

CRITICAL PERIOD AND COLOMBIA BILINGÜE PROGRAM

THE IMPORTANCE OF THE CRITICAL PERIOD HYPOTHESIS IN THE COLOMBIA
BILINGÜE PROGRAM

by

Andres Insuasty Cardenas

Submitted to the School of Human Sciences
in partial fulfillment of the requirements for
the degree of B.A. in English and French
Linguistics and Languages Department
University of Nariño
October, 2011

CRITICAL PERIOD AND COLOMBIA BILINGÜE PROGRAM

“Las ideas y conclusiones aportadas en la tesis de grado, son responsabilidad exclusiva de sus autores”.

Artículo 1° del Acuerdo No. 324 de octubre 11 de 1.966, emanado del Honorable Consejo Directivo de la Universidad de Nariño.

CRITICAL PERIOD AND COLOMBIA BILINGÜE PROGRAM

Nota de aceptación

Asesor

Jurado

Jurado

Pasto, Octubre 2011

CRITICAL PERIOD AND COLOMBIA BILINGÜE PROGRAM

Table of contents

The importance of the critical period hypothesis in the Colombia bilingüe program.....	5
Colombia Bilingüe program.....	5
The definition of standards for English in the Colombia bilingüe program.....	8
Bilingualism	10
The age factor and second language acquisition	
A brief reference about Second Language Acquisition (SLA) theories.....	12
Interactionist theory.....	13
Behaviorist theory	15
Contrastive analysis hypothesis	15
Innatist theory.....	16
Language acquisition device	16
Critical period hypothesis (CPH)	18
First language acquisition CPH.....	19
Second language acquisition CPH	21
Sensitive period hypothesis.....	27
Assumptions for the language classroom.....	30
References	37

The importance of the Critical Period Hypothesis in the Colombia Bilingüe Program

This research paper intends to explain how the critical period should be taken into account when teaching a foreign language in Colombia in order to foster bilingual study. It is a common fact that in Colombia many people consider going abroad in order to get a job or study. These reasons have been important to learn a foreign language which brings many advantages to our lives. However, learning a foreign language is a process that involves different aspects such as social, educational and age aspects. For this reason, this research emphasizes mainly on how age influences on the process of learning a foreign language both in children and in adults. In addition, some theories and studies will support the Colombia Bilingüe program taking into account the teaching of English in the early stages of life. It is known that developing and acquiring a language is considered as a minimal part in the complete development of human beings. Language is also the main means in which people know about others thoughts and establishes relationships. Every time people speak, they reveal something about language. Now, how foreign language teaching is going to be carried out in Colombia by means of Colombia Bilingüe program is presented next, a program which was proposed so as to foster foreign language teaching.

Colombia Bilingüe Program

Before explaining what the aims of the bilingual program are, it is important to identify the differences between the acquisition of English as a second language (ESL) and English as a foreign language (EFL). Thus, Siegel, J. (2005) cited in Doughty, Catherine J. and Michael H. Long (2005) stated that learning English in an EFL setting makes reference to a language that is learned in a context where the foreign language instruction only takes part in a formal classroom setting, with limited or no opportunities for use outside the classroom. Whereas the learning of a

language in a country in which English or any language does play an important role in internal communication is called ESL setting. Now, based on this assumption, it is important to know that in our country exists an EFL context.

Thus, in an EFL context like ours, our country needs to develop the citizens' ability to learn at least one foreign language. For this reason, the ministry of education has developed the Programa Nacional de Bilingüismo 2004-2019, which includes the new English as Foreign Language standards. It is supposed that this program aims to increase and improve the communicative competence in English in all educational systems. In this project, teachers and – public and private – schools play an important role putting into practice the teaching of English from kindergarten to secondary school. However, it is also necessary that other social sectors, such as business, cultural and communication are involved in order to face this new challenge. (www.mineducacion.gov.co/.../article-97495)

Although English is considered essential in learning nowadays, it is important to know and speak other languages such as German, French, Italian or Chinese, because of the new business relationships with Europe and China. Our economy is more increasingly associated with international markets. Thus, a foreign language is a principal means to profit from the advantages that learning an L2 brings along. For example, by means of Free Trade Agreement (TLC), there could be more opportunities in business or study abroad. The foundation of both Colombian and international enterprises in our country will increase the demands of graduated bilingual people, because of the interaction with foreign providers and customers.

