

Age and second language acquisition: is there a critical period

أ . رندة عبد المولى
كلية الآداب/ جامعة الزاوية

مقدمة

لقد كان تأثير اكتساب اللغة (على كل من اللغتين الأولى والثانية) مصدرا للاختلاف بين الباحثين و وزارات التعليم والآباء الذين يرغبون بانخراط أبنائهم في بيئة ثنائية اللغة. إنهم قلقون حول أفضل عمر لبدء الطلبة الصغار في تعلم لغة ثانية أو أجنبية ، نتج هذا بسبب فكرة الفترة الحرجة التي انبثقت من عمل علماء الأحياء والذين فرضوا أن هذه الفترة تكون مع سن البلوغ (حوالي 12 سنة). يمكن تعريف هذه الفترة بأنها الفترة التي تحدد إكساب اللغة بسهولة أما بعدها فسيصبح اكتساب هذه اللغة صعب.

لقد تم دراسة عامل الفترة العمرية مع الفترة الحرجة بالنسبة للغة الأولى ولكن بعض العلماء مثل سكوفل (1988) أشار أن هناك فترة حرجة للغة الثانية كما التي توجد للغة الأولى . ولهذا كل الدراسات التي أجريت علي اللغة الأولى طبقت نتائجها علي اللغة الثانية. لاحظت العديد من الدول التأثير القوي لعمر التعرض للغة على إكساب هذه اللغة، و لهذا السبب لقد تقرر تعليم اللغة الثانية أو اللغة الأجنبية لمراحل عمرية مبكرة. وزارة التعليم في ليبيا على سبيل المثال وضعت تدريس اللغة الإنجليزية على قائمة المواد المهمة التي يتم تدريسها من الصف الرابع الابتدائي، لكن أغلب المدارس الخاصة تبدأ تدريس أبنائهم هذه اللغة من مرحلة الحضانة، و ربما لهذا السبب يرغب العديد من الآباء في تعليم أبنائهم في هذا النوع من المدارس.

بصفة عامة، كفاءة الأجيال الجديدة في تعلم نطق مفردات اللغة الإنجليزية أفضل من الأجيال السابقة ، لأنهم تعلموا هذه المفردات في مرحلة عمرية مبكرة. كمعلم للغة

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الإنجليزية لاحظت أن مقدرة الأطفال على إكساب علم الأصوات تتفوق على مقدرة الكبار على الرغم من أن المتعلمون الكبار يتفوقون في تعلم القواعد النحوية. لقد استنتجت هذا عندما قمت بمقارنة مقدرة نطق طلبة الثالث الابتدائي و طلبة السنة الأولى في كلية الطب لبعض المفردات. وكانت النتيجة أن طلبة الثالث الابتدائي استطاعوا نطق هذه الكلمات بشكل أفضل من طلبة كلية الطب.

تهدف هذه الورقة البحثية لتقييم العمر و علاقته بالفترة الحرجة و عرض الدراسات التي دعمت، رفضت و اتخذت جانب محايد لفكرة الفترة الحرجة بالإضافة إلى شرح أهم النظريات العلمية المتعلقة بإكساب اللغة الثانية.

Introduction

The effect of age on language acquisition (both first and second languages) has been an issue of disagreement between the scholars, Ministries of Education and parents who want to put their children in bilingual environment. They are worried about the best age for the young learners at which learners have to learn a second or a foreign language. This was partly as a result of the concept of Critical Period (CP) which was emerged from the work of the biologists. CP can be defined as the period of life which is biologically determined and by when language acquisition can occur easily. However, language acquisition beyond this period is difficult.

The age factor and CP were studied in relation to first language acquisition but many scholars like Scovel (1988) insists that there is a CP for second language (L2) just as the one exists for

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first language (L1). Consequently, all the studies which were conducted to study L1 were applied to the studies of L2.

Many countries have noticed the influence of the age of exposure to a language on language acquisition. Therefore, they decided to teach second or foreign language at early stages. The Ministry of Education in Libya, for example, has placed teaching English on the top list of the curriculum. They insist to teach this language from the fourth grade in primary schools. However, many private schools start teaching English from nursery, so many parents prefer to educate their children in these schools at least for the first five years of their education. In general, the proficiency levels of the new generation are much better than the old one because they started learning another language while they still in primary schools.

As a teacher of English, I have noticed that children are better in acquiring phonetics than adults. Nevertheless, the adult learners are better in learning grammatical structure than the young learners. I have concluded this when I compared the proficiency of third grade students in private school, when I taught them instead of my friend for two weeks, with that of medical school students. I found that the former learners were able to imitate the sounds exactly like native speakers but the

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latter ones did not manage to accurately pronounce many words, although they gained full marks in tests related to grammar. The aim of this paper is to evaluate the age factor in relation to CP and to consider the early theories of second language acquisition.

