The Critical Period Hypothesis in Second Language Acquisition: A Review of Thomas Scovel's Argument

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Anecdotal observance appears to confirm to us that, in second language learning, it becomes extremely difficult for us to acquire native-like proficiency once we pass a certain period of age. The period, which is commonly termed "the critical period" or "the optimal age," has been a great concern and aroused much discussion among the researchers of second language acquisition since Wilder Penfield first articulated the possibility of such a crucial time in terms of brain mechanisms in the 1950s (Scovel, 1988). Presupposing that a child is really more adept than an adult in language learning,Penfield attributed the child's superiority to brain plasticity, and Lenneberg endorsed the claim by examining the cases of (1) children who recovered from aphasia and (2) children who because of brain pathology had an entire hemisphere removed (Scovel, 1988: 55).

Thomas Scovel, one of the consistent advocates of this biologically or neurologically based critical period for language learning, wrote his first article on the issue in 1969, in which he argued that the inability of adults to master a language without a foreign accent should be related to the loss of brain plasticity, i.e., the completion of lateralization (1969: 252). Though his contentions were based on those of Penfield and Lenneberg, Scovel tried to clarify some points in the argument of a critical period. Specifying lateralization as a major neurological change related to language acquisition, he claimed that a critical period must correspond to the age of puberty because the onset of lateralization seems to occur around the age of twelve. Scovel also maintained that the validity of a critical period should be limited to just one aspect of linguistic skills, that is, phonology. There was no distinct evidence, he argued, which indicated that other linguistic skills like morphology and syntax might be affected by the loss of brain plasticity (1988: 59).

The critical period hypothesis, since Scovel illustrated it in his 1969 article, has been challenged, from a number of angles, by numerous researchers in the past two decades.For example, Hill (1970) introduces some anthropological data which suggest that there are tribal societies where adults (who are well over puberty) seem to acquire perfectly new languages, besides their native tongue. Krashen (1973) claims that the development of lateralization is complete by around five, that is, much earlier than

puberty and is thus not related to possible language learning difficulties people have after puberty. And Neufeld proposes that there should be some exceptional adults who can acquire a native-like accent in a second language, whereas Scovel (1969) does not allow for exceptions (Sekiya, 1988: 58). Further, Hakuta (1986) states that a critical period for language acquisition, if it does exist, might be validly explained by nonbiological (such as environmental or social) variables rather than biological reasons. Schumann (1975), by the same token, emphasizes affective variables, instead of biological ones, to account for the problems older learners after puberty have in acquiring a second language. Researchers like Stern (1976) and Walberg et al. (1978) express, more fundamentally, their doubts about the existence of a critical period. Stern cites Burstall's report which argues that the Penfield thesis that younger learners are more efficient cannot be supported: on the contrary, "the factor that matters most in language learning is *time,* not *age*" (1976: 287).

In his 1988 book Scovel synthesizes these and a considerable number of other discussions on the critical period hypothesis, most of which are cons, and tries to defend his interpretation of the hypothesis. Although the notion that humans have biologically timetabled constraints on language learning was widely accepted among educators and gave an impetus to the early-age bilingual programs in Canada in the 1950s, most of the later research, Scovel admits, has not been in favor of the idea, and today its advocates are in the minority (1988: 54 &140).

When we consider the process of second language acquisition, I believe we should not ignore or belittle the biological variables, which the critical period hypothesis represents, just because it appears almost impossible to experimentally prove their validity. Our experience and observation seem to tell us that, as well as social, affective, and cognitive factors, biological changes do play a decisive role in second language learning. On this condition, this paper will re-examine the arguments Scovel presents in his book, and review other related literature in order to understand how and to what extent the biological variables, in connection with other factors, should be taken into consideration in our study of second language acquisition.