(www.mineducacion.gov.co/.../article-97495)

It is noticeable that proficient bilingual people who show a good level of English gain more advantage compared to those who do not have knowledge of an L2. Colombia has great advantages within the field of engineer, architecture, statistics and mathematics, because

professionals in those areas have big demands in foreign countries, but these people could work there by learning an L2 that allows them to live and work abroad. For this reason, bilingualism must be considered important in everyday life to improve the social competitiveness in the following years. For example, India has got acceptable advantages because it has a good amount of bilingual professional people and technicians. As general, mastering an L2 will be obligatorily required so that professional people could apply for suitable jobs.

(www.mineducacion.gov.co/.../article-97495.html)

Despite the advantages mentioned previously, there are some drawbacks which could affect the educational purpose of the program because there are more economical profits rather than educational ones. Nowadays, English is taught since elementary levels in private schools but the situation is not the same for the public sector who serves the needs of a greater number of people. The problems are related to a limited time for English language teaching, not many resources, large classes, unqualified teachers, and poor use of English language in authentic communication, the Critical Period Hypothesis has not been taken into account so far, because age is also another feature that really affects the process of learning a foreign language. Also there are other languages such as those spoken by indigenous people which should never disappear, because they represent our identity. These aspects have to be taken into account at the moment of applying this program in all educational levels. The “Colombia bilingüe” program includes some issues in language teaching and teacher education, and highlights the need to see how English is taught.

According to Cárdenas (2006) the Bilingual program has been planned for the period 2004 to 2019 with the purpose of improving the quality of English language teaching at all educational levels. In 2010 students should have a B1 or pre-intermediate level and teachers a minimum of B2. By 2019, the students’ school level should be B2 or intermediate and their

teachers should be at least in C1. Two phases have been proposed by the program. By the end of the first one, that is 2010, secondary school students should have a basic management of English. In the second stage, all the people have to acquire an L2. The following data shows the levels expected at the end of the bilingualism program:

Table 1	
<i>English proficiency levels in Colombia Bilingüe Program</i>	
Primary teachers and teachers of other areas	A2
Teachers of English in levels 1-11	B2
Students who finish high school (11th grade)	B2
Graduate language teachers	B2-C1
<p>Note. According to the CEF standards A2 ranks at a basic level of English, B2 an intermediate level and C1 advanced level.</p> <p>(Taken from: Cárdenas, M.L. (2006) <i>Bilingual Colombia: Are we ready for it? What is needed?</i>, 19th Annual EA Education Conference 2006).</p>	

In order to achieve these levels three points have been taken into account: the use of appropriate teaching strategies, examinations, and teacher preparation. Recently, schools and universities agree with the idea of teaching a foreign language in its respective places of study. But the problem appears when there are no clear arrangements to make language teaching conditions appropriate to fit into the goals proposed.

The definition of standards for English in Colombia bilingüe program

The Ministry of Education decided to adopt the Common European Framework standards for languages - learning, teaching, and evaluating – proposed by the Council of Europe in 2001. Unfortunately, many academic communities have expressed that because of contextual reasons

the Common European Framework does not fit in the Colombian context. This assumption can be explained because despite the fact that the CEF proposes a very wide and complete teaching standards, some people argued that there could be other factors such as cultural and social ones. Consequently, Cárdenas (2006) argued that some critics appeared in which why proposals based on *Los Tres Espacios Lingüísticos* (TEL-The three linguistic spaces: Spanish, French and Portuguese) or the American National Standards for Foreign Language Education were not taken into account. Each one of the frameworks quoted above offers valuable approaches.

The CEF advocates the overcoming of difficulties generated by the different European educational systems that limit communication among professionals working in the modern languages field. Also it is necessary acquiring one or more foreign languages for the adequate performance of people in the public and working domain. In the same way, the contributions proposed by the ACTFL framework are based on improving communication among people and the respect for social diversity. Those features presented in both programmes will successfully work on multilingual and multicultural contexts that do not necessarily fit into the general characteristics of our Colombian context. Mostly monolingual people make 2% (approximately 450 indigenous communities who do not have the same reasons and motivations for communication in foreign languages.

Based on Cárdenas' (2006) assumptions, it is necessary to establish differences between the CEF standards and the conditions of Colombian educational institutions, infrastructure, curriculum organization, use of foreign languages in the academic and cultural domains of the country, working hours and competences of language teachers. Unfortunately English cannot be a definitive tool of communication in Colombia, because Colombia is a country with about 41.2 million people and more than 3 million internally displaced persons, persons who have many problems on their own such as low familiar incomes, poor living conditions, families with many

children (3 to 7 children average) etc. There are also some regions where English is not a priority for the educational system e.g. very remote rural areas, regions suffering socio-political conflicts, or those with hardly any chance to use the language for authentic purposes etc. Besides in a survey carried out in 2008 over one million four hundred children can not attend school because they have to work as maids, street vendors, agriculture, or sexual workers, Guerrero (2008).

