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Passive Speech Research, Language, and the Animal Mind

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This paper provides an overview of investigations into communicating with animals using English language, and, after a brief survey, delves into an in-process passive speech study with a talking bird. Previously, mainly in studies of language-using primates, researchers devoted scant attention to understand voluntary statements by their nonhuman subjects. Arielle, a macaw, a parrot species whose ability to use language has not been studied previously, is the subject of this report. She has learned language. Transcriptions of her recorded voluntary speech reveal her thoughts as well as provide insight about her cognitive abilities.

Assumptions

In discussions related to the mind, scientists, psychologists, biologists, and many academics generally assume that humans are vastly superior to other animals. This assumption was manifest in the longstanding claim, "Man is the only animal that uses tools." Jane Goodall's observations about chimpanzees using tools demonstrated that the assertion, which many scientists held, was false. The scientific world did not immediately embrace her findings early in 1960; rather, the population gradually accepted the information.

Scientists, who study animal behavior, as well as evolutionary linguists, have been moving through a similar controversy concerning the statement, "Man is the only animal to use language." [1] The statement is under attack from different quarters by anthropologists, ethologists, neuroscientists, linguists, and

geneticists, many of whom disagree that only man possesses language.

Many people think that man is an exceptional creature. Claims supporting man's superiority to other animals decline as we obtain more information. However, many individuals support the tenant that animals are not capable of complex behaviors and feats of mind similar to those of Homo sapiens. The anthropocentric claim occurs because of man's arrogance; people tend to make such claims either purposefully or subconsciously through conditioning, often without specific intent to make such statements.

Skeptics originally claimed, "Only man has the gift of language," which was similar to saying, "No other animal but man has language." In a startling publication, the Gardners revealed that they had taught a human language to a chimpanzee using sign language. The psychologists showed with an ape called Washoe that man was not alone in his ability to understand and employ language. Nearly twenty years later, birdsong researchers showed that the original premise neglected to consider the natural communications of at least one avian species. The investigators, Hailman and Ficken, found that chickadee calls have the required technical characteristics to be considered a language. They wrote, "The joint occurrence of these three elements (combinatorial structure, openness and computable syntax) makes chick-a-dee calls far more like human language than any animal system yet described." [2]

Allied in principle to anthropocentrism is the related idea of anthropomorphism, by which one inappropriately attributes human abilities or human characteristics of mind to another animal. Some might claim that Hailman and Finken's assertions are anthropomorphic for conveying the idea that birds have language. In the last section of this paper called "Findings from Free Speech," I summarize evidence from studying Arielle's speech and argue that a parrot-like bird can learn human language.

Previously, I introduced the idea that critics believe that no animal has complex language similar to ours. To maintain their logical position, those individuals fail to accept that the chickadees in Hailman and Ficken's study behaved as the authors described. The problem I perceive is: "For centuries, skeptics proclaimed what animals cannot do, and hardly anyone ever challenged their views."

I question the logic of their

assumptions, since provocateurs cannot prove a negative assertion. For example, they could never prove "Man is the only animal to use tools," because the assertion was equivalent to "Other animals cannot use tools." For a similar reason, the assertion "Only man has the gift of language" has likewise been at least partially discredited. I believe that the reason that such claims cannot survive scrutiny is because, as negative contentions, they are inherently flawed.

The absence of evidence for a behavior in other creatures is not evidence for the absence of that behavior in the species. Recognizing that our knowledge about the behavior and ultimate capabilities of other animals is still relatively primitive, the debate has traveled full circle to note that it serves us better to study animals and draw conclusions about what other animals can do, rather than to continue to speculate about the abilities they might lack.

