Mate Preferences and the Relationship to Diseases
In 1859, Darwin introduces the concept of Natural Selection which explains how a species becomes better adapted to its environment.
If natural selections makes a species better adapted to its environment, why are males and females often quite different?

Don’t males and females belong to the same species?
For example
In U.S.A., the average adult male is about 5 inches taller than the average female.
White tail deer

Males can outweigh females by more than a 100 lbs
Female lions often weigh 100 – 150 lbs less than males
Adult male elephant seals are about 15 ft long and weighs about 6000 lbs. Females are about 10 ft long and 2000 lbs.
Male deer, lions, and elephants seals seem to have developed these exaggerations to use against other males.

*Bigger weapons and bigger sizes are a burden for males but*

*these things do make sense.*

*Don’t they?*
Do peacock tails make sense?
It’s pretty clear that peacock tails are not used to defeat other male peacocks!

So, why do peacocks have such elaborate feathers?
In 1872, Darwin modified his notion of the evolution of traits by natural selection and introduced the concept of 

**Sexual Selection**

Behavioral and/or Morphological Traits that are designed to secure matings

Either by defeating other males or attracting females
So, we have lots of observations and lots of speculation but where is the science?
Long Tail Widowbird
An Experiment

Do these outrageous tails on male widowbirds relate to their abilities to secure matings?
Females prefer a tail length that doesn’t exist!

Long tail widowbirds

![Graph showing the mean number of nests per male across different tail treatments.](image)
Two Final Questions:

Why do males develop the trait AND females get the choose??

Why would females care about such traits?
Why Do Males Develop the Trait and Females get to choose??

- Too much sperm competing for too few eggs.
- Too Many Males Competing Over Too Few Females
- Is this a testable hypothesis?
Can We Make Males More Choosey?
Enhancing male attractiveness
**Why would females care about such traits?**

**Why bright colors and exaggerated traits?**

Do they have any inherent value to females?

What is there about males that females might value?
Large body size, ridiculous structures such as awkward feathers, obvious colors that will likely attract predators, etc.

Perhaps it is not about the extravagant trait itself but rather the exaggeration.

Perhaps only extremely healthy males are capable of building these traits?

Perhaps these are reliable signals of mate quality
• Does he look healthy?
• Seems unable to care for himself
• Perhaps can’t eat solid food
• Seems cold
• Low energy

• **AND...why is he sick??**
Clinical Manifestations of Confirmed Lyme Disease Cases--United States, 2001-2010

(note: Erythema migrans is the skin rash associated with Lyme disease)

- Erythema migrans: 70%
- Arthritis: 30%
- Bell's palsy: 8%
- Radiculoneuropathy: 4%
- Meningitis/Encephalitis: 2%
- Cardiac: 1%

Total cases: 213,515

Number of cases
Disease Resistance and Male Quality

• All animals are subjected to diseases and individuals may show different symptoms based on their genetic makeup.

• Quite possibly individuals that have poor resistance to disease will not be able to develop and/or maintain these exaggerated traits.

• The ability of an individual to develop these exaggerated traits may allow females to judge the genetic quality of a male.
Current Hypothesis:

These traits are reliable signals of disease resistance.

Females that can assess differences in disease resistance of among males should produce more surviving offspring.
Satin bower bird and an ectoparasitic louse

Females prefer males with lower number of parasites AND parasite resistance appears to be inherited.
Male red jungle fowl infected with an intestinal parasite when young are not preferred by females and the only external traits affected appeared to sexually-selected traits.

Male guppies infected with a gut parasite performs fewer courtship displays and are less preferred by females.
Three-spined Stickleback Males

Formerly parasitized males have duller colors and are less preferred by females.
Perhaps females are using male traits, such as his ability to dominate other males or his ability to exaggerate such costly structures, as indicators of his inherent quality.
Where are we now?

1. Darwin seems to be right as to the function of these structures. Experiments support his hypotheses.

2. We have a growing number of experiments illustrating why males compete and females choose.

3. We have some good preliminary evidence as to how females benefit from these exaggerated structures.
So, the next time you see a weird male....