

[Articles (論説)]

A Polyglot's Perspective on the Age Factor in Foreign Language Acquisition

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Abstract

There is a plethora of literature on the age factor in foreign language acquisition (often referred to as Second Language Acquisition or SLA). The main focus tends to be on the Critical Period Hypothesis (CPH) for SLA, which proposes an age limit for native-like acquisition. From the perspective of a polyglot who has learned/used multiple languages in diverse situations over the past 40 years, the argument for a CPH seems more like a rationalization for non-success rather than a serious scientific hypothesis. There is also a lot of disagreement in the applied linguistics community, with some authors rightly claiming that “the idea of a critical period specifically for language development may have had its day” (Singleton and Ryan 2004:227). No researcher is without personal perspective as there is no such thing as pure objectivity. However, it is not simply an issue of creating and following the most objective research methods as possible. There are the issues of what questions to ask and how the results should be interpreted. The ability to perform both these critical research tasks in applied linguistics focusing on additional language acquisition (beyond L1 or one's first language) can be greatly enhanced by personal success in acquiring additional languages. Unfortunately, as is seen in the discussion of the relevant research literature in this paper, some of the strongest proponents of the CHP for SLA do not have this experience. This paper offers a perspective on the CPH literature enhanced by personal experience in living and functioning abroad in multiple and diverse languages and cultures.

Introduction

There is a wide diversity of language learning beliefs including beliefs about the possibility of becoming a native-like speaker, the relative difficulties of languages, the importance of explicit grammar study, etc. One of the most pervasive beliefs concerns alleged age-related limitations. In this paper it is argued that the alleged existence of a critical period for acquiring additional languages, or the more common term – second language acquisition (SLA), is nothing more than a rationalization since any alleged age-related factors are not insurmountable barriers, rather they represent specific challenges that are correlated with age but vary greatly according to the accumulated experience, attitudes, other affective factors, and habitual traits of the individual learner. A

critical period for acquiring additional languages must preclude success at ages beyond the alleged, usually very poorly defined, critical period. Every age offers advantages as well as challenges.

In the case of life-long learners/users of multiple foreign languages (successful polyglots), age can offer great advantages allowing for the accumulation of experiences and knowledge that facilitate learning additional languages. From a personal perspective, with 40 years of experience in learning/using foreign languages in multiple contexts, I am a better language learner now than I had been at any previous age. Another person my age with no experience in learning foreign languages would obviously face a different age-related effect and easily come to the conclusion or belief that the ability to acquire additional languages is biologically linked to age. Beliefs concerning a critical period for acquiring additional languages acquisition should be seen as part of a belief system that may become self-fulfilling reality due to the power of our beliefs in determining success or failure. There is plethora of books and articles concerning the Critical Period Hypothesis (CPH) for SLA. The objective of this paper is to examine some of the most salient arguments for and against the hypothesis while considering how the lack of personal experience of the hypothesis proponents has apparently affected their analysis and conclusions.

Questioning Conventional Wisdom

Conventional wisdom often says that when it comes to learning a foreign language, the younger the better. But conventional wisdom, as argued in the popular book *Freakonomics*,¹ is often wrong. Humans are social beings and nurturing relationships are a core need, particularly during the formative years of childhood. The language(s) of significant others, particularly caregivers, is usually acquired with apparent ease during this period. However, without motivation stemming from this interactional instinct, most attempts to teach a foreign language to a child will be limited in effectiveness. This view was also expressed by one of the world's most renowned polyglots, Kató Lomb (1995),

My objection to early foreign language instruction is that it's rarely effective. The time spent with parents or grandparents hardly leads to a direct result. As far as a child is concerned, the mother, father, grandmother, and grandfather are established, 'programmed' for the

¹ A book by Steven Levitt and Stephen Dubner in which they turn conventional wisdom on its head.

mother tongue; they are embedded in its context. Yet, I believe that if one parent is a native speaker of a language foreign to the environment, let him or her make use of the opportunity provided by the still perfectly pliable mind. The result may come out only years later, when the child sets out to learning consciously and with motivation, but it is still something. (p. 52)

There is a strong emotional appeal associated with the critical period hypothesis for second language acquisition (SLA-CPH)² as a rationalization for failure to become fluent in foreign languages. When families move to a new language/cultural environment, adults often see their children make much faster progress in acquiring the new language. Marinova-Todd, Marshall, and Snow (2000) accept that generally adults achieve lower levels of proficiency than younger learners do, but they attribute this to contextual rather than to biological factors. They claim that those favoring the CPH fall victim to three fallacies.

The first fallacy is misinterpretation of observations of child and adult learners, which might suggest that children are fast and efficient at picking up second languages. Hard data make it clear that children learn new languages slowly and effortfully - in fact, with less speed and more effort than adolescents or adults. When a family moves abroad to a different cultural/language environment, differences in child and adult acquisition usually reflect psychological and social factors that may favor child learners. For example, children may be more motivated to fit in with their per groups in terms of accent. In addition, in such situations children are often placed in more situations where they are forced to communicate in the foreign language.

The second fallacy is misattribution of conclusions about language proficiency to facts about the brain; connections between brain functioning and language behavior will no doubt in time be confirmed, but their exact nature cannot even be guessed from the data currently available on brain functions in early versus late bilinguals. Furthermore, as discussed below, the current evidence suggests how language is processed in the brain is not so much of an age-dependent phenomenon and more of a level-of-attainment phenomenon

Finally, the third common fallacy is reasoning from frequent failure to the impossibility of success and this fallacy has dogged second language research.

