

Online Teaching Resources for Animal Behavior

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The study of animal behavior has a long history in psychology (e.g., Watson, 1910). Nonhuman behavior can provide insights into many human behaviors, as humans also have many instinctive responses (Lorenz, 1981; Tinbergen, 1951). I therefore use examples of nonhuman behavior to illuminate human behavior. I believe that students find the parallels between nonhumans and humans entertaining, and at the same time edifying. For example, talking about parenting in humans and nonhumans (e.g. Altmann, 1980) illustrates the similarities and differences across phyla. Thus I think that a course in animal behavior can be an integral part of the psychology curriculum.

Introduction, Research Methods

I feel that the best way to start a course in animal behavior is with the idea of evolution. I find that the best introduction to the idea of evolution comes in two parts. The first part is a general introduction to how evolution may construct new species. To demonstrate this, I discuss the evolution of ring species. These are species that at their geographic borders can interbreed with each other, but as they get further away from the edges, the species can no longer interbreed. I typically discuss *Ensatina* salamanders, which live in the California coastal range and in the Sierra Nevada range of mountains around the California Central Valley. These salamanders can interbreed with the species to which they are geographically closest, except for those at the far southern end of their range. In that area, the two species are quite different. This is explained well in the following video:

<http://www.youtube.com/watch?v=PjcFSy1KCTI>

I next discuss the research methods that psychologists use to investigate animal behavior. I talk about the difference between psychologists and ethologists and the seminal work of Konrad Lorenz (e.g., 1981) and Niko Tinbergen (e.g., 1951) in the study of instinct. I discuss Lorenz's work on imprinting in waterfowl and mention that he substituted himself for the mother duck in these studies. I then show the following video:

<http://www.youtube.com/watch?v=2UIU9XH-mUI&feature=related>.

I also discuss the importance of developing a list of an organism's typical behaviors; a list ethologists typically call an ethogram, along with aspects of such behaviors that are invariably part of the ethogram. The following laboratory exercise from the Animal Behavior Society Web site gives students information on how to develop an ethogram: <http://www.animalbehavior.org/ABSEducation/laboratory-exercises-in-animal-behavior/laboratory-exercises-in-animal-behavior-ethograms>.

Genes and Behavior

Second, it is also important to talk about genetics, a topic about which students in my course often have different levels of understanding. Thus, I find it necessary to begin at the structure of DNA and then cover transcription and translation and the construction of proteins. I then discuss how proteins make up everything in the human body. It is important that students understand that when authors talk about a gene for a particular behavior, the authors are using a "shorthand" method of reference. I emphasize that genes simply code for proteins. These proteins then combine into tissues and organs and organ systems. To clarify this, I show a brief video on transcription of DNA into messenger RNA: <http://www.youtube.com/watch?v=cD9t8c3BUCY>. I then show another brief video (<http://www.youtube.com/watch?v=6Rrymt6XwI>) that discusses the translation of messenger RNA into proteins. I finish with a video that integrates both halves of the process to give an overview of the process: http://www.youtube.com/watch?v=OEWOZS_JTgk

To reinforce the connection between genetics and behavior, I show the following video of a teenage girl with Tourette's syndrome. Though somewhat lengthy (about 18 minutes) and often graphic, it clearly demonstrates the interaction of the effects of environment and genes on behavior: <http://video.au.msn.com/watch/video/tourettes-out-of-control/xa2sgkl>

I also explain how humans (and other species) are continually evolving. I focus specifically on the

phenomena of lactose tolerance and intolerance. I show students a map of areas in the world where lactose tolerance exists. I talk about the development of tolerance in light of the facts that agriculture began fewer than 15,000 years ago and that keeping domestic animals, including those that produce milk, is a relatively recent innovation in human history. The following entry from Wikipedia shows the map I use to display the development of lactose tolerance: http://en.wikipedia.org/wiki/Lactose_intolerance.

