A Review of the Critical Period Hypothesis

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Abstract

This review critically explores one controversial issue in SLA: the Critical Period Hypothesis which advocates “a specific and limited time period for language acquisition” (Lightbown and Spada, 1999, p.19). Many studies investigating the relationship between age of onset and second language development have concluded that puberty is a turning point in language learning and that after this period achievement of native-like proficiency especially in phonological features can only occur with difficulty. Conversely, a number of studies have successfully shown that postpuberty learners have achieved native-like mastery of their respective target language. In this article I outline four principal studies weighing against the Critical Period Hypothesis and examine whether it is possible to attain native-like competence in SLA after this “critical period.” I demonstrate that individual variables such as training, instruction, L1-L2 correspondence and motivation are clearly influential factors in language learning besides age.

Key words: the Critical Period Hypothesis

Introduction

It is commonly believed that children can acquire languages better than adults. This “the sooner, the better” belief has prevailed in the language education field all over the world for a long time. It often happens that children who grow up in an L2 community can easily master a second language by exposure to it in their daily life, whereas their parents have difficulty achieving the same levels of mastery as their children. The factor which differs between children and adults, i.e., age, has been a big issue in the second language acquisition field since the influential work by Lenneberg (1967). He claims that “the language acquisition device, like other biological functions, works successfully only when it is stimulated at the right time” (cited in Lightbown and Spada, 1999, p.19). The Critical Period Hypothesis states: “a specific and limited time period for language acquisition” (Lightbown and Spada, 1999, p.19). In their study, Seliger, Krashen and Ladefoged (1975) argue that there is a correlation between the age of arrival in an L2 community and the degree of foreign accents. They concluded that puberty may be an important turning point in language learning and after this period non-nativeness cannot be easily overcome. However, in their study they found the following two exceptions: that postpuberty learners are successful in achieving native-like proficiency, while prepuberty learners feel that they have still foreign accents. Neufeld (1979), on the other hand, contended that postpuberty learners have not lost the ability to achieve native-like mastery of pronunciation in a foreign language in his laboratory experiment. In his study he examined 20 Canadian university
students under an intensive training in pronunciation skills and claimed the attainability of adult foreign language learners. Thus researchers are still debating the pros and cons of the maturational effects on language acquisition.

The purpose of this paper is to investigate the studies against the Critical Period Hypothesis. The questions discussed throughout this paper are: Is it possible to achieve native-like competence in second language acquisition after the Critical Period? Secondly, is age the only factor that affects second language acquisition? Finally, if age is not the only factor for language acquisition, what kind of factors other than age have already been examined in second language acquisition studies? Articles which are reviewed in this paper include those by Bongaerts et al. (1995), Ioup et al. (1994), Bialystok (1997) and Moyer (1999).

Review of Material

While researchers such as Seliger et al. (1975), Patkowski (1980), and Long (1990) support the idea of maturational constraints on language development, there are also quite a few who oppose the Critical Period Hypothesis.

Bongaerts et al., in Can late starters attain a native accent in a foreign language? (1995), suggest that postpuberty learners can achieve native-like proficiency in phonology. They found that learners after puberty attained a native accent in English.

This study included three groups of subjects: two groups of native Dutch speakers and one group of native English speakers. The latter group acted as a control group consisting of five native English speakers all of whom spoke without a noticeable regional accent (Group 1). All of them had a university background and their average age was 30 years old. One of the groups of native Dutch speakers consisted of highly proficient learners who could speak and write in English quite well. Their average age was 37 years old (Group 2). The second group of native Dutch speakers consisted of students and lecturers at a Dutch university and whose pronunciation of English ranged from slightly to heavily accented (Group 3). All subjects in Groups 2 and 3 were late learners who started learning English at or around age 12 and had already received seven to twelve years of formal English language instruction. The subjects were asked to conduct four speech tasks with four different degrees of pronunciation monitoring. Their speech samples were judged by four native speakers of British English with no experience in assessing pronunciation. None of the judges spoke with a noticeable regional accent. They rated each speech sample for foreign accent with a five-point scale. A score of one indicated a very strong foreign accent with five indicating no foreign accent at all.