² SLA-CPH is used in order to distinguish between this concept and that of Lenneberg (1967) who hypothesized that language (first or primary language) could be acquired only within a critical period, extending from early infancy until puberty. PLA-CPH is used when it seems necessary to stress the focus on primary language in relation to the CPH.

Most adult second language learners do, in fact, end up with lower-than-native-like levels of proficiency. But most adult learners fail to engage in the task with sufficient motivation, commitment of time or energy, and support from the environments in which they find themselves to expect high levels of success. This misemphasis has distracted researchers from focusing on the truly informative cases: successful adults who invest sufficient time and attention in second language acquisition and who benefit from high motivation and from supportive, informative second language environments. Marinova-Todd, Marshall, and Snow (2000) assert that influence of age should be examined in terms of how it may relate to availability of authentic input, instruction, interaction, etc., as well as the learner's intention to attain a certain level. Only through careful measure of L2 experience these aspects can be ascertained.

Piller (2002) also argues that the widespread assumption that the SLA-CPH is valid accounts for the disregard for successful advanced second language learners. Additionally, she points out that many textbooks used in applied linguistics draw upon Long's (1990) overview article on SLA-CPH, which argues for maturational constraints on language development. Piller's (2002) data suggests that age is not the critical factor in reaching high levels of L2 proficiency as it is often portrayed to be.

Rather, personal motivation, choice, and agency seem to be more crucial in ultimate attainment. Indeed, expert L2 users themselves often distinguish between a point in their lives when they first started to learn it. For many of my participants this latter point coincides with the time when they met their partner, but for others it is job-related or due to some other emerging interest in the target country and culture. (p. 201)

Continuous learning of multiple languages and interaction in multiple cultural environments helps maintain a high degree of the neuroplasticity related to foreign language acquisition. This assertion is supported by the research that indicates older brains can be revitalized through 'mental training or workouts' to produce functioning characteristics that closely resemble or even exceed those of younger brains (Smith et al., 2009; Willis et al., 2006). My own experience as well as that of my polyglot colleagues indicates that if there is a strong desire to become fluent in multiple languages, adults have some clear advantages over children in terms of potential metacognitive and metalinguistic awareness (how languages function and similarities between languages). I argue that, given a group of people encountering a new language and culture under similar conditions, the main reasons for individual differences in foreign language

acquisition are mainly related to motivation, flexibility of linguistic/cultural identity, emotions, openness, along with other psychological and affective factors, as well as knowledge, explicit/implicit awareness (from experience) about how to learn languages (metacognitive knowledge).

A Brief Overview of the Neurological Evidence

The evidence in relation to neuroplasticity, discussed in Keeley (2016), indicates that there are no neurological insurmountable barriers to becoming fluent in a foreign language as an adult. Below is a brief overview of that evidence as well as the evidence concerning the neurological benefits of multilingualism. Clearly, in many ways, the adult brain of a multilingual develops a different trajectory compared to the lifelong monolingual.

1. Pascual-Leone et al. (2005:378-379) declare that *plasticity is an intrinsic property of the nervous system retained throughout a lifespan and it is not possible to understand normal psychological function or the manifestations or consequences of disease without invoking the concept of brain plasticity*. They stated that we should think of the nervous system as a continuously changing structure of which plasticity is an integral property and the obligatory consequence of each sensory input, motor act, association, reward signal, action plan, or awareness. In this framework, notions such as psychological processes as distinct from organic-based functions or dysfunctions cease to be informative. Behavior will lead to changes in brain circuitry, just as changes in brain circuitry will lead to behavioral modifications.
2. *As the brain ages, functionality may decline, maintain, or even improve*. While it is true that processing speed generally slows with age, it is possible to revitalize older brains through 'mental training or workouts' to produce functioning characteristics that closely resemble or even exceed those of younger brains (e.g., Smith et al., 2009; Willis et al., 2006). Certain types of functioning improve with age such as integrated functioning, and flexible problem solving (Anderson et al., 2008).
3. *We can impact how our brain ages*. Perhaps the most profound conclusion in recent years is the notion that there are things we can do to maintain our brain and potentially protect it from certain types of cognitive decline (National Institute on Aging).³

³ <http://www.nia.nih.gov/alzheimers/publication/preventing-alzheimers-disease/search-alzheimers-prevention-strategies> Accessed Feb. 28, 2016.

