Call Discrimination in Chimpanzees

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In linguistics, it is generally held that sounds. or phones, infinite in number, arc grouped together into a small number of significant classes of sounds called phonemes It is reasonable to assume that all vocal communication in animals is similarly variable. This would indicate the necessity of the animals perceiving different sounds as the "same". In attempting to discover how the animals communicate vocally, it is first necessary to group their .sounds together into meaningful classes. These classes must be those perceived by the animals not the experimenters. The ability of the linguist to perceive more sounds in a language than are significant is clearly analogous to the ability of the comparative psychologist to distinguish more differences in sounds made by the animals than are significant. It is therefore incumbent on students of animal communication to discover which sounds are significant to the animals and which arc variations within a class

Chimpanzees have been shown to have a wide variety of calls. Scientists differ on how many calls there are and what they indicate. A solution to the first part of the problem must precede any attempt to solve the second part. One way to make an attempt at a solution is to play a tape of pairs of chimpanzee calls for chimpanzee subjects and ask them to indicate "same "and "different".

Through the generosity of Peter Marler, a tape recording was made of pairs of chimpanzee calls classified by humans as "barks" and "screams". These were chosen for their lack of similarity to one another from our point of view The sequences on the tape were as shown in table 1

In discrimination experiments, it is usually the case that the observer decides in advance whether the stimuli are the same or different and then trains the animal to distinguish between them. In the experiment described here, we were, in effect, asking the animal to indicate how it perceived the sounds.

In the 1960s, Alan and Beatrice Gardner taught a wild born chimpanzee named Washoe a number of signs in American Sign Language. Among the signs that Washoe mastered, were those for "same" and "different". It seemed reasonable to make use of these signs to examine the chimpanzee call system. Permission was obtained from the University

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TABLE I
CHIMPANZEE CALLS AND SIGNS

FIRST CALL		SECOND CALL		
Animal	Call	Animal	Call	Sign[a]
A	bark	B	scream	d
A	bark	A	scream	sd
A	bark	B	bark	sd
A	$bark_1$	A	$bark_2$[b]	sd
A	$bark_1$	A	$bark_1$[c]	s

[a]D= different; sd, same-different (the animal first signed the one and then the other

[b]Here two barks were made by the animal at different times

[c]Here the two barks were the same (i.e., the same tape was played twice).

(where Washoe is) to carry out research with the chimpanzees there. Unfortunately, Washoe was in heat at the time, and it not possible to work with her. As a result, a five-year-old male chimpanzee named Bruno was selected. With the help Roger Fouts, Bruno was taught the Signs for "same" and "different" and then was exposed to the tape of chimpanzee calls.

The initial training of Bruno involved placing two objects before him and molding his hands into the signs for "same" and "different." He was rewarded for correct answers with food or liquids. Following several sessions where the objects were presented simultaneously, objects were presented sequentially. After it became clear that he could classify objects that were sequentially presented, the tape was played for him and he was asked to classify the paired calls as "same" or "different."

The first time the tape was played, Bruno seemed not to respond. At that point, his hand was moved to his ear (the sign for "listen," 'which he already knew) to direct his attention to the source of the stimuli. After that, he attended to the sounds. On the next playing of the tape, Bruno ran up into a tree. After that, he showed no particular reaction to the sounds, although the moving tape reel was the object of some attention. He was

allowed to continue signing as long as he chose. In each of four trials on two successive days, the results were those shown in table 1.

From these results it appears that Bruno did not know which dimension to respond to, the call or the animal. Thus, when both the call and the animal were the same, he responded unambiguously "same." When the call and the animal were different, he responded unambiguously "different." When one dimension varied and the other did not (either same-call/ different-animal or same-animal/different-call), he gave two signs-"same" and "different" - apparently indicating that he recognized one dimension as the same and the other as different. This is not surprising, given the fact that in the social organization of chimpanzees different animals have different relationships to one another; an animal may very well respond differently to the same call made by animals with whom his relationships differ.

By using the tape recorder in this way, it would be possible to test for the chimpanzee perception of all the calls we have to determine whether or not we have divided them correctly. It might even be possible to teach chimpanzees a sign for each call as it is isolated and then ask them to label various calls in isolation.

Thi_5 pilot study, utilizing the chimpanzee's acquired ability to communicate, may well have opened up a new approach, not only for scientists interested in animal communication, but for those interested in other areas of animal behavior. The possibilities inherent in this technique may prove very productive.