Chimpanzees can use signs, but do they have language?

The primary purpose of language is to communicate meaning, and so if chimps are to be shown to 'have language' then they must at the very least be capable of understanding and conveying meaning. However, the training of chimps (and other animals) invariably involves some form of OPERANT CONDITIONING (that is, training an animal by providing or withholding rewards). Such techniques have been used by circus trainers and pet-owners alike to shape animal behaviour, and can make it seem that an animal 'speaks' to its owner. This impression can be especially beguiling, since humans are naturally inclined to look for patterns and meaning. But it is far from clear whether an animal behaving in this way is making a conscious attempt to communicate, much less that it is using language to do so.

In order to demonstrate language ability we have to look for more than just remarkable behaviour, and more than just the appearance of comprehension. One of the skills demonstrated by children when they acquire language is the ability to combine words that they have learned into new patterns: if chimps can do this, then this would support the idea that they have language skills. An example frequently cited is of a chimp called Washoe, who was trained to use American Sign Language (ASL). It is claimed that on seeing a swan (or duck, according to some sources) for the first time, Washoe signed "water bird". But we have no way of knowing whether Washoe was creating a new compound word here, or simply making the signs for "water" and then "bird". And while this example may be favourable, there may have been many other occasions when Washoe made "meaningless" signs, which would not have been documented: it may be a case that simply by watching for long enough, "one is bound to find random combinations in the chimps' gesturing that can be given sensible interpretations" (Pinker, 1994:341). A stronger argument could be made if the "water bird" compound had been adopted by Washoe and subsequently used in a consistent way.

"Kanzi" is a chimp who "has demonstrated unequivocal understanding of thousands of novel spoken sentences with syntactically complex structures" (Kanzi, 1998). However, this claim is made by the same researchers who have spent many years working with Kanzi and so many people would regard it as suspect. Whether or not Kanzi has these comprehension abilities, he has not demonstrated any ability to form complex sentences by himself, and the "sentences" that he does form using symbols are mostly "fixed formulas with little if any internal structure" (Fromkin, Fromkin and Hyams, 2003:389).

So while it may be very tempting to believe that chimps 'have language', the burden of proof is still on scientists to show that abilities claimed for them are any more than a sophisticated (and generously interpreted) version of a pigeon in a "Skinner Box", tapping at a lever in the expectation of receiving food.

Naturally occurring speech errors provide a window on the adult speaker's language processes

Suppose I am an unscrupulous businessman wishing to find out how Maltesers are made, but am frustrated because the manufacturing process used in a Malteser factory is a closely guarded secret. One thing I might consider doing would be to open many packets and look for any sweets inside that are unusual or imperfectly formed. By doing this I might be able to infer something about the production techniques. For example, if on some occasions I find a hemispherical sweet which has no chocolate covering on the exposed flat edge, and on other occasions I can discern a faint ridge of chocolate around the circumference of some of the sweets, I might suspect that each Malteser is formed by joining together two half-Maltesers.

In trying to understand the processes involved in speech production, we face a similar problem to the crooked confectioner. While we do know an increasing amount about the physiology of the brain, much of its workings are hidden from us, and most of the data we have available consist of the verbal equivalent of fully-formed Maltesers: everyday speech. While we can, to a limited extent, establish conditions where we attempt to manipulate the environment and measure what differences result, it is very difficult to set up experimental conditions which can provide useful information: there are many variables involved over which we have no control.

So “naturally occurring” errors (those which are commonly observed in the general population) are a relatively cheap and ethical source of data.

An example of such an error which most people have experience of is that of a mother trying to attract the attention of a child who has siblings. Instead of calling “George – don't do that!”, she may say “Fred .. Tim .. I mean George – don't do that!”; before using the correct name, the mother iterates through those of his brothers. This particular type of error is interesting in several ways:

(a) the incorrect utterances are real words, not gobbledygook sounds;

(b) the words are not any old words: for example, the mother doesn't say something like “chair .. warmth .. I mean George..”;

(c) the names are not random: they are specifically the names of people who she is accustomed to speaking to.

While it would be wrong to jump to conclusions based on a single instance or even a single class of errors, these points do seem to support the idea that speech production involves several processing components, and that the way information passes between them contains some kind of meta-information other than simply the phonetic sound of each word to be spoken. For example, (b) might lead us to suppose that there is a discrete component which retrieves people's names, and will not return other types of words, even if the input parameters provided to it are in some way malformed.

Naturally occurring speech errors of this type can not ever show conclusively how the language process operates, but they can provide clues, and perhaps stimulate further, more specific research into exactly what mechanisms are at work.

Does understanding the organisation of language in the brain contribute to the study of language?

As discussed in the previous essay, we may form hypotheses about the brain's linguistic processes based on naturally occurring speech processes; these hypotheses can in some cases be refuted or supported by a clearer understanding of the physiology of the brain in relation to language use. Much of the data obtained about the way the brain works is from individuals who have suffered brain disease or trauma, where damage to the brain is not necessarily localized to a specific region of the brain, but nevertheless, common features mean that we can be increasingly certain about how language ability is distributed through the brain.

The data from many case studies shows that distinct areas of the brain are involved with different aspects of linguistic ability. For example, BROCA'S AREA is typically associated with grammatical abilities, and WERNICKE'S AREA with vocabulary. While it does not seem possible to say that specific areas have exclusive and unique purposes (“the role of Broca's is maddeningly unclear” (Pinker 1994:310)), the fact that we know that these linguistic functions are to some extent dealt with by specific parts of the brain is of interest because it suggests that we might learn about other aspects of language as we understand more about what the brain does.

As an example, the report on a patient called 'Mr Harvey' shows that research can be stimulated by specific case studies. Mr Harvey had suffered brain-damage, and his speech was severely impaired. But while he was unable to read simple words, he was able read numbers aloud with apparent ease. When subjected to a brain scan, the results showed that “disease was ravaging Mr Harvey's temporal lobes, but had left the parietal lobes intact” (Lost For Words:2002). In this case, it would appear that the structure of the brain is such that numerical ability is in some way distinct from verbal ability, even though they must at some stage share the common functions of comprehension of sound signal and production of words.

One piece of work that might be interesting would be to subject “signing chimps” to brain scans, and see whether the attempts by the chimps to communicate with their keepers correlates with increased activity in the same region of the brains as in humans. Doing this might help to show whether they are actually using “language” or not.

We are some way from understanding how the brain works, but it does appear that there are things we can learn about language, just by learning about how the brain processes language.

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