4. Bialystok et al. (2010) conclude from multiple studies that *lifelong bilingualism confers protection against the onset of Alzheimer disease*. The effect does not appear to be attributable to such possible confounding factors as education, occupational status, or immigration. All other things being equal, bilingual people with dementia start having problems with cognitive function four years later than do their monolingual counterparts. Bilingualism thus appears to contribute to cognitive reserve, which acts to compensate for the effects of accumulated neuropathology.
5. *The cognitive benefits of bilingualism (or multilingualism) apply not only to those who are raised from birth speaking a second language, but also to people who take up a foreign tongue later in life; also the more languages the better*. Perquin (2011) also demonstrated in a study involving 230 men and women with an average age of seventy-three who had spoken or currently spoke two to seven languages that speaking multiple languages may lower the risk of developing memory problems. People who spoke four or more languages were five times less likely to develop cognitive problems than those people who only spoke two languages. Furthermore, people who spoke three languages were three times less likely to have cognitive problems compared to bilinguals.
6. *How language is processed in the brain is not so much of an age-dependent phenomenon and more of a level-of-attainment phenomenon*. Research carried out by Leonard et al. (2011) clearly demonstrates it is the lack of proficiency rather than secondary acquisition order that determines the recruitment of non-classical areas for word processing. In other words, the more fluent a person is in an additional language, the more word processing in the brain resembles that of the mother tongue. Hesling et al. (2012) examined brain mechanisms underlying the processing of connected prosodic speech comprehension in moderately- and highly-proficient late second language learners. A main finding was that L1 (native language) and L2 (additional language)-connected prosodic speech stimuli were found to share the same neural network encompassing both the dorsal and ventral pathways in highly-proficient L2 subjects. Furthermore, a positron emission tomography (PET) study of a subset of late bilinguals who managed to become extremely fluent in their L2 demonstrated that the cortical representations of L1 and L2 were indistinguishable from and similar to those of native speakers (Perani et al., 1998).
7. Mechelli et al. (2004) also conclude that *the degree of this structural*

reorganization in bilinguals is correlated with their second language performance. They note that their results are consistent with growing evidence that the human *brain changes structurally in response to environmental demands.* The size of and shape of areas of the brain respond to how they are used. Maguire et al. (2000) demonstrated navigation-related structural change in the hippocampi of London taxi drivers.

8. *There is also evidence that restructuring or the creation of grey matter is not just a result of long-term language acquisition.* Kwok et al. (2011) concluded that the adult human brain is capable of new rapid growth when exposed to stimuli similar to what babies experience as they are learning from their environment.
9. Osterhout et al. (2008) studied second language learning and changes in the brain. They investigate how modern brain-based methods can be used to discern some of the changes that occur during L2 learning (L2 indicating second language). According to the authors' conclusions in the paper, *their results suggest that the brain of an adult second-language learner is a highly dynamic place, even during the earliest stages of L2 learning.*
10. Crinon et al. (2009) identified regional structural differences in the brains of native speakers of a tonal language (Chinese) compared to non-tonal (European) language speakers. Importantly, *the effects were found in both native Chinese speakers and European subjects who learned Chinese as a non-native language in adulthood,* illustrating that they were language related effects and not ethnicity effects. On the basis of prior studies, they suggested that the locations of these grey and white matter changes in speakers of a tonal language were consistent with a role in linking the pitch of words to their meanings.
11. Merzenich et al., (1996) conclude that *it is possible to teach anyone to speak an accentless second language as an adult with proper training.*
12. Iverson (2005), of the UCL Center for Human Communication, echoed the same conclusion at the "Plasticity in Speech Perception 2005" workshop.⁴ He asserted that the *our ability to hear and understand a second language becomes more and more difficult with age, but the adult brain can be retrained to pick up foreign sounds more easily again.* It was also noted that this observation builds on an important new theory that the difficulties we have with *learning languages in later life are not biological and that, given the right*

⁴ International Speech Communication Association (ISCA) workshop on plasticity in speech perception held by UCL at Beverage Hall, Senate House, 15 th - 17 th June, 2005.

*stimulus, the brain can be retrained.*⁵

A Critical Period for Primary Language Acquisition vs. a Critical Period for SLA

The critical period hypothesis (CPH) for language acquisition was first proposed by neurologists Penfield and Roberts (1959) and later popularized by Lenneberg (1967). It should be noted that the focus in both these cases was on first or primary language acquisition (PLA-CPH). Proponents of both the PLA-CPH and SLA-CPH often seek to defend the hypotheses based on comparisons with maturational constraints seen in the animal kingdom (e.g. Pinker 1994). However, in doing so they should consider that critical periods in biology are typically characterized as follows (Singleton & Ryan, 2004:32). (1) They relate to very specific activities and behaviors. (2) Their duration is limited within well-defined and predictable termini. (3) Beyond the confines of the period in question the relevant behavior is not acquired. In other words, if one argues for the existence of a critical period for primary language acquisition on biological foundations and then seeks to offer this as theoretical evidence for a critical period for second language acquisition then there should be a clear well-defined period after which it is impossible to acquire a second language to the extent that the competence and performance equals or exceeds that of primary acquisition. Examining the literature proposing a SLA-CPH reveals that there is an incredible lack of consistency; there is much debate over the timing of the critical period with respect to SLA, with estimates ranging between 2 and 13 years of age; for example, Paradis (1999) and Loewen & Reinders (2011).

Thus, linking primary and secondary language acquisition in terms of a critical period opens up a relatively easy way to falsify the latter. Force those who advocate such a connection to provide a well-defined and predictable age for the SLA-CPH. Then require the proponents to offer performance criteria for judging whether or not someone performs like a native speaker. In studies that claim to support the SLA-CPH, such criteria usually include syntactic judgments, semantic interpretations, and phonological capabilities. As for the last category, some studies focus on what might be referred to as accent, which is much more subjective than the previous two criteria. Nevertheless, this can be operationalized as whether or not the adult learner/user can pass as a native speaker in terms of accent as judged by the natives speakers using the target

⁵ <http://www.sciencedaily.com/releases/2005/06/050615060545.htm> Accessed Feb. 12, 2016.

accent in the target language.