Early theories of language acquisition

1. There are two main theories that have had big debate about first and second language acquisition. Each of these theories tries to protect its points of view as well as principles. These theories can be elaborated as follows:

1.1 Behaviorism theory

According to Brown (2007), this theory emerged in 1950s. It was introduced by the work of psychologists like Pavlov and B. F. Skinner. Skinner, who was regarded as the father of this theory, thought of language acquisition as a habit formation. In other words, the process of language acquisition is stimulus, response and then reinforcement. Moreover, the behaviorism theory states that all children are born without any ability to use a language, but their brains are *tabula rasa*, a white paper which is formed and structured by the surrounding environment. On the other hand, many theories came either to support or broaden the basis of behaviorism theory. One of these theories was the *mediation theory*. In this theory, the meaning of words

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was connected with the concept of linguistic stimulus which leads to self-stimulating meditation.

In 1959, Noam Chomsky (American linguist and psychologist) criticized the principles of behaviorism theory. He insists that Skinner's verbal behavior is not adequate for acquiring and developing language. Moreover, he criticized the main concept of behaviorism which is *children acquire language by repeating what they hear*, on the base if that was true why children create sounds and utterances that they never heard. This conclusion leads Chomsky to present the *mentalist theory*, (Spada and Lightbown 2010).

1.2 Mentalist theory

Brown (2007) points out this theory came as a reaction to the principles of the Behaviorism theory. It is also called *Natives theory*. Mentalists, like Chomsky, insist that language acquisition is an innate process because all people are born with innate capacity which helps in language perception. Chomsky (1965) claims that all humans are genetically provided with *innate capacities* which enable them to master their native languages in short time, he calls this ability *Language Acquisition Device (LAD)*. One the other hand, one of the most important concepts that caused debate between the previous theories is the Critical Period.

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1. Critical Period Hypothesis (CPH)

As was mentioned earlier, the CP can be defined as the period of life which is biologically determined and by when language acquisition can occur easily and language acquisition beyond this period is difficult. This period has a start and an end point of time, these points can be discussed as follows:

2.1 When does the Critical Period start?

Lenneberg (1967) conducted some research on deaf children. In this research, he compared some children who deafened before the end of their second year with those who were congenitally deaf. He found that it was easier to train the former group than the latter one. Consequently, the Critical Period starts around the age of two years.

On the other hand, Singleton and Ryan (2004) state that this result was not widely accepted as Lenneberg only tested the deaf children. However, children start to differentiate between some sounds at the age of four months and this ability is developing as long as the baby is growing.

Singleton and Ryan (2004) carry out a study which focused on infants' Voice Onset Time (VOT) which proves that infants who are one month old can differentiate between many phonological categories exactly like adults. When the vocal

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chords start vibrating, this period of time is called VOT. Furthermore, another study was conducted by the aforementioned scholars reveal that American infants were able to distinguish between some speech sounds that were produced synthetically like [b] and [p], but they failed to discriminate between the sounds that were emerged from the same VOT. However, infants can classify the sounds of their languages and develop these sounds.

Another research was conducted by Stark (1986) in which she studied the pre-speech segmental phonology of infants. She found that during their first post natal year, infants develop their vocal stages. However, the earliest vocalizing contributes to the later phonological development.

2.2 When does CP end?

Singleton and Ryan (2004) point out that the highest limit of the CP is the early teens (the age at which childhood ends and adolescence begins). There are two evidences for CP's end which can be illustrates as follows:

2.2.1 Neurological evidence

According to Singleton and Ryan (2004), neurology and neurologists were interested in the existence of CP. They agree on that child's brain differs from adult's brain and immature brain is more flexible than mature brain. Moreover, human

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beings are able, at specific maturational level, to turn the damaged language area to stable and healthy area especially the children. These writers confirm that children are able to learn language again after disorder or injury which damage speech area. Nevertheless, speech recovery in adults is more difficult because their brains are rigid and inflexible after the age of nine.

On the other hand, Adams (1997) proves that acquiring language after CP is difficult. He reached to this conclusion when he studied the language and speech development of a boy whose age was 8 years and 2 months. This boy underwent an operation for his brain's left hemisphere at 8 years and 6 months years, but he did not speak before the surgery. At the age of nine, the boy started to acquire a language. His language acquisition was measured frequently between nine and fifteen years. His scores at the age of fifteen were similar to a normal learner whose age is between eight and ten years. The following section will present more specific cases related to the end of the CPH.

