

# Behaviorism on Language Acquisition

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## **Abstract:**

In the 1950s, the social sciences were dominated by Behaviorism- the school of thought popularized by J. B. Watson and B. F. Skinner. Behaviorism viewed psychology as the science of behavior that can be objectively observed and described. Thus, behaviorism stated that the behavior can be explained scientifically without any reference of inner mental states. In other words, mentalistic concepts such as consciousness, images or mind has no place in scientific and objective study. Language development occurs in all children with normal brain function irrespective of race, culture or general intelligence. Several theories try to define the process of language learning from their own perspectives. Here we will discuss the behaviorist models as proposed by J. B. Watson and B. F. Skinner in relation with language learning. Behaviorism will not accept anything over and above overt behavior. For them, all our behaviors are product of conditioning. Language, is thus for behaviorists, is a learned behavior that occurs as a result of this process. Thus, the behaviorists can be considered as the proponents of extreme empiricist model.

**Keywords:** Behavior, stimulus, response, reinforcement, condition, environment, operant.

## **INTRODUCTION**

We cannot imagine our life without language. It is an inseparable aspect of human species. It has intricate association with human mind as well as human society. It is related to both cognition and communication. In other words, it is both abstract knowledge and actual behavior. Language acquisition refers to the child's acquisition of her/his mother tongue; i.e. to understand and speak the language of her/his community. In all over the world, children take almost the same time to learn to speak unless they are isolated during the critical acquisition period or unless they suffer from any sort of extreme deficiency. Language acquisition process in this regard addresses several questions, namely, what enables children to learn words and connect them together into meaningful sentences? What facilitate children to develop the grammatical system of their language? How do the children communicate competence to express their thoughts? Linguists, psychologists and psycholinguists take their time and effort to denote these problems from their own realm and perspectives.

According to behaviorism, psychology is the study of behavior that can be observed and explained in an objective manner. For the behaviorists, all behaviors are acquired through interactions with the environment, including conditioning, rewards and penalties. The pioneers of behaviorism like Ivan Pavlov, J. B. Watson, B. F. Skinner created several theories, including classical and operant conditioning to describe how organisms link stimuli to reactions in order to alter their behavior. For the behaviorists, our surroundings have a greater influence on behavior than do our emotions and ideas.

Behaviorists did not admit the theory of introspection because of its subjective characteristics. They developed their theories with a series of experiments on animals in terms of stimulus and response mechanism. For example, they observed that rats, dogs or birds could be taught to perform various tasks

by habit-formation. In other words, the animals have dispositions to behave in a certain way under certain circumstances. With the same laws, the behaviorists intend to predict and control human behavior and its activities. In their experiments, they rewarded positive behavior. This was known as positive reinforcement.<sup>1</sup> Undesirable behavior was punished or simply not rewarded. This was called as negative reinforcement. Thus, it might be said that all behavior is determined by the environment either through association or reinforcement.

In context of language acquisition, behavior teaches that man is nothing more than a machine that responds to conditioning. Man has no soul or no mind. It has only a brain that responds to external stimuli provided by the environment. According to behaviorism, the mind of the newborn infant is linguistically a blank slate. The child imitates the speech around it and uses a process of trial and error. It is reinforced in these imitations or discouraged from them, by the degree of success it achieves in communicating.

In this article, we are interested in language acquisition. So, keeping that in mind, we will focus on J.B. Watson.

### **Watson's Theory of Language Acquisition or Learning:**

Watson's seminal work, "Psychology as the Behaviorist Views It", was published in 1913, officially establishing behaviorism. According to J. B. Watson (1878-1958) and his followers, psychologists had no need to postulate the existence of mind or anything else that was not observable. Watson claimed that psychology would be concerned only with external behavior. The behavior of any organism from an amoeba to human beings can be studied objectively and explained in terms of the organism's responses to the stimuli presented by features of the environment. It was assumed that the organism's learning of these responses could be explained satisfactorily by means of the familiar laws of physics and chemistry, just like a thermostat that learns to respond to changes in temperature and switches its furnace on or off. Watson had a strong conviction that the whole range of human behavior from coughing to writing poetry can be explained on the basis of stimulus-response principle.