Scovel's 1969 Article

In his 1969 article "Foreign accents, Language Acquisition, and Cerebral Dominance," Scovel posits as a fact that "adults cannot master the sound patterns of a second language with the fluency of a native speaker" (245). Questioning this premise, some later researchers claim that there are some adults who have acquired a second language to the extent that they can pass themselves off as native speakers. Hill tries to disprove Scovel's assumption by pointing out that "there are many societies where, unlike in the United States, the learning of new languages in both childhood and adulthood is widespread and thought to be perfectly ordinary" (1970: 240). Hill cites two anthropologists: Sorenson and Salisbury. Sorenson reports that in the northwest Amazon basin there is an Indian society where exogamy is practiced and "about two dozen mutually

unintelligible" languages are spoken, and that the Indians living in "patrilocal long-houses" acquire all the languages perfectly throughout their lives (Hill, 1970: 240). Salisbury's study informs us that in the Siane tribe of New Guinea where several languages are spoken, adults actively master new languages for achieving their "political" success (Hill, 1970: 242). However, as Sekiya(1988) points out, Hill's argument cannot be said to be fully credible because it depends upon second-hand episodic evidence. We do not have any means (for the present) to ascertain whether those adult second language learners who are reported to "have achieved native-like proficiency actually speak the language with native-like accent" (Sekiya, 1988: 69). Hill, herself, mentions that these data do not entirely answer our present concern, though further investigation of these societies will provide valuable information (1970: 241). In the 1988 book, Scovel treats Hill's paper "not as a rejection of the critical period hypothesis but as a reassessment of it," (90) considering her suggestion from a sociocultural viewpoint as worth noting when we discuss "accent" (90).

Neufeld's (1979) experiments seem to present the actual evidence for the counter-argument about the notion that no adult can acquire a second language without a foreign accent. In the 1974 study, twenty native speakers of English were given intensive pronunciation training in Japanese and in Chinese. The subjects were from 19 to 22 years old, that is, well past puberty (Scovel, 1988: 156). Three native speaking judges for each target language scored the subjects' utterances. Neufeld reports that "Eleven of the 20 subjects were judged to be native speakers of Japanese and nine were judged to be native speakers of Chinese, based upon their ability to imitate ten target utterances" (1979: 234). Neufeld conducted further experiments in which he used, instead of ten simple utterances, a corpus in French of approximately 150 words in order to see if the subjects could pass as native speakers of the target language "under rigorous conditions." He made 10 subjects (including 3 native speakers of French) read the corpus into a tape recorder. French-Canadian judges heard the 10 randomly arranged passages consecutively and decided whether each of the persons was "Francophone" or "Non-francophone." And Neufeld claims that, out of 7 non-native speakers, "five anglophones who had learned French as adults were consistently identified as native speakers of French" (Neufeld, 1979: 236). Scovel, however, criticizes Neufeld's experimental proceeding and does not take the results as convincing counterevidence for his premise (1988: 157-59).

The next point Scovel argues in his 1969 article is the inconsistency of the "nurture" theories which account for the discrepancy in language learning between children and adults: why can children master a second language with the native speaker fluency while adults cannot (245)? Wolfe and Geschwind are first taken up. Both of these suggest that the manner or mode of language learning in adults is different from that in children. While Wolfe uses the dichotomy of a child's "unconscious" vs. an adult's "conscious" learning, Geschwind defines a child's learning as "visual and tactile-auditory association," and an adult's learning as "auditory-auditory association." The presupposition of Wolfe and Geschwind is that children acquire a second language in a

natural informal setting, whereas adults learn it in a formal school situation. But Scovel rules out their presupposition because children also receive formal school instruction (consciously and by auditory-auditory association) and, unlike their older counterparts, are still able to master a second language without a foreign accent (246). Other "nurture" based theories such as Valette's first language interference and Newmarks's material presentation are also excluded, for their reasoning is weak. Thus, Scovel concludes that "no learning theory based solely on nurture can account for," explaining that child language acquisition is a *trait* while adult language acquisition is a *skill* (248). Because it is a trait, there is no room for nurture variables like intellectual capacity and social environment affecting language acquisition in childhood. All children, without exception, are endowed with the ability to master the language system completely. Nurture theories, Scovel acknowledges, are effective, "to some extent," only in explaining why some adult language learners become more skillful than others.

Despite Scovel's impassive treatment, nurture theories on second language acquisition have greatly evolved and produced a number of studies over the past two decades. Those studies are now classified into three arguments: (1) sociocultural, (2) affective, and (3)cognitive. Besides Hill whom we saw earlier, John Schumann (1975) has made a major contribution to the sociocultural argument. He explores how the degree and state of acculturation are related to the acquisition of a new language. Schumann states that "in order to become bilingual one must become a member of the target language community"(1975: 210), and therefore the success or failure of second language learning depends on the way one deals with the problems one might have in adapting oneself to the new community. His discussion naturally includes affective factors such as attitude, motivation and empathy as well. We will review his argument later.

