

## APE LANGUAGE STUDIES

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### Summary

Scientists have learned a great deal about the biological and behavioral origins of human language through careful examination of our closest evolutionary cousins — the Great Apes (chimpanzees, bonobos, orangutans, and gorillas). These great apes share a multitude of anatomical and behavioral characteristics with humans including important genetic, morphological, and cognitive continuities that distinguish the great apes and humans from the remainder of the animal kingdom. Given these similarities, it is reasonable for one to expect common communicative competencies as well.

Various behaviors that characterize the human capacity for language have been reported in all four of the Great Apes. In this way, the study of language with apes has contributed richly to our understanding of human language and its evolutionary origins. Systematic investigations have documented that all four species of great apes possess the ability to learn and use symbols to represent things and events, possess the ability to employ these learned symbols among themselves and/or with humans to exchange information, and to comprehend and use relatively simple rules for the organization of these symbols. Perhaps most notably, research into the linguistic potential of apes has demonstrated that the foundations of language are rooted in the functional exchange of

relatively complex information between two or more participants. Language is therefore more accurately characterized as a *continuum*, rather than an *all-or-none* phenomenon.

## 1. Introduction

Speculations regarding the linguistic potential of the Great Apes have most likely existed since modern humans first happened upon our closest evolutionary relatives. However, it has only been since the 1950s that the apes' capacity for acquiring human language has been the focus of scientific inquiry. This chapter is a review and discussion of the most notable of these studies. Where appropriate, critical evaluations of the methodologies and results will be presented, and comparisons among the studies will be made in order to synthesize a comprehensive summary of these ape language studies. However, to begin, a brief overview of human language is necessary.

Language is considered to be a uniquely human characteristic. However, the extent to which nonhuman animals possess the capacity for or exhibit features fundamental to human language remains an active area of scientific inquiry. Certainly, the functional characteristics of human languages, and the neurological structures they rely upon, are the products of the same evolutionary processes that shaped the communicative systems of all animal species. At the core of these communicative systems, including human language, is the production and transmission of signals, as well as the perception, processing, and appropriate response to the signals of others.

Human language, it has been argued, is characterized by a number of additional features (Hockett's so-called, "design features of language.") All human languages are said to be made up of a finite set of arbitrary, discrete, and largely meaningless elements, that, when combined, refer to external events or entities not necessarily present or tangible. Novel meaning can be constructed by recombining these elements based on rules, and similar or identical combinations of elements can maintain single or multiple meanings. Messages need not be honest, accurate, or meaningful. Users of a language learn that language culturally, from more experienced counterparts, and retain the potential to learn new meanings or entirely different systems.

These features of human language have been used and misused in an attempt to evaluate the linguistic competencies of various nonhuman species. Still, the features do accurately, if not incompletely, characterize many human languages. It should not be surprising, therefore (at least in an evolutionary sense), that the features describe a number of nonhuman animal communication systems as well. Thus, the central question underlying much of the ape language research over the 20th century is whether or not human language is *fundamentally* different from other communicative systems.

## 2. Early Ape Language Research

In perhaps one of the earliest examinations of a great ape's capacity for human language, Witmer attempted to teach human language to a chimpanzee named Peter who had been previously trained to perform for entertainment. Witmer included his evaluation of Peter's capacity for language among other behavioral observations and

cognitive tests. Although his attempts to teach Peter language were unsuccessful, Witmer suggests that cross-fostering a chimpanzee in a human home from a very young age may lead to the successful training of language. Similar findings are reported by Furness who attempted to teach both chimpanzees and orangutans to utter human speech. Furness' most advanced pupil, a female orangutan, only managed to utter two words, "papa," and "cup," before the work was abruptly cut short by her death.

In the 1930's, Kellogg and Kellogg acquired a 7-month-old female chimpanzee from the Anthropoid Experiment Station of Yale University in Orange Park, Florida. Gua, as she was named, was to be raised alongside the Kelloggs' 10 month old son, Donald in order to compare directly the development of the two subjects reared in identical environments. Although the experiment only lasted for nine months, in that time, the Kelloggs kept daily records of their subjects' behaviors and milestones. In addition to a variety of cognitive and behavioral tasks, the Kelloggs noted that both Gua and Donald were able to differentially respond to a number of spoken English requests. However, their relative comprehension differed, with Donald overtaking Gua midway through the study. It is important to note that these requests were heard frequently by both subjects, and used in well known contexts. All attempts to teach the subjects specific names for specific items failed, as did the attempts to train Gua to produce the word, "Papa."

Following the Kelloggs' lead, Keith and Catherine Hayes raised a female chimpanzee in their home for nearly 7 years. Their findings are described in a book published by Catherine Hayes, entitled, *The Ape in our House*. The Hayes obtained Viki when she was only three days old, and she lived with the Hayes' from that time until her death at age 7. Despite 6 years of training (often involving manual manipulation of her lips), Viki succeeded in producing only four distinguishable words. In addition, the functional relevance of the sounds to Viki herself was doubted. Despite the relative failure of vocal training, Viki's performance on a number of cognitive tasks was unprecedented for a nonhuman. It is also worth noting that Viki was successfully trained to produce a voiced sound voluntarily, and although not tested systematically, was thought to comprehend a number of spoken requests.

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### Biographical Sketch

**Jared P. Tagliatela** is a Research Associate and Postdoctoral Fellow at the Yerkes National Primate Research Center in Atlanta, Georgia. His research interests include nonhuman animal communication as well as the neurological substrates that mediate these behaviors. His current research focus is on the functional use of primate vocalizations and gestures, how individuals produce and perceive these utterances, and how they relate to the evolution of spoken language. In addition, he is interested in the functional relevance of neuroanatomical asymmetric organization, its evolution, and its significance in the evolution of human language and the neurological mechanisms that mediate linguistic behaviors.