2 Animals and Human Language

One evening in the mid-1980s my wife and I were returning from an evening cruise around Boston Harbor and decided to take a waterfront stroll. We were passing in front of the Boston Aquarium when a gravelly voice yelled out, "Hey! Hey! Get outa there!" Thinking we had mistakenly wandered somewhere we were not allowed, we stopped and looked around for a security guard or some other official, but saw no one, and no warning signs. Again the voice boomed, "Hey! Hey you!" As we tracked the voice we found ourselves approaching a large, glass-fenced pool in front of the aquarium where four harbor seals were lounging on display. Incredulous, I traced the source of the command to a large seal reclining vertically in the water, with his head extended back and up, his mouth slightly open, rotating slowly. A seal was talking, not to me, but to the air, and incidentally to anyone within earshot who cared to listen.

Deacon (1997)

There are a lot of stories about creatures that can talk. We usually assume that they are fantasy or fiction or that they involve birds or animals simply imitating something they have heard humans say (as Terrence Deacon discovered was the case with the loud seal in Boston Aquarium). Yet we believe that creatures can communicate, certainly with other members of their own species. Is it possible that a creature could learn to communicate with humans using language? Or does human language have properties that make it so unique that it is quite unlike any other communication system and hence unlearnable by any other creature? To answer these questions, we first look at some special properties of human language, then review a number of experiments in communication involving humans and animals.

Communication

We should first distinguish between specifically **communicative signals** and those that may be unintentionally **informative signals**. Someone listening to you may become informed about you through a number of signals that you have not intentionally sent. She may note that you have a cold (you sneezed), that you are not at ease (you shifted around in your seat), that you are disorganized (non-matching socks) and that you are from somewhere else (you have a strange accent). However, when you use language to tell this person, *I'm one of the applicants for the vacant position of senior brain surgeon at the hospital*, you are normally considered to be intentionally communicating something. Humans are capable of producing sounds and syllables in a stream of speech that appears to have no communicative purpose, as in **glossolalia**, or "speaking in tongues," which is associated with the religious practices of Pentecostal Christian churches. These outpourings sound like language, but with no speaker control it is not intentional communication. We might say the same thing about some of the chirping and singing produced by birds. We also don't assume that the blackbird is communicating anything by having black feathers and sitting on a branch. However, the bird is considered to be sending a communicative signal with the loud squawking produced when a cat appears on the scene. So, when we talk about distinctions between human language and animal communication, we are considering both in terms of their potential for intentional communication.

Properties of Human Language

While we tend to think of communication as the primary function of human language, it is not its only distinguishing feature. All creatures communicate in some way, even if it is not through vocalization. However, we suspect that other creatures are not reflecting on the way they create their communicative messages or reviewing how they work (or not). That is, one barking dog is probably not offering advice to another barking dog along the lines of "Hey, you should lower your bark to make it sound more menacing." They're not barking about barking. Humans are clearly able to reflect on language and its uses (e.g. "I wish he wouldn't use so many technical terms"). This is **reflexivity**. The property of reflexivity (or "reflexiveness") accounts for the fact that we can use language to think and talk about language itself, making it one of the distinguishing features of human language. Indeed, without this general ability, we wouldn't be able to reflect on or identify any of the other distinct properties of human language. We willl look in detail at another five of them: displacement, arbitrariness, productivity, cultural transmission and duality.

Displacement

When your pet cat comes up to you calling *meow*, you are likely to understand this message as relating to that immediate time and place. If you ask your cat what it has been up to, you will probably get the same *meow* response. Animal communication seems to be designed exclusively for the here and now. It isn't used to relate events that are removed in time and place. When your dog says *GRRR*, it means *GRRR, right now*, because dogs aren't capable of communicating *GRRR, last night, over in the park.* In contrast, human language users are normally capable of producing messages equivalent to *GRRR, last night, over in the park*, and then going on to say *In fact, I'll be going back tomorrow for some more*. Humans can refer to past and future time. This property of human language is called **displacement**. It allows language users to talk about things not present in the immediate environment. Displacement allows us to talk about things and places (e.g. angels, fairies, Santa Claus, Superman, heaven, hell) whose existence we cannot even be sure of.

   We could look at bee communication as a small exception because it seems to have some version of displacement. When a honeybee finds a source of nectar and returns to the beehive, it can perform a dance routine to communicate to the other bees the location of this nectar. Depending on the type of dance (round dance for nearby and tail-wagging dance for further away), the other bees can work out where this newly discovered feast can be found. Doesn't this ability of the bee to indicate a location some distance away mean that bee communication has at least some degree of displacement as a feature? Yes, but it is displacement of a very limited type. It just doesn't have the range of possibilities found in human language. Certainly, the bee can direct other bees to a food source. However, it must be the most recent food source. It cannot be *that delicious rose bush on the other side of town that we visited last weekend*, nor can it be, as far as we know, possible future nectar in bee heaven.

Arbitrariness

It is generally the case that there is no "natural" connection between a linguistic form and its meaning; the connection is quite arbitrary. We can't just look at the Arabic word كلب and from its shape determine that it has a natural and obvious meaning any more than we can with its English translation form *dog*. The linguistic form has no natural or "iconic" relationship with that hairy four-legged barking object out in the world. This aspect of the relationship between words and objects is described as **arbitrariness**. It is possible to make words "fit" the concept they indicate, as in Figure 2.1, but this type of game only emphasizes the arbitrariness of the connection that normally exists between a word and its meaning.

Figure 2.1 Words made to "fit" concepts

There are some words in language with sounds that seem to "echo" the sounds of objects or activities and hence seem to have a less arbitrary connection. English examples are *cuckoo, crash, slurp, squelch* or *whirr*. However, these onomatopoeic words are relatively rare in human language.

