The Critical Period Hypothesis Revisited

Christo Moskovsky
Department of Linguistics, University of Newcastle
Christo.Moskovsky@newcastle.edu.au

1. Introduction

The Critical Period (CP) Hypothesis in essence contends that the ability to learn a language is limited to the years before puberty after which, most probably as a result of maturational processes in the brain, this ability disappears. Since Penfield & Roberts (1959), and especially since Lenneberg (1967), this has been one of the most hotly debated issues in psycholinguistics and, generally, in cognitive science. In an already imposing body of literature on CP there are a large variety of views on the nature of the phenomenon (e.g. whether it is a critical, a sensitive, or an optimal period), on its origin (e.g. whether it is caused by maturational or cognitive or some other factors), on its onset and completion times, etc. and, while the importance of such issues is acknowledged, they will not be addressed here. The principal goal of this paper is rather to consider some of the existing arguments against CP for second language (SL) acquisition in a framework which, following some recent proposals (e.g. Bley-Vroman 1989, Schachter 1996), assumes that first and second language acquisition are two fundamentally different processes.

Nowadays there seems to be a wide acceptance that there is a CP for first language (FL) acquisition, with compelling evidence that, unless they are exposed to language in the early years of life, humans lose the ability to learn a language, especially its grammatical system. The situation with (adult) SL acquisition however appears to be far less clear. While it is true that very few adult SL learners achieve native competence in the SL, some competence is nevertheless acquired, which seems to go against the notion of a biological constraint on language learning. It is true that prepubescent learners as a rule achieve higher levels of proficiency in the SL than adult learners and that generally only very young starters can hope to achieve native competence in the SL. Critics of the CP hypothesis however point out that the attested age-related decline in adult SL learning ability is too gradual to be seen as the result of a critical period. They also point to the nature of errors which adult SL learners have been found to make: more often than not these errors affect SL structures which are different from the learners' FL. If a biological constraint was at play–critics have argued–then SL learners should make errors across the board, not only where the learners' FL and SL differ.

The issue of CP is closely related to the issue of access to Universal Grammar (UG) in SL learning: a CP hypothesis would entail that after a certain age (e.g. early teens) UG is no longer available. Following the Fundamental Difference (FD) hypothesis proposed in Bley-Vroman (1989), the paper assumes that, in contrast to first language acquisition, SL learning uses the FL (rather than UG) as a knowledge base and involves general (rather than domain-specific) cognitive procedures. The paper argues that such an approach provides a neat account for some of the issues claimed to be problematic for the CP hypothesis.

2 Critical period for first language acquisition

Nowadays there appears to be a wide acceptance of the idea that FL acquisition is subject to maturational constraints. As Long (1990: 256) points out, the homogeneity of the process in terms of onset, rate, sequences, age of completion, level of ultimate attainment, etc. across cultures and environments suggests that it is biologically scheduled. In addition, there is an increasing body of evidence from a variety of sources, such as FL acquisition by linguistically isolated children (the so called *feral children*, among whom the tragic

Genie is the best documented case), acquisition by hearing children of deaf adults, by deaf children of hearing adults, late acquisition of American Sign Language, etc. all of which lend support to the CP hypothesis for FL acquisition. An excellent review of such evidence is provided in Long (1990) therefore there is no need to go into further detail here, but a study which appeared subsequent to Long (1990), viz. Grimshaw *et al.* (1998), is worth mentioning because it presents a case of a linguistically isolated deaf individual whose linguistic deficiencies were remarkably similar to those of Genie despite the fact that he shared none of Genie's adverse circumstances providing "converging evidence for the existence of a critical period for first-language acquisition" (p. 250).

