

Literature Review on Critical Period Hypothesis

Xu Ying

School of Foreign Languages,
China West Normal University,
No. 1 Shi Da Road, Nanchong, 637009,
Sichuan, China
E-mail: 845299155@qq.com

Abstract

Critical period hypothesis, CPH in short, enjoys its popularity in the realm of second language learning and research. Many researchers both in abroad and home have made herculean efforts to finger out whether the CPH truly exist, and if it does, how it influence the second language acquisition. This paper is geared to do a literature review on the heat-discussed critical period hypothesis, with the hope to provide a detailed retrospection of what have been done by the researchers.

Keywords: critical period hypothesis, second language acquisition, review

Given the general failure and difficulties experienced by adults when attempting to learn a second or foreign language, many observers and scholars have hypothesized that a critical period exists for the realm of language learning. CPH, short for critical period hypothesis, remains the subject of a long-standing debate in linguistics and language acquisition over the extent to which the ability to acquire language is biologically linked to age (Andy Schouten, 2009), ever since initially proposed by Montreal neurologist Wilder Penfield and co-author Lamar Roberts (1959) in their book *Speech and Brain Mechanisms*. The one who made the hypothesis popularized is Eric Lenneberg since he (1967) hypothesized that language could be acquired only within a critical period, extending from early infancy until puberty. Indeed, his CPH focuses on the acquisition of a first language. Nevertheless, it is essential to our understanding of the nature of the hypothesized critical period to determine whether or not it extends as well to second language acquisition. If so, it should be the case that young children are better second language learners than adults and should consequently reach higher levels of final proficiency in the second language, which will be of great help for both the 2L learners and the language research field especially in today's situation where the concept "the

earlier, the better for children to acquire a second language “gradually grows deep-rooted in parents’ minds. For nation’s policy makers, the credibility of CPH will definitely influence them to decide when to begin the L2 education.

Considering the realm of first language acquisition only, Lenneberg (1967) sought to determine the age at which it becomes too late for an individual to acquire language. “Using different types of evidence including data from recovered aphasics, the development of language in the mentally disabled, and the effects of sudden deafness on people of different ages, he surmised that due to structural reorganizations that occur within the brain during puberty, any language skills which were not learned before this restructuring occurs would remain permanently underdeveloped. Consequently, the ages between the onset of language development during infancy and the restructuring of brain functions during puberty represented a window inside which a first language could be acquired. Language learned outside of this *critical period*, Lenneberg hypothesized, would develop neither normally nor sufficiently” (as cited by Andy Schouten, 2009). Despite no direct evidence for the hypothesis at the time his book was written, Lenneberg’s argument contained two parts: a) normal language learning occurred primarily or exclusively within childhood, and b) he proposed a mechanism which might be responsible for a maturational change in learning abilities (Johnson & Newport, 1989). The proposed mechanism was fundamentally neurological in nature. He suggested that the brain, having reached its adult values by puberty, has lost the plasticity and reorganizational capacities necessary for acquiring language. After Lenneberg’s writing, behavioral studies approximating a direct test of the critical period hypothesis for first language acquisition have become available---the well-known case of Genie, a thirteen-year-old victim of lifelong child abuse (Curtiss, 1977). Her father had judged her retarded at birth and had chosen to isolate her, and she was deprived of language and social interaction until her discovery at the age of thirteen. It was an ideal opportunity to test the theory that a nurturing environment could somehow make up for a total lack of language past the age of 12. Her lack of linguistic competence, particularly in syntax, after seven years of rehabilitation supports the critical period hypothesis (Johnson & Newport, 1989).

The later research on CPH mainly falls into the controversy concerning the credibility of the critical period hypothesis applied to second language acquisition. Supporters of the CPH contend that language learning, which takes place outside of this critical period (roughly defined as ending sometime around puberty), will inevitably be marked by non-nativelike features. In opposition to this position, several researches have postulated that, although rare, nativelike proficiency in a second language is in fact possible for adult learners (Andy Schouten,2009).

Among the numerous studies in support of the CPH, the most representative ones go to the researches did by Johnson and Newport in 1989, 1991 and 1992 (Pingying Hou, 2008).

Hoping to extend Lenneberg’s (1967) hypothesis to second language acquisition, Johnson & Newport did a research on 46 native Chinese or Korean speakers who learned English as a second language and varied in age of arrival in the United States from ages 3 to 39 (Johnson & Newport, 1989). Chinese and Korean were chosen as the native languages because of their typological dissimilarity to English. Subjects selected from the student and faculty population at an American university were instructed to make a grammaticality judgment for each sentence, guessing if they were not sure. Subjects were divided into 4 groups depending on their age of arrival (age 3-7, age 8-10, age 11-15, and age 17-39, respectively). The

pairs of sentences were constructed to test 12 types of rules of English, listed in Table 1.

1. Past tense	7. Practicle movement
2. Plural	8. Subcategorization
3. Third person singular	9. Auxiliaries
4. Present progressive	10. Yes/no questions
5. Determiners	11. Wh-questions
6. Pronominalization	12. Word order

Table 1 Rule Types Tested in Grammatically Judgment Task (Johnson & Newport, 1989, p.72)

Johnson and Newport 's(1989) research results suggested that subjects who arrived in the United States before the age of seven reached native performance on the test. For arrival after that age, there was a linear decline in performance up through puberty. Subjects who arrived in the United States after puberty performed on the average much more poorly than those who arrived earlier. After puberty, however, performance did not continue to decline with increasing age. According to this view, children receive the ideal type of input for successful language learning, while adults do not.

