**Discussion Questions**

to accompany

***Animal Behavior,* Eleventh Edition**

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**Chapter 8**

**Principles of Communication**

8.1 Females of many African cichlid fish lay their eggs on lake bottoms in depressions made by males. The females brood their eggs and young fry in their mouths. A female picks up her orange eggs almost as quickly as she lays them. As this happens, the male cichlid that made the “nest” may move in front of her and spread his anal fin, which in many species is decorated with a line of large orange spots. The female may try to pick up the objects on the fin. As she does, the male releases his sperm, some of which swim into the female’s mouth, where they fertilize her eggs (Egger et al. 2011). If sensory exploitation explains the evolutionary origin of the female’s behavior, what prediction can you make about how female fish of a related species will respond to the normally unspotted anal fins of males that have been painted with colorful egg-like spots?

8.2 In studying the courtship behavior of the empid flies, E. L. Kessel was amazed to find a species, *Hilara sartor*, in which males gather together to hover in swarms, carrying empty silken balloons, which females accept prior to mating with balloon-carrying males (Kessel 1955). Use the concept of a co-opted, preexisting sensory system to explain how this sort of behavior could have originated. You should know that many empid flies are predatory and that males often offer their mates a prey item as an inducement to mate. In one species of this sort, some males supply their mates with an inedible dandelion-like tufted seed (LaBas and Hockman 2005).

8.3 How would you take advantage of information on the biology of the other species of hyenas (see Mills 1990, Owens and Owens 1996, Watts and Holekamp 2007) to test adaptationist hypotheses on the greeting ceremony of the spotted hyena (*Crocuta crocuta*)? In addition, could you make use of information on another highly social mammal, the naked mole rat? There are some mammals in which females have an enlarged clitoris (Ostner and Heistermann 2003, Place and Glickman 2004). What might these species tell us about the adaptive value of the spotted hyena’s behavior?

8.4 Baby songbirds usually produce fairly loud vocalizations in response to the arrival of a parent bird with food at the nest. This begging behavior could be an honest signal of the need for food by each nestling (see Chapter 11). Alternatively, the vocalizations could be an honest signal of the nestling’s “quality,” its likelihood of achieving high fitness, which could provide a parent with information needed to invest more in offspring with the potential for higher fitness. If the first hypothesis is correct, what prediction follows about the begging intensity of well-fed nestling songbirds when placed in a nest with food-deprived youngsters of the same age?

8.5 Birds are not the only animals in which offspring have special signals that appear to provide information to a parent. Develop an evolutionary analysis of crying by human infants in which you consider the two hypotheses outlined in Discussion Question 8.4 for begging by baby birds. Then employ the following data in evaluating your hypotheses: (1) young infants expend considerable energy when crying; (2) the growth rate for typical infants is highest during the first 3 months of life, with smaller and smaller portions of the energy budget going to growth as opposed to maintenance thereafter; (3) consumption of breast milk peaks at 3 to 4 months of age and then declines; (4) crying peaks at about 6 weeks of age and occurs progressively less often after 3 months of age, except when the child is being weaned; (5) babies who are carried everywhere and nursed on demand (as in traditional societies) cry far less than babies in Western societies; and (6) the high-pitched cries of unhealthy babies are considered especially unpleasant by adult listeners (Furlow 1997, Lummaa et al. 1998, Wells 2003).

8.6 When males of the Australian slender crayfish (*Cherax dispar*) compete aggressively with one another, they begin by displaying their enlarged front claws (see Figure 8.31). The larger the claw, the more likely the male is to dominate his rival, which may leave without grappling with the larger-clawed crayfish. However, the muscles in the claws of males generate only half the force of the claw muscles of females. In addition, the actual strength of the claw has no bearing on which male is dominant (Wilson et al. 2007). Much the same applies to male fiddler crabs, in which males with a regenerated large claw quickly defeat rivals, despite the fact that replacement claws are relatively weak (Lailvaux et al. 2009). Are males with large but weak claws dishonest signalers? But how could a mindless crab be dishonest?

8.7 An assassin bug that captures and kills orb-weaving spiders sometimes approaches a web and plucks at the silken strands it encounters. The resident spider sometimes responds by moving across the web to the place where the assassin bug is at work. The spider’s behavior can lead to its death (Wignall and Taylor 2011). Use net benefit theory to explain why spiders respond to web vibrations in this way. Use your hypothesis to make predictions about the response of spiders to web movements caused by the predatory bug, prey struggling in a web, leaves falling into the web, and male spiders that have moved onto the web to court the female web builder.

8.8 Charles Darwin loved both orchids and sundews, the latter because of their carnivory. As is true for certain orchids, sundews engage in deceptive signaling (Darwin 1892, Darwin 1896). The fluids exuded by the plants attract insects that become trapped when they alight upon the sticky, glue-like droplets, a prelude to their death and digestion by the plant. Analyze the evolutionary basis for this case of deception, using the net benefit theory.

8.9 The fork-tailed drongo (*Dicrurus adsimilis*), an African bird that often perches in trees, sometimes gives alarm calls that warn of predators when it is accompanying flocks of the pied babbler, a bird that forages on the ground. Upon hearing the drongo’s alarm call, pied babblers dash to cover, sometimes leaving behind recently captured insect prey (Ridley et al. 2007). If we hypothesize that these alarm calls are often deceptive (Flower et al. 2014), what prediction can we make about the kind of alarm call produced by drongos vocalizing in the absence of babblers? Why might it be adaptive for babblers to react to drongo warning calls if some, or even most, are false alarms? Does the same argument apply to the case of male topi antelopes that produce false alarm signals when associating with groups of females on their mating territories?

8.10 Males of a fish called the northern swordtail (*Xiphophorus nigrensis*) attract mates with flashy displays that show off their elaborate tails. But this species shares its habitat with a lethal predatory fish, the Mexican tetra (*Astyanax mexicanus*). The bodies of male northern swordtails, especially their tails, reflect a considerable amount of ultraviolet radiation (Cummings et al. 2003). When researchers put male and female swordtails in tanks with and without ultraviolet filters, they found that female swordtails were more attracted to males when the ultraviolet channel was available to them. Given that these researchers were interested in how swordtails might reduce the risk of eavesdropping by Mexican tetras, what other experiment would they have to do as well? Outline the science behind this research, starting with the causal question and ending with the possible conclusions the researchers might have reached.

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