3 Critical period for second language acquisition

The issue of CP for SL acquisition is considerably less clear and remains among the most hotly debated issues in SL research. It should be noted that a CP for SL acquisition does not necessarily follow from a CP for FL acquisition. The latter means that there is a limited period in the early years of life when individuals can exercise a (special) language learning ability, and if this ability is not exercised (e.g. as a consequence of linguistic isolation during this period), it dies away and can never again be exercised. In the case of SL acquisition, we have individuals who have successfully exercised their language ability during the CP and have attained the normal high level of competence in their FL. The crucial question here is: does the language ability inevitably die away after the CP irrespective of whether it has been exercised during the CP or not? In the absence of compelling evidence to the contrary, we cannot discount the possibility that, once the language ability has been exercised, it stays alive.[1] For many, the fact that, in contrast to late FL starters, adult SL learners can achieve a very high level of competence in the SL can be seen as evidence favoring such a position. Others have pointed to the highly variable success rate in SL learning and the widely known fact that native competence in the SL can only be achieved by very young starters, suggesting that maturational constraints apply to SL learning as well.[2] There have been a number of studies (e.g. Oyama 1976; Patkowski 1980, 1994; Johnson & Newport 1989, Thompson 1991, among others) showing a distinct advantage of young children over adult SL learners with regard to ultimate attainment. While such studies have often been the target of severe criticism for being methodologically flawed, no one actually seems to dispute the generalization that on average children achieve higher levels of SL proficiency than adult learners. According to critics of the CP hypothesis, however, this alone cannot be taken as conclusive evidence for the existence of maturational constraints on SL acquisition. Bialystok (1997: 117) argues that this is a descriptive generalization which may be statistically correct, but from which "nothing inevitable follows". The crucial question then seems to be not so much whether children are more successful SL learners than adults, but rather whether it is impossible for adult SL learners to achieve native competence in the TL, because, as Long (1990: 274) puts it, "[t]he easiest way to falsify [the CP hypothesis] would be to produce learners who have demonstrably attained native-like proficiency despite having begun exposure well after the closure of the hypothesized sensitive periods". There have been several experimental studies in recent years (Birdsong 1992, Ioup *et al.* 1994, Bongaerts *et al.* 1995, White & Genesee 1996) in which the researchers identified–usually after rigorous screening - some highly proficient SL learners whose exposure to the SL had only begun in adulthood, and using various experimental techniques (more often than not, grammaticality judgements) compared their competence in the SL to that of native speakers. The results from these studies appear to indicate that achieving native competence by adult SL learners, while extremely rare, is not impossible, thus arguably proving that the CP hypothesis does not hold for non-primary languages. Other serious arguments against CP for adult SL acquisition have been raised as well. Bialystok and Hakuta (1994) re-analyse the data presented in Johnson & Newport (1989) and argue that there is no evidence for an

[1] A position often referred to as the 'exercise hypothesis' (see e.g. Johnson & Newport 1989, Long 1990)

[2] A position often referred to as the 'maturational state hypothesis' (see e.g. Johnson & Newport 1989, Long 1990)

abrupt change in language ability after puberty, only for a very gradual decline which 'projects well into adulthood' (Bialystok 1997: 122). Such findings, according to Bialystok, can hardly been seen as evidence in favour of a biological constraint on language ability which ends around puberty or shortly afterwards. Furthermore, Bialystok and Hakuta found that only some of the SL structures tested in the Johnson & Newport study showed age-related effects: those were as a rule SL structures which were different from the subjects' FL. On the face of it, for a CP based account of age-related differences in SL learning, this is a rather unexpected finding as one would rather assume that a biological constraint would affect language structures across the board. In the forthcoming discussion I will show that under the FD hypothesis none of these arguments presents a problem for CP for non-primary languages.

4 Access to UG, the FD Hypothesis and CP for SL acquisition

There are a number of striking aspects of FL acquisition: the learners involved are very young and cognitively undeveloped, and yet they learn a very rich and highly complex hierarchically structured communication system; they learn this system in the absence of sufficient evidence about basic properties of the system; they are insensitive to correction or instruction; individual cognitive ability, motivation, social status, etc. play no role; learning involves no visible effort; they can learn **any** language they are exposed to, with equal ease; all learners unfailingly manage to acquire complete competence; the whole process is largely uniform in terms of onset and completion times, developmental sequences, etc. across cultures and environments. In the light of these facts, the nativist position that language acquisition is guided by an innate domain-specific mental faculty (UG) seems highly plausible and has been the prevailing position in the last fifty years or so.

In the field of SL acquisition in recent years one of the most debated and investigated issues has been whether SL learners have access to UG, the same way as FL learners do. Those assuming continued access to UG (see e.g. Cook 1993, Cook & Newson 1996, Epstein *et al*. 1996, White 1996, among many others) have argued that input limitations pose the same learnability problems for both first and second language learners suggesting that language learning outside of UG would be impossible. In addition, there have been proposals (e.g. Schwartz 1989, cited in Eckman 1996) pointing to the undeniable advantage of a unified theoretical account of language acquisition (first, second, etc.) and arguing that theoretically 'access to UG' is the default position, i.e. the one that must be assumed in absence of evidence to the contrary.

