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THE EVOLUTION OF PRETTY BOYS

(1) According to Darwin's Theory of Evolution by Natural Selection, heritable traits which are beneficial for survival and reproduction in a population will get selected *for* by nature and heritable traits which harm your survival and reproductive chances will get selected *against*. Is it ever possible for natural selection to select for traits that can decrease your chances for survival? It is possible if the trait is one that greatly increases your reproductive chances even as it negatively impacts your survival chances. "Survival of the Fittest" doesn't mean merely having the traits necessary to survive. Having fitness involves two components. It involves having traits that increase your chances for survival but it also includes traits that increase your chances of reproductive success. In terms of evolutionary fitness, there's not much point in being great at surviving if you can't reproduce.

(2) This interesting conflict between a trait that's great for reproduction, but not so great for survival, is seen in the example of the peacock. The peacock is a male bird with a large beautiful tail, called a train, which can span up to five feet wide. The female, called a peahen, is a dull brown color with a stubby tail. Her coloring provides her with camouflage to hide from predators. The peacock is another matter. His bright large train doesn't help him defend himself, nor find food, nor avoid In fact, if anything, it attracts predators. predators and slows him down when he tries to escape. Not only that, but making such a huge showy train requires a lot of energy. You would think that with all of these negatives, natural selection would have selected against the genes that produced a large and beautiful train, yet the train has gotten bigger, brighter and more beautiful over time. What possible good can this do for the peacock? Simply put, the train is beneficial because the "ladies" like it. Unless a peacock has a great train, a peahen won't even give him a chance to mate.

(3) This type of selection is called *sexual selection* which is a special case of natural selection. There are two types of sexual selection. The example of the peacock and peahen falls under the category of *female mate choice*. The other category of sexual selection is called *male competition*. Male



competition can be seen in many species where males compete and battle physically with one another to win a territory containing females with which to breed.

(4) Peacocks aren't the only species of birds that have beautiful males and dull looking females. "Pretty boys" are also found in the 41 species of birds of paradise that can be found in Indonesia, Papua New Guinea and Eastern Australia. Like the peacock, the male birds of paradise are extreme cases of pretty boys. Not only are these male birds very striking with exaggerated feathers and colors, they have also developed elaborate dances and complex mating calls which have to be performed to perfection for picky female birds.

Ronald Fisher, a biological statistician (5) (someone who interprets mathematical data from biological research) came up with many important evolutionary theories in the early 20th century. One theory, called the "Fisherian Runaway", tries to explain how female mate choice leads to the evolution of "pretty boys". In his model, if the female preference for a particular male trait becomes exaggerated in a population, she will only mate with the males that have this trait. This causes this trait to become represented more highly in the next generation of males. If this continues on generation after generation, then there is a "runaway" effect that causes the male trait to get more and more exaggerated as well. This happens because both the preferred male trait and female choosiness are heritable so both can be passed on to their offspring.

(6) Is there any benefit to a species that evolves to have pretty boys and picky girls?

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One hypothesis proposes that there is a benefit. If females prefer traits that are pretty but decrease survival chances, then the pretty boys that survive to mate must have a lot of good genes that allow them to evade predation and create a beautiful train at the same time. The more beautiful he is, the more likely he is to be eaten, so he'll have to possess superior genes to stay alive. The peahen would want to pass on these good genes to her offspring. In this theory, when she selects for "beauty" she's also selecting for substance.

(7) Both female mate choice and male competition have interesting consequences on the evolution of a species. One consequence is that it can result in *sexual dimorphism*, which is

where the males and females of the same species begin to look more and more dissimilar. In the case of female mate choice between the peacock and peahen, the males begin to look more colorful and have a larger tail in comparison to the females. Elephant seals use male competition to determine mating opportunities. This has caused male elephant seal bulls (16ft/4.9m long and 6600lb/3000kg) to become three times larger than the female elephant seal cows (10ft/3.0 and 2000lb/910kg). Sexual selection favors the largest bulls because only the largest ones are strong enough to physically fight for and win sole control over a mating territory. This causes the body sizes of males and females to become more dissimilar over time.

Article Questions

- 1) In what situation does natural selection allow for a trait to be passed on when that trait decreases individual survival chances?
- 2) Describe female mate choice and give an example.
- 3) Describe male competition and give an example.
- 4) What is sexual dimorphism?
- 5) Explain how Fisherian runaway has been exhibited in the evolution of the peacock and the peahen.
- 6) One theory proposes that selecting for "pretty boys" isn't just superficial and can benefit a species. Explain this theory.