Development

Next, I discuss the development of organisms. A large part of my lectures on this topic deals with critical periods in the development of organisms. I reference the Konrad Lorenz video that I showed earlier in the course and talk about critical periods in the development of organ systems, especially in humans and other mammals. To illustrate I show this short video about the development of vision in humans: <http://www.psychbytes.com/Flash/Critical%20Periods%20Video/critical%20periods.htm>.

Learning

I briefly cover learning and its relevance to evolution. I explain how learning helps organisms adapt to environmental changes that occur over a shorter time span than evolutionary history. To reinforce the notion of short-term adaptation, I discuss Pavlovian learning and show the following video of Ivan Pavlov: <http://www.youtube.com/watch?v=hhqumfpxuzl>

I also discuss the development of phobias and other sorts of behaviors that may provide an evolutionary advantage. I show the following video in which John B. Watson and Rosalie Rayner (1920) attempted to instill in Little Albert a fear of furry things. I use this example because most students have heard of Watson and Rayner's work with Little Albert, although they typically have little knowledge of the experimental paradigm that Watson and Rayner used. <http://www.youtube.com/watch?v=Xt0ucxOrPOE&feature=related>.

Cognition

I talk about Tinbergen's (1972) work on cognitive mapping in wasps, which demonstrates that organisms use the environment to find necessary resources. The following video demonstrates the idea of cognitive maps: <http://www.youtube.com/watch?v=SBTP7W5c3c8>

Foraging

Foraging is an important part of any organism's life. To demonstrate the various ways in which organisms collect and process food, the following exercise from the Animal Behavior Society Web site gives students a chance to observe the process in squirrels: <http://www.animalbehavior.org/ABSEducation/laboratory-exercises-in-animal-behavior/laboratory-exercises-in-animal-behavior-squirrels-and-food-selection>.

Predation and Predator Avoidance

A large part of foraging consists of preying on other organisms or avoiding being preyed on by other organisms. There are many ways organisms accomplish both of these tasks. When discussing these topics, I first talk about avoiding predation. Often one of the best ways to avoid predation is to look like a dangerous organism. I therefore talk about both Batesian and Müllerian mimicry, using a personally developed PowerPoint slideshow that shows similarities between the Monarch butterfly, the Viceroy butterfly, and the Queen butterfly (<http://www.psychbytes.com/Audio%20PowerPoints/mimicry.ppt>). Of these three butterflies, only the Viceroy is palatable; the other two are poisonous. Therefore, the Viceroy exhibits Batesian mimicry with both the Monarch and the Queen butterfly. Because Monarch and Queen butterflies are poisonous, they exhibit Müllerian mimicry with respect to each other. It is important to note that in the case of Batesian mimicry, the mimic must be less common than the model, because if the mimic becomes more common, the mimicry will no longer deter predators.

I also present the various behaviors of the hognose snake. The snake is an excellent example of an organism that uses many different escape behaviors. For example, it hisses and vibrates its tail as if it were a rattlesnake. The snake also flattens its upper body to mimic a cobra-like animal and narrows its neck right behind its head to give it the appearance of a viper. The following video shows these behaviors: <http://www.youtube.com/watch?v=5Z6P35xJPvg&feature=fvw>. If these techniques do not work for the snake, it then tries to play dead by turning over on its back and opening its mouth and sticking out its tongue. If one tries to turn the snake right side up when it has done this, it will immediately turn itself upside down again. These latter behaviors are well demonstrated in the following video: <http://www.youtube.com/watch?v=7nScxF8vGw0>

This death-feigning behavior is different from the tonic immobility that is exhibited by the Virginia Opossum. When the opossum is prodded, it makes no move and, in fact, exhibits what appears to be a rigor mortis state. This is displayed in the following video: <http://www.youtube.com/watch?v=NCW9CrqD48>

Of course, other mechanisms for avoiding predation abound. There are several caterpillars, for example, that mimic a snake with their thoracic segment. I have included two different videos of two different caterpillars engaging in this behavior: <http://www.youtube.com/watch?v=uQhWDBzILCM> and <http://www.youtube.com/watch?v=L1oFJb3luQ0&NR=1&feature=fvwp>

Many animals also engage in aggressive mimicry. This is mimicry that is designed to increase the ability of the organism to capture prey. The example I discuss is of an anglerfish that uses part of its body to mimic a food that its prey eats. This is demonstrated in the following video: <http://www.arkive.org/anglerfish/lophius-piscatorius/video-08.html>.