For the majority of animal signals, there does appear to be a clear connection between the conveyed message and the signal used to convey it. This impression may be closely connected to the fact that, for any animal, the set of signals used in communication is finite. Each variety of animal communication consists of a limited set of vocal or gestural forms. Many of these forms are only used in specific situations (to establish territory) or at particular times (to find a mate).

Cultural Transmission

While we inherit physical features such as brown eyes and dark hair from our parents, we do not inherit their language. We acquire a language in a culture with other speakers and not from parental genes. An infant born to Korean parents in Korea, but adopted and brought up from birth by English speakers in the United States, will have physical characteristics inherited from his or her natural parents, but will inevitably speak English. A kitten, given comparable early experiences, will produce *meow* regardless.

This process whereby a language is passed on from one generation to the next is described as **cultural transmission**. It is clear that humans are born with some kind of predisposition to acquire language in a general sense. However, we are not born with the ability to produce utterances in a specific language such as English. We acquire our first language as children in a culture.

The general pattern in animal communication is that creatures are born with a set of specific signals that are produced instinctively. There is some evidence from studies of birds as they develop their songs that instinct has to combine with learning (or exposure) in order for the right song to be produced. If those birds spend their first seven weeks without hearing other birds, they will instinctively produce songs or calls, but those songs will be abnormal in some way. Human infants, growing up in isolation, produce no "instinctive" language.

Productivity

Humans are continually creating new expressions by manipulating their linguistic resources to describe new objects and situations. This property is described as **productivity** (or "creativity" or "open-endedness") and essentially means that the potential number of utterances in any human language is infinite.

The communication systems of other creatures are not like that. Cicadas have four signals to choose from and vervet monkeys have thirty-six vocal calls. Nor does it seem possible for creatures to produce new signals for novel experiences or events. The honey-bee, normally able to communicate the location of a nectar source to other bees, will fail to do so if the location is really "new." In one experiment, a hive of bees was placed at the foot of a radio tower and a food source placed at the top. Ten bees were taken to the top, given a taste of the delicious food, and sent off to tell the rest of the hive. The message was conveyed via a bee dance and the whole gang buzzed off to get the free food. They flew around in all directions, but couldn't locate the food. (It's probably one way to make bees really mad!) The problem seems to be that bee communication has a fixed set of signals for communicating location and they all relate to horizontal distance. The bee cannot manipulate its communication system to create a "new" message for vertical distance. According to Karl von Frisch (1993), who conducted the experiment, "the bees have no word for *up* in their language" and they can't invent one.

This lack of productivity in animal communication can be described in terms of **fixed reference**. Each signal in the communication system of other creatures seems to be fixed in terms of relating to a particular occasion or purpose. This is particularly true of scent based signaling, as in the pheromones (a chemical substance) released by insects such as female moths as they try to contact a mate. It's a case of one scent, one meaning.

Among our closer relatives, there are lemurs (similar to small monkeys) in Madagascar that have only three basic calls. In the vervet monkey's repertoire, there is one danger signal *CHUTTER*, which is used when a snake is around, and another *RRAUP*, used when an eagle is spotted nearby. These signals are fixed in terms of their reference and cannot be manipulated. What might count as evidence of productivity in the monkey's communication system would be an utterance of something like *CHUTT-RRAUP* when a flying creature that looked like a snake came by. Despite a lot of laboratory research involving snakes suddenly appearing in the air above them (among other weird experiences), the vervet monkeys didn't produce a new danger signal. The human, given similar circumstances, is quite capable of creating a "new" signal, after initial surprise perhaps, by saying something never said before, as in *Hey! Watch out for that flying snake!*

Duality

Human language is organized at two levels simultaneously. This property is called **duality** (or "double articulation"). When we speak, we have a physical level at which we produce individual sounds, like *n, b* and *i*. As individual sounds, none of these discrete forms has any intrinsic meaning. In a combination such as *bin*, we have another level with a meaning that is different from the meaning of the combination in *nib*. So, at one level, we have distinct sounds, and, at another level, we have distinct meanings. This duality of levels is one of the most economical features of human language because with a limited set of sounds we are capable of producing a very large number of sound combinations (e.g. words) that are distinct in meaning.

Among other creatures, each communicative signal appears to be a single fixed form that cannot be broken down into separate parts. Although your dog may be able to produce *woof* ("I'm happy to see you"), it does not seem to do so on the basis of a distinct level of production combining the separate elements of *w + oo + f*. If the dog was operating with the double level (i.e. duality), then we might expect to hear different combinations with different meanings, such as *oowf* ("I'm hungry") and *foow* ("I'm really bored").

Talking to Animals

If these properties make human language such a unique communication system, then it would seem extremely unlikely that other creatures would be able to understand it. Some humans, however, do not behave as if this is the case. Riders can say *Whoa* to horses and they stop, we can say *Heel* to dogs and they will follow at heel (well, sometimes . . .), and a variety of circus animals go *Up, Down* and *Roll over* in response to spoken commands. Should we treat these examples as evidence that non-humans can understand human language? Probably not. The standard explanation is that the animal produces a particular behavior in response to a sound stimulus, but does not actually "understand" what the noise means.

If it seems difficult to conceive of animals understanding human language, then it appears to be even less likely that an animal would be capable of producing human language. After all, we do not generally observe animals of one species learning to produce the signals of another species. You could keep your horse in a field of cows for years, but it still won't say *Moo*. And, in some homes, a new baby and a puppy may arrive at the same time. Baby and puppy grow up in the same environment, hearing the same things, but two years later, the baby is making lots of human speech sounds and the puppy is not. Perhaps a puppy is a poor example. Wouldn't it be better to work with a closer relative such as a chimpanzee?