In his monumental book *Behaviorism* (1924), he considered language as manipulative habit. Because, when we speak, the sounds originate in our larynx. It is a bodily organ. By the help of this bodily organ, we manipulate the sounds to hear our voice. Different sounds come out from the changes of the shape of our throat and position of our tongue. For example, when a baby first cries or utters a sound like "da" or "ma", it is learning the language. When the child grows up, s/he starts imitating the sounds uttered by her/his surrounding people. Thus, in this way, for Watson, the child can learn language with its vocabulary from three years of age through imitation. Watson claims that **words are but substitute for objects or situation.**<sup>2</sup>

For Watson, babies form their language by applying sounds they have already formed. He also claimed that speech was one of the directly observable behavior characteristics of human beings and thought was merely inaudible speech.

Watson did not focus much on language learning. He was mainly concerned with behavioral manifestations of animals and human beings. But he should be credited for his endeavor to explain behavior from a new perspective.

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<sup>1</sup> The term 'reinforcement' will be discussed later in detail.

<sup>2</sup> Watson, J.B., 1924. *Behaviourism*, New York: W. W. Norton & Company. P-180-190

### **B. F. Skinner's Theory of Language Acquisition or Learning:**

Another important person associated with Behaviorism is B.F. Skinner (1904-1990). He made his reputation by testing Watson's theories in the laboratory. His studies led him to reject Watson's exclusive emphasis on reflexes and conditioning.

Skinner modified Watson's theory by arguing that people not only respond to their environment; rather they operate on the environment to produce certain consequences. He carried out experimental work mainly in comparative psychology from the 1930s to 1950s; and developed a distinct kind of behaviorist philosophy, which is regarded as 'Radical Behaviorism'. Radical Behaviorism is sometimes regarded as 'Logical Behaviorism.'<sup>3</sup> In other words, Radical Behaviorism was first promoted by B. F. Skinner. In contrast with classical and methodological behaviorism, it (Radical Behaviorism) includes behavioral approach to 'mental life', through internal states. On the other hand, it maintains that what it is to ascribe mental state to a person, is nothing more nor less than to ascribe that person some appropriate behavioral disposition. A behavioral disposition is a person's tendency or propensity to behave in a certain way in certain specified circumstances. Skinner also claimed to have found a new version of psychological science, which he called functional or experimental analysis of behavior. As he turned from his earlier experimental work (on animal) to concentrate on the philosophical base of a science of behavior, human language comes within preview of his research. His famous book *Verbal Behavior* (1957) laid out a vocabulary and theory for functional analysis of verbal behavior.

The brief account of verbal behavior (VB) illustrates that Skinner divides the responses of the animal into two main categories-

- a) **Respondants**
- b) **Operants**

Respondants are purely reflex responses elicited by particular stimuli. On the other hand, operants are emitted responses, for which no obvious stimulus can be discovered. Skinner is primarily concerned with the operant behavior.

Now let us explain this operant behavior.

First, Skinner had arranged a box for his experiment. The box was attached with a bar to its one wall in such a way that when the bar is pressed, a food pellet is dropped into a tray. Now, if a hungry rat is placed into the box, it will soon press the bar and as a consequence, a pellet will come out into the tray. This state of affairs results from the bar pressing operant and increases its strength. The food pellet is called the reinforcer or the reinforcing event. Moreover, if the release of the pellet is conditioned by a flash of light, then the rat will come to press the bar only when the light flashes. This is called **stimulus discrimination**. The response is known as a **discriminated operant** and the light is called the occasion for its emission. Here, operants may be arranged in another way. That is, the bar pressing may require a certain character, for example, duration to release the pellet. Then the rat will come to press the bar in the required way. This process is called **response differentiation**.

Now, with respect to the bar-pressing experiments, the notions as stimulus, response, and reinforcement are relatively well-defined. 'Stimulus' is any or only one physical event to which the organism is capable of reacting on a given occasion.

'Response' on the other hand, is either any part of behavior only one connected with stimuli. In his major

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<sup>3</sup> The sophisticated version of Logical Behaviourism is developed by Gilbert Ryle in his book *The Concept of Mind*, 1949, London: Hutchinson.

scientific book *Behavior of Organism* (1938), the ‘operation of reinforcement’ is defined as the presentation of certain kind of stimulus in a temporal relation with either a stimulus or response.

