

Nature or Nurture?: A Case Study from Feral Children on Their Grammar Acquisition

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Abstract: The present study asks whether Nature or nurture is important for feral children to acquire grammar. Two different experiments are carried out to prove the significance of Nature and nurture with one type of participant because the previous research mainly focused on the case study of one participant on Nature and nurture. This study combines and measures both to better determine the connection. The differences in input, like with or without feedback and correction, will show the relationship between Nature and nurture and whether they are both essential. Through the picture-speaking and nurture experiments, it is assumed that input is pivotal in presenting Nature and nurture prepositions. In addition, this study will be helpful for the latter study by pointing out problems with limitations.

Keywords: Nature, nurture, language acquisition, feral children, grammar acquisition

1. Introduction

Nurture or Nature? What is essential for human first-language acquisition has been controversial for many years. Many researchers debate whether biology or experience is essential to language acquisition. Noam Chomsky [1] argued that knowledge of language is knowledge without grounds; it is not taught or learned knowledge. That is to say, nature is a system of knowledge, typically called Universal Grammar (U.G.) and related to genes. In contrast, nurture indicates external factors, including experience and environment. According to Skinner [2], language is learned from other people via behavior-shaping techniques.

Although some researchers acknowledge that nature or nurture plays a vital role in grammar acquisition, some researchers reckon that nature and nurture play a vital role because, without the natural supply, humans will not speak. At the same time, nurture is essential because it will only be realized with the input and involvement of nature's natural supply. Therefore, whether nature and nurture are critical to grammar learning during first language acquisition is still being determined.

In the present study, the importance of nature or nurture on grammatical learning during the first language acquisition of feral children will be investigated. The picture-speaking experiment and the

nurture test from the feral children can answer whether nature and nurture are important in children's language acquisition. The generative approach, the usage-based approach, and optimality theory are considered the theoretical bases. The common sense of language acquisition is that exposure to syntactic language is essential. Some references indicate that grammar acquisition provides a bridge to learning other skills to obtain cognitive ability. The deficiency in language acquisition is related to the problem of nature and nurture. Thus, studying nature and nurture's influence on adolescents entirely linguistically isolated in their early years can be meaningful.

2. Literature Review

Despite syntax's complexity, previous studies have argued that a child's language acquisition is natural or nurtured. The debate on whether nature or nurture plays a more significant role in human development is essential. Nurture refers to environmental factors such as our childhood experiences, upbringing, social connections, and cultural influences that shape who we are. According to Skinner [3], children develop their cognitive and other abilities through repetition and understanding the consequences of their actions. The environment is crucial in children's cognitive development since behavioral changes are linked to the stimuli parents expose them to. This means that he thinks nurture is more critical to language development. Previous experiments with feral children (sometimes known as separate children), which are human children that have lived separated from human interaction since a very young age and have had little experience with human care, love, or social conduct, have demonstrated the importance of nurture. A linguistics professor at UCLA, Susan Curtiss [4] had previously worked with Genie's language development for seven years. (Genie is a teenage girl who experienced social isolation and experiential deprivation not previously described in current scientific history throughout most of her life.) Her research revealed that Genie was making significant progress in her language skills and continued to do so. However, Genie's language was not typical, and her speech was described as "syntactically primitive and underdeveloped." Her report demonstrated that nurturing is important. Genie hardly uses correct syntax, such as "no book" instead of "I do not have a book." Curtiss noted that Genie's statements were "grammatically uninflected and telegraphic." At the same time, a boy known as "Wolfe Boy" Victor [5] lived with Dr. Jean-Marc Gaspard Itard, a physicist dedicated to helping him develop his speech and learning abilities. Despite their efforts, Victor's progress could have been improved. He could never achieve complete syntactic proficiency like an average person, and he could only manage simple tasks like setting a table. When the research funds ran out, Victor had to be left in the care of a maid. Sadly, he passed away at the age of 40 in 1828. Victor's story continues to prove the importance of nurture. [6]

