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Comparison Between Animal Communication and Language

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Abstract: Language is a structured system that consists of grammar and vocabulary. Although animals communicate with each other, it has remained unsettled that whether animals use language. As Pearce concluded four main elements of language (arbitrariness of units, semanticity, displacement and productivity), this paper aims to evaluate animal communication according to these criteria and figure out their ability to learn language by studying the experiments conducted by scientists before. As a result, this paper found that animal communication met the criterion of semanticity, but failed to meet other criteria, especially the criterion of displacement and productivity, and it is very hard to teach them language. It is argued that they showed no evidence of using language even after they were taught some elements of it. The conclusion indicated that animals do not have language considering the evidence drawn from the studies before. However, it is also suggested that further studies are needed to find a better way to study animal communication and more suitable criteria for them. Signs also showed that animals may develop language referring to these criteria in the future.

Keywords: animal communication, language, arbitrariness of units, semanticity, displacement, productivity

1. Introduction

Animal language use has been a subject of much discussion. Initially, several scientists contended that one trait separating humans from other animals is language. But soon after, people discovered that animals appeared to have a means of communication. Since the late 1970s and early 1980s of the 20th century, scientists have increasingly attempted to investigate animal communication as Comparative Psychology and Behaviorism have grown [1]. This is especially true of those species that are thought to have higher intelligence than other animals.

It is necessary to first define language before discussing whether or not animals can communicate. Language has a number of definitions. Some of them see language as a mental faculty of humans; these definitions emphasize that our brains provide the fundamental basis of language [2, 3]. Others refer to it as a system of signs under grammatical rules, which emphasizes that human languages are some kinds of structural systems full of rules that can relate certain units to certain meanings [4, 5]. Pearce [6] draws the conclusion that the arbitraryness, semanticity, displacement, and productivity of language's units are some descriptions of its key elements. There are no obvious links between a language unit and its meaning because language units are arbitrary. According to semanticity, every word should have a distinct meaning. Displacement refers to the possibility that the communication

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may be about objects or events that are not immediately nearby, either temporally or physically. Productivity is about users' ability to develop new signals or words in accordance with predetermined norms.

According to some clear features of Pearce's theory that humans can follow, this research uses these standards to assess how well animals communicate. The report also discusses the potential for animal language in the future and the likelihood that they speak the language that humans taught them.

2. Animal Communication

It has been well accepted that animals do communicate with each other in the wild, animal communications often refer to the transfer of information from one or a group of animals to one or a group of animals [7]. This kind of communication includes multiple ways such as visual [8], auditory [9] and touch [10]. Researchers found that animals use communication in different circumstances. First, many species have unique signals that express aggression or signals to convey retreat during competitions over food, territories, or mates [11]. Second, it is widely used as alarm calls that communicate the threat of a predator [12]. Food calls are also used by many kinds of animals, they use food calls to attract other members of a social group to a food source [13]. Considering the importance of reproduction for animals, mate-attraction is certainly an important part of animal communication [14]. However, whether these communications can be considered as a language, we need to compare them with the criteria mentioned before.

3. Criteria of Language

3.1. Arbitrariness of Units

There shouldn't be any logical connections between the many signs or sounds that make up language and the things they refer to [6]. An investigation by Goodale and Kotagama [15] looked at bird warning sounds in a rainforest with a variety of species. In their research area, which had about 11 different species, they only kept track of instances when a predator flew directly into the flock for a few years. The Shikra, Crested Goshawk, and Besra Sparrowhawk were the three main predators they encountered. Additionally, they recorded 12 separate flocks for 10 hours over the course of two months in their study location, and they addressed the alarm sounds in these records for analysis. Since the arbitrariness of units is also used to explain why people in different countries use different words for the same thing, their study revealed that different birds used different sounds to frighten the same predator. This is likely the most direct evidence for the arbitraryness of units. Furthermore, there is little chance that predator nature and bird calls have rational links.

However, certain messages also appear to go against this standard. In their study of the white-browed scrubwren, a particular species that can signal an emergency through an alarm call, Leavesley and Magrath [16] hypothesized that there may be a connection between the bird's tendency to increase its minimum call frequency when a predator is nearby. Furthermore, wolves also droop their tails to indicate submission [17], and it appears that this behavior is related to their emotional state.

This criterion appears to have conflicting evidence, as some animal communication is consistent with it and other is not.

3.2. Semanticity

Since animals undoubtedly have semantics, there isn't much discussion of this rule in animal culture. The term "semanticity" refers to the idea that each word in a language has a particular meaning. This is the cornerstone of comprehension. Therefore, it may be assumed that their communication

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complies with the criterion of semanticity because they can comprehend one another and are not constrained by factors like predator kind or distance.

3.3. Displacement

The honeybee dance provides compelling proof of the displacement. For almost 50 years, Von Frisch [13] researched honeybees' dance and navigational mechanism. He took notes on the dance's direction, tempo, and a variety of other characteristics. He hypothesized that by wriggling in various ways and altering the tempo of their dancing, honeybees can convey the location and orientation of food sources. Additionally, they are able to pinpoint food sources even a few kilometers distant. This is consistent with the displacement criterion since honeybees talk about far-off objects in their communication.