Animal & Human Biology

The contemporary doubting of the similarity between animals and human beings is a phenomenon that likely has roots in religious writings. Many arguments extolling the superiority of man derive from ideas advanced by philosophers and scientists from the 18th Century through the 20th Century. Contrary to the position held by many of his contemporaries, Darwin analyzed the characteristics of a variety of animals and concluded that the abilities of creatures exist on a continuum with some evolving greater capabilities than other species. [3]

In *Animal Minds*, Donald Griffin discusses different aspects of anatomy. He contents that "... the basic structure and functioning of neurons and synapses are quite similar, as far as we know, in all animals with organized central nervous systems. ... the component of central nervous system activity of which we are conscious is of special significance because it is what makes life real and important to us, and insofar as other species are conscious, the same importance may well be manifest." [4] Until recently, we have been naïve concerning the neurology of other creatures, but also our knowledge of the animal mind is extremely limited because no direct means exists to examine animal mentality.

After discovering a syntax-like behavior in monkeys, Philip Lieberman proposed that the basal ganglia are the elementary control elements that gave rise to our ability to develop language. The region of the basal ganglia is a primitive part of the brain of vertebrates that developed with the rise of reptiles. Lieberman's theory explains why other animals such as chinchillas, seals, apes, dogs, and birds can discriminate human speech and, perhaps, to understand our language.

The scientists cited above trace abilities prevalent in other animal species and then show a link with our abilities. Critics of Darwin, Griffin, and Lieberman might accuse them of taking an anthropomorphic position about the animals, but, on the other hand, the critics might be accused of assuming a view of life on Earth that centers on mankind.

Words Representing Thought

Although we can monitor the complex electrical activity associated with thought on electronic instruments and view patterns of brain activity on a computer monitor, no machine yet invented reveals the content of a subject's thoughts. For now, the subject of thought must be investigated using indirect means.

For a long time, man has wanted to understand animals and to communicate with them, so there are historical references to such events in ancient literature. For more than 200 years, the principal means to investigate the animal mind was through observing animal behavior and making inferences about their behavior from anecdotes. Contemporary researchers have tried to interpret natural communications by animals, but, at present, we understand a tiny fraction of the specific messages communicated by other creatures. Consequently, over the last forty years, one method to explore the mind of another creature is by teaching the animal to understand and to communicate using a human language.

People regularly communicate thoughts through language. One individual transmits words through the air to another person, and the listener, through experience, indirectly unravels the idea conveyed by the sounds. Since some animals have the ability to learn vocabulary, communicating through the vehicle of language provides a way to investigate an animal's thoughts. The technique relies on the principle expressed earlier by Griffin that brain function in animals is analogous to a similar task within the human brain.

The original pioneering investigations of early language development

used children as study subjects. Educators and others continue to study how youngsters use language; over many years, studies about children comprise the most researched topic about how language is learned.

It is only within the last hundred years that psychologists seriously began to investigate the mind of nonhuman animals using human language. Over the last half-century, startling studies of language-using animals blazed a new path to investigate what animals are thinking. The pioneering studies described dolphins responding to hand signals and a handful of language-using apes capable of employing visual representations for words.

After many decades of unsuccessful efforts to train apes to speak, investigators recognized that the great apes lacked the physical capacity for speech. In the 1960s, R. Allen Gardner and Beatrice T. Gardner stunned the scientific community when they revealed their breakthrough in communicating with a chimpanzee called Washoe.[5] The Gardners contribution to language communication projects was to introduce into practice an idea suggested by Darwin: to teach chimpanzees using a visual means—sign language. Penny Patterson's research with a gorilla called Koko is a long-standing project; Koko also conveys concepts using American Sign Language.[6] In an ongoing symbolic language project using computers, Sue Savage-Rumbaugh has made considerable progress with a Bonobo chimpanzee named Kanzi.[7] Lyn Miles worked with a signing orangutan known as Chantek.[8] Among the researchers of cetaceans, Louis Herman taught his dolphin subjects to respond to hand signals used to make sentence-like representations about objects in the dolphin's tank.[9] Although the apes and, to a limited extent, dolphins differ from children in lacking the vocal ability to speak, the animals demonstrate a rudimentary understanding of language and can communicate answers to questions employing visual symbols.