Their findings were roughly in accord with Lenneberg's hypothesis, but Lenneberg's proposal seemed to imply that a decline in performance should first appear at puberty. Instead of puberty, Johnson and Newport (1989) found a small but significant decline in performance in subjects who had arrived in the United States as early as age 8 to 10. And later in 1991 they did a similar experiment on subjects, two groups of Chinese who differs from their arrival in America. One group members came to America in their 14-16, the other in adult. Subjects were required to make the syntactic judgment. Results confirmed again the existence of CPH (Pingying Hou, 2008).

In order to examine the effects of maturation on pronunciation, multiple studies have been conducted, again often using immigrants with various ages of arrival as subjects. Thompson (1991) examined data collected from 39 Russian-born subjects who had immigrated to the United States between the ages of 4 and 42. The subjects were each given three types of speaking tasks: (1) reading a list of 20 sentences which were intentionally "seeded" with English sounds that are known to be difficult for native Russian speakers; (2) reading a 160-word passage which had not been seeded; and (3) speaking spontaneously for one minute about their activities on the day of the experiment (Andy Schouten, 2009). Thompson's results pointed to a strong link between a subject's age of first exposure to English and the nativeness of his or her accent. Subjects with an early age of arrival scored consistently and considerably better than subjects with a late age of arrival.

Despite the strong evidence produced in the studies by Johnson and Newport (1989) and Thompson (1991) supporting the existence of a critical period for second language acquisition, important doubts remain regarding the CPH applied to the SLA.

One of the most significant studies related to age and SLA comes from the research of Catherine E. Snow and Marian Hoefnagel-Hohle (1982). They investigated 51 English subjects in five age groups whose target language was Dutch. The subjects' accomplishments at three points in the Netherlands were compared with the accomplishments of two advanced speakers of Dutch and native speakers. The beginners were

tested three times at 4 to 5 month intervals, but the advanced learners were tested only once. The subjects were tested individually at school or at home in various categories—pronunciation, auditory discrimination, morphology, sentence repetition, sentence translation, sentence judgment, Peabody picture vocabulary test, story comprehension and storytelling. The results of their study gave strong evidence against the critical period hypothesis. All the tests showed a rapid learning by the 12 to 15 years old and adults during the first few months of acquisition (Krishna K. Bista, 2009). Their finding rejected the notion of younger learners as better learners in L2 acquisition.

Birdsong and Molis (2001) offer an expanded challenge to the CPH not only by demonstrating the existence of nativelike achievement among adult learners, but also by raising doubts as to the universality of Johnson and Newport's (1989) results. Using materials and methodologies that were virtually identical to those used in the Johnson and Newport study, Birdsong and Molis substituted Spanish speakers for speakers of Chinese and Korean as their subjects, and sought to replicate Johnson and Newport's study. What they found, however, contrasted sharply with the outcome of Johnson and Newport's original study, and provided counterevidence to the CPH. Birdsong and Molis's (2001) research results suggested that even the immigrants who arrived in America after their puberty, their English proficiency was as good as the native's. Therefore, Birdsong and Molis suggested that Johnson and Newport's data were not generalizable to multiple L1-L2 pairings, and thus they cannot be taken as strong support for the existence of a critical period.

David Birdsong (2006) has studied theoretical issues and empirical findings of age related research of second language acquisition. He had found that brain memory, learning conditions and second language processing speed are connected with age factor. He has pointed out that morphological changes and cognitive process are different in young and adult learners.

Still others, in light of the robust debate and research both supporting and challenging the CPH, have reconceptualized their views regarding a possible critical period for language learning, claiming that in combination with age of exposure, sociological, psychological, and physiological factors must also be considered when determining the factors that facilitate and debilitate language acquisition (Andy Schouten, 2009).

Alongside the two international major strands of research on critical period hypothesis, a lot of efforts have also been made by many Chinese researchers to investigate the CPH's implications in Chinese EFL context.

Nearly all the scholars in China have shown their cautious attitude to the CPH. This is because they realized that the research on the CPH has primarily concentrated on learners in L2 setting, in which learners get access to L2 outside the classroom and are immersed in the context where the L2 is used as a main communicational tool. In China, learners have very limited access to English outside classrooms, so it is too rash to use the CPH to serve in Chinese EFL context (Wuhan Zhu, 2011). Zhao and Zou (2008) conducted a qualitative analysis of 42 autobiographies of contemporary renowned foreign language experts in China to examine the age related factors that may have led to success in foreign language learning. The study demonstrates a moderate correlation between age of onset and self-assessed achievements in the whole database of early-starters and late-starters and a weak correlation found in the early-starters. This finding does not support the CPH and argues that the other important factors such as motivation, teachers and

language aptitude may decide L2 success for the learners.

Compared with myriads of empirical studies of the CPH outside China, the CPH studies in China are still staying in their initial stage. A lot more research is urgently called for in Chinese EFL context (Wuhan Zhu, 2011).

So far, no study has been conducted to elicit whether the CPH apply to Chinese rural students who generally have much less opportunity to be exposed to English than the students in metropolis. Most Chinese researchers and scholars redouble their efforts on the students in cities because of study convenience. Empirical studies on what are the possible factors hindering rural students acquiring a second language must be great help for the rural education development. The study is a direct response to this research gap.

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