Other creatures, however, hardly ever make use of this standard. The only animal whose communication Marler [18] identified as possibly involving a delay is the honeybee. According to his conclusion, talking about things like food that are far away in time or space is pointless and ineffective for an animal's existence, thus they simply have no need to discuss things or events that are far away from them in time or space.

3.4. Productivity

Under certain grammar, productivity equates to endless invention. In addition, the content should cover a wide range of subjects. There aren't many researches that suggest animals might possess some form of grammar. For eight months, Robinson [19] observed and measured the communication patterns of six groups of titi monkeys. They discovered that depending on the social context, these types of monkeys combined words made of repeated cries to create sequences. Similar to this, the structure of a male gibbon's song was discovered using a playback experiment [20]. They discovered that males only employed a small number of sounds or parts to create their songs. The new songs, however, didn't elicit "squeaks" when they were rearranged, which indicated that either the new range had no meaning or that the pieces couldn't be combined to make something. In accordance with specific principles, capuchin monkeys also demonstrated the ability to combine various sounds to create novel sequences [21], but once more, there was no indication of originality. Overall, even while some studies have suggested that many animals use a "grammar" to communicate, these principles have never been conclusively linked with simultaneous changes in meaning or demonstrated the creation of new communicational units or sentences.

Honeybees may communicate information about practically any orientation and distance of food as well as a suitable location for a new home by modifying their dance in a certain way, according to McFarland [22]. However, their dance is not sophisticated enough to be considered productive. However, even if people disregard the sophistication, the fact that honeybees often indicate distance by the pace at which they dance already violates the unit arbitraryness condition.

Pearce [6] also acknowledged that investigations of animal communication that occur naturally have never matched this productivity condition, but he hypothesized that this might be what distinguishes human language from animal communication.

4. Language Studying

After comparing animal communication to human language according to the four criteria, it is discovered that there are certain disparities, most notably in productivity. Will they use language once we teach it to them since this article has determined that they do not do so naturally?

When Washoe, a chimpanzee, was taught American Sign Language (ASL) over the course of five years, Gardner and Gardner [23] found that Washoe could recall 132 signals and even displayed evidence of productivity by using the term "water bird" to refer to a swan. However, since signs

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physically move Washoe's hand to teach language, their memory can act as a form of conditioning. Furthermore, the use of the word "water bird" may be a result of Washoe simply illustrating what she has learned. Others attempted to observe whether chimpanzees would continue to utilize the language after instruction. ASL was utilized in Project Nim, which was carried out a few time after Washoe's experiment [24], and Nim developed in a household where ASL was used to communicate with him and among family members. By the end of the project, Nim appeared to be able to construct sentences, but an analysis of the videotapes revealed that the majority of his performances were inspired by his teacher's earlier utterances. Additionally, Nim's capacity to learn this language is significantly less than that of human infants.

Studies on non-primates found that the outcomes were still not encouraging. Pilley and Reid [25] trained the dog Chaser for three years with more than 1,000 objects, and it was discovered that Chaser could correctly pair more than 1,000 toys with their individual names and respond to various commands. Additionally, if a new object was present, he could find it by calling its name, which demonstrated that he understood and could use the object. The issue is that if a new object was present, he might choose it without comprehending it just because he heard a new name for it and had no other option. As dolphins use semantically reversible sentences to measure the effects of learning and no reversal errors were made, teaching language to dolphins demonstrated very modest success [26]. After instruction, there is still no indication of language use.

Overall, recent research found little evidence that animals will use language after learning words or phrases, other from the fact that training animals to speak is extremely difficult due to their limited capacity for learning.

5. Conclusion

This study examined animal communication using Pearce's [6] four criteria and discovered that some of the animals failed to satisfy the arbitraryness of units criterion while the majority of them failed to satisfy the displacement criterion. Although none of the animal-related communications we looked at can demonstrate productivity, they all appear to meet the semanticity requirement. In addition, it is challenging to teach kids language because of a number of factors, including their intelligence and measuring limits. And even after we taught them some basic language skills, there was no sign that they would be able to apply them. As a result, this research demonstrated that there has not yet been any evidence to support the claim that animals can communicate using language under these criteria. However, this does not necessarily imply that animal communication is inferior to human language, as there is still much to learn about animal communication.

Due to the shortcomings of methodology, which are difficult to fully understand from a human perspective, it is also possible to classify it as communication rather than language in the interim. People may need a new method that can be better adapted to them, and even the criteria themselves may need to change in the future. Diana monkeys may also exhibit an early prototype of productivity and the evolution of syntactic skills, according to a playback experiment [27], which raises the possibility that animals may one day speak in accordance with these four requirements. The research may only cover a small portion of animal communication, or perhaps animals already speak languages but no one has ever studied them.

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