

# 02

## what is language?

This chapter outlines some important 'design features' of human language, and explores the extent to which they are found in animal communication. It also looks at the main purposes for which language is used.

Linguistics can be defined as 'the systematic study of language' – a discipline which describes language in all its aspects and formulates theories as to how it works.

But what exactly *is* language? People often use the word in a very wide sense: 'the language of flowers', 'the language of music', 'body language' and so on. This book, in common with most linguistics books, uses the word to mean the specialized sound signalling system which seems to be genetically programmed to develop in humans. Humans can, of course, communicate in numerous other ways: they can wink, wave, smile, tap someone on the shoulder, and so on. This wider study is usually known as 'the psychology of communication'. It overlaps with linguistics, but is not the concern of this book.

It is also clear that humans can transfer language to various other media: written symbols, braille, sign language, and so on. Sign language in particular has interesting characteristics which are not all predictable from the spoken word. However, language based on sound is more widespread, and perhaps more basic, and so has been given priority in this book.

But can language be defined? And how can it be distinguished from other systems of animal communication? A useful approach was pioneered by the American linguist Charles Hockett. This is to make a list of design features, and to consider whether they are shared by other animals. Some important ones will be discussed in the next few pages.

## Use of sound signals

When animals communicate with one another, they may do so by a variety of means. Crabs, for example, communicate by waving their claws at one another, and bees have a complicated series of 'dances' which signify the whereabouts of a source of nectar.

But such methods are not as widespread as the use of sounds, which are employed by humans, grasshoppers, birds, dolphins, cows, monkeys, and many other species. So our use of sound is in no way unique. Sound signals have several advantages. They can be used in the dark, and at some distance, they allow a wide variety of messages to be sent, and they leave the body free for other activities:

... .. signaling system at a fairly late stage in their evolution. This seems likely because all the organs used in speech have some more basic function. The lungs are primarily used for breathing. Teeth, lips and tongue are primarily for eating. The vocal cords (thin strips of membrane deep in the throat) were used primarily for closing off the lungs in order to make the rib cage rigid for actions requiring a great effort. When people lift something heavy, they automatically hold their breath. This is caused by the closing of the vocal cords. The grunt when the heavy object is dropped is caused by the air being expelled as the vocal cords open. Millions of years ago we possibly needed a rigid rib cage for swinging in the trees – but humans still need this mechanism today for such actions as weightlifting, defecation and childbirth.

## Arbitrariness

There is often a strong recognizable link between the actual signal and the message an animal wishes to convey. An animal who wishes to warn off an opponent may simulate an attacking attitude. A cat, for example, will arch its back, spit and appear ready to pounce.

In human language, the reverse is true. In the great majority of cases, there is no link whatsoever between the signal and the message. The symbols used are arbitrary. There is no intrinsic connection, for example, between the word *elephant* and the animal it symbolizes. Nor is the phrase 'These bananas are bad' intrinsically connected with food. Onomatopoeic words such as *quack-quack* and *bang* are exceptions – but there are relatively few of these compared with the total number of words.

## The need for learning

Many animals automatically know how to communicate without learning. Their systems of communication are genetically inbuilt. Bee-dancing, for example, is substantially the same in bee colonies in different parts of the world, with only small variations. Even in cases where an element of learning is involved, this is usually minor. In one experiment a chaffinch reared in a soundproof room away from other chaffinches developed an abnormal type of song. Yet when the bird was

exposed to only occasional tape recordings of other chaffinches, its song developed normally.

This is quite different from the long learning process needed to acquire human language, which is culturally transmitted. A human being brought up in isolation simply does not acquire language, as is shown by the rare studies of children brought up by animals without human contact. Human language is by no means totally conditioned by the environment, and there is almost certainly some type of innate predisposition towards language in a new-born child. But this latent potentiality can be activated only by long exposure to language, which requires careful learning.

## Duality

Animals who use vocal signals have a stock of basic sounds which vary according to species. A cow has under ten, a chicken has around twenty, and a fox over thirty. Dolphins have between twenty and thirty, and so do gorillas and chimpanzees. Most animals can use each basic sound only once. That is, the number of messages an animal can send is restricted to the number of basic sounds, or occasionally the basic sounds plus a few simple combinations.