So far, birds are the foremost animal to exhibit the ability to communicate vocally without electronic devices. Surprisingly, evidence exists of communication between man and birds from experiments with songbirds. In post World War Two England, Len Howard explored the ability of birds to comprehend speech.[10] One bird, which Howard called "Star," understood words representing numbers; Star demonstrated her knowledge by correctly rapping appropriate combinations of pecks on a screen. Several decades later, Irene Pepperberg tutored the famous Grey parrot Alex. Alex vocally related his perception of differences in the shape, material of construction (matter), color, and the number of objects presented on a tray.[11] He replied succinctly to questions answering with a single word, and, accordingly, his researcher never claimed that the bird had language. Alex demonstrated that a parrot has general cognitive competencies and processes information in a sophisticated manner similar to primates and cetaceans, both of which are considered species possessing great intelligence.[12]

In previous language communication experiments with nonhumans, the idea was to test the subject animal's cognitive abilities, using language as a probe, and ultimately to reveal the workings of the animal's mind. The human instructor trained and then tested the subject to determine the extent of the animal's ability. In each situation, the researcher executed the experiment in accordance with the experimenter's view of how to conduct the study. Occasionally, the animals surprised investigators by expressing ideas about a topic unrelated to the experiment, but the authors assigned no special significance to events beyond test results.

The train-and-test method universally used by investigators of language-using animals likely provides inadequate vocabulary, too little practical experience, and insufficient encouragement for animals to reveal much about the content of their thoughts. No animal in previous studies directed where the project headed; contrariwise, the investigators examined the animal mind using linguistic probes conceived by the principal scientist. Too much control over a creature's response might impede the study of what one seeks to learn about language growth.[13]

Investigators researching early language development in children exhibited creativity in devising their experiments using passive techniques. Ruth Weir placed a microphone in her child's bedroom; she then recorded and analyzed the child's ramblings (free speech) as he spoke prior to falling asleep in his crib.[14] Patricia Greenfield recorded a great quantity of undirected voluntary speech by toddlers while studying the development of one- and two-word sentences in children.[15]

Cognitive speech reveals comprehension through statements made relating three elements: sound, sign and meaning. For example, the elementary statement "Ball" might be spoken by a child when holding a ball; similarly, a rolling ball might elicit the comment from a nearby talking bird. Single word sentences are part of a child's initial mastery of speech through vocal inflection, so a child might use the word "Ball" in four different ways.[16] As an example, a speaker can form an interrogatory about a ball by simply saying "Ball?" with a rising tone.

Because children and parrot-like birds characteristically possess object permanence, an utterance by either speaker can recall an absent ball.[17, 18] The early researchers of child speech recorded large quantities of data to obtain results, partly, because the attention span of toddlers is short and the children often expand or repeat utterances in their monologues. Consequently, the topics appearing in the child's monologue often jump suddenly from one concept to another, but through evaluation of the speech, one can learn about what an individual knows.

Originally, I recorded the voluntary speech of my macaw, Arielle, for a purpose unrelated to analyzing her words. During recording sessions, I discovered that her free speech followed a pattern similar to that of ramblings by a young child. In my passive speech research, I sort through an enormous number of voluntary statements, because a loquacious parrot can speak far more rapidly than a child.[19, 20] Arielle, as an educated talking bird, was not encouraged to speak hackneyed phrases, so the evaluation of her free-speech utterances provides much information about another kind of mind.

A previously little explored approach to learn about the animal mind is through passive speech research, a technique used previously during investigations of child speech. The subject of my linguistic experiment is Arielle, a macaw capable of communicating using some surprisingly complex statements. I treat Arielle as an intelligent partner and educate her in a manner similar to how a parent interacts with a child. Arielle is different from the other language-using animals because she does not perform; she speaks in English and sometimes responds voluntarily to questions posed to her. Arielle speaks single words, sentences with as many as 15 syllables, as well as sequences of two to four topical sentences. Many of her sequential statements consist of untrained phrases; although she is not human, many of her creative expressions shadow those spoken by precocious children. Arielle also displays inherent linguistic abilities that sometimes exceed those of a toddler.[21] A significant aspect of her free-speech utterances is that her expressions more closely resemble those of a child at play than verbalizations by the nonhuman animals studied at universities.

