

Sexual Selection I

A broad overview

[picture omitted for copyright reasons]

Charles Darwin with his son
William Erasmus in 1842

[picture omitted for copyright reasons]

Emma Darwin
in 1840

[picture omitted for copyright reasons]

A section of
Darwin's
"notes on
marriage",
1838.

Lecture Outline

- Darwin and his addition to Natural Selection
 - Difficulties with Natural Selection
 - Definition and idea
 - Humans
- Modern Study of Sexual Selection
 - Focus on advantages to mate choice
 - Types of study

Examples of problematic phenomena for the theory of Natural Selection

- Peacocks' tails
- Blackbird song
- Antlers in deer
- Sexual dimorphism in many species
- Mating display of Great Crested Grebe

Examples of problematic phenomena for the theory of Natural Selection

- Peacocks' tails (technically trains)
- Blackbird song
- Antlers in deer
- Sexual dimorphism in many species
- Mating display of Great Crested Grebe

[pictures omitted for copyright reasons]

[frontispiece omitted for
copyright reasons]

Darwin (1871, p256):

“We are, however, here concerned only with that kind of selection, which I have called sexual selection. This depends on the advantage which certain individuals have over other individuals of the same sex and species, in exclusive relation to reproduction.”

‘In relation to reproduction...’

- Being more noticed by, more attractive to, or more persuasive towards the opposite sex, and so gaining a mating advantage
 - Inter-sexual selection, ‘female’ choice
- Out-competing other members of the same sex in contests whose outcome determines mating success
 - Intra-sexual selection, ‘male’ competition

Darwin's criteria

- Age: juvenile vs adult
- Sex: male vs female
- Season: breeding season vs year-round
- Use: specially displayed during mating?

Why does advantage in reproduction lead to exaggeration?

- ‘Disproportionate gains’
- Our similarity to targets of propaganda

Natural Selection vs Sexual Selection

Natural Selection vs Sexual Selection

- Utilitarian, functional
- Showy, elaborate

Natural Selection vs Sexual Selection

- Utilitarian, functional
- Solves a problem
- Showy, elaborate
- Impresses an audience

Natural Selection vs Sexual Selection

- Utilitarian, functional
- Solves a problem
- Sensible
- Showy, elaborate
- Impresses an audience
- Whimsical

Natural Selection vs Sexual Selection

- Utilitarian, functional
- Solves a problem
- Sensible
- Economical
- Showy, elaborate
- Impresses an audience
- Whimsical
- Wasteful

Natural Selection vs Sexual Selection

- Utilitarian, functional
- Solves a problem
- Sensible
- Economical
- Fixed
- Showy, elaborate
- Impresses an audience
- Whimsical
- Wasteful
- Changeable

Natural Selection vs Sexual Selection

- Utilitarian, functional
- Solves a problem
- Sensible
- Economical
- Fixed
- Constructive
- Showy, elaborate
- Impresses an audience
- Whimsical
- Wasteful
- Changeable
- Destructive

Natural Selection vs Sexual Selection

- Utilitarian, functional
- Solves a problem
- Sensible
- Economical
- Fixed
- Constructive
- Dull
- Showy, elaborate
- Impresses an audience
- Whimsical
- Wasteful
- Changeable
- Destructive
- Exciting

[frontispiece omitted for
copyright reasons]

Darwin (1871, p256):

“We are, however, here concerned only with that kind of selection, which I have called sexual selection. This depends on the advantage which certain individuals have over other individuals of the same sex and species, in exclusive relation to reproduction.”

Human traits possibly related to sexual selection

- Racial differences
 - skin colour
 - hair colour and texture
- Gender differences
 - physical
 - psychological
- Analogy to fashion in clothes and personal styles

[picture omitted for copyright reasons]

Lecture Outline

- Darwin and his addition to Natural Selection
 - Difficulties with Natural Selection
 - Definition and idea
 - Humans
- Modern Study of Sexual Selection
 - Focus on advantages to mate choice
 - Types of study

Modern topics

- Fireflies
- Bird coloration
- Anatomy of reproductive organs
- Sperm competition
- Pollen competition
- Disease resistance

Modern topics

- Fireflies
- Bird coloration
- **Anatomy of reproductive organs**
- Sperm competition
- Pollen competition
- Disease resistance

[frontispiece omitted for
copyright reasons]

Eberhard (1985)

[picture omitted for copyright reasons]

Population level effects...

- include polygamy, polyandry, leks and ruts
- are discussed by Alex Kacelnik in his lecture on mating systems

Lecture Outline

- Darwin and his addition to Natural Selection
 - Difficulties with Natural Selection
 - Definition and idea
 - Humans
- Modern Study of Sexual Selection
 - Focus on advantages to mate choice
 - Types of study

Modern study of sexual selection

- focusses mainly on preferences,
- treats preferences as adaptive,
- looks for a selective advantage to preference,
- and there are several possibilities.

Females might choose

- **non-adaptively**: because of sensory bias, species recognition.
- **adaptively directly**: for reasons of fertilisation ability, fecundity, nutrition, parental ability, territory quality, avoiding venereal disease, social status of offspring
- **adaptively through good genes**: because of inherited attractiveness of sons, or more general 'quality'.

Lecture Outline

- Darwin and his addition to Natural Selection
 - Difficulties with Natural Selection?
 - Definition and idea
 - Humans
- Modern Study of Sexual Selection
 - Focus on advantages to mate choice
 - Types of study

In summary,

- Darwin invented sexual selection to accommodate certain kinds of facts within his scheme, partly as a defence against non-biological theories
- He established there was female choice but said little about why
- We assume selection is at work, and want to know why there is choice