On the other hand, there have also been some previous experiments that demonstrate the importance of nature. Nature encompasses all genetic factors that influence our physical appearance and personality traits. Linguists who think nature is more important think developmental processes are most closely associated with initial language acquisition [7]. Like Chomsky said [8], the theory proposes that there is an innate, biologically determined language faculty that knows these rules, making it possible for children to learn to speak. Based on the theory of universal grammar, humans are believed to naturally develop language with specific characteristics, such as the ability to differentiate between nouns, verbs, function words, and content words. This development occurs when individuals are raised in typical circumstances rather than those that involve severe sensory deprivation. On June 26, 1931, psychologist Winthrop Niles Kellogg [9] raised his children and chimpanzees together from a young age and made their food, clothing, housing, and transportation the same. During the early stages of the experiment, the chimpanzee showed faster progress than the boy. However, towards the end, the chimpanzee's success was attributed to its ability to adapt intellectually to human demands. According to a report prepared by A., Dr. Kellogg, and his wife, it was found that animals could be socialized and humanized through education and association with

humans. However, the report also stated that non-human species can achieve limits to humanization, regardless of the amount of socialization and humanization effects. That suggested the importance of nurture.

Even though there is no clear experimental evidence that nature and nurture are both important, after conducting research, Li Gao's [10] paper concluded that language development depends on nature and nurture. This is because individuals need to have the innate ability to learn languages (Nature) and then be immersed in a language context (nurture) to speak them fluently after significant training in listening and speaking. Children are born with a language acquisition device (L.A.D.) that enables them to learn language and apply grammar, as Chomsky [11] suggested.

3. Proposed Study

3.1. Hypothesis

It is predicted that when feral children learn grammar, there are three possible situations. Nature is essential for feral children during their grammar acquisition period. Nurture is important for feral children during their grammar acquisition period. Both Nature and nurture are essential during their grammar acquisition period.

3.2. Logic

The production experiment is used [12] to eliminate the errors because this experiment can provide a manipulated environment that can make the target project present in the expected way. Suppose the picture-speaking experiment shows that children can use the internal device to acquire input with immersion from the environment but without feedback or correction. In that case, it suggests that Nature exists and serves a critical role. Besides, this can indicate that the input is not affected by the environment, making the experiment more accurate. If Table 2 shows that children can use external factors like feedback and correction to produce syntax, then nurture plays an essential role. The input with correct feedback in the nurture experiment is set as an influential factor that can help us define the benefits of nurture.

4. Methods

4.1. Participants

Three feral child participants were involved in the study, and all the participants would have two experiments. They were after a critical period when they participated in the experiments, as these feral children were found at about puberty or even older (12–15 years old). Basic information showed that all participants were not exposed to human languages and could not speak them when they were first found.

4.2. Materials

By referring to linguistic isolates performance in verbal and nonverbal tests performed by Andrey Vyshedskiy's team[13], two experiments are hypothesized to prove the importance of nature and nurture. Experiment 1 (Nature): Researchers used one picture to test participants' grammar acquisition in this experiment. As shown in Figure 1, the picture involved a rabbit and a plate full of carrots. It showed that the rabbit ate all the carrots. They need to try to describe relevant information in the picture, like speaking a short sentence with subject, verb, and object structure (the rabbit eats carrots). Over 90% of them could output the correct sentence through a pretest using typical children.

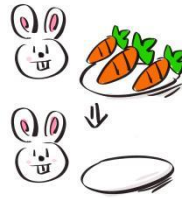


Figure 1: Nature experiment.

Experiment 2 (Nurture): In the nurture experiment, researchers gave another picture to the participants. Figure 2 shows that a dog and a bottle of water were in the picture and the dog has drunk out the water. Participants were required to output the sentence, "Dog drinks water." This experiment also used typical children to have a pretest, with the same result: most could speak correct sentences. The content of the two experiments are reframed based on the famous Adam and Eve's study. [14]

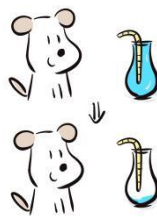


Figure 2: Nurture experiment.

