The Critical-Period Hypothesis and its Implications from Western Scholars

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Abstract. The Critical Period Hypothesis is still controversial recently, so it cannot be said to be absolutely confirmed to be false. It is more important to realize the significance of application. Although the exact properties of this phenomenon remain unclear and the literature is divided, more and more Chinese mothers choose to teach English or other languages as a second language to their children from a very early age (0-3 years old). This paper discusses whether these attempts can help children achieve the future goals set by their parents through literature review. The results attempt to support the existence of the Critical Period Hypothesis, because from the end of adolescence, the ability to learn grammar declines sharply, and the ability to reach native-like proficiency depends largely on the age at which learning begins.

1 INTRODUCTION

The Critical Period refers to a specific stage of life development in which one can learn a language easily and quickly without external intervention or teaching (Fromkin & Rodman, 1983) [1].

In 1970, Lenneberg proposed in The Biological Basis of Language [2] that the best period for language acquisition is that, that the language develops so rapidly that there is a clear development process according to a clear schedule, and the Critical Period extends from about 2 years old to 12 years old, which is explained from the perspective of neurophysiology. During this period, the human brain is both flexible and elastic, the language function in the brain has not moved laterally to the left hemisphere, and the entire brain is involved in language learning. Therefore, it can easily and naturally absorb new language information at this stage. Lenneberg initially studied the acquisition of first languages by children whose parents were deaf and mute, and later turned to the study of foreign accents in second language acquisition to show that language development usually ends after the age of 12 or 13, that is, after puberty begins [2]. He pointed out the relationship between foreign accents and the beginning of learning a second language: children aged 4-12 had no foreign accents in their target language pronunciation, and there was no significant decline in this ability during this period. However, after puberty begins, children around the age of 12 begin to learn the target language with a foreign accent. Lenneberg's view of the Critical Period of language acquisition is a turning point in the study of second language acquisition [2].

In addition, Singleton also commented on influence of age on second language acquisition in Introduction to Language Acquisition. He believes that children perform better than adults in the early stage of second language learning, which has been widely recognized. As early as 1950, Penfield proposed the optimal age for learning a second language, stating that if a child interacts with a second or even a third language speaker before the age of 10 or 14, he can learn two or three languages too much effort in a way that learns the first language (the mother tongue) [3].

Johnson and Newport (1989; 1991; 1992) conducted a large number of experimental studies to confirm the existence of the Critical Period of second language acquisition. Through extensive experimental studies by the earlier the age of second language acquisition, the smaller the impact on the grammar of mother tongue, and the English level clearly shows a decline in adolescence. Some scholars support the traditional view of this hypothesis, and generally believe that age is closely related to learner's final pronunciation level and the acquisition of syntactic morphology.

There has been a debate between the researchers who support the existence of critical periods and those who oppose the existence of critical periods. At the end of last century, there was an unprecedented new climax. In 1996, the International Society of Applied Linguistics, chaired by Professor Birdsong, held a symposium in Finland with the theme of "New Perspectives on Critical Phase Research in Second Language Acquisition". The supporters are represented by Johnson and Newport, Eubank and Gregg, Hurford and Kirby, Patkowski, WeberFox and Neville, etc., while the opposition is represented by Bialystok, Bongaerts, Flege, Major, Snow and Hoefnagel-Hohle, etc., and the opposition is in the upper hand.

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2 SUPPORTING THE CRITICAL PERIOD HYPOTHESIS

When confirming the Critical Period Hypothesis, Johnson and Newport, introduced two secondary assumptions (two explanations of Lenneberg's critical period model for first language acquisition) – the practice hypothesis and the maturity hypothesis.

2.1 Practice Hypothesis

In short, the ability to learn a language must be used continuously, otherwise it will be lost. Early in life, people have a higher ability to master language. If the ability is not trained at this time, it will disappear or decline with the maturity of the person; It is the ability that has been cultivated, and the ability to further learn the language will remain unchanged throughout life. This hypothesis explains an anecdote of some people learning foreign languages: they start learning languages very early and are still able to successfully learn new languages in adulthood (Birdsong, 1999) [4]. Bever (1981) explained that the two systems of speck generation and speech perception must work together to ensure that a specific linguistic structure is obtained. If the language learning activity cannot last forever, the two systems will gradually separate, and the result is that the perceptual ability far exceeds the generative ability, because mental grammar is normally the intermediary between the two, but at this time it loses its effect. However, under the condition of continuous use, mental grammar has not lose its role, and there is no disconnection between generation and perception.