Studies focusing on age of SLA in the context of immigration, such as the often cited Johnson and Newport (1989), are really only exploratory in nature. In other words, such studies can only suggest that age might be a factor in SLA. The abstract of Johnson and Newport's study clearly states that it is theoretically based on Lenneberg's hypothesized PLA-CPH. Thus, on the surface the study is claiming biological constraints as the basis for the SLA-CPH. However, the methods of the Johnson and Newport's study surely do not coincide with the theoretical foundations of biological constraints or biologically based critical periods.

So what methods are required if Lenneberg's PLA-CPH is the basis for SLA-CPH? In some shape or form, such studies should focus on falsifying the hypothesis and not trying to rely on correlations between age and the results on the test criteria mentioned above. Instead, there should be an exhaustive search for the best among the best 'non-native' adult acquirers of the target language. Why, because it only takes one example to falsify the SLA-CPH based on Lenneberg's PLA-CPH if it really a scientific hypothesis and not a myth. As for the representative native speakers, at one extreme there could be a search for the worst of the worst native speakers for comparison. Some might object to this method even though it fits the theoretical criteria as long as the native speakers do not suffer from any verifiable biological developmental deficiencies. To make it more convincing to some skeptics, a proxy for the native speaker could be a large random sample of native speakers. However, unlike the process for choosing the non-native speaker in the study, the native speaker should not be the best of the best in terms of the measurements used. Why, because if social, psychological, and affective factors are not involved then any native speaker without biological developmental deficiencies could serve as a comparison. Even intelligence should not be a factor selecting native speakers if you believe in all the arguments Pinker (1994) makes for the so-called language instinct.

Yes, it certainly gets messy and seemingly unscientific. That is why Singleton (2005) claims that the SLA-CPH is misleading since there is a vast variation in the ways the critical period for second language acquisition is understood and such variation fatally undermines the status of the SLA-CPH as a scientific hypothesis.

Issues with Native Speaker Comparison

As mentioned above, when investigating the SLA-CPH it is necessary to consider some inherent difficulties in trying to compare a non-native speaker with a native speaker of a given language. How do we define the 'ideal or generic native speaker' against whom the foreign language learner/user can be compared? The concept of 'native speaker competence' is theoretically very closely related to the SLA-CPH. Large differences among native speakers of a given language have been reported for the ability to give syntactic judgments (Snow, 1975; Snow & Meijer, 1977) and semantic interpretations (Gleitman & Gleitman, 1970). Evidence concerning such variation among native speakers is important to the assessment of the SLA-CPH because if native speakers who have had all the advantages of the alleged full critical-period exposure to the first language do not achieve equal skill levels, then the fact the post-critical period learners show a range of skill levels is not surprising (Snow and Hoefnagel-Höhle, 1978). Furthermore, individual differences in second or additional language acquisition have been found to correlate with individual differences in native language ability.

Even within a given dialect, style, and register, clearly there is no single viable model of a native speaker since monolingual speakers of these dialects vary greatly in their command of their language in terms of vocabulary, adherence to grammatical form, eloquence, social pragmatics, etc. In reality non-native speakers can potentially and at times do surpass many native speakers in various domains of the target language. It would be interesting to use syntactic judgment and semantic interpretations with a group of highly educated non-native speakers of English and compare the results with a random group of an average high school in the US. Davis (2003) highlights the problem of defining the native speaker with the following metaphor:

The Native Speaker, like Lewis Carroll's *snark*, is a useful and enduring linguistic myth; again, like the snark, itself is the product of the debate over idealism in philosophy, it must be taken with a large pinch of salt. (p. 92)

⁶ For example Bongaerts et al. (1997); Nikolov (2000); Bellingham (2000); Neufeld (2001).

Some More Arguments and Studies Refuting the SLA-CPA

A number of studies⁶ suggest that adults are in fact capable of attaining a native-like accent, which runs counter to the claims of SLA-CPH. Nikolov's study (2000) is particularly interesting in terms of her interpretation of the data (observations). Her study involved thirty-three successful language learners aged 20 to 70, all of whom had acquired their target language after puberty. Of these, twenty were of native speakers of various languages learning Hungarian and thirteen were of native speakers of Hungarian learning English. As judged by three groups of native speakers, six of the learners of Hungarian and five of the learners of English were either generally or often mistaken for native speakers. She observed that, "these successful language learners want to sound like natives, they share intrinsic motivation in the target language which is often part of their profession, or they are integratively motivated ... They work on the development of their language proficiency consciously and actively through finding chances for communicating with speakers of the target language, reading and listening extensively..." (p. 122). In summary, desire (or passion), integrative motivation, diligence, and effective use of opportunities to practice the target language were all important variables leading to success in the study.