The results showed that in the four rating tasks Group 2 outperformed Groups 1 and 3, the cell means of Group 2 being 4.31, while that of Group 1 being 3.94 and Group 3 being 2.35. The subjects in Group 2 belonged to the same range as those in Group 1, but those in Group 3 were outside the range of Group 1 and 2. What is most notable is that the four subjects who belonged to the ideal score were all from Group 2, excellent English learners, and not from Group 3, native English speakers.

They concluded that “there appear to be cases of ‘late’ second language learners who can pass for native speakers phonologically” (Bongaerts et al., 1995, p.43). They claimed that this study provides a challenge to Scovel’s hypothesis of a biologically constrained period for
the acquisition of phonology (Scovel cited in Bongaerts et al., 1995). Thus, special and intensive training in phonetics and pronunciation, they assert, may eliminate "the biological disadvantages of a late start" (Bongaerts et al., 1995, p.44). They suggested a detailed investigation of the cognitive and affective characteristics of excellent second language learners. They assumed the need to research how a learner's characteristics and variables of learning environment can make up for this disadvantage as well. They argue that the term 'critical period' should be replaced with that of the 'sensitive period' so as not to deny a probable advantage of an early start while at the same time allowing for the possibility of successful postpuberty learners.

Another study which examines the ability of late learners is *Reexaming the critical period hypothesis* (1994) by Ioup et al. They found that an exceptional adult learner could achieve native-like proficiency without formal instruction.

The subject of this study is Julie, who came to Cairo from Britain at the age of 21, and had been learning Arabic in a naturalistic environment for 26 years. In her process of acquisition, she always paid conscious attention to grammatical structures, fixed expressions, and idioms. Being interested in effective communication, but equally attentive to the value of grammatical correctness, she is good at imitating accents, and makes few mistakes in morphology and syntax. She can manipulate discourse structure without any conventionalized forms. They compared Julie with two native speakers of Arabic and a proficient learner, Laura, who learned Arabic under formal instruction. The following three elements were analyzed to assess Julie's linguistic competence: the quality of her speech productions, her ability to recognize accents, and her knowledge of syntactic rules.

The results show that both Julie and Laura were rated as native-like concerning speech production. Regarding accent identification, Julie achieved almost the same level of native speaker performance. Finally, as for grammatical intuition, there seems to be little difference between Laura and Julie, despite the former having received formal instruction and the latter having not. Moreover, the data indicate that Julie has better perceptual skills for accent identification than Laura and better command of manipulating discourse structure.

In a further discussion of their subject's success, the authors focus on the relationship between talent and the ability to achieve native-like proficiency. While they agree with Schmidt's hypothesis that conscious awareness of form is necessary for adults to acquire the redundant grammatical features of language (Ioup et al., 1994), they claim another factor for successful L2 learning: talent. Although it is still uncertain how the talented brain acquires language differently from the normal brain, they assert that if postpuberty learners have linguistic and memory abilities, there are exceptions to the critical period in which certain neurocognitive changes do not occur in the ordinary way in the brain as hypothesized in neuropsychological research (Ioup et al., 1994). They come to the final conclusion, however, that there is a significant difference between talented adult learners and L1 child acquirers in that even talented adults must pay conscious attention to grammatical form.

Bialystok, in *The structure of age: In search of barriers to second language acquisition* (1997), emphatically pointed out that there is insufficient evidence to claim that maturational factors affect
language acquisition primarily. She hypothesizes that "correspondence between language structures in the first and second language" (Bialystok, 1997, p.116), not the age of onset, is the most important factor affecting language acquisition.

