategies
  - Grooming
  - Language



## Evolutionary Approach

- Menopause
- Obesity
- Sexual behaviour
- Child development

## Caution!

- “Just So” Stories
- Panglossian paradigm
 

*Master Pangloss taught the metaphysico-theologo-cosmologology. He could prove to admiration that there is no effect without a cause; and, that in this best of all possible worlds, the Baron's castle was the most magnificent of all castles, and My Lady the best of all possible baronesses.*

*"It is demonstrable", said he, "that things cannot be otherwise than as they are; for as all things have been created for some end, they must necessarily be created for the best end. Observe, for instance, the nose is formed for spectacles, therefore we wear spectacles. The legs are visibly designed for stockings, accordingly we wear stockings. Stones were made to be heun and to construct castles, therefore My Lord has a magnificent castle; for the greatest baron in the province ought to be the best lodged. Swine were intended to be eaten, therefore we eat pork all the year round: and they, who assert that everything is right, do not express themselves correctly; they should say that everything is best."*
- Non-inherited behaviour
  - Meme

## Summary

- Behaviours evolve through natural selection
- Comparative and morphological approaches
  - Mating systems
  - Group size
- Not the answer to everything but always worth considering