While nativist approaches have strongly dominated the field, there have been a few dissenting voices asserting that an 'access to UG' position for SL learning is justified neither empirically, nor theoretically (Bley-Vroman 1989, Clahsen & Muysken 1986, Eckman 1996, Schachter 1989, 1990). Eckman provides a compelling argument that from a theory-building point of view an 'access to UG' position[3] is in no way more justified than a 'no access to UG' position[4]. Bley-Vroman contends that empirically first and second language acquisition are marked by fundamental differences which indicate that they are essentially two different processes. Indeed, a comparison between the two shows that (adult) SL acquisition manifests very few of the remarkable properties that are characteristic of FL acquisition: in SL acquisition there is very little uniformity; individual cognitive ability, motivation, social status, etc. play a significant role; learning involves a serious effort; SL learners are not 'equipotential' (Schachter 1996: 159) for any natural language: learners find languages which are typologically closer to their first language easier to learn, and generally achieve higher levels of proficiency in such second languages (in addition, the learner's FL has been found to exert substantial influence on both SL competence and performance); results from recent experimental studies (e.g. deGraaf

[3] *Special nativism* in his paper
[4] *General nativism* in his paper

1997) suggest that SL acquisition is sensitive to instruction and correction; very few (if any) SL learners manage to acquire complete competence in the SL. For an approach assuming that first and second language acquisition are essentially the same (i.e. both involving UG), such differences are rather unexpected.

The Fundamental Difference hypothesis proposed by -Vroman (1989: 50-54) assumes that both first and second language acquisition involve a linguistic knowledge base and a set of cognitive procedures but that these are different in the two types of language acquisition: FL acquisition relies on UG as an innately specified linguistic knowledge base and a set of domain-specific learning procedures (e.g. an innate language acquisition device, or LAD); in contrast SL acquisition relies on the learner's FL as a linguistic knowledge base and a set of domain-general learning procedures. This proposal is extremely appealing in a number of ways: it provides a neat account for the rather striking differences between first and second language acquisition, and eliminates some of the most serious arguments against a CP for (second) language acquisition.

The FL as a knowledge base is clearly an invaluable aid for the SL learner as it contains most of the universal properties of language as specified in UG. Problems for the SL learner arise from the fact that not all of UG is encoded in the FL;[5] furthermore, FL knowledge involves a lot more than UG: it contains a number of language-specific features which are subject to substantial crosslinguistic variation. If SL acquisition involves the FL as a knowledge base (as assumed in the FD hypothesis then it is not unlikely that the ability to utilize this knowledge will vary among individual learners (Bley-Vroman: 53) which would contribute to the variable success attested in SL acquisition. It also stands to reason that: (1) all things being equal, learners will be more successful with second languages which are typologically closer to their first language (i.e. lack of equipotentiality) and, (2) the first language will affect the nature of the attained second language knowledge. And this is exactly what happens: learners generally achieve more with typologically closer second languages (see e.g. Ringbom 1987 and the sources cited there), and the influence of the 1st language can be observed at all language levels (phonological, syntactic, semantic, pragmatic).

The FD hypothesis also posits a set of domain-general cognitive procedures for SL learning in the place of the domain-specific LAD operating in FL acquisition. In other words, SL learning is simply one manifestation of general cognition and is therefore no different from any other type of general learning. In terms of the characteristic features of SL acquisition (briefly mentioned above) which distinguish it from FL acquisition, such an assumption is highly plausible. Adult SL acquisition has a number of properties which are typical of any area of general learning. There is significant variation in the success rate of learners.[6] Complete mastery of a specific discipline is possible, but extremely rare – usually associated with exceptional talent in that particular area. Any area of general learning involves a large number of interacting social and psychological variables (such as educational level, intelligence,[7] personality type, motivation, attitudes, learning strategies, learning goals, etc.) which have been found to determine the learner's degree of success (or failure). Instruction can play an important facilitative role. Prior learning experience contributes to success. There is an age-related decline in cognitive ability with the general result that as a rule older learners do not achieve as highly as younger learners.