She conducted two studies to investigate her hypothesis. The first study involved 26 university students who were native English or German speakers. She examined their ability to master the system of gender marking for nouns in French. The subjects had to conduct three tasks: the first, translating French sentences requiring knowledge of gender, the second, determining the gender of pseudo-words, and the third, regarding the relation between grammatical and semantic gender. The results demonstrated the importance of the correspondence between language structures in the first languages, English or German, and the second language, French. It is noteworthy that older individuals fared noticeably better—which is to say, in this study, age, as a factor, operated in the opposite way that the Critical Period theorists have come to expect. The second study involved 31 native Mandarin speakers with the different age of onset. She investigated their grammatical knowledge of English. The subjects had to discern grammaticality of 160 sentences. The results demonstrated that it is easier to judge grammaticality of the same structures in both English and Mandarin. What is more important is the correlation it showed between performance and the length of residence, (as opposed to the time of arrival).

In her discussion of the structure of age, Bialystok assumes that mental structures that reflect the linguistic knowledge affect second language acquisition. She mentions that there are two options available to learners when adapting the L1 mental structures to develop a linguistic representation of L2. The first option is extending "assimilation" and the second is "accommodation" (Piaget as cited in Bialystok, 1997, p.132). It is generally believed that adults tend to employ "assimilation" whereas children tend to create "accommodation." She claims, however, that it is the "stylistic differences in learning at different time in life," not "maturational limits on language learning" (Bialystok, 1997, p.132), that make different options between adults and children. Therefore, she believes that age is not a primary factor for second language acquisition and, likewise that L2 perfect mastery of late learners is not a mere exception limited to individuals with extraordinary talent. She argues, rather, that adult learners can achieve the same level of proficiency as children under favorable conditions.

The last study that I would like to comment upon is Ultimate attainment in L2 phonology (1999) by Moyer. Moyer argues that "it is questionable whether age should be examined in isolation from sociopsychological influences and the extent of exposure to the second language" (Moyer, 1999, p.81). She claims that individual factors affecting the acquisition process should be considered in studies of second language acquisition.

Her study involved 24 graduate students who are highly motivated German learners. They did not have any exposure to German before the critical period. The tasks for the subjects consist of word recitation, specific read-aloud items, and a free-response section. The subjects were asked to fill out self-reports concerning "biological variables", "affective variables" and "instructional variables" (Moyer, 1999, p.87). Four NS judges were asked to rate each speech sample based on a six-point scale, with 1 being definitely native
and 6 being definitely nonnative.

The results show that the mean ratings of four tasks indicate that nonnative speaker performance did not overlap with that of native speakers, but there is only a slight difference between those exposed to the target language at the age of 15, a mean rating of 5.25 and those exposed from 11 to 15, that of 5.09. Regarding “correlations and regression models” (Moyer, 1999, p.91), there are three primary factors: “age of immersion,” “presence of both segmental and suprasegmental feedback” and “motivation” (Moyer, 1999, p.94). Even though the subjects did not perform at the same levels as native speakers, “there was neither sharp decline nor unpatterned individual variation after age 15” (Moyer, 1999, p.95). As regards suprasegmental and segmental feedback, the subjects who received this kind of feedback scored closer to native speakers. With respect to motivation, the data show that it is the most significant variable affecting performance.

In further discussion of these three factors, Moyer claims that age of immersion, when correlated with other variables, might affect a mean rating or outcome, however, “its relative influence is marginal” (Moyer, 1999, p.94). She emphasizes that age of immersion is not an independent factor of less-than-native-like attainment and it should be correlated with interdependent variables such as motivation, affect to achieve native-like proficiency and instructional variables. She suggests that this study leads to include motivational and instructional influences although these two variables did not succeed in surpassing the impact of age factor. She proposes further research in these three elements: the first is investigating maturational effects further, the second is more thorough investigation of motivation for ultimate attainment and the third is “further exploration and experimentation regarding both the process of second language phonological acquisition, as well as the ultimate effects of overt training” (Moyer, 1999, p.100).

Discussion

As I have reviewed the literature documented in this paper, the Critical Period Hypothesis is a controversial issue to verify in terms of second language acquisition. The following discussion is an attempt to answer the questions posed at the beginning of this paper.

(1) Is it possible to achieve native-like competence in a second language acquisition after the Critical Period?