Birdsong (2005:125) is also very critical of the SLA-CPH and insists that any number of exogenous and endogenous variables may come into play that can flatten the slope of decline and result in significant numbers of learners attaining native-like ability. Many other researchers (e.g., Epstein, Flynn, and Martohardjono, 1996; Hakuta, 2001) have also rejected the SLA-CPH for numerous other reasons. For example, identification of older learners who achieve native-like competence in a second language and behavioral evidence that fails to reveal a qualitative change in learning outcomes at the end of a putative period have been used to challenge the SLA-CPH. It is suggested by Bialystok and Hakuta (1994) and Flege et al. (1999) that among social factors, the amount of the second language education is the strongest predictor of second language acquisition. Amount of language use varies among immigrants because they have different experiences, are qualitatively and quantitatively exposed to different levels of the new language, and have different opportunities for formal study of the language. Flege (1987) strongly states, based on a review of the relevant literature, that the SLA-CPH is misguided:

An examination of the existing empirical and theoretical literature leads to the conclusion that there is no conclusive support for the existence of

a critical period for human speech learning, and that assuming a critical period does exist may inhibit the search for testable hypotheses concerning the basis for observed adult-child differences in L2 pronunciation. These conclusions are based on the existence of direct counter-evidence, as well as the observation that apparent adult-child performance differences may arise from many different confounding factors other than differences in neurological maturation or organization that cannot be adequately controlled in behavioral research. (p. 162)

One of the Most Cited Studies in Support of the SLA-CPH

Johnson and Newport (1989) focused on the age of arrival of immigrants in order to examine the SLA-CPH. They studied 46 native Chinese or Korean speakers who arrived in the United States between the ages of 3 and 39 and had been living there between 3 and 26 years at the time of testing. Since, according to Google Scholar, this article has been cited 2038 times by February 19, 2015, it is important to examine the validity of the inferences and conclusions drawn in this paper in particular. The subjects were tested on a wide variety of structures of English grammar. The test results showed that the earlier arrivers had reached higher levels of final proficiency in English than the later arrivers. Test performance was linearly related to age of arrival up to puberty; after puberty performance was low but highly variable and unrelated to age of arrival. Newport and Johnson claim that the age effect was shown not be an inadvertent result of differences in the amount of experience with English, motivation, self-consciousness, or American identity. They conclude that the results support the contention that a critical period for language acquisition extends its effects to second language acquisition.

Specific to Johnson and Newport's conclusions⁷, Bialystok and Hakuta (1994) point out that age of exposure, duration of exposure, and social and linguistic backgrounds of the participants are possible confounding factors. However, perhaps the most important problem with Johnson and Newport's conclusions is their claim that the age effect was shown not to be an inadvertent result of differences in amount of experience with English, motivation, self-consciousness, or American identity. Only the following four questions were employed to measure these social, psychological and affective (SPA) factors:

⁷ Johnson & Newport (1989).

- 1) How strongly do you identify with American culture?
- 2) Did you feel self-conscious while you were learning English in the United States?
- 3) Is it important to you to be able to speak English well? (to assess motivation)
- 4) Do you plan on staying in the United States? (to assess motivation)

When using psychometric instruments, it is common practice to use multiple questions to form scales for each factor under investigation. Using only one or two questions does not allow for creating a reliable scale and is considered highly unreliable for measuring a factor. It is plainly very poor research design. In contrast, the instrument used in a study carried out on SPA factors affecting foreign language acquisition measured 16 factors by employing a total of 159 questions items (Keeley 2013, 2014). Additionally, there were six extra questions used to measure different types of motivation. The results of the study clearly show that identity and self-confidence (an alternative way of measuring self-consciousness) were crucial factors affecting oral performance.

Another important point is that there are other SPA measurements that should be made besides the three Johnson and Newport chose to measure in their study. Moreover, even though identity and self-consciousness were measured using one question each, both of these factors added prediction value to the regression model. One would have to wonder what would be the case if they were measured properly. Furthermore, in email correspondence with Newport (July 19, 2013) in which I discussed my objections to the CPH she responded,

The questions of neuroplasticity and learning are my interests – not really second language acquisition, which shows more modest effects of these variables (perhaps due to the presence of another early language) and is not my area of expertise. I'm sure that many variables affect second language acquisition, only one of which might be age. Multilingualism, I would imagine, changes age effects quite substantially.

This is quite an interesting response given that Johnson and Newport's 1989 study is one of the most often cited in support of a SLA-CPH for second language acquisition. She is quite right to conjecture that multilingualism changes any possible age effects but it also nullifies any conjectured age-related limitations that are held to be true by people who hold onto the myth of the SLA-CPH. Here we clearly see the problems that occur in research design and analysis when the researchers lack personal experience in successful language acquisition.

Perpetuation of the SLA-CPH Myth

Pinker can serve as a perfect example of how the lack of having acquired oral proficiency in at least one additional language can result in a lack of important insight, intuition, and holistic understanding of language acquisition in general and SLA in particular. Since his book *The Language Instinct* (1994) became a best-seller it largely contributes to the perpetuation of the SLA-CPH myth. Pinker's Harvard bio⁸ states: "Steven Pinker was born in 1954 in the English-speaking Jewish community of Montreal, Canada. He earned a bachelor's degree in experimental psychology at McGill University ..." Perhaps the phrase "born in the English-speaking Jewish Community" is included in order to offer a rationalization for not learning French. Is it meant to imply that during Pinker's alleged 'critical period' (however long that is construed to be) he had minimal contact with the majority of the dominant French-speaking community? Pinker does not believe motivation and other SPA factors are significant. To Pinker by far age of exposure accounts for the degree of acquisition. However, in reality, the reasons accounting for Pinker's failure to become a fluent speaker of French are surely social, psychological and affective factors. His stressing of 'English-speaking Jewish community' reflects the construction of a social, psychological, and attitudinal barrier to the dominant French spoken around him and not a realistic physical or geographic barrier – SPA factors!