Many experiments indicating bar pressing example demonstrate the influence of social reinforcements upon verbal behavior. In one experiment, subjects were presented with a series of cards on which there appeared six personal pronouns (“I”, “he”, “she”, “you”, “we”) with a verb. The same pronouns appeared on each card, although the verb was changed from one card to the next. Subjects were instructed to compose a sentence for each card by using one of the pronouns and the verb. The interest of the experimenter is to increase the number of sentences that included pronouns “I” or “we”. Consequently, the experimenters reinforced the use of these pronouns by saying “good” whenever one was used it appropriately in a sentence. It was possible to control partially the verbal behaviors of the subjects through this simple procedure.

Thus, the results indicated that the reinforced pronouns (“I” and “we”) were used with increasing frequency. Studies like this suggest that verbal responses may be strengthened through the operation of verbal reinforcement (“good”). Skinner claimed that careful arrangement by the community is a necessary condition for language learning. According to him, humans acquire spoken language as a result of behavioral conditioning. He writes:

A child acquires verbal behavior when relatively unpattered vocalizations selectively reinforced, gradually assumes forms which produce appropriate consequences in a given verbal community. In formulating this process we do not need to mention stimuli occurring prior to the behavior to be reinforced. It is difficult, if not possible, to discover stimuli which evoke specific vocal responses in the young child. There is no stimulus which makes a child say b or a or e, as one may make him salivate by placing a lemon drop in his mouth or make his pupils contract by shining a light into his eyes. The raw response from which verbal behavior is constructed are not “elicited”. In order to reinforce a given response, we simply wait until it occurs.<sup>4</sup>

Skinner defined ‘verbal behavior’ as behavior reinforced through the maturation of other persons. It is a special kind of operant behavior. Verbal behavior (VB) has so many distinguishing, dynamic and topographical properties. The properties of operant VB are related to the effects on its listeners. Here, the listener was conditioned by the verbal community to be a mediator between the verbal behavior of the speaker and its consequences. In order to explain such VB, Skinner provides a functional analysis. By functional analysis, Skinner means identification of the independent variables that control the verbal behavior of the individual speaker in a concrete interaction with listener in a specific and known environment. The controlling variables of VB can be understood in terms of stimulus, response, reinforcement, deprivation etc. Moreover, in his *Verbal Behavior* (1957), he provides us a way to predict and control verbal behavior by observing and manipulating the physical environment of the speaker.

Now, we have already discussed that Skinner used the concept of discriminated stimulus to account for the fact that through appropriate training, a rat can be taught to press the bar only under certain conditions and not indiscriminately. similar process seems to occur in language behavior. A child can be trained so that s/he will say “thank you” only on certain occasion. For example, if a child is given a candy bar, s/he will say “thank you” only that particular occasion. Skinner viewed the child as the passive subject of operant conditioning in which randomly occurring behavior is selectively reinforced. There is no doubt about the fact that children acquire a good deal of their verbal and non-verbal behavior by casual

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<sup>4</sup> Skinner, B F. 1957. *Verbal Behaviour*. USA: Appleton-Century-Crofts Inc.p-31.

observation and imitation of adults and other caregivers. Successful attempts are rewarded, because an adult who recognizes a word spoken by a child will appreciate the child in the right occasion. Therefore, successful utterances are reinforced while unsuccessful ones are forgotten.

Now, several evidences can be offered to challenge Skinnerian hypothesis of verbal behavior in association with language learning. For instance, a child may pick up a large vocabulary from television, books, music and interaction with others. Even at a very young stage, a child (who has not yet acquired a minimal repertoire from others) may use those vocabularies to construct a new sentence which s/he has never encountered before. They have also the capacity to understand utterances which are quite new. These abilities indicate that in spite of the 'feedback' from environment, there must be some fundamental process at work.

Secondly, the child has the capacity to generalize, hypothesize and 'process information' in a variety of very special and highly complex ways which cannot be easily understood. There may be innate factors which may be largely innate or may develop through the maturation of the nervous system. Therefore, it is often a matter of doubt that whether innatism or empirical support provides the best solution to the process of acquisition of language.

