Why Did the Peafowl Scream? — Functions of Animal Vocalisations

Daniel T. Blumstein

It was a sweltering day. A companion and I were sitting in the not-so-cool shade of an observation tower in Corbet National Park, India. Suddenly, the call of an Indian Peafowl shattered the heated silence of the forest clearing. The call was repeated. A troop of rhesus monkeys burst through the dense vegetation and ran to the side of the river where they paused. The bird called again. The monkeys, with a final side-long glance, swam quickly across the river. Once on the other side, they climbed trees and began to chatter nervously. A large, adult tiger emerged from the river-side vegetation and languidly bathed in the cool river water.

There are several reasons why non-humans may vocalise. In this essay I shall discuss a few of the potential functions of vocalisations. While reading this, try to develop a hypothesis about why the peafowl called. I will give you my best guess at the end of the essay.

Evidence from some species suggests that females may be estimating male quality based on call characteristics. Thus, males with longer calls may be more attractive to females. If calling is an expensive behavior (e.g., it requires energy or exposes males to a heightened risk of predation), then not all males may be able to call. Thus, males with long calls may be of higher quality than males with shorter calls.

Animals may call to attract others. Many birds call when they establish territories (areas of exclusive use) in an area prior to mating. In these situations, male birds are the usual callers. Calls tend to occur during predictable times (e.g., the morning). Evidence from some species suggests that females may be estimating male quality based on call characteristics. Thus, males with longer calls may be more attractive to females. If calling is an expensive behavior (e.g., it requires energy or exposes males to a heightened risk of predation), then not all males may be able to call. Thus, males with long calls may be of higher quality than males with shorter calls.

Often males continue to call even after they attract a mate. In such cases they may be advertising occupancy. Thus, if a new individual enters the area, they will immediately know that other individuals live there. Current theory and some evidence suggests that new individuals may prefer to

settle in areas where there are already established residents. The idea is that it is easier to use conspecifics as cues for habitat quality than it is to go out and personally assess quality.

Current theory and some evidence suggests that new individuals may prefer to settle in areas where there are already established residents. The idea is that it is easier to use conspecifics as cues for habitat quality than it is to go out and personally assess quality.

Animals may call to warn conspecifics. When an animal's call functions to warn others, we refer to these calls as **alarm calls**. However, calling may be risky for it may attract the attention of a predator. If calling is risky, we do not expect all individuals to call. How then, can alarm calling be maintained?

Consider a population of close relatives. If a caller is killed, but relatives survive, some of the caller's genetic material survives and can be passed on to future generations. A major advance in our understanding of evolution is that a relative's DNA is essentially the same as one's own DNA. It turns out that if enough relatives survive from the action of an individual, then it is as if the individual's own DNA survived. We refer to this form of selection as **kin selection. Kin selection** has been extremely useful in explaining alarm calls in some species. For instance, female Belding's ground squirrels (a North American squirrel), call more when they have more kin in the area than when they have fewer kin in the area. However, just because kin selection is another way to pass on genetic material, does not mean that individuals should always take risks. In fact, Belding's ground squirrels tended to call only when they were in relatively safe locations.

A major advance in our understanding of evolution is that a relative's DNA is essentially the same as one's own DNA. It turns out that if enough relatives survive from the action of an individual, then it is as if the individual's own DNA survived.

What if individuals are not closely related. Can calling still evolve and be maintained? Yes, if those individuals who benefit from alarm calls later reciprocate and warn callers. **Reciprocity**, may rely on ways to detect cheaters (individuals who benefit from calls but do not call themselves). This is an exciting, yet understudied field of animal behavior.

Alarm calls may also warn heterospecifics. However, it is a bit more difficult to understand the evolution of these calls if their *primary* function is to warn other species. Different species do not share common genes and we must hypothesise that there is some form of reciprocity occurring when we see a highly developed form of interspecific alarm calling. Perhaps the best documented case of interspecific reciprocity is from East Africa, where a hornbill and a mongoose species appear to warn each other about predators. Often, warning heterospecifics may simply be a by-product of warning conspecifics.

So, why did the peafowl call? It is possible that peafowls and monkeys warn each other. Both could potentially be prey to tigers and both could presumably benefit from a warning. Chital and monkeys associate with one another and may warn each other about predators and it is quite possible that monkeys attend to vocalisations of other species. However, a more parsimonious explanation would be that the peafowl was warning unseen

conspecifics and monkeys may have heard these calls. To test this provisional functional hypothesis, we need to make observations of the frequency of calling by both monkeys and birds combined, with playback experiments to quantify the response of both species to peafowl calls. Ideally, we would like also to know how peafowl are distributed in space. Perhaps peafowl only call when there are others in the immediate vicinity. Since I never saw the peafowl, I do not know what sex or age it was. Thus, it is difficult to invoke a more specific mechanism to account for this bout of calling.

The next time you hear an animal vocalise, ask yourself why, and then keep watching to see if your explanation makes sense. ■

For more information about animal communication, see:

Alcock, J. 1989. *Animal Behavior*, 4th. ed..Sinauer Associates, Inc., Sunderland, Mass.

Halliday, T. R., and P. J. B. Slater, eds.1983. *Animal Behavior*, Volume 2: *Communication*. W. H. Freeman and Company, New York.

Editor's Note: *The author, a Ph.D candidate in the Animal Behavior Graduate Group, at the University of California, Davis, USA, has been studying the behavioral ecology of golden marmots in Khunjerab National Park, Pakistan, since 1989.*