2.2.2 Evidences from wild children

Singleton and Ryan (2004) assess that the wild children are those who were isolated from any contact with human beings. They were deprived from usual linguistic interaction until they

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became mature, so they failed to learn the language exactly like those who exposed to language at normal age. There are two famous cases of the wild children which are: Victor, the wild boy of Aveyron and Genie, the American girl.

a) Victor

This boy was found in 1797, running naked and looking for some food in woods in south France. Although he was captured to be taken to live with human beings, he escaped many times because he did not want any contact with them. When he was twelve years old, he was taken to *Institute for Deaf-mutes*. It was noticed that he responded only to specific subjects of his needs like *food* and there was no development in his intellectual and cognitive abilities. Nevertheless, doctor Itard, from that institution tried to train him. The doctor noticed two things. First, after a short time of the training program, Victor managed to reach puberty. Second, Victor only acquired a few words like the word *lait* (milk) which he learned to spill out.

Moreover, Victor learned to say some phrases by action. For example to learn the phrase *break a cup*, he dropped a cup to break it and the verb *eat*, he took a small piece of bread to eat it. For Victor, however, spoken language was more difficult than written language. He was not able to produce some sounds to

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help him to imitate many words accurately. That is why Itard taught him speech articulation by visual manners.

Itard attributed Victor's failure to completely develop his language to the effect of Critical Period, because Victor started his learning after the age of puberty. Furthermore, Itard did not deny the other reasons that prevented Victor from being fluent learner like *isolation*. However, it can be noticed that the environment in which he received his learning was very narrow. It was restricted to his teachers only, (Singleton and Ryan 2004).

b) Genie

According to Singleton and Ryan (2004) Genie was an American girl whose father isolated her and kept her in a closed dark room when she was 20 months old. At the age of 13 years and 9 months, she was found without learning. After four weeks in children's hospital, she started to respond and she was curious to live.

Although it was not known whether or not Genie talked before her isolation, she managed to produce some sounds and she was able to understand a few words that herself could not utter. After two years, she developed some grammatical structures, for example *singular and plural nouns, possessiveness, the use of propositions and negative and affirmative sentences*.

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However, her progress in speech production was very slow as well as her sound production was strange and weak. With regard to syntax, Genie was able to combine three or four words to make a sentence and to produce a negative form of that sentence. Nevertheless, she faced particular difficulties in written language and she could not fully understand the different ranges of WH questions. It was concluded that, Genie's linguistic problems resulted from her isolation and the effect of not being in the suitable environment for acquiring a language.

In general, Genie made very slow progress in language acquisition compare it with that of normal English speakers. However, her language was better than Victor's; she managed to produce many rule-governed sentences and to understand speech while Victor's communicative language was very poor. In another vein, the concept of CPH was a source of argument between the scholars, biologists and language teachers. This is due to the fact that some of them support this concept while the others were either challenges or moderates. The following points will highlight the different points of view related to this concept.

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2.3 Supports for CPH

Lenneberg (1967), who is regarded as the father of CPH, insists that the effect of CP is responsible for insufficient learning that occurs after the age of puberty. The work of many researchers came to support this concept. The study of Johnson and Newport (1989), for instance, proves the reality of CPH. They conducted a study in which the correlation between the age of first exposure to a language and the accuracy of morpho-syntactic in that language had been established. The subjects of the study were 46 native speakers of Korean and Chinese who studied English as a second language and went to USA between the age of three years and 39 years. They were divided to four groups according to their age of arrival (from three to seven years, from eight to ten years, from 11 to 15 and from 17 to 39). In order to find out their awareness of English morpho-syntax, the subjects were asked to elaborate the grammar of some English sentences.

The results of the test revealed that there was a correspondence between the subjects' age of arrival and their performance. Learners who aged between 3 and 7 years performed like native speakers. However, the overall scores of the subjects who exposed to English between 8 and 10 years were very high but lower than the first group. The third group

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(who aged between 11 and 15) scored less than the second group, yet the third group's scores were higher than adult arrivals (who aged between 17 and 39 years).

From these results Johnson and Newport (1989) concluded that gaining native-like proficiency in a second language is impossible after the age of puberty. Moreover, those researchers discovered that human brain is maturing at the time of CP (between infancy and puberty), so maturation affects language learning. On the other hand, Scovel (1988) argues that CP only exists in the scope of pronunciation. He points out that using syntactic structure to learn new word lists is different task from producing and/ or uttering words. However, if a person acquires the neuromuscular structure of second language, which is different from first language, before the end of CP, s/he will attain native like accent.