Human language works rather differently. Each language has a stock of sound units or phonemes which are similar in number to the basic sounds possessed by animals; the average number is between thirty and forty. But each phoneme is normally meaningless in isolation. It becomes meaningful only when it is combined with other phonemes. That is, sounds such as *f*, *g*, *d*, *o*, mean nothing separately. They normally take on meaning only when they are combined together in various ways, as in *fog*, *dog*, *god*.

This organization of language into two layers – a layer of sounds which combine into a second layer of larger units – is known as duality or double articulation. A communication system with duality is considerably more flexible than one without it, because a far greater number of messages can be sent.

At one time, it was thought that duality was a characteristic unique to human language. But now some people claim that it

exists also in birdsong, where each individual note is meaningless. It is the combination of notes into longer sequences which constitutes a meaningful melody.

## Displacement

Most animals can communicate about things in the immediate environment only. A bird utters its danger cry only when danger is present. It cannot give information about a peril which is removed in time and place. This type of spontaneous utterance is nearer to a human baby's emotional cries of pain, hunger or contentment than it is to fully developed language.

Human language, by contrast, can communicate about things that are absent as easily as about things that are present. This apparently rare phenomenon, known as displacement, does occasionally occur in the animal world, for example, in the communication of honey bees. If a worker bee finds a new source of nectar, it returns to the hive and performs a complex dance in order to inform the other bees of the exact location of the nectar, which may be several miles away. But even bees are limited in this ability. They can inform each other only about nectar. Human language can cope with any subject whatever, and it does not matter how far away the topic of conversation is in time and space.

## Creativity (Productivity)

Most animals have a very limited number of messages they can send or receive. The male of a certain species of grasshopper, for example, has a choice of six, which might be translated as follows:

- 1 I am happy, life is good.
- 2 I would like to make love.
- 3 You are trespassing on my territory.
- 4 She's mine.
- 5 Let's make love.
- 6 Oh how nice to have made love.

Not only is the number of messages fixed for the grasshopper, but so are the circumstances under which each can be communicated. All animals, as far as we know, are limited in a

similar way. Bees can communicate only about nectar. Dolphins, in spite of their intelligence and large number of clicks, whistles and squawks, seem to be restricted to communicating about the same things again and again. And even the clever vervet monkey, who is claimed to make thirty-six different vocal sounds, is obliged to repeat these over and over.

This type of restriction is not found in human language, which is essentially creative (or productive). Humans can produce novel utterances whenever they want to. A person can utter a sentence which has never been said before, in the most unlikely circumstances, and still be understood. If, at a party, someone said, 'There is a purple platypus crawling across the ceiling', friends might think the speaker was drunk or drugged, but they would still understand the words spoken. Conversely, in an everyday routine situation, a person is not obliged to say the same thing every time. At breakfast, someone might say 'This is good coffee' on one day, 'Is this coffee or dandelion tea?' on the next, and 'It would be cheaper to drink petrol' on the next.

## Patterning

Many animal communication systems consist of a simple list of elements. There is no internal organization within the system.

Human language, on the other hand, is most definitely not a haphazard heap of individual items. Humans do not juxtapose sounds and words in a random way. Instead, they ring the changes on a few well-defined patterns.

Take the sounds *a*, *b*, *s*, *t*. In English, there are only four possible ways in which these sounds could be arranged, *bats*, *tabs*, *stab* or *bast* (the latter meaning 'inner bark of lime', *Oxford English Dictionary*). All other possibilities, such as *\*sbat*, *\*abts*, *\*stba*, are excluded (an asterisk indicates an impossible word or sentence). The starred words are not excluded in this case because such sequences are unpronounceable, but because the 'rules' subconsciously followed by people who know English do not allow these combinations, even for new words. A new washing powder called *Sbat* would be unlikely to catch on, since English does not permit the initial sequence *sb*, even though in some other languages (for example, ancient Greek) this combination is not unusual.

again, only three combinations are possible: *The burglar sneezed loudly*, *Loudly sneezed the burglar* and (perhaps) *The burglar loudly sneezed*. All others are impossible, such as \**The loudly burglar sneezed*, or \**Sneezed burglar loudly the*. Note also that had the four words been *burglars*, *a*, *sneezes*, *loudly*, there is no way in which these could be combined to make a well-formed sentence. \**A burglars* is an impossible combination, and so is \**burglars sneezes*. In brief, English places firm restrictions on which items can occur together, and the order in which they come.