In response to above objections, verbal behavior has one unique characteristic that makes it different from other forms of behavior. Skinner felt that verbal behavior does not operate directly upon the environment to produce reinforcements. Instead, it (verbal behavior) usually leads to reinforcement through an indirect medium with the actions of others. For example, at the time of dinner, one may be faced with the problem of getting cream for her/his coffee. S/he can obtain this goal quite directly through the non-verbal act of reaching; or in an alternative way. One may verbally request for the cream and find that her/his behavior ("please pass the cream") effects upon the behavior of others.

The aforesaid statement of the speaker "please pass the cream" is a kind of **verbal operant**. This type of verbal operants is classified by Skinner in terms of their functional relation to discriminated stimulus, reinforcement and other verbal responses. Skinner called this verbal operant as '**Mand**'. In mand, the response is reinforced by a consequence and is therefore under the functional control relevant conditions of deprivation or aversive stimulation. A mand such as "please pass the cream" is a class of responses. Deprivation in this context is defined in terms of length of time that the animal has not been fed or permitted to drink. But sometimes deprivation in association with its relative mands bears a misleading and unjustifiable connotation of objectivity. **Aversive control**, like deprivation is a confusing term. It is intended to cover threats, beating and the like. For Skinner, mands are operants with no specific relation to a prior stimulus.

On the other hand, there is another type of verbal operant, namely, **tact**. In tact, a response of given form is evoked by a particular object or event. Our above-mentioned examples of stimulus control are all tacts. Most of the times, the verbal community sets up tacts on the child. In order to explain this fact, we may consider the implication of the tact on both the speaker and the listener. For example, as a speaker, parents often teach their child to acquire new vocabulary and extend their contact with the environment. On the other hand, the response of the listener to tact is as follows:

Suppose that there are two persons: A and B. B hears that A says fox and reacts appropriately, that is, looks around, runs away, aims his rifle etc. In explaining B's behavior, we may assume-

- 1) In the history of [B] the stimulus 'fox' has been an occasion upon which looking around is followed by seeing a fox.
- 2) The listener has some current interest in "seeing foxes"-that behavior which depends upon a seen fox

for its execution is strong and that the stimulus supplied by fox is therefore reinforcing.

This is not a good and convincing example. B may never have seen a fox and may have no current interest in seeing one, and yet may react appropriately, to the stimulus **fox**. Since the same behavior may occur when neither of the assumptions is fulfilled. There must be some other operative mechanism. For Chomsky, Skinnerian analysis of tact is fundamentally same as the tradition account. But Skinner provides various types of operants such as echoic operant, intra-verbal operant, autoclitic etc. in relation with verbal stimuli.

For our present context, we may consider the operants autoclitics. It includes negation, quantification of responses, construction of sentences and the highly complex manipulations of verbal thinking. Skinner considered the notion of grammar and syntax as autoclitic process. It differs from traditional account in respect of the use of the terms 'control' or 'evoke' in place of the traditional 'refer'. For example, in a sentence, 'The boy runs'-the final 's' of such subtle properties of a situation as 'the nature of running as an activity rather than object or property of an object'. In other sentence like, 'boy's gun'- the 's' denotes possession. For Skinner, a sentence can be considered as a set of key responses (nouns, verbs, adjectives etc) on a skeletal frame. In philosophy and linguistics, the traditional account considers that sentences consist of lexical items placed in a grammatical frame. With this idea Skinner adds that the internal process of composition, like nouns, verbs, adjectives are chosen first and then are arranged, qualified etc by autoclitic responses to these internal activities.

But unfortunately, it has been pointed out that the aforesaid view of sentence-structure phrased in terms of autoclitics is inadequate. There are several English sentences which has no (physical) frame at all, but the arrangement of their words constitutes a sentence. For example, 'Sheep provides wool' or 'friendly young dogs seem harmless.'

Thus, the above discussions imply that the child learned language through the process of conditioning. It is the process of stimulus-response mechanism where a result occurs as a consequence of actions and that the environment in which a child lives reinforce behavior. Skinner suggested that the pre-linguistic stage of language in which a baby cries with hunger, pain and anger are the early stage of learning and then s/he progresses on to cooing and babbling. It is reinforced by the parents; in particular, the mother, by rewards, such a smile or attention. Skinner and his followers believe that an infant acquires her/his language skills through the reinforced imitation of adult. Some of their (infant's) babbling is reinforced and some babbling is not. Through the reinforcement of correct small language units, the infants proceed to make large combination.