It may seem that Scovel's (1988) interpretation is logical because, as I noticed from my work as an English language teacher, gaining native like accent after the age of puberty is difficult. However, brain maturation helps to understand the complexity of a language.

2.4 Challenges to CPH

Long (1990) criticizes the findings of Johnson and Newport (1989). He points out that there are many learners of second

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language who gain native or near native proficiency after the end of CP. White and Genesee (1996) carry out a research in which they tested 89 speakers of English to find out if the proficient adults who acquired English as a Second Language were as proficient as the native speakers. The subjects were tested by using three types of tests, which are: *grammaticality judgment task*, *question formation task* and *an interview* by which the researchers examined the subjects' fluency, choice of vocabulary and the performance of pronunciation. The researchers found that despite of their age of first exposure to English (which was after CP), some subjects managed to gain near native levels of proficiency. Moreover, the performance of near native subjects in the grammaticality judgment task was similar to native speakers. On the other hand, White and Genesee (1996) did not ignore the relation between the age of first exposure to a language and the perfect attainment in that language. They state that young learners are more likely to gain native like performance than adults.

A further study to challenge the CPH was conducted by Birdsong and Molis (2001). In this study, the subjects were Spanish. Those researchers used the same materials and methodology that were used by Johnson and Newport (1989) but there was gap number between the Spanish subjects of

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Birdsong and Molis (2001) who performed like natives, and Johnson and Newport's (1989) Chinese and Korean subjects, who gained near native proficiency. In the grammaticality judgment test, one of the latter scholars' 23 subjects who arrived late got 92% while the latter scholars' 13 out of 32 late arrivals subjects scored 92%. From these results, Birdsong and Molis (2001) concluded that the concept of CP is not completely valid.

It may seem that the result of Birdsong and Molis (2001) is questionable. They used Spanish subjects, whose language is quite close to English language, to criticize Johnson and Newport's (1989) results. It would be better for the former scholars if they used other Asian subjects like Japanese or Taiwanese in order to get trustworthy results.

On the other hand, it can be noticed that the previous studies are different. In Johnson and Newport's (1989) study, one case of negative relation between age and the attainment of second language is that after CP. That means the curiosity to learn a language and the ultimate attainment in that language for the late arrival and pre pubertal learners is declining when they become older. On the other hand, the post pubertal learners reached a steady level of achievement, because their brains finished the process of maturation. With regard to Birdsong and

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Molis' (2001) study, the researchers found that there was not a level off of the adult arrivals' scores.

While the study of White and Genesee (1996) challenged the CPH on the ground of grammatical ability, Bongaerts et al (1997) challenged it on the ground of pronunciation ability. They tested the ability of Dutch speakers to acquire the pronunciation of British English. The subjects did not expose to English before the age of 18 years. There were two groups of judges who compared the subjects' speech samples with some native speakers of English. The results showed that some subjects (6 out of 11) scored like natives, yet there were some subjects who gained higher scores than the natives themselves.

2.5 Moderates on CPH

As a reaction to the studies which challenged, or even supported, the concept of CP, many writers redefined the function of CP and its relation to SLA. Dekeyser (2000), for example, maintains that finding adults who managed to perform like native speakers is not enough evidence to oppose CP, but an evidence to re-evaluate its limitations. He assesses that all human beings have language specific mechanisms of implicit learning (only exists during the CP) and general mechanisms of explicit learning. To restudy the research of Johnson and Newport (1989), Dekeyser (2000) tested the morpho-syntactic

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performance of 57 Hungarian learners of English language in USA. He measured the verbal ability of those subjects. The study revealed that there was a negative relation between subjects' age of first exposure to English and their grammaticality performance. Moreover, when he re-examined the subjects who got high scores in grammaticality test, Dekeyser found strong relation between adult learners' proficiency and high verbal aptitude.

On the other hand, Moyer (1999) claims that it is enough to use the age factor as evidence for or against the perfect achievement in second language. She carried out a research of which the subjects were 24 native speakers of English who graduated in German and did not expose to German before the end of CP. To test her subjects, this researcher used a group of pronunciation tasks like reading word lists and natural activities (talking about selected topics). The speech was recorded and then evaluated by native speakers of German. The subjects did not gain native like accent, so Moyer (2000) concluded that these results emphasizes the relationship between the age of first exposure to a language and the attainment of that language.

Although those subjects did not manage to beat the biological limitations of their age of first exposure, the results revealed that

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the age is not the only responsible for learners' proficiency. There were other factors like culture and motivation. It was found that some subjects whose aim is related to professional writing or translation in German scored closer marks to natives than their colleagues.

