

Montana State University-Billings

Apes and Language:

A Turabian Style Sample Paper

Karen Shaw

English 214

Professor Bell

22 March 2001

## Apes and Language: A Literature Review

Over the past thirty years, researchers have demonstrated that the great apes (chimpanzees, gorillas, and orangutans) resemble humans in language abilities more than had been thought possible. Just how far that resemblance extends, however, has been a matter of some controversy. Researchers agree that the apes have acquired fairly large vocabularies in American Sign Language and in artificial languages, but they have drawn quite different conclusions in addressing the following questions:

1. How spontaneously have apes used language?
2. How creatively have apes used language?
3. Can apes create sentences?
4. What are the implications of the ape language studies?

This review of the literature on apes and language focuses on these four questions.

### How Spontaneously Have Apes Used Language?

In an influential article, Terrace, Petitto, Sanders, and Bever argued that the apes in the language experiments were not using language spontaneously but were merely imitating their trainers, responding to conscious or unconscious cues. Terrace and his colleagues at Columbia University had trained a chimpanzee, Nim, in American Sign Language, so their skepticism about the apes' abilities received much attention. In fact, funding for ape language research was sharply reduced following publication of their 1979 article, "Can an Ape Create a Sentence?"<sup>1</sup>

In retrospect, the conclusions of Terrace and others seem to have been premature. Although some early ape language studies had not been rigorously controlled to eliminate cuing,

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1. Haley Terrace et al., "Can an Ape Create a Sentence?" *Science* 206 (1979): 894.

R. A. Gardner and B. T. Gardner were conducting double-blind experiments that prevented any possibility of cuing as early as the 1970s.<sup>2</sup> Since 1979, researchers have diligently guarded against cuing. For example, Rosh Lewin reported that instructions for Kanzi, a bonobo (pygmy chimpanzee), were “delivered by someone out of his sight,” with other team members wearing earphones so that they “could not hear the instructions and so could not cue Kanzi, even unconsciously.”<sup>3</sup> More recently, philosopher Stuart Shanker of York University has questioned the emphasis placed on cuing, pointing out that since human communication relies on the ability to understand cues and gestures in a social setting, it is not surprising that apes might rely on similar signals.<sup>4</sup>

There is considerable evidence that apes have signed to one another spontaneously, without trainers present. Like many of the apes studied, gorillas Koko and Michael have been observed signing to one another.<sup>5</sup> At Central Washington University, Loulis, the baby chimpanzee placed in the care of the signing chimpanzee, Washoe, mastered nearly fifty signs in American Sign Language without help from humans. “Interestingly,” wrote researcher Robin Fouts, “Loulis did not pick up any of the seven signs that we [humans] used around him. He learned only from Washoe and [another chimp] Ally.”<sup>6</sup>

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2. Robin Fouts, *Next of Kin: What Chimpanzees Taught Me About Who We Are* (New York: William Morrow, 1997), 102.

3. Rosh Lewin, "Look Who's Talking Now," *New Scientist* 130 (1991): 51.

4. Glenn Johnson, "Chimp Talk Debate: Is It Really Language?" *The New York Times*, 6 June 1995, [journal on-line]; available from <http://www.santafe.edu/~johnson/articles.chimp.html>; Internet; accessed 2 February 1998.

5. Frances Patterson and Elton Linden, *The Education of Koko* (New York: Holt, Rinehart, & Winston, 1981), 51.

6. Fouts, *Next of Kin*, 244.

The extent to which chimpanzees spontaneously use language may depend on their training. Terrace trained Nim using the behaviorist technique of operant conditioning, so it is not surprising that many of Nim's signals were cued. Many other researchers have used a conversational approach that parallels the process by which human children acquire language. In an experimental study, Chris O'Sullivan and Curtis Yeager contrasted the two techniques, using Terrace's Nim as their subject.<sup>7</sup> They found that Nim's use of language was significantly more spontaneous under conversational conditions.

### How Creatively Have Apes Used Language?

There is considerable evidence that apes have invented creative names. One of the earliest and most controversial examples involved the Gardner's chimpanzee, Washoe. Washoe, who knew signs for "water" and "bird," once signed "water bird" when in the presence of a swan. Terrace and others suggested that there was "no basis for concluding that Washoe was characterizing the swan as a 'bird that inhabits water.'" Washoe may simply have been "identifying correctly a body of water and a bird, in that order."<sup>8</sup>

The other examples are not so easily explained away. The bonobo, Kanzi, has requested particular films by combining symbols in a creative way. For instance, to ask for *Quest for Fire*, a film about early primates discovering fire, Kanzi began to use symbols for "campfire" and "TV."<sup>9</sup> In addition, Koko the gorilla has a long list of creative names to her credit: "elephant

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7. Chris O'Sullivan and Curtis Yeager, "Communicative Context and Linguistic Competence: The Effect of Social Setting on a Chimpanzee's Conversational Skill," in *Teaching Sign Language to Chimpanzees*, eds. Rick A. Gardner, Bell T. Gardner, and Timothy Van Cantfort (Albany: SUNY Press, 1989), 270.

