

INDIVIDUAL ADAPTATION

Language may be the one ability or skill that is unparalleled when we can compare what we can do in this area to other animals. Specifically, when it comes to language functioning, no other species on the planet comes close to what humans can do in this area.

For this reason, language is different to other behaviour, skills and abilities. Indeed, for most other behaviours and skills that humans are able to do, we can find that non-human animals are also able to do them. There are animals that can engage in complex social behaviours. They are able to learn new information by observing or imitating others. Once information has been learnt, many non-human animals can demonstrate that they can remember various types of information. Non-humans demonstrate that they can remember information such as where the food is and identify familiar individuals they have met before.

When it comes to language, there is a big difference between what humans and animals can do. It should be noted that many animals can communicate with members of their own species in a number of different ways. To achieve this, they might use sounds, visual displays, and pheromones or smells.

The difference between humans and non-human animals' language skill is found with respect to complexity, structure and productivity.

There have been quite a few attempts to teach intelligent animals, such as chimpanzees and gorillas, to use language. The first attempts occurred in the early 1900's and these failed. In this early work researchers literally tried to teach chimpanzees to speak. However, these attempts failed miserably. This occurred because the chimpanzees do not have the vocal cords to produce sounds. Perhaps the researchers should have checked this before they started. However, in the 1970's researchers tried again to teach chimpanzees and gorillas to use language. But, this time around, the researchers taught the primates to use sign language. This work did succeed to some extent. But still there were some differences. In terms of the complexity of language use, the best a chimpanzee or gorilla could do was produce language that was at the level of a 3-year-old child.

Humans therefore may be unique in the animal kingdom as a species with respect to language. That possibility would make language worthy of study however, language is also central to our social and intellectual lives. We use language not only to communicate with other people, but to help us solve problems, share complex ideas, remember, and even for the purposes of creative activity.

Language also serves as a mode of thought. We think and reason using language. To conclude, language plays a key role in many of our abilities. There are some animals that appear to use some type of language system to communicate. One of the best-known examples is the bee who are able to communicate information to each other and they achieve this by doing a "dance".

LANGUAGE ABILITIES OF THE BRAIN:

Researchers typically divide language into five components: pragmatics, semantics, syntax, morphology and phonology.

Phonology refers to a language's different sounds where there are rules or conventions about how individual sounds can be combined.

Morphology is the study of words and other meaningful units of language like suffixes and prefixes. In a language, a morpheme represents the smallest unit of language that has some meaning.

Syntax is the study of sentences and phrases, or how people put words into the right order so that they can communicate meaningfully. The way we put words together to create sentences differs between languages. For example, in English we can create a sentence by having a noun, verb and then a noun "the dog is chasing the cat". Note that not all languages follow this rule or convention.

Semantics is about the meaning of sentences. Someone who studies semantics is interested in words and what real-world object or concept those words denote or point to.

Pragmatics refer to the social aspects of language we use in our daily interactions with others. They include how we say things rather than what we say.

HOW LANGUAGE DEVELOPS:

One influential theory of language development was proposed by a linguist called Noam Chomsky. According to this theory, there is a language acquisition device which supports language learning. At the heart of Chomsky's theory is the idea that our knowledge of the different components of language is innate. That is, we inherit the knowledge via genetics. This proposal is forwarded on the idea that language is so complicated and, no one really teaches infants how to use language. Subsequently, we don't really learn language from the environment. Rather, we're born with the knowledge and this language acquisition device is what is used to learn language.

One set of alternative views are referred to as interactionist theories of language development. This theory is a middle ground between Chomsky's theory and theories of language which propose that language is not genetic. Rather, we learn everything about language from the environment. Interaction theories of language development propose that both environmental and genetic factors are important in language development. Within this theory is a sort of compromise between theories that are closer to one extreme than the other, however, all interactionist theories believe that language acquisition occurs as a result of the natural interaction between children, their genetics, and their environment. The basic idea of interactionist theories is that we are born with the capacity to learn the different language components, however, the specific bits of the components are learnt from the environment.

STAGES OF LANGUAGE DEVELOPMENT:

The first stage of life is often referred to as the pre-linguistic stage. This stage usually lasts up to the first 12 months and covers a period before infants utter their first words. While infants don't produce any words at this point in time, they are certainly acquiring a lot of information about language. During this stage, infants make eye-contact as parents communicate with infants. This eye-contact is something we do as adults when we are talking to someone. Infants also engage in take-in-turn babbling. This occurs when mum or dad might say something and the infant will be silent. When the parents have finished speaking, the baby will begin babbling and the parents are silent. During this time, infants are also learning the sounds of the language. We know that in the first 5 months infants are able to work out which sounds belong to their own language and which sounds belong to another language. We can also see evidence that infants are learning about the sounds of their language via babble. The babbling of infants often mirrors the sound pattern of the language. In English, many words are created by having a consonant, followed by a vowel and then a consonant. For example, the word 'dad' starts with a consonant which is the letter 'd', followed by a vowel, which is the letter 'a' then ends with a consonant which is a 'd'. The babble of infants often matches the consonant-vowel pattern. This is why infants will babble words like 'da da da da da da' or 'ba ba ba ba ba'. This pattern of their babble tells us they are working out the sounds.