An examination of the arguments made by Pinker (1994:290-296) in the section of his book *The Language Instinct* directly addressing the SLA-CPH reveal an extremely biased and ill-informed attempt to belittle the role of SPA factors. He begins with "Everyone knows that it is much more difficult to learn a second language in adulthood than a first language in childhood" (Ibid:290). This is a common way to introduce the subject for people who seek rationalizations beyond their control in SLA – it has strong emotional appeal. Actually, most polyglots or people with substantial multilingual/multicultural experience find it quite easy to learn additional languages. If Pinker means truly a person's 'second language' and not 'second' in terms of SLA, which is sometimes used to also signify all additional language acquisition (3rd, 4th, and so on), then it is true that one's second language can appear difficult. Nevertheless, this claim is spurious and based on the fallacious assumption that we all learn our first language quickly and easily as discussed above. Additionally, the fact that adult polyglots usually

⁸ <http://stevenpinker.com/biocrv> Accessed May 11, 2016.

learn new languages quickly and easily (much faster than is possible for young children) nullifies this argument in support for the SLA-CPH.

Then Pinker (Ibid:290) continues his argument with “Most adults never master a foreign language, especially the phonology - hence the ubiquitous foreign accent.” Pinker offers the American actress Meryl Streep’s attempt at a British accent in *Plenty* as evidence of failure. Whether it is true or not that most adults do not succeed is immaterial if Pinker is arguing that it represents evidence for SLA-CPH. It is not a game of averages or percentages, it only takes one example of an adult learning succeeding in all these areas to prove the hypothesis is false in absolute terms; and there are many such examples throughout the world. Besides the academic studies mentioned offering evidence that adult learners can pass as native speakers, there are cases of double agents who spend many years passing as a native speaker in languages they have acquired as an adult.⁹ As shown in the quantitative study presented in Keeley (2013, 2014, 2016) and other qualitative evidence, linguistic/cultural identity, in particular, along with other SPA factors determine accent in a foreign language.

Pinker (Ibid:290) then offers the following unsupported conclusion, “Many explanations have been advanced for children’s superiority: they exploit Motherese, make errors unself-consciously, are more motivated to communicate, like to conform, are not xenophobic or set in their ways, and have no first language to interfere. But some of these accounts are unlikely, based on what we know about how language acquisition works. For example, children can learn a language without standard Motherese, they make few errors, and they get no feedback for the errors they do make. In any case, recent evidence is calling these social and motivational explanations into doubt (sic). Holding every other factor constant, a key factor stands out: sheer age.” Pinker dismisses social, psychological and affective factors by simply stating “based on what we know about how language acquisition works.” In other words, Pinker is referring to many of the strongly disputed aspects of Chomsky’s Universal Grammar. Furthermore, recent evidence confirms social and motivation explanations rather than calling them into question.

Then Pinker (Ibid:291) states “More systematic evidence comes from the psychologist Elissa Newport and her colleagues. They tested Korean- and Chinese-born ...” Here Pinker is only offering one study, Johnson and Newport

⁹ For some references refer to such articles as <https://www.psychologytoday.com/blog/life-bilingual/201201/the-linguistic-and-cultural-skills-sleeper-agents> and <https://www.psychologytoday.com/blog/life-bilingual/201412/passing-native-speaker> Accessed April 29, 2016.

(1989). As discussed above, this study offers little or no support for the validity of SPA-CPH.

Thereafter, Piker (Ibid:293) writes, “In sum, acquisition of a normal language is guaranteed for children up to the age of six, is steadily compromised from then until shortly after puberty, and is rare thereafter. Maturation changes in the brain, such as the decline in metabolic rate and number of neurons during the early school-age years, and the bottoming out of the number of synapses and metabolic rate around puberty, are plausible causes.” Here Pinker is just demonstrating the degree of his ignorance about neuroplasticity and using the validity of some of his statements about neuroplasticity as a rationalization by assuming that they are significant factors in regards to SLA.

Pinker (Ibid:294) then offers some insight to why he never even learned French, “Even if there is some utility to our learning a second language as adults, the critical period for language acquisition may have evolved as part of a larger fact of life: the increasing feebleness and vulnerability with advancing age that biologists call senescence.” Obviously Pinker cannot fathom the innumerable benefits of multilingualism and multiculturalism. Due to his total lack of personal experience in foreign language acquisition, Pinker fails to realize that life-long learners and users of multiple foreign languages do not weaken in their ability to learn and use foreign languages. On the contrary, my personal experience shows that for the last four decades since my late teens I have continuously become more adept at learning and using foreign languages.

Another example of a researcher perpetuating the SLA-CPH myth is Patricia Kuhl (2004, 2007, 2010), not just in the academic literature but also to more general audiences in her public lectures, some of which are on YouTube. Kuhl has done excellent work on describing the social aspects of language acquisition. However, unfortunately she has linked her findings with the SLA-CPH, most likely, as in the case of Pinker, due to lack of personal experience in successful acquiring and functioning in foreign languages.