The evidence that I have reviewed in this paper clearly shows that it is possible for postpuberty learners to achieve native-like proficiency in a second language. The subjects in the study of Bongaerts et al. (1995), for example, are all adult learners who started learning English after puberty and had been exposed to formal English language instruction for five years or more. As they present the main conclusion that “there appear to be cases of ‘late’ second language learners who can pass for native speakers phonologically” (Bongaerts et al., 1995, p.43), this study can be considered as evidence that adults can achieve native-like competence in L2. Long (1983) assumes that instruction in the pronunciation of a second language does make a difference and that it will help children and adolescents as well as adults improve their proficiency in second language. Ioup et al. (1994), on the other hand, present a case in which an adult learner has achieved native-like competence without any formal instruction. They contend that “conscious awareness of form” has caused
the subject in their study to succeed in acquiring native-like proficiency. Taken together, these two independent studies verify that postpuberty learners can achieve native-like proficiency if they are consciously aware of linguistic aspects of the target language. If learners cannot become aware of them by themselves, it is necessary for learners to have special training so as to get consciously aware of these linguistic valuables as Long claims (1983).

As Scovel (2000) and many other researchers have pointed out, however, adult learners with native-like competence are still considered to be exceptions. Nevertheless, they are quite influential to SLA research. Therefore, rather than subscribing to the comparatively limiting concept of the Critical Period, a more accurate concept would be that of the “sensitive period, which does not exclude this possibility [the possibility that there are late learners who can learn to speak a second language without a foreign accent] and, at the same time, does not deny that there may be biological advantages to an early start” (Bongaerts et al., 1995, p.45). As Long (1990) suggests, “there is probably not just one sensitive period for SLA, but several” (p.274), making it natural that we take into account an innate age-related factor in second language acquisition. Therefore, taking into consideration the sensitive period hypothesis, I would maintain that, while it is still possible for postpuberty learners to achieve native-like competence in L2, it is perhaps easier for prepuberty learners to achieve native-like proficiency than adults.

(2) Is age the only factor that affects second language acquisition? If not, (3) What kind of factors other than age have already been examined in the second language acquisition studies?

If age were the only factor that affects second language acquisition, it would be impossible to verify the results of the studies that I have reviewed in this paper. Bialystok (1997) attributes the results of her study to the length of residence and learning the language, not to age of acquisition. Moyer (1999), on the other hand, claims that the influence of age of immersion is only “marginal” when other individual variables are taken into account. Furthermore, Gas and Selinker (1994) indicate that “At present there is no consensus at to why children are more able to achieve native-like fluency in a second language than are adults” (p.246). They argue that it is not age or maturation but L1 influence that dominates L2 acquisition.

These four studies reveal several factors other than age. Bongaerts et al. (1995) indicate the importance of special training in phonetics and pronunciation. Ioup et al. (1994) mention the value within L2 acquisition of instructional variables, such as “conscious awareness of form,” and individual variables, such as talent. Bialystok (1997) argues that L1 influence should be considered in the study of second language acquisition, – that is, the correspondence between language structures in the first and second language as an affecting factor for L2 learning. She also cites “stylistic differences in learning” (Bialystok, 1997, p.132) between children and adults as an important factor. Finally, Moyer (1999) investigates many kinds of individual variables and comes to the conclusion that instructional variables and motivation are the primary factors.

What other factors can be considered to be influential in second language acquisition? Lightbown and Spada (1999) mention “five main
categories: motivation, aptitude, personality, intelligence, and learner preferences” (p.51). Next I would like to discuss these five categories.

It is generally believed that when learners are more motivated, they can be more successful in second language learning. If a learner is interested in English music or movies, s/he might be eager to be able to have a better command of English so as to understand the language being used. An interest in English music or movies can be defined as “learners’ communicative needs” (Lightbown and Spada, 1999, p.56), – needs which might stimulate them to study English harder. However, research has not yet proved the correlation between motivation and successful learning (Lightbown and Spada, 1999, p.56). Therefore, as Gass and Selinker (1994) indicate, it seems to be rational that motivation can be “an impetus for learning, or perhaps even setting the stage for learning, but not as causing learning” (p.239).