From this, it follows that there is also a fixed set of possibilities for the substitution of items. In the word *bats*, for example, *a* could be replaced by *e* or *i*, but not by *h* or *z*, which would give \**bhts* or \**bzts*. In the sentence *The burglar sneezed loudly*, the word *burglar* could be replaced by *cat*, *butcher*, *robber*, or even (in a children's story) by *engine* or *shoe* – but it could not be replaced by *into*, or *amazingly*, or *they*, which would give ill-formed sequences such as \**The into sneezed loudly* or \**The amazingly sneezed loudly*.

Every item in language, then, has its own characteristic place in the total pattern. It can combine with certain specified items, and be replaced by others (Figure 2.1).

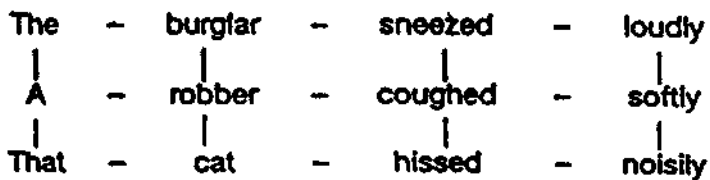


figure 2.1

Language can therefore be regarded as an intricate network of interlinked elements in which every item is held in its place and given its identity by all the other items. No item (apart from the names of some objects) has an independent validity or existence outside that pattern. The elements of language can be likened to the players in a game of soccer. A striker, or a goal-keeper, has

no use or value outside the game. But placed among the other players, a striker acquires an identity and value. In the same way, linguistic items such as *the*, *been*, *very*, only acquire significance as part of a total language network.

## Structure dependence

Let us now look again at the network of interlocking items which constitutes language. A closer inspection reveals another, more basic way in which language differs from animal communication.

Look at the sentences: *The penguin squawked. It squawked. The penguin which slipped on the ice squawked.* Each of these sentences has a similar basic structure consisting of a subject and a verb (Figure 2.2).

<p>The penguin It The penguin which slipped on the ice</p>	<p>squawked</p>
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figure 2.2

The number of words in each sentence is no guide whatsoever to its basic structure. Simple counting operations are quite irrelevant to language. For example, suppose someone was trying to work out how to express the past in English. They would have no success at all if they tried out a strategy such as 'Add *-ed* to the end of the third word'. They might, accidentally, produce a few good sentences such as:

*Uncle Herbert toasted seventeen crumpets.*

But more often, the results would be quite absurd:

\* *Clarissa hate frogs-ed.*

\* *The girl who-ed hate frogs scream.*



in fact, it is quite impossible for anybody to form sentences and understand them unless they realize that each one has an inaudible, invisible structure, which cannot be discovered by mechanical means such as counting. Once a person has realized this, they can locate the component to which the past tense *-ed* must be added even if they have never heard or said the sentence before, and even if it contains a totally new verb, as in:

*The penguin shramped the albatross.*

In other words, language operations are structure dependent – they depend on an understanding of the internal structure of a sentence, rather than on the number of elements involved. This may seem obvious to speakers of English. But the rarity, or perhaps absence, of this property in animal communication indicates its crucial importance. Its presence has not been proved in any animal system (though birdsong may turn out to be structure dependent, according to some researchers).

Moreover, the types of structure dependent operations found in language are often quite complicated, and involve considerably more than the mere addition of items (as in the case of the past tense). Elements of structure can change places, or even be omitted. For example, in one type of question, the first verbal element changes places with the subject:

1                      2  
[That dirty child] [must] wash,

has the related question

2                      1  
[Must] [that dirty child] wash?

And in the sentence,

*Billy swims faster than Henrietta.*

it is generally agreed that the sentence means 'Billy swims faster than Henrietta swims', and that the second occurrence of *swims* is 'understood'.

Such sophistication is mind-boggling compared with the thirty-six cries of the vervet monkey, or even the relatively complex dances by which bees indicate the whereabouts of honey to their colleagues.