The next stage of language development is referred to as the holophrase or one-word sentence stage. This occurs somewhere between 10 and 13 months of age. One thing that happens during this stage is that the infant produces his or her first words. But also, we see that infants are trying to convey more complex information such as to request something like that. They do this using a single word supplemented by a gesture and non-verbal cues. That is they try to create a one-word sentence. An example of such a one-word sentence would be an infant leaning over his/her cot and pointing a bottle. The infant might then say 'botty' or 'bot bot'. If you saw a baby doing that you would recognise it as a command from the infant that he or she wants its bottle. That is the infant saying "give me my bottle". Here the infant is trying to convey something beyond that of a single word.

The next stage of language is referred to as the two-word sentence stage. Infants usually begin this stage at around 18 months. The two-word sentences produced by infants during this period typically comprise a noun and another word. An example might be 'dog big'.

One main feature of language production at this stage is that infants mainly produce what are known as content words. Content words are words that express meaning or refer to something in the environment. Examples include words like dog, house and chair. These can be contrasted with what are known as function words. Function words to express the relationship between words and are used to contribute to the syntax rather than the actual meaning. Another way we could describe function words, is that they are words we use to make grammatical sentences e.g. 'is', 'are' and 'of'. During the two-word sentence stage, infants tend not to use function words.

The next stage of language development is referred to as the multiple-word sentence stage. Infants enter this stage at around two years of age. During this stage, we see infants create more complicated sentences. They are complicated because infants use function words and also grammatical morphemes. At this stage, an infant might now say "dog is big".

The following stages of language development take place when infants are between the ages of 3 and 5 years. During this period, children can create more complicated sentences by using more function words and grammatical morphemes. An example of something an infant might say during this stage is "where is my daddy?". From here, infant's language developments occur with the acquisition of more words, and creation of longer sentences which use more function words. So by about the age of 5, the language sounds very similar to an adult. By this stage, the infant has learnt the phonology, pragmatics, semantics and syntax without any formal instruction.

PARTS OF THE BRAIN THAT SUPPORT THE ABILITY TO LEARN AND USE LANGUAGE:

Researchers are yet to completely agree on which parts of the brain support our ability to use and understand language. One part of the brain that all researchers agree plays a role is the left inferior frontal gyrus which is located in the left prefrontal cortex. This was one of the first regions identified to be involved in language. The discovery was made in the mid 1900s by a French physician named Pierre Paul Broca. Pierre came across a patient who lost the ability to speak. In fact, the patient could only say one word, 'tan'. In addition, the patient lacked fluency in his speech. The patient's name was Louis Victor Leborgne, but is often referred to in textbooks as 'Tan'. After the patient died, an autopsy was undertaken and the patient's brain was examined.

It was found that most of the damage was in the left hemisphere, now known as Broca's area. Damage to this area causes a lack of fluency in speech where words are staggered. An important discovery by Paul Broca was that a region in the left inferior frontal gyrus was responsible for speech production, however, this is not all that it does. There can also be problems characterised mainly by the use of content words. That is, when a person with this sort of damage speaks, they don't stagger

their way through the sentence. For example, the person won't say something like "I went to the store yesterday". Rather they'll say "went store yesterday". These types of problems led to the proposal that Broca's area and the left inferior frontal gyrus plays a role in processing grammar for both speech production and also for understanding speech. One idea is that this part of the brain puts together individual words to create a sentence using syntax. So people with damage to Broca's area, often have problems in two areas. The first is being unable to produce a sentence fluently. The second is being unable to use grammar or syntax to produce and understand language.

Another part of the brain that is important for language comprehension is a region on the left temporal lobe which is now known as Wernicke's area. The role of this area of the brain in language was discovered by a German physician named Carl Wernicke. He came across a patient who had difficulty understanding language. Specifically, the individual has difficulty understanding the individual words and also the sentences because a sentence is made up of individual words. Unlike damage to Broca's area, people who have damage to Wernicke's area are still fluent in their speech. Also unlike people with damage to Broca's area, people with Wernicke's area damage can produce many words and speak using grammatically correct sentences, however, what they say doesn't make sense. Furthermore, people with damage to Wernicke's area also don't realise they are producing the wrong words. The reason for this is that they don't understand what they are saying themselves. The problem here is just accessing the meaning of individual words.