Over the years many studies have been conducted using a variety of aptitude tests so as to inspect the relationship between success in language learning and intelligence. The significance of these studies is that teachers can obtain information about students in terms of their proficiency, as derived from the results of these tests. Such studies help teachers offer proper classroom activities for particular group of students (Lightbown and Spada, 1999). That is to say, intelligence and aptitude are correlated with instructional variables and therefore, all these should be considered as interactively affecting factors in second language acquisition.

One of the personality factors is extroversion versus introversion. People tend to think that extroversion might cause learners to succeed in language learning, but it is often not the case. Ioup et al. compared their subject, Julie, with Wes, described in Shmidt (cited in Ioup et al., 1994, p.92), pointing out that Wes’s extroverted characteristics did not help him succeed in acquiring accuracy in grammatical structure because extroversion leads to success in communicative ability, but not necessarily in grammatical accuracy. As Lightbown and Spada (1999) suggest, “it is probably not personality alone, but the way in which it combines with other factors, that contributes to second language learning” (p.56). It is thereby necessary to relate personality with other variables, including one of the major factors, age.

Learner preferences are correlated with both learning style and learner beliefs. Then they will influence the use of learning strategies that learners apply to develop their language skills (Gass and Selinker, 1994). For example, to visual learners, who can learn better with visual aids, a communicative approach without any visual information might not suit their learning. Therefore, learner preference as well as learning style and learner beliefs might have a strong relationship with instructional variables.

As we have seen, while age is one of the major factors that affect second language acquisition, there are other variables which are also quite influential in language learning. Lightbown and Spada (1999) point out that “these learners characteristics are not independent of one another: learner variables interact in complex ways” (p.68) and the research has not yet proved “which of these variables, in what combinations, and to what degree, are supposed to affect learning, and why” (Long, 1990, p.275). Therefore, it becomes important to interrelate age with other variables when we think about second language acquisition. It will give us a broader picture of how age and other learner variables interact with each other, without
narrowing our view on nonlanguage influences.

Conclusion

The four studies that I have reviewed in this paper are all cases against the Critical Period Hypothesis. Each of the papers demonstrates other influential factors in language learning, besides age. Bongaerts et al. (1995) emphasize intensive training in phonetics and pronunciation. Ioup et al. (1994) discuss the importance of conscious awareness of form, focusing as well on the influence of talent. Bialestok (1997) asserts that correspondence between language structures in L1 and L2 is an influential factor for L2 learning. Moyer (1999) assumes that interdependent variables, such as motivational and instructional ones, are the primary factors in language acquisition. Insofar as these four studies are successful in demonstrating cases of postpuberty learners who have achieved native-like proficiency in English, we can affirm that it is possible to achieve native-like competence in second language acquisition after the Critical Period.

On the contrary, because data in empirical studies verifying the case against the Critical Period Hypothesis are still limited, an achievement of native-like proficiency is still considered to be possible only for some “exceptional” learners (Scovel, 2000, p.217). However, this does not mean that these successful learners can be excluded in SLA research. As Neufeld et al. (1980) argue, “they [successful adult language learners] nevertheless deserve our attention from theoretical and practical standpoints” (p.107). Therefore, it is more appropriate to speak in terms of a “sensitive period” rather than the Critical Period when discussing language learning. In the absence of compelling data, however, it is plausible that children who are exposed to a second language in a naturalistic setting can achieve more native-like competence than adults who start learning a language after puberty. As Bialystok (1997) contends, “it is prudent to assume that successful second language acquisition remains a possibility for all those who have learnt a natural language in childhood and can organize their lives to recreate some of the social, educational and experiential advantages that children enjoy” (p.134).

The purpose of reviewing these four studies is to show that, while age is one of the factors affecting second language acquisition, other individual variables such as instruction, motivation, talent, learning style, L1 influence, and learner preference, also play respective influential roles in language learning. For this reason, from these researchers’ standpoint, it is important to group age with these other variables when we take them as being influential in SLA. Consequently, as the research data to date would seem to remain quite small concerning “successful” postpuberty learners, this author advocates conducting further research to elucidate more clearly the relationship between acquisition of the target language and these affecting factors as a whole.

Reference


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