

Language Acquisition Device and the Origin of Language

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In the early twentieth century, psychologists realized that language is not just understanding words, but also requires learning grammar, syntax, and semantics. Modern language is incredibly complex, but young children can understand it remarkably well. This idea supports Chomsky's idea that language learning is innate. According to his hypothesis, young children receive "primary linguistic data" from what is spoken around them, which helps them develop knowledge of that specific language (Cowie 2008). Children passively absorb language from adults, peers, and exposure to media. However, this data is not sufficient to explain how children can learn unique constructions of words and grammar patterns. Previously structuralists created a list of "phrase structure rules" to generate all possible grammar patterns. However, Chomsky argued that grammar must also include "transformations" that combine old sentence patterns and reorganize them. He called these patterns "generative grammars." For a child to understand patterns of this complexity, their language ability must be well developed. The primary linguistic data they're exposed to isn't enough to give them this complexity. The complexity of language allows Chomsky to refute B.F. Skinner's hypothesis that grammar is developed through operant conditioning. Too many usages of each individual word are needed for conditioning to be a viable option. Since people can say and understand unique sentences, language ability must transcend pure conditioning. Furthermore, the mechanism for operant conditioning is unlikely to take place in a child's language development. If a child is trying to learn a new grammar pattern and makes a mistake, he or she could either be corrected by their parents or hear the sentence said by a more competent speaker. However, parents may not correct the child, and even if one child hears the correct sentence, it is unlikely that all children will hear a similar phrase. This does not prove that an innate language learning faculty exists, but it does strongly disregard operant conditioning's role in language development.

Chomsky proposed a theory of "universal grammar," in which all grammar follows certain rules that humans implicitly understand. Since the data that a child is exposed to is finite, but the number of expressions possible in language is infinite, there must be a way for a child to generate new ideas independent of the vocabulary they have encountered. When first developing the theory, Chomsky thought that children would do a "scientific inquiry" to investigate the working patterns of language. Later, psychologists created a "parameter setting" model, saying that the device is a normal part of development, and as children grow, "switches" are activated to further their learning (Cowie 2008). Depending on the more specific patterns of

a particular language, the universal grammar can be refined to fit a specific language. Even if some children may hear a specific language pattern more than others, the fact that all children know it indicates a possible innate language sense.

One of Chomsky's main tenants in his LAD theory is the Poverty of Stimulus argument. Though children do collect data to learn a language, it is unlikely that the data they are exposed to is enough to master an entire language. Instead, they must infer grammatical rules through an internal sense. There are several cognitive factors that support this argument. Underdetermination states that the finite data is applicable in infinite situations. In context, this means that children utilize the finite amount of data they hear to generate any possible sentence. Degeneracy is another important factor. In regular speech, people often use abbreviated or grammatically incorrect sentences, yet children still learn proper grammar. Idiosyncrasy is a third concept. Every child is exposed to a different sample of sentences, yet they all develop the same language abilities. This points to the idea that children possess an innate way to interpret these sentences and generate grammatical patterns. Fourth is positivity, which states that children only learn correct examples, and do not learn that "non-example" sentences are incorrect, since they are not exposed to incorrect sentences. In other

types of learning, examples are paired with counterexamples to ensure full understanding of a concept. In addition, children do not receive feedback for their sentence usage in most cases, which contrasts most learning from parents or teachers, in which feedback is used to reinforce or correct behavior (Cowie 2008).

Aside from cognitive factors, biological evidence supports the LAD hypothesis, since data suggests localization of language ability to certain regions of the brain. Broca's area is a section of the brain that is used for speech production. If this portion of the brain is impaired, then people are unable to utilize complex grammatical patterns. This indicates that Broca's area could contain a cognitive faculty for language development (Cowie 2008). All these observations indicate the validity of the LAD hypothesis. Though B.F. Skinner's theory of cognitive development of

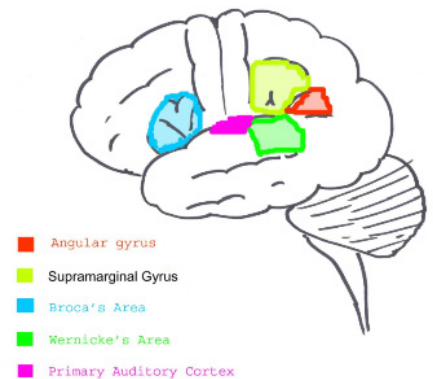


Figure 1: Chomsky's LAD theory corresponds with the localization of language skills in several brain regions, including Broca's and Wernicke's Areas.

grammar because they can pick up on semantics and put information into the correct context. According to supporters of cognitive language development, children use innate perceptual and cognitive skills to learn language, but these skills are not language-specific, since they allow children to learn other interpersonal communication skills.