4.3. Procedures

In nature experiments, all participants were immersed in a language environment, including the researchers' output. During the participants' language development, there was no feedback or correction, no matter whether they made right or wrong utterances. After seven years of immersion in the language, researchers gave the participants a grammar test, including letting them describe picture information in a short sentence, to identify whether the "nature" factor influenced feral children's grammar acquisition.

After the nature experiment, all participants were given feedback and corrections when they made mistakes in grammar. Another picture was used to test participants' grammar acquisition development through seven years of learning. Researchers did nurture tests separately based on two possible outcomes in nature experiments. This experiment aimed to test whether participants acquired grammar or made progress in grammar learning after feedback and correction.

4.4. Data analysis

The measurement of grammar acquisition is whether participants generated correct sentences or made mistakes in grammar when they spoke sentences. If they could speak the correct sentences, they could be regarded as having learned grammar. They did not learn grammar successfully if they just said some words, a disordered sentence, or nothing.

5. Results and Discussion

Generative acquisition researchers assume an innate language acquisition mechanism. According to experiment 1, when children have not been taught any grammar or other knowledge of the language but can still generate some correct and accurate grammar by themselves, such as producing a correct

sentence (Rabbit eats carrots), it shows that Universal Grammar (U.G.) plays an essential role in grammar learning, which means Nature is essential. On the contrary, if they say a word, like carrots or rabbit, it shows that U.G. in their mind does not work well for them.

According to experiment 2, after getting feedback and correction from the researchers, children have more developed skills and knowledge about grammar. They learn to put the words in the right place and know the correct meaning and usage of this grammar. For example, they generate a sentence (Dog has drunk water), showing that Nature and nurture are significant in their language acquisition period. However, if nothing differs from the previous study, Nature exists while nurture does not. Children who cannot produce meaningful sentences after learning to acquire language well, like producing an accurate sentence (Dog has drunk water instead of only one word), show that nurture exists while nature does not. When children have been trained and taught, they still need to learn to generate correct grammar and can only say some simple and single words (dog, bottle, or water). It suggests that neither Nature nor nurture have effects on their language acquisition.

6. Conclusion

6.1. Limitations

There are some limitations that cannot be ignored. Firstly, from the perspective of the moral norm about the picture-speaking experiment, the participants in the picture-speaking experiment are hypothetical. If normal children serve as participants to finish the experiment, it equals turning normal children into isolated children, which is human-induced. The data from feral children testing the function of Nature is rare, and using normal children to set up the experiment violates morality. It is anticipated to find a better way to tackle this problem in the future. Secondly, regarding the test procedure, the Nature and nurture tests on feral children cannot guarantee complete consistency. The data summarized from the nature test lies in the result of the picture-speaking experiment, while that of the nurture test is concluded by answering some questions. Thirdly, it can be assumed that the participants in the experiment missed the critical period[15] [16], which is influential for children's language acquisition. Therefore, the two experiments need to be observed with regard to the impacts on children's grammar learning before the critical period.

6.2. Implications

Past analyses of the impact of Nature versus nurture on language acquisition have been biased. The notion that Nature and nurture play an equally significant role was groundbreaking. Previous research has strongly emphasized the importance of nurture, particularly for children with autism or congenital language difficulties. However, only some experiments have been conducted to demonstrate that Nature and nurture are both crucial. This study integrates Nature and nurture to the fullest extent, highlighting the equal importance of both factors in language acquisition. The experiments conducted on feral children and Gua reinforce that Nature and nurture are equally important to a child's language development. Recognizing this will aid in Nature and nurture development and help children with developmental abnormalities enhance their language skills.

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