Though there might be some ample evidence in favor of Skinnerian hypothesis, but critics raised several objections. According to the modern psychologists in case of parent-child interaction, parents often reward incorrect utterances and not also able to reinforce all the utterances a child will use.

In this way, the very early stages of language acquisition are same in all over the world. During this pre-linguistic stage of babbling, babies produce every known phoneme that occurs in any human language. This is a unit of sound which is narrowed down by the parents to produce modern noises, which in turn produces early utterances and then moves on to the one-word stage and this stage of one grammar. This stage of language usually occurs between the ages of twelve and thirty months. Initially, this stage starts with one-word utterances such as, 'broom' for a car 'woof' for a dog. Words are also applied to their surrounding environment and then progresses on to simple two-word sentences, such 'mummy gone' or 'want milk'. We can illustrate this objection in the following way: -

1. Language is based on a set of structures or rules which could not be worked out simply by imitating individual utterances. The mistakes made by children reveal that they are not simply imitating, but actively working out and applying rules. For instance, a child who says, “drank” is not copying an adult, but rather over applying a rule. The child forms the past tense verbs by using a/d/or t by their own rules. Sometimes a child makes the past tense of ‘go’ is ‘goed’, rather than ‘went’. The mistakes occur because there are irregular verbs which do not behave in this way. Such forms are referred as intelligent mistakes or virtuous error.
2. Children are often unable to repeat the utterance of adults if it contains a structure. The classic demonstration comes from the American psychologist David Mc. Neill. Here the structure involves the negative verbs is as follows:

Child: Nobody don’t like me.

Mother: No, say, nobody likes me.

Child: Nobody don’t like me (eight repetitions of this dialogue)

Mother: No, now listen carefully: say, “Nobody likes me.”

Child: Oh! Nobody don’t likes me.

3. Few children receive much explicit grammatical corrections. Parents are more interested in politeness and truthfulness.

The most popular and possible argument against Skinner’s behaviorism came from Noam Chomsky in his review of B. F. Skinner’s Verbal Behavior in 1959. As a behaviorist Skinner claims that the mind of the new born infant is linguistically a blank slate (tabula rasa). It is controlled by outside influences and their conditioning. So, Skinner believed that scientific analysis will someday prove this assumption. He also claimed that one day science will prove that behavior is determined by external factors. Though he does not provide any proof, but Chomsky unfathomed Skinner’s dogmatism. According to Chomsky, mind of the new born infant is not tabula rasa (clean slate). On the contrary, every child is genetically predisposed to structure how knowledge is acquired. Chomsky claims that Skinnerian account rejects all the postulations of inner states and considers human behavior as entirely a function of antecedent event. For Chomsky, this reduction of human behavior to “conditioned responses” contradicts the actual complexity and freedom of consciousness.

Thirdly, construction of complex type of grammar with its aforesaid properties (for instance, autoclitic, phoneme, morpheme etc) enable us to describe and study the ability of the speaker, listener and learner. This grammar is extremely complex and abstract in character. All normal children rapidly can acquire that complex grammar. It suggests that human beings are somehow specially designed to construct this complex mechanism for generating a set of sentences which s/he has never encountered before. Thus, it might not be considered grammar as a component in the behavior of the speaker and listener which can be inferred from the resulting physical acts.

In this way, Chomsky challenged Skinnerian approach on several grounds and documented his biological perspective in 1957. Chomsky shows that behaviorist hypothesis confines itself in the explanation of what changes occur in our behavioral pattern; that is, in our physical system due to addition of some stimulus. Thus, Skinner’s theory implied that children learn entirely through trial and error. They do it by their possible utterances, which they adopt, if approved, and reject if they do not. But, according to Chomsky, it may be questioned that children can acquire language and its grammatical rules and extensive vocabulary in such a short time through a trial and error system.