Viewing Kuhl’s presentation at the University of Washington on “Early Childhood Development: Early Learning, the Brain and Society” on the Internet¹⁰, I made a number of observations. She presents a graph concerning the alleged ‘critical period’ for acquiring a second language. With age on the X-axis and ability on the Y-axis, the graph indicates that the ability to learn is at its peak from

¹⁰ https://www.youtube.com/watch?v=_T9OKKITsHs has basically the same content as the one I originally saw, which seems to have been taken down. The priming of the audience with “you all know how difficult it is to learn a foreign language” is not in this video but she still makes the same arguments. Accessed April 12, 2016.

infancy till about the age of 7 and then it steeply falls until it reaches the age of about 17 where it is at a very low level in relation to the peak (almost touching the bottom of her graph!). First, it should be noted that before she comments on her graph she says, “you all know how difficult it is to learn a foreign language.” This primes the audience’s emotions for accepting the existence of the SLA-CPH, just as Pinker did in his book in introducing the subject. As has been pointed out, successful learners and users of multiple foreign languages often find such arguments absurd since they do not coincide with their experience. If I were talking to a room full of polyglots I might say, “and you know how easy it is to learn a cognate foreign language.”

So what does ‘ability’ actually imply? In many areas of foreign language acquisition, adults have much greater potential than children. If ‘ability’ refers to being able to rapidly expand vocabulary in a foreign language that has a lot of cognates with a language or languages already known, then multilingual adults have much greater potential to increase their lexical inventory. Furthermore, at the age of 7 a child has not had enough time to gain the experience (context) necessary to understand a significant portion of the vocabulary available to an adult. A monolingual 7 year-old child who successfully learns Japanese as a foreign language most likely only develops an ability comparable to 7 year-old native Japanese speakers.

If ‘ability’ means the potential to understand grammar through explicit learning, then the adult is far superior. Note that some proponents of the SLA-CPH are under the mistaken impression that adults do not have access to the implicit learning of grammar. Not only do adults have the potential for implicit learning in foreign language acquisition,¹¹ they have much greater potential for explicit learning. If ‘ability’ implies mimicking native accents, children statistically appear to be better at it than adults; however, there is significant variation among children and adults in this respect so obviously there are not some insurmountable neural or physiological limitations involved. By far the strongest deterrent of accents is self-identity and ego permeability (Keeley 2013, 2014). Learning changes the neural networks in the brain at any age and brain plasticity can be enhanced at any age beyond the developmental years. In relation to the neurological factors related to phonetic properties of a given target language, Kuhl concedes that adults could be successful in distinguishing unfamiliar sounds in a foreign language if some of the principles of early learning are applied.

¹¹ For example, studies by Rebuschat & Williams (2009, 2012) provide evidence for the implicit learning of nature language syntax among adults.

Kuhl bases her argument on observations that the neural networks of the child are being committed to the properties of the native language. She observes that as the neural network grows and develops in infants it begins to interfere with the acquisition new languages. These conclusions concerning neural networks becoming fixed inhibiting foreign language acquisition with particular reference to phonetics are based on Kuhl's research team's study of how infants figure out which sounds their native language uses and how to differentiate between them. In laboratories in various countries across the globe they seek to understand which sounds babies initially hear (show indications of distinguishing between them) and this changes as the infants acquire a particular language. Until about 6 months of age, Kuhl says babies are 'citizens of the world', meaning that they can discriminate the sounds of all languages. She claims that as adult speakers of one or two languages we discern the sounds that are critical to our languages but find it very difficult to discriminate the sounds that are critical to other languages if they do not exist in the language(s) adults speak. This statement is true, however, the ability to discriminate such sounds can be developed at any age with experience, mindfulness, and willingness.

So she poses the question "when do children become culturally bound listeners like adults" and she says the answer is before their 1st birthdays. She demonstrates that at 6-8 months Japanese infants and American infants are more or less equal in their ability to distinguish the difference between /ra/-/la/. However, at 10-12 months of age American babies get much better and Japanese babies get a lot worse (the distinction is critical in English but not Japanese). These and other observations lead to Kuhl make the general conclusion that as native language learning begins foreign-language abilities decline. In actuality it is simply showing that as discrimination of native language sounds increase, discrimination of some foreign language sounds decrease. She cites this as evidence of the critical period. However, adults who successful discriminate sounds (not critical to their native tongue) in languages learned after this so-called critical period demonstrate that new neural networks can be formed. Notice that she wisely uses the term 'culturally bound' listeners. This is not only an indication of the strong link between culture and language; it also underscores the importance of cultural and linguistic identity as well as social factors.

Kuhl reasons that the babies are taking statistics on the sounds that they hear. By doing a kind of distribution frequency analysis the babies figure out where is it that most the vowels occur in their language. They develop the categories or boundaries for the sounds that most often occur in their language,

which later restrict what sounds they can distinguish. The babies are listening to the 'motherese,' the special language spoken to infants by adults. Tests in the laboratory show that babies greatly favor this slow well-articulated infant-directed speech with its rich change in tones to the faster more tonally bland adult directed speech. The over articulated speech directed towards infants makes it easier for babies to recognize the sounds critical to their language. The articulation has also been found to be useful in teaching a foreign language to an adult. The stretching of the vowels, or example, helps them get around the neural networks that they have developed for their native language.