Scovel is now ready to present his idea of what inhibits the ability of an adult to master a second language without a foreign accent. Because the "nurture" theories do not work, we are obliged to think that it is "nature" (or biological factors) which can account for the issue. As I mentioned in the beginning of this paper, Scovel, following the initial arguments of Penfield and Lenneberg, claims that the completion of lateralization is responsible for the loss of the ability to perfectly acquire the sound patterns of a second language. Accepting again Lenneberg's view, Scovel then states that lateralization has become permanent at about the age of twelve, that is, around puberty. Thus, it is proposed that puberty is the critical period after which it becomes impossible for humans to achieve the native speaker fluency in second language learning. The uniqueness of Scovel's idea is that he has confined the critical period only to the acquisition of sounds, whereas:

> Penfield does not limit this critical time of learning to one or two aspects of the language; he tends to see this period as being beneficial to the acquisition of *any* part of the language — from phonetics to semantics. (1988: 54)

Aitchison (1978) explains that it is a French physician, Marc Dax who first reported, in 1836, the dominance for speech of the left hemisphere. Dax came to this conclusion when he found that "paralysis of the right side of the body (controlled by the left hemisphere) was often associated with loss of speech, while patients whose left side (controlled by the right hemisphere) was paralysed could usually talk normally" (Aitchison, 1978: 56). In 1874, the British physician, John H. Jackson brought up the similar hypothesis:

> I hope to show two things — 1) that both halves [of the brain] are alike, in so far that each contains processes for words, 2) that they are unlike in that the left only is for use of words in speech and the right for other processes in which words serve. (Jackson, in Scovel, 1969: 250)

This historical recognition led Penfield, Lenneberg, and then Scovel to their biologically based critical period hypothesis a hundred years later. Scovel's argument, in the 1969 article, concerning the left hemispheric dominance for speech appears somewhat too simplistic, judging from our knowledge of today. Hatch (1983) mentions that the dichotic listening test and the visual test, which have been adopted to confirm the dominance for speech of the left hemisphere, have also suggested that "the right hemisphere does seem to be able to process language to some extent" (Hatch, 1983: 211). That is, the dichotic listening test tells the existence of a left ear advantage (right hemisphere) for some features of language like vowels, nasals, and intonation, while the visual test has revealed that the right hemisphere can deal with chunk-learned utterances, content words, and especially swear words (Hatch, 1983).

The completion of lateralization that localizes speech (and analytical functions) to the left hemisphere is then related to the inability of adults to acquire fluent, authentic pronunciation of a second language. Penfield's studies of aphasia make clear the difference of linguistic ability between children and adults. Children below the age of ten or twelve can relocalize speech functions to the right hemisphere and recover their language even though they suffer injury to the left hemisphere. But:

> After the age of ten or twelve, the general functional connexions have been established and fixed for the speech cortex. After that, the speech centre cannot be transferred to the cortex of the lesser side (right hemisphere)and set up all over again. This 'nondominant' area that might have been used for speech is now occupied with the business of perception.
>
> (Penfield, in Scovel, 1969: 251)

Referring to Lenneberg who indicates that the appearance of foreign accents co-occurs with the establishment of lateralization, Scovel concludes as follows:

> The simultaneous occurrence of brain lateralization and the advent of foreign accents is too great a coincidence to be left neglected.(252)

> ....it seems apparent that the *inability* of adults to master a language without a foreign accent after the age of about twelve is directly related to the fact that lateralization has become permanent.(252)

And the aforementioned point that Scovel has limited the critical period to phonology only is the most crucial factor in his version of the critical period hypothesis. He has been consistent in holding the notion up until today and uses it as a foundation in order to rule out all the criticisms in his 1988 book.

Scovel's 1988 Book: *A Time to Speak*

As Brown (1980) points out, Scovel's 1969 article became a prompt for other researchers to think over biological or neurological factors in language acquisition. No one, however, has been successful in finding out the definitive experimental evidence that supports the biologically based critical period. Thus, the idea, Scovel (1988) states, has turned "so generally unpopular, at least in North America" (186) at present, despite its initial promising signs. We will see how Scovel sticks to and defends his idea about the critical period regardless of the unfavorable situation, while some modifications are observed.

