Spontaneous symbol acquisition and communicative use by pygmy chimpanzees

Savage-Rumbaugh et al (1986)

Introduction

Whether the ability to communicate using human language is learned or arises as the result of an innate biological structure in the human brain is an example of the nature-nurture debate. To try to answer this question many attempts have been made to teach primates to use human language with varying outcomes. This study reports the language development of Kanzi, a pygmy chimpanzee, who used symbols (lexigrams) to communicate with humans. The report contrasts how Kanzi, unlike common chimpanzees, began spontaneously to use symbols and also understood spoken English, and suggests that pygmy chimpanzees have symbolic and auditory perceptual skills that are different from common chimpanzees.

The study arose as a result of 'a serendipitous' occurrence, when Kanzi was observed spontaneously to start using the symbols, perhaps as a result of observing his mother using symbols, to communicate with humans.

Method

A case study – having a longitudinal design:

The participant: A pygmy chimpanzee, Kanzi (his name means Treasure in Swahili) born 28/10/80 in captivity in the Yerkes Regional Primate Centre, USA. His mother was a 'language chimp'. Kanzi was assigned to the language research centre at 6 months old and was reared in a 'language using' environment with humans. When he was 2.5 yrs old, after being separated from his mother, he was observed spontaneously to start using symbols, (he had observed his mother using the lexigram keyboard). Without training, Kanzi identified symbols correctly and did not confuse them (e.g. apple, orange, banana) and he understood spoken words.

Procedure

Because chimpanzees have no vocal chords; when indoors Kanzi uses a battery powered keyboard with geometric symbols that brighten when touched, then a speech synthesiser 'speaks' the word. When outdoors, Kanzi uses a laminated copy of the keyboard as a 'pointing' board (each symbol is called a lexigram).

Kanzi's environment:

Kanzi's outdoor environment is 55 acres of forest in which specific food types are stored at 17 different locations, thus he must travel to get the food type he prefers. e.g. If he wants bananas he must go to the tree house but if he wants peaches he must go to the 'lookout'. A record was kept of Kanzi's language development (symbol use) for 17 months from when he was 2 ½ years old. Two kinds of records were kept – an automatic computerised record from his keyboard use and notes from observers when outside.

Kanzi's symbol use was recorded as correct, incorrect, spontaneous, imitation, structured (e.g. response to question) and a record was kept of whether his behaviour matched his symbolic utterance e.g. if he indicated he was going to the treehouse he led a person to the treehouse.

Kanzi's progress

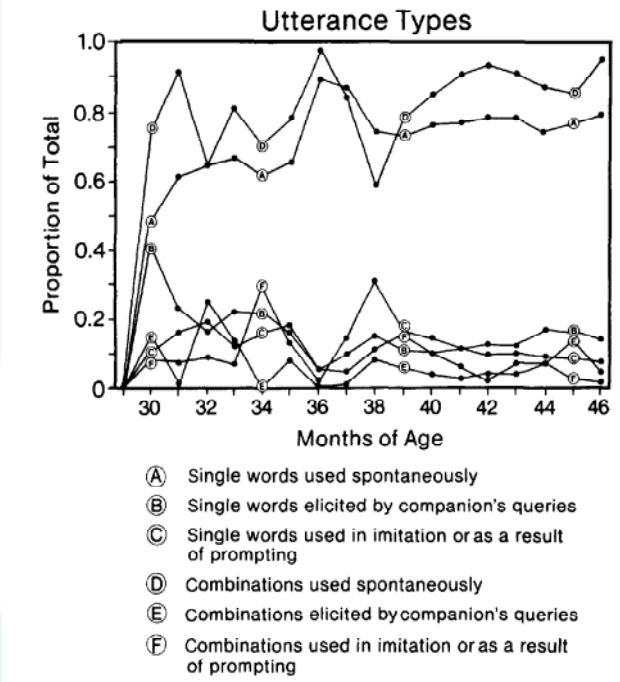
Savage-Rumbaugh reports that Kanzi learned where all the food was located. He could use a photo on the ground to select a food and then guide another person to his chosen location. He also learned to use the symbols on the keyboard to indicate where he wanted to go.

Kanzi's symbol use was analysed and some results are shown :

Kanzi using his pointing board

Results

2530 correct combinations of symbols, many being 'two foods' e.g. hotdog & coke, were recorded. 265 instances of imitating symbols were recorded.



Examples of symbol combinations:

'person (g) chase Kanzi'

(g) is used to represent Kanzi using a gesture to indicate 'who' is to chase Kanzi. The ordering of symbol, gesture, symbol indicates that Kanzi is using English syntax

Chase person 1(g) person2(g)
Person 1(g) pat(g) person2(g)
Person1(g) person2(g) pat(g)
Person1(g) chase person2(g)
Person 1(g) grab person2(g)
Person1(g) chase(g) person2(g)
Person1(g) person2 (g) chase
Kanzi chase person(g)
Chase bite person(g)
Person(g) chase Kanzi

Comparing Kanzi with other language learning primates.
Imitated Versus Spontaneous Utterances

Subject	Proportion of imitated utterances	Proportion of spontaneous utterances
Kanzi	.11	.80
Mulika	.20	.67
Nim	.39	.56
Sherman	.10	.78
Austin	.05	.90

Conclusion

Kanzi learned to use symbols spontaneously - compared to other species of chimps, pygmy chimpanzees appear to be able to learn and use language more like a human child.

The lexigram (symbol) keyboard used by Kanzi