Therefore, we might say that behaviorism is a turning point in philosophy of science where everything is

perceived in a novel way. But it's a kind of reductionism from the perspective of language acquisition. It has its limitations. That is, behaviorism confined its quires into observable and measurable phenomena and rejected the concepts like intuition, soul and consciousness. The main drawback of behaviorism is that it could not accommodate the intricacies of language acquisition. Behaviorism is gradually losing its glamour with the initiation of philosophy of language and linguistics in the intellectual stage. Although Skinner's direct influence within mainstream linguistics was relatively short-lived, his work continues to be important in other areas. The new perspectives of the upcoming philosophers drew attention from all corners. According to the historical development, in this respect, the theory that deserves attention as far as language is concerned is 'Structuralism'. In 1930s and 1940s, linguists admit that the structures, forms and uses of language could be explained by theories founded on the principles of Behaviorism. So far, two major scientific revolutions were the main pillars of 20<sup>th</sup> century Anglo-American linguistics. Their fundamental issue is the ontological status of the sentences and language. The outcome of each revolution is to replace one conception of ontology of grammars with another. In this respect, the first revolution is Bloomfield's revolt against the nominalist tradition of the 19<sup>th</sup> century linguistics. Leonard Bloomfield (1887-1949) was one of the influential figures in the period from the foundations of Linguistic Society of America in 1924 to the beginning of Second World War. He was exposed to various influences; such as, the methodology of comparative and structural linguistics, the increased popularity of empiricism in the natural sciences and the shift from behaviorism<sup>5</sup> to mentalism.<sup>6</sup> Bloomfield writes:

**Non-linguists (unless they happen to be physicalist) constantly forget a speaker is making noise, and credit him, instead, with the possession of impalpable 'ideas.' It remains for the linguists to show in detail, that the speaker has no 'ideas' and that the noise is different.<sup>7</sup>**

The second one is Chomskyan revolution which mounted an argument against Bloomfield's nominalist view of language and its taxonomic conception of grammars. Noam Chomsky (1928-) is a renowned living thinker of twentieth century. He is the Professor of the Institute of Philosophy and Linguistics at Massachusetts Institute of Technology. His work in Linguistics has revolutionized the study of language. Chomsky writes:

**Linguistic theory concerns primarily with an ideal speaker-listener, in a completely homogeneous speech-community, who knows its language perfectly and is unaffected by such grammatically irrelevant conditions as memory limitations, distractions, shifts of attention and interest, and errors...in the application of his knowledge of the language to actual performance...Hence, in the technical sense, linguistic theory is mentalistic, since it is concerned with discovering a mental reality underlying actual behavior.<sup>8</sup>**

The aforesaid account on language acquisition mainly focuses on the importance of imitation and observation. For empiricists, children learn language analogically. According to them, we produce and understand new sentences by analogy or similarly with the old. We can understand a new sentence because

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<sup>5</sup> Behaviourism is the idea that mental activity is not distinct from behaviour.

<sup>6</sup> Mentalism states that mental process are independent of physical interaction.

<sup>7</sup> Bloomfield, L. 1985. "Language or Ideas?" In *The Philosophy of Linguistics*, edited by Jerrold J. Katz. Oxford: Oxford University Press. P-23.

<sup>8</sup> Chomsky, N. 1965. *Aspects of the Theory of Syntax*. Cambridge, Massachusetts: MIT Press.p-3.

it is obviously similar to the sentences we were acquainted with, in the past. On the other hand, if we admit that the study of language behavior involves describing and explaining the unobservable activity, the situation becomes much more complicated. Because we have to postulate some set of processes, some internal mechanism which operate when we speak and understand. In other words, we have to postulate something we can call a mind. The study of language from this point of view is equal as a study of specific properties, whose outward manifestations are observable behavior. For Chomsky, the linguist is trying to establish certain general properties of human intelligence. Linguistics is simply the sub-field of psychology that deals with these aspects of the mind.<sup>9</sup>

But we are not born with automatic skill of speaking and understanding language. We have to acquire this skill of speaking. So this approach to language is not only concerned with what goes on when we speak and understand, or what has been called linguistic performance, but how we come to be able to do these things? Language behavior is evidently such a complex skill for an infant to acquire it in a short period of time. Thus, some thinkers propose that the disposition to acquire it must be innate. They also intend to propose that the only human beings possess language. It means that there is something peculiar to the human species that predisposes it to acquire language. Some linguists and psychologists go so far as to suggest that the human infant is born with a specific, genetically determined language-learning capacity. Besides these linguists, on the other hand, others provide only that the ability and predisposition to acquire language is a function of the general cognitive capacities of the human being, which enable her/him to learn at all.

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<sup>9</sup> Chomsky, N. 1968. *Language and Mind*. New York: Harcourt, Brace & World, Inc. p-24.