Following is a brief outline of the different styles of speech used to provide information about another kind of mind. As will be shown, Arielle's speech provides evidence about her thought and her mental abilities. Discovery about her aptitudes align with Darwin's theory of the continuity of abilities in species, the arguments about similarity of neurological structures presented by Griffin, and Lieberman's findings that the development of language by man likely resulted from abilities, which man shares with other animals. I promote the controversial idea, as others have, that human language derives from birdsong; consequently, the history of language likely extends millions of years prior to the ascent of man.[22]

Findings From Free Speech

I have worked with my macaw, Arielle, for 17 years. The macaw is a companion animal living in my home and she is a central and important part of my life. We share many experiences such as attending art shows together, so she is, indeed, an unusual research subject. Arielle is an intelligent parrot that initiated my education about the advanced linguistic abilities of talking birds. One indication was a few weeks after coming to live me, she surprised my wife and me by christening me with a name she invented: "Abba." Arielle continues to call me "Abba."

Not only has Arielle learned to say words, but she also employs *cognitive speech* in reference to many objects and concepts. Arielle demonstrates her knowledge in a fashion similar to a child; for example, she voluntarily speaks words in proper context to describe objects with which she has familiarity such as book, wood, fruit, and flower. She knows the names for animals including cat, dog, caterpillar, and several bird species, which she mentions in her impromptu monologues.

Early in our life together Arielle showed that she comprehended

English. As a juvenile, Arielle demonstrated that not only could she learn a word without specific training, but also she could *transfer* the meaning of the word to an unrelated, novel, circumstance. That is just what she did one evening when, without prompting, she applied the word "Wet!" to a series of puddles on the sidewalk. It took weeks for me to determine how she had learned the statement, since I never consciously tried to teach the word to her. Like children, Arielle adds to her lexicon through associative learning and then is able to transfer the meaning to a new situation.

Clearly, an observer who repeatedly recognizes meaningful utterances spoken by a bird in proper context concludes that the parrot's speech is cognitive. Most bird owners do not record speech by their birds, so there is little evidence available to examine. Consequently, finding examples of meaningful expression by a talking bird can be difficult, which is one reason for my study of Arielle's recorded free speech.

In thinking about other means to determine whether an animal comprehends words, other than situations in which an animal's expression refers to something tangible, I came upon a straightforward way—through *synonyms*. One infers that a speaker able to interchange terms with similar shades of meaning understands the interrelated concepts. For instance, Arielle knows five to eight synonymous terms to describe herself and an equal number to describe me.[23]

A particularly revealing series of synonyms involves three sight verbs that Arielle correlated of her own accord. We sporadically play the child's game "Peek-a-boo" using her cage cover. Arielle apparently learned not only to say "Peek-a-boo," but she also extracted the meaning for the verb to peek from the game. She spoke the word "peek" as part of a sequence of sight verbs without having heard a model for the related terms of the progression. The sequence Arielle spoke, which I transcribed from a recording, was, "Look! Peek! See that!"[24]

Related to synonyms is the ability to combine words, phrases, and sentences into a sensible *sequence*. Children construct rudimentary sentences by spontaneously stringing together one or two words. Advanced series of expressions spoken about a single topic are like synonyms in that a speaker must understand the component parts of the series to assemble the statements sensibly. Not only must the speaker understand the individual elements of the sequence, but also the speaker needs to conceive the overall meaning of the message prior to vocal transmission.[25] If a language-using animal does *not* understand the meaning for words and phrases, then the probability is extremely remote that the creature could repeatedly create series of topical statements.

Another means to demonstrate understanding of language is by posing a question and supplying an appropriate answer. To illustrate the point, I offer the following transcription from a recorded sequence of Arielle's free speech. Late one afternoon, Arielle became frightened as a storm struck suddenly. Outside alone, she asked, "What's happening?" then answered "I don't know," and continued by yelling a statement that I had never heard her say before, "I want to go in!" Such spontaneous speech shows a creature that comprehends language and that she has the ability to improvise answers using her English vocabulary.