When children learn languages, their early linguistic abilities are constrained by their overall cognitive function. As a child increases their overall cognitive function, their language ability increases as well. Like the innate language theory, the cognitive language theory states that language learning ability increases from input data (Behme



Figure 2: A mother reads to her child. As she reads sentences out loud, her daughter starts to pick up on patterns in the speech rhythms and grammar.

2008). However, unlike the innate language theory, cognitive language theory states that children do receive negative evidence in language learning. If a child says a sentence that others do not understand,

then the child will realize that their sentence does not make sense. In addition, if a child expects a certain grammar pattern but never hears it, they will realize that this pattern is probably incorrect. Parental feedback also shapes a child's linguistic ability. Demetras, Post, and Snow found that parents will repeat entire correct sentences from their child, but will not fully repeat incorrect ones. If they do repeat an incorrect sentence, they will say the correct version instead. Children are more likely to repeat their parent's corrections of incorrect sentences than to say the incorrect sentence again.

According to cognitive psychologists, cognitive development allows young children to learn complex grammar patterns because the development process starts early, even before birth. Fetuses can respond to sound at only 22 weeks old, and will postnatally recognize passages that were read to them while in the womb (Behme 2008). Newborn infants pick up on their own language more than other ones only a few days after birth. They are able to discriminate between languages with different rhythmic patterns, and can discriminate their own language from others after several months. Since this ability takes time to develop, it suggests that language learning is not innate in itself. Instead, it develops out of their innate auditory ability.

Studies have indicated that very young babies can learn patterns of speech, suggesting that the language learning process follows the same process of learning other things. Though young children learn language at an early age, it takes time for them to refine it and produce meaningful words. Children start by babbling in sounds from

all languages, but narrow down to sounds from only their languages as they grow and mature. However, infants aren't necessarily corrected in their babbling, so the exact reason why they narrow down is unclear. One explanation may be the exposure to their parents' grammar and speech patterns. This data can lead to their cognitive development of language. When parents speak to children, they use simpler grammar patterns that are easier for them to learn and comprehend. Researchers found that most of children's verbalizations are things they have previously said, suggesting that they practice these phrases to encode them in their brains. Just as cognitive linguistic ability is an application of auditory learning, it could also be an application of statistical learning. Statistical learning is a general ability that has been observed in other primates, not simply a separate, innate ability in humans. In a study done by Jenny Saffran, young children were able to sense the boundaries between words and the distribution of speech sounds (Behme 2008). They track that some words correspond to certain objects even before they know the meaning of the words, which would not have to occur if language learning was innate. Babies can also sense patterns in sounds that appear frequently at the beginning or the end of a word, which is another way for them to learn words.

However, the LAD theory is not without problems. It states that language is too complex for its syntax to be learned, but this research indicates that children can observe these differences through statistical information. Even young children pick up on patterns like verb endings that distinguish different parts of speech. Though this does not disprove the LAD theory, it does act against the poverty of stimulus argument.

Another theory of cognitive development, posed by John Macnamara, suggests that an infant learns meaning and language independently, and later combines them as they mature. Macnamara defines meaning as any idea that a person can express through language, while the language itself is a collection of rules and structures that are used to convey this meaning. Speech is a way to convey this meaning (MacNamara 1972). Language and meaning are almost always combined, but they are two separate ideas. For example, individuals with underdeveloped cognitive function are still able to use other cognitive facilities. Assigning words and objects is more complicated than one expects, since there are often



Figure 3: A young boy plays with a toy truck. The boy knows that this is a "truck," but cannot recognize it as a "toy."

multiple words for objects, and it would be difficult to identify which word is being referenced. If an adult references a specific object by name directly, the infant will interpret this as the object's name. This also occurs even when the word is not the object name, but is used in the same context. For example, if a parent tells their child not to touch an object because "It's hot," the child will think the object is called "hot." After learning names of objects or other nouns, children tend to learn conditional attributes of an object, and finally, they learn permanent attributes. Children initially cannot discriminate between more and less descriptive words. For example, a child will know the word "truck," but will not recognize that his truck is also a "toy." However, he will also realize that a collection of toys are called "toys." He treats "toys" as a separate idea from his truck. Children learn more abstract words like "and" at a young age, suggesting that they need this word to give meaning to their thought processes. Many grammar patterns can express multiple ideas based on context, and many times, the same ideas can be expressed through multiple grammar patterns. Children can learn which patterns work in which contexts if they discover what the sentences mean independent of learning the grammar patterns.

Overall, there is compelling evidence for both the innate and cognitive theories of development. There is heavy evidence showing the development of linguistic ability through cognitive processes. Yet these processes do not disprove the existence of a language acquisition device. However, the poverty of stimulus argument does not prove its existence, either. Whether or not there is an innate language device in humans, it is clear that humans possess a remarkable ability to understand and produce complex grammar patterns and meaningful sentences.

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