

Language and inherent communicative systems of animals.

Natural Animal Communication

Pearce (1987, p252) cites a definition of animal communication by Slater (1983, see Pearce for reference), which we will also use as a working definition in this lecture:

Animal communication is "the transmission of a signal from one animal to another such that the sender benefits, on average, from the response of the recipient".

This loose definition permits the inclusion of many types of behaviour and allows "communication" to be applied to a very large range of animals, including some very simple animals.

Natural animal communication can include:

Chemical signals (used by some very simple creatures, including protozoa)

Smell (related to chemical signals, eg. pheromones attract, skunk secretions repel)

Touch

Movement

Posture (eg. dogs, geese)

Facial gestures (eg. dogs snarling)

Visual signals (eg. feathers)

Sound (eg. very many vertebrate and invertebrate calls)

Such signals have evolved to:

attract (especially mates)

repel (especially competitors or enemies)

signal aggression or submission

advertise species

warn of predators

communicate about the environment or the availability of food

Such signals may be

instinctive, that is genetically programmed

learnt from others

Language

Some linguists (eg Chomsky, 1957, Macphail, 1982, both cited in Pearce, 1987) have argued that language is a unique human behaviour and that animal communication falls short of human language in a number of important ways.

Chomsky (1957) claims that humans possess an innate universal grammar that is not possessed by other species. This can be readily demonstrated, he claims, by the universality of language in human society and by the similarity of their grammars. No natural non-human system of communication shares this common grammar.

Macphail (1982, cited by Pearce, 1987) made the claim that "humans acquire language (and non-humans do not) not because humans are (quantitatively) more intelligent, but because humans possess some species-specific mechanism (or mechanisms) which is a prerequisite of language-acquisition".

Some researchers have provided lists of what they consider to be the criteria that animal communication must meet to be regarded as language.

For this lecture the list devised by Hockett (1960) is utilised, although this list is not the only such list available. Such lists tend to be quite similar and certain elements of the Hockett list are considered particularly important in evaluating the question "can animals be taught language?"

Hockett's thirteen "design-features" for language are as follows:-

Vocal-auditory channel: sounds emitted from the mouth and perceived by the auditory system. This applies to many animal communication systems, but there are many exceptions. Also, it does not apply to human sign language, which meets all the other 12 requirements. It also does not apply to written language.

Broadcast transmission and directional reception: this requires that the recipient can tell the direction that the signal comes from and thus the originator of the signal.

Rapid fading (transitory nature): Signal lasts a short time. This is true of all systems involving sound. It doesn't take into account audio recording technology and is also not true for written language. It tends not to apply to animal signals involving chemicals and smells which often fade slowly.

Interchangeability: All utterances that are understood can be produced. This is different to some communication systems where, for example, males produce one set of behaviours and females another and they are unable to interchange these messages so that males use the female signal and vice versa.

Total feedback: The sender of a message also perceives the message. That is, you hear what you say. This is not always true for some kinds of animal displays.

Specialisation: The signal produced is specialised for communication and is not the side effect of some other behaviour (eg. the panting of a dog incidentally produces the panting sound).

Semanticity: There is a fixed relationship between a signal and a meaning.

Arbitrariness: There is an arbitrary relationship between a signal and its meaning. That is, the signal, is related to the meaning by convention or by instinct but has no inherent relationship with the meaning. This can be seen in different words in different languages referring to the same meaning, or to different calls of different sub-species of a single bird species having the same meaning.

Discreteness: Language can be said to be built up from discrete units (eg. phonemes in human language). Exchanging such discrete units causes a change in the meaning of a signal. This is an abrupt change, rather than a continuous change of meaning (eg. "cat" doesn't gradually change in meaning to "bat", but changes

abruptly in meaning at some point. Speech loudness and pitch can, on the other hand be changed continuously without abrupt changes of meaning.

Displacement: Communicating about things or events that are distant in time or space. Bee dancing is an example of this.

Productivity: Language is an open system. We can potentially produce an infinite (2) number of different messages by combining the elements differently. This is not a feature of, for example, the calls of gibbons who have a finite number of calls and thus a closed system of communication.

Traditional transmission: Each generation needs to learn the system of communication from the preceding generation. Many species produce the same uniform calls regardless of where they live in the range (even a range spanning several continents). Such systems can be assumed to be defined by instinct and thus by genetics. Some animals, on the other hand fail to develop the calls of their species when raised in isolation.

Duality of patterning: Large numbers of meaningful signals (eg. morphemes or words) produced from a small number of meaningless units (eg. phonemes). Human language is very unusual in this respect. Apes, for example, do not share this feature in their natural communication systems.