On the other hand, autistic children prefer a computer analog of infant-directed speech of actual speech produced by mothers. Note that non-autistic babies prefer the live 'motherese' even when it is not their own mother speaking. Though during her presentation Kuhl did not go on to speculate why autistic children prefer computer analogue speech, she does assert in her written works that children with autism exhibit twin deficits in social cognition and language due to social factors gating language learning. Autistic children's deficiencies in dealing with emotions highlight the importance of empathy, emotional sensitivity, and emotional intelligence in foreign language acquisition.

Next, Kuhl shows that better native speech sound perception (distinguishing between similar sounds) at 7.5 months predicts faster language growth measured in terms of the words the infant is able to produce at 24 months of age as well as sentence complexity at 30 months. On the other hand, nonnative sound discrimination at 7.5 months, when the babies are still in the 'global citizens phase', also predicts future language development, but in the opposite direction. Those infants that are better at non-native sound discrimination produce fewer words at 24 months of age. This observation shows that when neural commitment begins, the move towards giving priority to sounds of their native language, native language development begins in the infants.

Kuhl then did experiments to show that at the age between 8 to 10 months of age American babies learning English as their mother tongue were able to perform as well as Taiwanese babies in discriminating sounds in Chinese after only 12 sessions of being exposed to Chinese in play sessions with native speakers. Subsequent experiments showed that the same results were not attained if the sessions involved introducing exposure to Chinese with DVDs created to be stimulating for this specific purpose as well as when audio tapes were used. There was absolutely no learning using the audiotapes and almost the same results for the captivating DVDs. Thus, it is clear that social interaction is critical

to this learning process. Kuhl proposes that the social brain might 'gate' the computational mechanisms of learning. In other words the social brain focuses on what is important from a social or human relations standpoint.

Furthermore, Kuhl investigated if babies' social interaction skills predict how much they are going to learn from a foreign language. It showed that measures of social interaction predict the degree to which their abilities show an increase from exposure. The experiments also showed that the 12 sessions of exposure to a foreign language improves infants' cognitive skills, in particular executive function and the direction of attention. In her presentation Kuhl mentions that she is unable to distinguish between tones in Chinese that distinguish otherwise equal sounds that her Taiwanese students say has the same degree of difference as the 'r' and 'l' sounds in English. Though she did not state the distinction couldn't be learned as an adult, many people interpret her whole discussion about the 'critical period', when neural networks are being formulated in infancy, to indicate that it is impossible to do as an adult. Actually she only says it becomes difficult – in her words 'you are fighting against nature'.

Is it really fighting against nature? Could it not be a lack of the motivation, the willingness to establish new cultural and linguistic identities, and deep desire to create new deep human bonds with representatives of different cultural and linguistic groups? Obviously, an infant needs bonding and once this is satisfied the innate desire tends to recede in intensity. In their book, *The Interactional Instinct* by Lee, Mikesell, Joaquin, Mates, and Schumann (2009:5) state, "Crucial for language acquisition is what we call an interactional instinct. This instinct is an innate drive among human infants to interact with conspecific caregivers." They go on to explain on pages 6-8 that, in their model for the neurobiology of social affiliation, intensively rewarding aspects of the attachment bond become part of the child's sociostatic memory and serve as the template for subsequent affiliative relationships. They argue that children are more advantaged at language learning because their brains are more suitable for this task (response to affiliative stimuli). However, they then state that under conditions where social and emotional affiliation with target language speakers is sufficiently strong, aspects of the mechanisms underlying the interactional instinct (in particular, affiliative aspects) may be activated in ways that facilitate second language learning. So I would conclude that any possible critical period for the authors is based on the degree of the desire for social and emotional affiliation (integrative motivation) and the willingness to create new linguistic, social and cultural identities.

As an adult, I have learned a number of tonal languages that have systems

that are differentiated in some aspects from one another in terms of the number of tones and their characteristics (Chinese, Thai, Lao and Vietnamese at this point in time). Though it was a challenge at first perseverance and attitude have led to a high degree of success. I have observed the same degree or even higher degrees of success in other adult learners. It is interesting to note that I can mimic certain sounds that are distinguished in many northern dialects of Chinese but not southern dialects. When I point out the difference to Chinese speakers of southern dialects often they are not able to perceive or mimic the sounds. I attribute this to identification with and ensuing emotional attachment with their linguistic reference group rather than some insurmountable neural network developmental state. They may be limited by their existing neural networks at any given moment; however, it is certainly possible to learn to distinguish between these sounds and mimic them at any age. In the process of doing so, we create and reinforce new neural networks.

Conclusion

In spite of the beliefs of many unsuccessful and frustrated adult learners of foreign languages, the evidence of any critical period hypothesis is very weak to say the least. Though many studies focusing on age of arrival in a foreign country do demonstrate correlations with the results of evaluations of proficiency in the foreign language, this does not confirm any type of biological critical period for acquiring new languages. In other words, there are a multitude of non-biological factors that can clearly account for associations between age and the degree of success in foreign language acquisition. Most adult learners fail to engage in the task with sufficient motivation, commitment of time or energy, and support from the environments in which they find themselves to expect high levels of success. The evidence of life-long neuroplasticity is overwhelming and indicates that the age-related issues associated with non-success in foreign language acquisition are social, psychological and attitudinal in nature.

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