First, we need to know Scovel's understanding of language proficiency. In constructing his hypothesis that a critical period can be applied only to the sound patterns, not to the syntactic patterns of a second language, Scovel (1969) referred to Joseph Conrad as an instance. As it is well known:

> Joseph Conrad, who learned English when he was eighteen, was able to write fluently and creatively in English after a few years' practice. His prose demanded almost no grammatical editing, and yet his strong foreign accent prevented him from lecturing publically in English (Gerard 1967).(247)

This "fact," which he later terms the "Joseph Conrad phenomenon," constitutes a strong basis of Scovel's argument. The same phenomenon is also called the "Henry Kissinger effect" in honor of the famous American scholar whose English is superb except for his accent. It is not difficult to spot similar examples around us these days. For instance, the Japanese TV news correspondent whom we can often see interviewing Dr. Kissinger represents, I believe, the phenomenon. Thus, according to Scovel, even after puberty humans still retain "the potential for perfect lexical and syntactic performance" in a second language, though they cannot achieve perfect phonological learning any longer (1988: 65). I would like to agree with Scovel on this point, but Patkowski (1980) has doubts about the "Conrad phenomenon." He argues that Conrad could not be necessarily considered fully native-like in writing, and quotes Vonnegut:

> The writing style which is most natural for you is bound to echo the speech you heard when a child. English was the novelist Joseph Conrad's third language, and much that seems piquant

> in his use of English was no doubt colored by his first language, which was Polish. (Vonnegut, in Patkowski, 1980: 463)

Criticizing also the 1977 experiment which has confirmed to Scovel that there is no age limitation on the acquisition of vocabulary and syntax, Patkowski contends that the Scovel study shows that accent is more easily perceived than syntax by native judges, but it does not lead us to determine that "native-like syntactic proficiency is attainable by adults in a second language" (1980: 463). Coping with Patkowski, Scovel (1988) mentions Ioup's experiments which demonstrate that syntactic information is not as useful as phonological information to identify the native language of the subjects, which Scovel assumes would underpin the Joseph Conrad phenomenon. However, here it would be enough for us to note (rather than follow this issue further) that Scovel has singled out phonological ability and differentiated it from the others in examining second language proficiency.

Although Scovel's contention has not basically changed at all these twenty years, he now admits that there may be some exceptional adults who are not restricted by the critical period. Scovel does not, however, intend to compromise with the advocates of the weak version of the critical period hypothesis. As I mentioned earlier, he does not acknowledge Neufeld's claim that some adults can achieve native-like pronunciation of a second language if they are trained well enough. Scovel, likewise, rejects Seliger who, explaining the exceptions neurologically, claims that "almost 36% of a normal population may be said to have *potential* for hemispheric plasticity beyond puberty"(Seliger,in Scovel, 1988: 178).Thus, Scovel rules out conventional, that is, environmental or neurological explanations for exceptional cases in order to keep the consistency of his strong version of the hypothesis. What he does, ingeniously, is to employ the concept of normal distribution. Since "the outcome of almost all human behavior is a normal distribution" (Hatch & Farhady,1982: 63), Scovel proposes to apply the concept to the present problem as well. The negative exceptions such as autism, dyslexia, and more severe disorders, Scovel argues, would be considered to fall into the ranges of -2 and -3 standard deviations. And, when handling exceptions to the critical period, the other side of the bell-shaped curve should be taken account of. Scovel illustrates as follows:

> Exceptional language learners would naturally fall into the 2.14% of the population that comprises +2 standard deviations, and I would be willing to concede that superexceptional language learners, that is, adults who can learn a foreign language well enough after puberty to be misidentified as native speakers on a tape, would fit into the category of +3 standard deviations. From this, we can infer that about 0.13% of any population of adults, or about 1 out of 1000, are not bound by critical period constraints.(1988: 181)

In this manner, Scovel believes that he has succeeded in settling the matter of possible exceptions within the scope of his strong version of the hypothesis, and so he does not call this broadened view a modification (1988: 176). To me, however, the use of the term

"modification" does not seem unsuitable in such a case as this. In any case, if those exceptional adults do exist, Brown's following remark would represent our interest: "If we could only discover what those unique properties are!" (Brown, 1980: 49)