Returning to the CP polemic, it seems that an FD based approach will also eliminate some of the major arguments against a CP for SL acquisition. In this approach, a CP will mean that after a certain age UG and LAD will no longer be available to the language learner; it will not mean that language learning will be altogether impossible. Therefore the fact that

[5] It has been argued, for instance, that some languages (Korean) do not involve the Subjacency Principle

[6] in any area of general learning we can expect to get the normal bell-shaped distribution of achievement: some low achievers, some high achievers, with the rest falling in-between

[7] Aptitude (or propensity) for language learning is according to some (e.g. Skehan 1985) one of the best predictors of success in SL learning; no one considers 'aptitude' with regard to FL acquisition

language learning takes place after the CP cannot be taken as evidence against the CP hypothesis. Language learning is possible: simply a different mental device is involved, i.e. learners make use of their general problem-solving abilities. The general cognitive apparatus, however, is not specifically designed for language learning thus it should not be surprising that complete competence in the SL is rarely attained. Someone may argue that late FL starters like Genie have also used their general cognitive abilities in trying to learn language but have nevertheless failed to get anywhere close to the achievement levels of the average SL learner. There is a very simple reason for that: in contrast to SL learners, late FL starters have no linguistic knowledge base: they have no first language and, because of the CP, UG is no longer available to them.

The issue of native competence in the SL is widely regarded as the ultimate test for the CP hypothesis: Long (cited earlier) points out that attested cases of SL learners who have arguably achieved native proficiency in the SL would automatically refute the CP hypothesis. The position taken here is that this is not necessarily the case. An approach based on Bley-Vroman's FD hypothesis does not exclude the possibility that, in some quite rare cases involving exceptional talent, complete mastery of the SL can be attained, the same way as complete mastery can occasionally be achieved in any area of learning. In this sense, the CP hypothesis will only be falsified if it can be shown that a large number of SL learners can achieve native competence in the SL. Such a position is clearly vulnerable to criticism: How many is a 'large' number of learners? What is the 'admissible' number for exceptional learners so that they can be seen as falling into the category of 'quite rare'? A satisfactory answer to such questions would be extremely difficult to come by because these are categories which are very hard, probably impossible, to quantify. There is no doubt, however, that the vast majority of those professionally involved in SL learning/teaching or research regard cases of complete mastery of the SL as rare exceptions rather than as normal or expected. It should be noted that relevant literature reporting experimental studies designed to attest native competence in SL learning openly admits that such cases are extremely hard to come by, and quite often the reported studies involved rigorous screening to select a group of very fluent SL learners among whom **only a few manifested SL competence arguably comparable to native standards**. There have been suggestions (Bongaerts *et al.* 1997: 451, and the references cited there) that native mastery of the SL involves individuals that are in many ways exceptionally gifted. It should also be noted that some of these studies (e.g. Bongaerts *et al.*) see factors such as high learner motivation, intensive training, typological distance between first and second language as the determining factors for success in achieving native mastery in the SL. It hardly needs emphasizing that such factors are completely irrelevant to language learning involving UG and LAD.

As regards the gradual life-long age-related decline in language learning ability, in an FD based approach assuming that SL learning is no different from any other type of general learning, this is not longer problematic for the CP hypothesis. There is a large body of literature investigating age effects on general cognition (e.g. Bosman & Charness 1992, Craik & Salthouse 1992, Denney 1990, Kausler 1991, etc.) showing that the process of aging involves a gradual decline in cognitive ability. Thus the gradual decline of language learning ability observed in Bialystok & Hakuta's (1994) reanalysis of Johnson & Newport's (1989) data is neither unexpected nor unnatural and should only be seen as a manifestation of the age-related decline of general cognitive ability.

Finally it has been argued that the types of grammatical structures displaying age effects (see Bialystok 1997) cast doubts on the CP hypothesis: it has been regarded as unexpected that a biological constraint on language learning should mostly affect SL structures different from corresponding FL structures. In the FD hypothesis this should no longer be seen as unexpected. In adult SL acquisition, UG as a linguistic knowledge base is no longer available and language learning relies on the learner's FL as a principal knowledge base. As a result SL learners find those SL structures that are similar to FL structures easier to learn, and generally find it harder to deal with SL structures which are not shared by

their FL. It should therefore be expected that age effects on learning ability would be more visible on such structures compared to structures which are similar in the two languages.

5. Conclusion

This paper has briefly outlined Bley-Vroman's FD hypothesis according to which UG as an innately specified mental device is not available for adult SL acquisition. The paper has addressed some of the existing arguments against CP for (second) language acquisition and has shown that, in an approach assuming the FD hypothesis, such arguments are not only not valid, but should actually be regarded as evidence in favour of CP.

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