## Human language versus animal communication

So far, the main similarities and differences between human and animal communication can be summed up as follows:

Human language is a signalling system which uses sounds, a characteristic shared by a large number of animal systems. In animal communication, there is frequently a connection between the signal and the message sent, and the system is mainly genetically inbuilt. In human language, the symbols are mostly arbitrary, and the system has to be painstakingly transmitted from one generation to another. Duality and displacement – the organization of language into two layers, and the ability to talk about absent objects and events – are extremely rare in the animal world. No animal communication system has both these features. Creativity, the ability to produce novel utterances, seems not to be present in any natural communication system possessed by animals. Finally, patterning and structure dependence may also be unique language features.

To summarize: language is a patterned system of arbitrary sound signals, characterized by structure dependence, creativity, displacement, duality and cultural transmission.

This is true of all languages in the world, which are remarkably similar in their main design features. There is no evidence that any language is more 'primitive' than any other. There are certainly primitive cultures. A primitive culture is reflected in the vocabulary of a language, which might lack words common in advanced societies. But even the most primitive tribes have languages whose underlying structure is every bit as complex as English or Russian or Chinese.

But one other similarity links human language with animal communication: it is predestined to emerge. Just as frogs inevitably croak, and cows moo, so humans are prearranged for talking.

Human language is innately guided. Human infants are not born speaking, but they know how to acquire any language to which they are exposed. They are drawn towards the noises coming out of human mouths, and they instinctively know how to analyze speech sounds. Bees present a parallel case: they are not born

are pre-programmed to pay attention to important flower characteristics – especially scent. So they quickly learn how to recognize nectar-filled blooms, and do not waste time flying to kites or bus-stops.

## Origin of language

Language is a highly developed form of animal signalling. But there is a missing link in the chain. How, and when, did we start to talk?

Until recently, most linguists regarded this fascinating topic as outside linguistics, many agreeing with the 19th-century linguist William Dwight Whitney that 'the greater part of what is said and written upon it is mere windy talk'.

Yet suddenly, language origin has become a trendy topic. Chunks of information are being slotted into place in a giant evolutionary jigsaw puzzle whose picture is slowly emerging.

Language probably developed in east Africa, around 100,000 years ago. Three preconditions must have existed. First, humans had to view the world in certain common ways: they noticed objects and actions, for example. Second, they were able to produce a range of sounds – a spin-off of walking upright, according to one view. Third, they must have attained the 'naming insight', the realization that sound sequences can be symbols which 'stand for' people and objects.

These preconditions enabled early humans to build up a store of words. But what about linguistic 'rules', conventional word arrangements? In all probability, rules came about among early humans in much the same way as new rules emerge in any language today. Briefly, preferences tend to become habits, and habits become 'rules'.

Original language preferences possibly reflected ways in which humans view the world. Most languages put words for actions near the objects which are acted upon, for example, 'The fisherman *caught a fish*', as in English, or 'The fisherman *a fish caught*', the order preferred in, say, Turkish. So preferences to habits to rules may be a natural progression. There was

probably always flexibility, which is why all languages are not the same. Eventually, an instinctive need to maintain patterns possibly overruled any desire to preserve a strict world to language link.

## The role of language

But *why* did language begin? Social chit-chat, the meaningless small talk of everyday life, may have played a key role, as it does today: 'Hallo, how nice to see you. How are you? Isn't the weather terrible?' Keeping in touch via talking could have replaced the friendly grooming indulged in by primates, according to one view. It has even been called 'grooming talking'.

The use of language for persuading and influencing others has probably always been important. Yet 'information talking' – swapping news and conveying essential commands – may not be as basic as was once assumed. It is prominent primarily in public forms of language, less so in private conversations, which form the bulk of day-to-day interactions.

Language can of course be used to communicate feelings and emotions, though this aspect of language is not well developed. Humans, like other primates, can convey emotions via screams, grunts, sobs, gestures and so on. So they need language only to confirm and elaborate these more primitive signals.

These days, various other biologically less important functions of language are also found.

Humans may use language for purely aesthetic reasons. In writing poetry, for example, people manipulate words in the same way as they might model clay or paint a picture. Or they may talk in order to release nervous tension, a function seen when people mutter to themselves in anger and frustration.

This chapter has listed some important design features of language, and considered to what extent they are found in other animal communication systems. It has also mentioned some of the main purposes for which language is used.

The next chapter will outline the major directions taken by linguists over the past two centuries, as they explored the thickets of language.