2.2 Maturity Hypothesis

Advanced cognitive abilities hinder (modularize) language learning tasks. Newport (1990) argues that cognitive immaturity is conducive to language learning [5]. The learning ability that comes with maturity reaches a peak at a certain stage. Beyond this stage, it begins to decline. Children have a small capacity for short-term memory and can initially extract only a few morphemes from verbal input. Within the range of processing ability, children are more successful than adults, because while adults' memory ability is increasing, they are allowed to extract more information from input, but at the same time, they face another more difficult problem: they need to analyze various information at the same time. Universal grammar and advanced cognitive abilities applicable to various fields coexist, and the two compete with each other, and the latter wins. Mature cognitive abilities suitable for different fields are not suitable for modular language learning tasks, so second language acquisition often fails.

During the validation process, in order to find out whether the practice or perfection of the hypothesis will affect the second language acquisition, Johnson and Newport surveyed 46 Chinese aged between 3 and 39, and conducted a grammar and lexical test on Korean in the United States. The participants have been exposed to English for at least 5 years in the target language country and have lived in the United States for 3 years before the test. In the acquisition of second language grammar, age and language ability are closely related. The results are consistent with the conclusion of the maturity hypothesis: the earlier participants learn a second language, the closer their grades are to their mother native language, and due to the effect of maturity, the subjects' grades gradually decreases. People aged 3-7 complete tasks, such as native English speakers. After the age of 7 and between puberty, the grades gradually decreased. Compared with children aged 8-10, the scores of children aged 11-15 gradually decreased. Students aged 17-39 have the worst grades. In general, other factors other than age (learning motivation, the quantity and quality of English exposure, the influence of the first languages, etc.) cannot well explain the difference between early and late scholars. Therefore, they concluded that they confirmed the hypothesis that humans have a special ability to acquire languages in childhood, whether those languages are first or second to them. Johnson and Newport's research "confirmed" the critical period of second language acquisition and proved the prophecy of the maturity hypothesis.

3 REPRESENTATIVE STUDIES ON THE CRITICAL PERIOD HYPOTHESIS

Bongaerts studied the phonetic ability of 12-year-old Dutch people to learn English and French [6]. Participants began to be exposed to the target language after 12 years of age. The participants were divided into two groups: one group is composed of 11 participants; The other group consisted of 9 participants. Thirteen native English speakers and 10 native French speakers assessed the above participants, and found that about half of the participants in each of the two learning groups had the same pronunciation as the native speakers of the second language. The conclusion of "falsification" is that the research results of second language learners who started late to successfully master the phonetics of the target language contradict the critical period hypothesis.

4 HYPOTHESIS BACK TO THEORETICAL EXPLANATION

The critical Period Hypothesis is based on the modular theory of the brain, that is, there are various relatively independent abilities, and language abilities are relatively independent from other forms of abilities. As for its existence and its role in language acquisition, theorists have made different interpretations from different aspects: neurolinguistics and neuroscience; universal grammar; mature theories; evolutionary theories of language acquisition; practice hypothesis and traditional learning theories.

According to the theories of neurolinguistics and neuroscience, before the completion of cerebral lateralization, the two hemispheres of the brain are evenly balanced. There are two language regions, one in the left hemisphere and the other in the right hemisphere. The left hemisphere is used to store the mother togue and the right hemisphere is used to receive the second language. However, with the specialization of the functions of various brain tissues, the

relatively weakly functional language regions in the right brain disappear (James, 1996; Fromkin & Rodman, 1983) [7].

After birth, with the lateralization of brain function, neural tissue loses flexibility, and some cranial nerve tissues required for language learning cannot be reached after the critical period. Lenneberg (1967) posits that language acquisition is a process determined by biological factors. The critical period of language acquisition is roughly limited to 2 years old to adolescence.

From the powerful theory of Universal Grammar, the end of the critical period means the loss of Universal Grammar. With the end of the critical period, the innate strategies associated with language learning may also be lost. It is used to explain the difference between the early start of first language acquisition and the late start of second language acquisition. According to the Weakness theory, universal grammar persists in the brain, but for various reasons, it has become the inertia of language learners. The principle of universal grammatical constancy in adult second language acquisition has not disappeared. The problem lies in the habit of second language parameters: after the critical period, the age increase, and the parameter values need to be reset (Birdsong, 1999) [8].