Courtship

Most students are quite interested in the different courtship displays that organisms use. I therefore show several different videos on aspects of courtship behavior. I start with a video of ringneck doves courting, which many of my students have seen before: <http://www.youtube.com/watch?v=svf45ButTfs>. I then discuss less common courtship behaviors such as that of the stickleback fish. In this fish, the male builds the nest and gives parental care to the offspring. The following video shows a male displaying for a female, enticing her to go through his nest and deposit her eggs. He then follows the female through the nest and releases sperm to fertilize the eggs, staying guard until the eggs hatch: <http://www.arkive.org/three-spinedstickleback/gasterosteus-aculeatus-aculeatus/video-ac09b.html>.

Many bird species use courtship feeding as part of their courtship ritual. In courtship feeding, male birds feed female birds, which gives the females an opportunity to gauge how well the male could provide for the nestlings. The example below is of Kingfisher courtship feeding: <http://www.youtube.com/watch?v=WkHX9p7vWnA&feature=related>.

Birds-of-Paradise probably have the most interesting courtship displays in birds. I include the following video because the birds engage in so many varied behaviors. It gives students an interesting taste of the variety of courtship behaviors that are present: <http://www.youtube.com/watch?v=HyvxlUpEjgI>.

After courtship behaviors, we typically discuss various mating systems, including polygyny,

polyandry, polygynandry, and monogamy. Students usually have little problem understanding polygyny, monogamy, and polyandry. In contrast, the less common types of polygyny, such as lek mating, are more difficult to understand. Thus I show the videos of the black grouse mating on the prairie (<http://www.youtube.com/watch?v=AAXf4UMYnoI&feature=related>) and of bowerbirds displaying in their bowers (<http://www.youtube.com/watch?v=GPbWJPsBPdA> and <http://www.youtube.com/watch?v=li2D9Bd5OoE&feature=related>).

I also talk about forced copulation in waterfowl and show the following video: <http://www.flickr.com/photos/brownpau/2508870680/>. As part of this lecture, I talk about the problems inherent in anthropomorphism (i.e., attributing human thoughts and emotions to nonhumans). I explicitly mention that researchers use the term “forced copulation” rather than “rape” because of the emotional valence of the term for humans and because we don’t know how the female duck “feels” about the issue.

Parental Care

When discussing parental care, I emphasize that species vary considerably in the amount of care they give to their young. For example, whereas species such as codfish or maple trees give no care, species such as humans, elephants, and chimpanzees give much care. I also talk about relatively odd examples of parental care. For example, the following video shows a male seahorse giving birth: <http://www.youtube.com/watch?v=uKrkXXaRMUI>. I use this video to emphasize that it is not always the female who ends up caring for the offspring. I also emphasize that there are many different ways to care for offspring. To reinforce this idea, I show the following video, which features mouth brooding in cichlid fishes: <http://www.youtube.com/watch?v=bchZjZrmPJY>.

Migration

I finish the course talking about proximal and distal cues for migration. I also discuss the great migrations of the world. Because my university is located in the central flyway (the major migratory path for birds in the central part of North America), I take my students to observe the spring migration of sandhill cranes through the Platte River Valley. I also show them a video of a monarch migration through North America to Mexico (<http://www.youtube.com/watch?v=rFPIQK9rnI4>) and a video of the wildebeest migration across the Serengeti in Africa (<http://www.youtube.com/watch?v=rFPIQK9rnI4>).

com/watch?v=HYM6LqDJLiM). These three migrations are arguably three of the most impressive migrations in the world.

Conclusion

I find that my course is improved immeasurably by giving students an opportunity to observe animals in their natural habitat, even if they observe the animals via video. Students report that they have a better, more complete understanding of the course concepts. I hope these resources give readers a good starting point for their own courses on animal behavior.

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