8. Terrace et al., "Can an Ape Create a Sentence?" 895.

9. Elson Eckholm, "Kanzi the Chimp: A Life in Science," *The New York Times*, 25 June 1985, C1.

baby” to describe a Pinocchio doll, “finger bracelet” to describe a ring, “bottle match” to describe a cigarette lighter, and so on.<sup>10</sup> If Terrace’s analysis of the “water bird” example is applied to the examples just mentioned, it does not hold. Surely Koko did not first see an elephant and then a baby before signing “elephant baby” or a bottle and a match before signing “bottle match.”

### Can Apes Create Sentences?

The early ape language studies offered little proof that apes could combine symbols into grammatically ordered sentences. Apes strung together various signs, but the sequences were often random and repetitious. Nim’s series of 16 signs is a case in point: “give orange me give eat orange me eat orange give me eat orange give me you.”<sup>11</sup>

More recent studies with bonobos at the Yerkes Primate Research Center in Atlanta have broken new ground. Kanzi, a bonobo trained by Savage-Rumbaugh, seems to understand simple grammatical rules about lexigram order. For instance, Kanzi learned that in two-word utterances an action precedes an object, an ordering also used by human children at the two-word stage. In a major article reporting on their research, Greenfield and Savage-Rumbaugh wrote that Kanzi rarely “repeated himself or formed combinations that were semantically unrelated.”<sup>12</sup>

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10. Patterson and Linden, *The Education of Koko*, 65.

11. Terrace et al., “Can an Ape Create a Sentence?” 895.

12. Pat Greenfield and E. Savage-Rumbaugh, “Grammatical Combination in *Pan Paniscus*: Processes of Learning and Intervention in the Evolution and Development of Language,” in *Language and Intelligence in Monkeys and Apes: Comparative Developmental Perspectives*, eds. Stan Parker and Kris Gibson (Cambridge: Cambridge University Press, 1990), 556.

More importantly, Kanzi began to create certain patterns on his own that may not exist in English but can be found among deaf children and in other human languages. For example, Kanzi used his own rules when combining action symbols. Lexigrams that involved an invitation to play, such as “chase,” would appear first; lexigrams that indicated what was to be done during play (“hide”) would appear second. Kanzi also created his own rules when combining gestures and lexigrams. He would use the lexigram first and then gesture, a practice often followed by young deaf children.<sup>13</sup>

In a recent study, Kanzi’s abilities were shown to be similar to those of a 2½-year-old human, Alia. Deborah Rumbaugh reported that “Kanzi’s comprehension of over 600 novel sentences of request was very comparable to Alia; both complied with the requests without assistance on approximately 70% of the sentences.”<sup>14</sup>

#### What Are the Implications of the Ape Language Studies?

Kanzi’s linguistic abilities are so impressive that they may help us understand how humans came to acquire language. Pointing out that 99 percent of our genetic material is held in common with the chimpanzees, Greenfield and Savage-Rumbaugh have suggested that something of the “evolutionary root of human language” can be found in the “linguistic abilities of the great apes.”<sup>15</sup> Noting that apes’ brains are similar to those of our human ancestors, Ryan Leakey and Rosh Lewin argued that in ape brains, “the cognitive foundations on which human

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13. Ibid., 560.

14. Deborah Rumbaugh, “Primate Language and Cognition: Common Ground,” *Social Research* 62 (1995): 722.

15. Greenfield and Savage-Rumbaugh, “Grammatical Combination in *Pan Paniscus*,” 540.

language could be built are already present."<sup>16</sup> The suggestion that there is a continuity in the linguistic abilities of apes and humans has created much controversy. Linguist Noam Chomsky has strongly asserted that language is a unique human characteristic.<sup>17</sup> Terrace has continued to be skeptical of the claims made for the apes, as have Petitto and Bever, co-authors of the 1979 article that caused such skepticism earlier.<sup>18</sup>

Recently, neurobiologists have made discoveries that may cause even the skeptics to take notice. Ongoing studies at the Yerkes Primate Research Center have revealed remarkable similarities in the brains of chimpanzees and humans. Through brain scans of live chimpanzees, researchers have found that, as with humans, "the language-controlling PT [*planum temporale*] is larger on the left side of the chimps' brains than on the right. But it is not lateralized in monkeys, which are less closely related to humans than apes are."<sup>19</sup>

Although the ape language studies continue to generate controversy, researchers have shown over the past thirty years that the gap between the linguistic abilities of apes and humans is far less dramatic than was once believed.

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