The next notable point in the 1988 argument is that Scovel frequently makes reference to ethological background. Although the idea of a critical period was borrowed from ethology, the study of animal behavior (Scovel, 1988; Hinde, 1982), Scovel did not touch on the discipline in his 1969 article. On the contrary, he spares one chapter of the 1988 book to illustrate the ethological studies of Frisch, Tinbergen, and Lorenz which "have given us the best evidence for critical periods in learning" (1988: 33). Scovel then refers to "imprinting" again in the final chapter to corroborate his claim. This focal shift, I believe, must have been induced by the fact that the causality between brain lateralization and the appearance of foreign accents has not been experimentally substantiated for the last two decades. Because, in spite of this fact, Scovel goes on to adhere to the biologically based critical period for language acquisition, it is not surprising that he has felt the need of returning to the other biological (ethological) foundations.

I would like to point out, lastly, Scovel's more open stance toward nonbiological variables in the acquisition of second language phonology. It is needless to say that nonbiological (such as social, affective, and cognitive) variables should play crucial roles in second language acquisition in general. But, as far as phonology is concerned, Scovel appears to imply that nonbiological factors are insignificant or at best of secondary importance in the 1969 article. As mentioned before, Scovel understands that language acquisition in childhood is biologically predetermined, in other words, a *trait*, therefore "the child is able to master the language system completely, regardless of his intellectual capacity or his social environment" (1969: 248). Namely, Scovel in 1969 believes that all humans before puberty, who are yet free from critical period constraints, impartially have the ability to learn a language without a foreign accent. However, twenty years later, his assesment of social and affective variables has turned more affirmative, as one of his conclusions of the 1988 book shows:

> The existence of a critical period does not mean that mere exposure to a language before puberty will ensure a native accent; it is a necessary but not sufficient criterion for ultimate linguistic success. Here is where affective, social, and motivational variables, among others, are of great import.(1988: 185)
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> (Emphasis, mine)

We can see Scovel's concern about affective variables in his 1978 article, in which he deals with the relationship between anxiety and language acquisition behavior. The article seems to have been written in concert with other major studies on affective and social factors in second language learning in the 1970s. I will have a look at the affective argument, before concluding this paper, in order to gain a more holistic view toward Scovel and his critical period hypothesis.

Affective Variables

Schumann (1975) argues that the development of "language ego" (the notion proposed by Guiora) may well account for difficulties in second language learning after puberty. In parallel with the acquisition of his native language, the child gradually develops his language ego and completes it around the age of puberty. Language ego, thus, can be defined as one's identity molded and prescribed by one's native language. Then, the establishment of language ego means the formation of language boundaries around the self. And it is the language boundaries that keep adults from acquiring native-like pronunciation in a second language:

> In the early stages of development the boundaries of the language ego are in a state of flux and, hence, pronunciation ability is quite malleable. One clear manifestation of this state of affairs is the child's relative ease in assimilating native-like pronunciation in a foreign language. Once these boundaries become set, in terms of the degree to which they will be allowed to fluctuate under normal circumstances, the ability to approximate authentic pronunciation in a second language will be drastically reduced. (Guiora et al., in Schumann, 1975: 223)

Guiora et al. have shown, in their well-known experiment, that the adult can recover temporarily the permeability of the boundaries by the use of alcohol (Brown, 1980). A group of subjects given small quantities of alcohol seemed to be able to dismantle the ego boundaries, for in a pronunciation test in Thai, they performed significantly better than a group of sober subjects. Recovering ego permeability can be paraphrased into lowering the inhibitions or increasing empathic capacity, and thus, these notions such as ego permeability, inhibitions, and empathy are considered as the key affective variables to effect the success in second language performance, especially in articulatory tasks.