According to the Maturity theory, Newport (1990) argues that cognitive immaturity is beneficial to language learning. The learning ability that comes with maturity reaches a peak at a certain stage. Beyond this stage, it begins to decline. Children have a small capacity for short-term memory. At first, only a few morphemes can be extracted from language input. Within the range of processing ability, children are more successful than adults, because while adults' memory capacity is increasing, they are allowed to extract more information from input, but at the same time, they face another more difficult problem: they need to analyze various information at the same time. Universal grammar and advanced cognitive abilities applicable to various fields coexist, and the two compete with each other, and the latter wins. Mature cognitive abilities suitable for various areas are not suitable for modular language learning tasks, so second language acquisition often fails.

On the basis of the Evolutionary view of Language Acquisition Theory, children will naturally lose their learning ability after they acquire a language. Learning languages early means gaining the benefits of communicating with the language for a longer period of life. Therefore, while people use language throughout adulthood, the language learning mechanism fulfills its mission in early childhood (Pinker,1995) [9]. Hurford and Kirby (1999) explained the mechanism of language learning using an evolutionary model: the critical period is about the end of adolescence, during which the pressure to choose development decreases and the motivation for development decreases [10].

The Practice Hypothesis illustrates that language learning ability must be used continuously, otherwise it will be lost. Anecdotes about some people learning a foreign language can explain that they started learning a language very early and still successfully learned a new language in adulthood (Birdsong, 1999). Bever (1981) explained that the two systems of speech generation and speech perception must work together to ensure that a specific language structure is obtained [11]. If the language learning activity does not last forever, the two systems gradually separate, and the result is that the perceptual ability far exceeds the generative ability, because mental grammar is normally the intermediary between the two, but at this time it loses its effect. However, under the condition of continuous use, mental grammar does not lose its role, and there is no disconnection between generation and perception.

The Traditional Learning Theory holds that one kind of learning inhibits another. Learning is a process of gradually accumulating experience and strengthening the connections between input and output. The greater the possibility of correct system output, the stronger the connection. The disadvantage of this kind of learning is that once it is learned, it is difficult to "unlearn". According to this theory, in order to successfully learn a second language, the neural representations of the new language must replace the previous ones.

5 CONCLUSION

In the first language acquisition, there is a critical period determined by physiological factors (from birth to critical period), after which it is difficult to reach the normal level of language acquisition. In second language acquisition, researchers have different views on whether there is a critical period. Scholars who agree with the Critical Period Hypothesis have different opinions on the start and end time of the critical period and the affected language fields.

The Critical Period Hypothesis focuses on the ultimate state of language learning, that is, the highest attainable level. Previous studies have shown that people who start learning foreign languages after puberty may also reach the level of native speakers. However, to achieve this, it is necessary to have a high level of language learning ability and a long period of immersion.

As we grow older, our ability to learn language declines. This is the age effect in language learning. The age effect impact on the ultimate state. At the beginning of acquisition, the younger the age, the greater the possibility of reaching the level of native speaker. However, the age here refers to the age at which it reaches, not the age at which formal teaching begins. In addition, under the same conditions, adolescents and adults learn faster than children in the initial stage.

REFERENCES

1. Fromkin, Rodman & Hyams, An Introduction to Language 9th edition, 2010.
2. Eric Lenneberg, The Biological Basis of Language, 1967.
3. Dechert H W. Some critical remarks concerning Penfield's theory of second language acquisition. In Singleton D, Lengyel Z.(Eds) The age factor in second language acquisition. A critical look at the Critical Period Hypothesis [M]. Clevedon Multilingual Matters, 1995:67-94.

4. Birdsong, D. Introduction: Why,s and why nots of the Critical Period Hypothesis for second language acquisition In D. Birdsong(Ed), Second language acquisition and the Critical Period Hypothesis [M]. NJ: Lawrence Erlbaun,1999:1-22.
5. Newport, E. 1990. Maturational constraints on language learning. *Cognitive Science* 14: 11-28.
6. Bongaerts, T. 1999. Ultimate attainment in L2 pronunciation: the case of very advanced late L2 learners. In Birdsong, D., ed., 133-59.
7. Birdsong, D. 1999. Introduction: whys and why nots of the Critical Period Hypothesis for second language. In Birdsong, D., ed. 1-22.
8. Birdsong, ed., 1999. Second Language Acquisition and the Critical Period Hypothesis. Mahwah, N.J.: Lawrence Erlbaum Associates.
9. Pinker, S. 1995. *The Language Instinct*. New York: Harper Perenial.
10. Hurford, J.K. and S. Kirby. 1999. Co-evolution of language size and the Critical Period. In Birdsong, D., ed., 23-64.
11. Bever, T.G. 1981. Normal acquisition processes explains the critical period for language learning. In Diller, K.C., ed., 176-98. *Individual Differences and Universals in Language Learning Aptitude*. Rowley, London and Tokyo: Newbury House Publishers.