On the other hand, Flege (1999) confirms that learners who exposed to language before the end of CP are more likely to outperform others who exposed to language after the age of puberty. His study focused on providing understandable views for some factors that affect second language pronunciation. He introduced the term Speech Learning Model (SLM) by which he found that learners' first and second languages affect each other. Moreover, SLM proposed that the pronunciation of a bilingual is not only controlled by the age of first exposure to a second language, but also by the use or misuse of first language. Consequently, if the speakers overuse their first language, the phonology of the second language will be affected. To prove that, this scholar conducted a study in which the subjects were two native Italian groups who migrated to Canada at the age of five. They were asked to read some English sentences after dividing themselves to frequent and infrequent users of Italian. Their readings were judged by native speakers as definitely English or Italian

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speakers and probably English or Italian speakers. He found that many subjects had foreign accent. With regard to (SLM) hypothesis, there was difference between frequent and infrequent users of Italian. The frequent users were judged to have stronger foreign accent than the infrequent users. From these data, Flege (1999) concluded that second language is not only influenced by maturation but there are other factors like the overuse of first language.

All the previous studies lead to one important question which is: *can late learners achieve native like accent?* The next section will try to answer this question.

2. Can late learners achieve a native like accent?

As was mentioned earlier, Scovel (1988) argues that there is only a CP for pronunciation but not for any other components of language. Phonological production is expected because it has neuromuscular basis whereas acquiring words or syntactic and morphological structure do not require neuro-motor entailment as well as do not have physical reality. He insists that to achieve native like accent, language should be acquired before the end of CP (around 12 years). Consequently, learners who started acquiring second language after CP cannot be regarded phonologically natives.

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Furthermore, Bongaerts et al (1997) point out that in terms of acquiring accent, children are able to pick up language quickly and easily, while their parents face some difficulties to attain high level of proficiency. However, many adult learners achieved high levels of proficiency in second language regarding vocabulary, syntax and morphology but they failed to attain native like accent. Bongaerts et al (1997) carried out a study in which 70 Cuban immigrants, whose ages were between 7 and 19 years and most of them lived in USA for five years, were asked to read four English sentences loudly. There was a control group which consists of 30 native speakers of English. The recorded sentences were judged by 19 native speakers who classified the subjects' readings to four points scale starting from (native) and ends by (completely foreign accent). The results showed that no one of the subjects achieved native like accent. Moreover, there was strong relation between subjects' age of arrival to USA and the characteristics of their pronunciation. Subjects whose age of arrival were between one to six years gained native accent while others who arrived at age of 7 to 11 years were judged to have near native accent. The last group whose age of arrival was from 11 to 13 was noticed to have foreign accent. From these results,

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Bongaerts et al (1997) concluded that adult learners cannot achieve native like accent.

Another study was conducted by Neufeld (1977) who found out that adults are able to achieve native like accent in second or foreign language. In this study, 20 Canadian students, who aged between 19 and 22 years, studied the pronunciation of Japanese and Chinese sound patterns. The subjects were asked to repeat some sentences five times. Three native speakers of Chinese and Japanese, who were given some instructions, judged the subjects' last try. This scholar found that nine subjects gained Japanese native like accent and other eight subjects were judged to have native Chinese accent.

However, Scovel (1988) points out that the study of Neufeld (1977) has some drawbacks. The former analyzed the scores of the latter's subjects and discovered that only one student gained full marks in both languages and two students got the same scores in Japanese language. In addition, Neufeld's (1977) results were affected by the instructions that were given to the judges, who were not told that the subjects were native English speakers. The judges thought that the subjects were Chinese and Japanese immigrants. A further drawback is that Neufeld did not explain either the grammatical structure or the meaning of the sentences to the subjects

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Conclusion

The age factor affects language acquisition as the supporters for CP proved. However, many writers ignored the concept of CPH as its explanations did not convince them. This paper evaluated the different views of CPH in order to find out which of them is more convincing than the others. It was concluded that the concept of CPH exists only in regard to pronunciation because, as many studies revealed, the young learners are better than adults in acquiring phonetics. However, there is no CPH for grammar or vocabulary because if a learner gets older, his/her ability to grasp grammar increases. This is because the mature brain is more capable to understand the complex parts of a language than the immature brain.

It would seem that it is better for students to start learning a second language at early stages if they want to attain a native like accent. In Libya, it was decided to teach English from the fourth grade of primary schools and they have very interesting textbooks which match the students' level as well as needs. This was very effective because it was found that many students managed to gain high scores in all types of English tests. In spite of this effectiveness, students should start learning English from nursery because, as I noticed, children are eager to learn another language.

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