It is not very difficult to follow the affective argument thus far, but when they contend that "essentially, to learn a second language is to take on a new identity" (Guiora et al., in Schumann, 1975: 223), their discussion seems to become ambiguous. Schumann states that ego permeability should be fostered so that "the learner is able to partially and temporarily give up his separateness of identity from the speakers of the target language (Guiora et al.) and to incorporate a new identity so essential to bilingualism" (Schumann, 1975: 231). What I believe is problematic is that while the notion of a "new identity" is introduced, no researcher has made clear what he means by it. Based on Guiora's view, Schumann also claims:

> Children do generally learn a second language without an accent, becoming bilingual does seem to involve taking on a new identity, "foreign accents" are difficult for adults to overcome, and the desire to take on a new identity (integrative motivation) is often associated with successful second language acquisition.(1975: 224)

Do Guiora and Schumann imply that we have to abandon our language ego, that is, as

seen before, our identity molded and prescribed by our own language, if we want to acquire native proficiency in a second language? If, as Guiora says, to learn a second language is to take on a new identity, do we come to have two identities through learning a second language? Unless the term "identity" is precisely defined in the field of second language acquisition research, I do not think that we can mean anything substantial by saying "to take on a new identity." It might be admissible if we understand that Guiora and Schumann refer to another additional language ego when they mention a "new identity." In my understanding, language ego should be subsumed under "identity," instead of treating them on equal terms. Thus, it seems more reasonable to assume that to learn a second language is not to take on a new identity, but to add one more language ego within the same identity.

The problem of language and identity is naturally pressing to immigrants and their children. In their case, becoming a member of the country they have immigrated to involves, literally, giving up their native language, and accordingly their "former identity." To immigrants and their children, acquiring a second language, which is to be their new native language, is not adding a language repertoire. It is, in most cases, the process of breaking away from the yoke of the country from which they emigrated. It is naturally accompanied by the constant and painful self-negation of their native language, values, and identity. Hakuta (1986) has reported on such an agonizing transformational process experienced by a son of Mexican immigrants in the Sacramento area of California. To the boy, Richard Rodriguez who "grew up speaking only Spanish at home," learning English entailed "leaving the security of his ethnic home to become a member of American society" (1986: 170). Rodriguez came to distinguish between the two spheres of his life, the private and the public. One sphere linked up with the language of his home (Spanish) and the other corresponded to the language of his public persona (English):

> Spanish was family, protection, intimacy. English was the outside, the public, the unfamiliar. As young Rodriguez progressed through school, he went through a transformation from a Spanish to an English identity. "Nights when relatives visited and the front rooms were warmed by Spanish sounds," he wrote, "I slipped quietly out of the house"(p. 51). This shift was encouraged by his parents, who despite their own lack of control of English accepted the advice of the Catholic nun teachers at his school to make every effort to speak English at home. Dinner-table conversation ceased as his parents mumbled their English. The parents were even willing to take the scorn of their intimates to let "Ricardo" become "Richard."(Hakuta, 1986: 170)

Young Rodriguez had to endure the contempt by relatives and family friends when he could not answer their questions in Spanish. His public identity was, as it were, developed at the expense of a private one, in order to attain social success. The similar painful acculturation process can be observed in a Japanese boy, Shin, who stayed, with his family, in Michigan for about a year (Kikuchi, 1987). Shin, who was nine years old, first enrolled in the ESL class and moved to the grade class, where he had a great deal of frustration and anger with himself as well as with others, since his American teachers

and peers expected him to behave in their way. Kikuchi, his mother, states that "the full membership in the new language community demanded of him a new identity separated from his native L1 identity" (1987: 81). When getting through this hard experience, Shin became "an accepted member of the L2 community" and "began to speak and behave like his peers in the classroom and on streets" (81-2), whereas his father, a 'visiting professor' and his older sister, a senior in a public school remained "visitors" in the L2 community.

It is not conceivable that when Guiora and Schumann claim that "to learn a second language is to take on a new identity," they expect every second language learner to undergo the same agonizing process of immigrants. As we have seen above, such thorough acculturation seems to be possible, if at all, only for children. And, according to their argument,unless a person has integrative motivation, i.e., the desire to become a member of a second language society, he or she cannot attain native-like pronunciation. However, the ambiguity of the term "identity" prevents us from drawing a conclusion here.

The difference between children and adults in the ability to acquire native-like proficiency seems to be too dramatic to be explained only by nonbiological, nurture variables. In this sense, the lack of decisive experimental evidence might not necessarily undermine the validity of Scovel's biologically based critical period hypothesis. Our experience tells us that without some "internal" change, whether it is lateralization or the loss of neuromuscular plasticity, as Brown (1980) argues, the sudden inability after puberty in acquiring native-like phonology cannot be well accounted for. Will the further study of brain waves not provide us with some clue to the critical period hypothesis?

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