Arielle can attribute speech to a person, and, in the following sequence, she refers to my grandson, who was then five years old. The boy often played on the floor close to a bathroom adjoining a shallow alcove, which houses Arielle's cage. The child constantly said, "got," and he often referred to people he did not know well as "friend." Arielle reports that Jackson said, "You've *got* a *friend* in the bathroom." The statement is marked through Jackson's irregular word choice. The complete recorded selection, posted on Arielle's Internet site, replicates the series from her advanced free speech in which she reports, "'You've *got* a *friend* in the bathroom,' *Jackson* said that."[26, 27] Moreover, from the sound clip, I learned that Arielle knew the words bathroom and that. Her utterance demonstrates that a parrot can recall a statement verbatim from ongoing spontaneous speech based on a single hearing. As in other instances, I also determined that Arielle created a short sentence to attribute speech to an individual by name.

Some of Arielle's statements, such as the previous citation, represent complex ideas. Consequently, casual listeners do not perceive her words, and, as a result, they are unable, without help, to analyze her sequential statements. Assertions made by Arielle provide information about her thoughts, so the listener must work at analyzing the content of her information-rich locutions. In

studying her speech, I am most gratified when I derive an understanding of her thoughts from the statements she made, as in the previous quotation about Jackson. In her monologues, she reveals a sense of humor, that she is a conscious being, and that she possesses a "Theory of Mind."[28]

The idea of contextual syntax is familiar from child speech, and Arielle's speech shows that birds are capable of using terms in a manner similar to a child.[29] Arielle aptly applies the practical rules governing language such as verb tenses and viewpoint. Within the context of her innovative speech, she displays that she has learned how:

1. to categorize words,
2. to vary a template (a word pattern),
3. to speak expressive language consisting of interrogatives, negatives, imperatives, and emotional terms,
4. to anticipate certain events resulting in occasionally insightful statements, and
5. to apply straightforward logic aptly to speech.

To briefly exemplify some of the concepts above, Arielle speaks proper words related to her situation. Like a child, a talking bird can employ a single-word sentence to convey an idea or thought. The syntax is in the physical correlation between the proper choice of words about an action or a corresponding biological circumstance. One example is, while alone, Arielle said, "Steps!" as she mounted her swing.[30] A similar spur-of-the-moment case occurred when she invented the phrase "Bird water;" she surprised me by uttering the statement to describe her urine as she eliminated after a pause along a shady street during our daily walk.[31]

I have presented some examples of the things Arielle learned based on selected examples from her monologues in this article. For an in-depth look into her ability to use language, the reader should refer to *Another Kind of Mind* for information about different elements of speech, including discussion of the transcriptions from Arielle's free speech. Interested parties might wish to investigate sample clips from Arielle's recorded speech available for audition on her Internet site, www.Parrot Speech.com, additionally, a related Yahoo Internet group, ParrotSpeech, explores sensible speech by parrots.

Summary

Many assumptions about nonhuman animals are changing as we learn more about the creatures who inhabit Earth with us. For decades scientists thought that only man used tools; likewise, many learned individuals think that man is alone in his linguistic abilities.

Biologists, psychologists, and linguists attempt to learn whether our closest living relative, the chimpanzee, can respond to human language. The attempts to teach language to apes over a period of a hundred years have produced some results, but the sentences used by the animals are invariably rudimentary one-word or two-word communications.

There is no academic individual investigating the use of language by birds. This situation is a little peculiar, since there are indications that birds have a natural protolanguage. The reports about birds understanding and speaking human language correctly come from many parts of the world, but the researchers at universities are not paying attention. From previous efforts, we know that wild birds can learn language, and studies at universities show that parrots possess sophisticated cognitive abilities. Few parrots speak spontaneously in the presence of strangers, so one needs an alternative, less stressful, technique to work with birds.

This is where passive speech research enters the picture. In a manner similar to those employed by early researchers of child speech, parrot owners ought to record the speech of educated birds. The advantage of the passive speech research approach with a parrot is that it is not highly dependent on human influence. From future transcriptions of voluntary statements by birds, others will duplicate my results with Arielle.

Readers are encouraged to send comments and questions to the author about this article. The author's e-mail address is mike@ParrotSpeech.com .

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