As a matter of fact, teachers cannot impose students learn a foreign language, because imposing creates aversion, lack of interest, knowledge acquired for a short- term and develop dependent learners. If teachers create internal motivation, fostering interest in learning and propose long-term strategies in order to grasp knowledge can result in independent learners. This would finish with the early view in which English was considered as another subject to accomplish and teachers had few opportunities in decision-making process. If the Ministry of Education and the government in Colombia take into account the pros and cons, revising and evaluating the educational frame, taking into account the importance of age in language teaching by means of Critical Period Hypothesis, the standards and the people who are in charge of teaching English, the bilingual program in our country could be possibly applied. Thus far, the purposes and goals of the bilingual program were explained, but it is necessary to know first what bilingualism means. This term implies many sub-topics which are necessary to take into account. Those features will be explained next.

Bilingualism

One of the goals of the Ministry of Education is that all Colombian people speak English in an appropriate way, but it is necessary to know what a bilingual person is and what the implications of becoming bilinguals are. Lightbown & Spada (1999) argued that the terms *bilingual* and *trilingual* are used to describe those people who are able to manage two or three languages, a person who masters more than three languages is called *polyglot*. In fact, all the

speakers have to acquire and master one language at least through their life. This is called first language (L1). The first language is acquired without formal education, children who acquire more than one language from birth are called *simultaneous bilinguals*. Those children can succeed in both languages if they live in an environment where they receive input containing the two languages. Those children who study a second language later are called *sequential bilinguals*. One advantage of *simultaneous bilinguals* is the increase of metalinguistic awareness, that is, a greater ability to classify language patterns and increase language knowledge both in meaning and structure.

There is another negative case of bilingualism, this is called *subtractive bilingualism*, this situation happens when a child has not learned L1 structure completely and they begin to learn an L2. Despite the cases mentioned previously, there is no evidence that the brain has a limited capacity for acquiring languages, but if a child learns two languages since early stages of life, they take advantage and succeed better than a teenager or adult who learns a language later. For example, schools in Canada teach both English and French to the students since childhood. These studies could be used to make an appropriate teaching of a second language in all schools as early as possible, in order to give children tools so as to increase their cognitive abilities.

(en.wikipedia.org/wiki/Multilingualism)

In this part, the definition of bilingualism was explained, its different types and the different ways a person acquires a foreign or second language. Regarding our context the purpose is that all the people become simultaneous bilinguals, it means to be able to manage and speak appropriately both Spanish and English languages. This could be possible if it is taken into consideration the teaching of a foreign language in childhood, based on the Critical Period hypothesis. Moreover, it could be advisable that the Ministry of Education takes into consideration the “age factor” in the program because it has to do a lot in the way a person learns

any foreign language. This aspect influences on the process of foreign language learning, because the younger a person is, the more opportunities they have to succeed. In the next part, it will be presented some studies that explain how age has to do into the process of learning a foreign language and some theories that support this view.

The Age Factor and Second Language Acquisition

A Brief Reference about Second Language Acquisition (SLA) Theories

The internal processes carried out in humans' brains regarding acquisition, age factor and use of appropriate linguistic structures depending on a determined context are comprised into the Second Language Acquisition (SLA) theories. These theories were proposed to explain how languages are acquired. Also Lightbown & Spada (1999) asserted that SLA has been one of the most impressive and important aspects in human development, a complex process that requires attention and efforts to get it. As a natural process, learning other languages take students to make errors and try to make assumptions in order to comprehend a language. Those kinds of errors would not be logically made in the native language, because students do not need to be involved into solving tasks, deduction and memory exercises, those are activities that second language learning requires. In proportion as a person grows up, they develop the ability to define or what sounds conform a word, remarkable element in both foreign and second language learning.

It can be noticed that most students, mainly children, feel comfortable using the elements of a L2. Some of them enjoy speaking, others prefer to listen and take part in social interaction with their peers, no matter if their L2 proficiency level is limited. Unlike children, teenagers and adults feel uncomfortable and stressed when they are unable to understand or make themselves understood. It can be said that it is not a simple process to carry out, because it is exposed to changes where the environment or learning place can make either positive or negative

contributions. Thus, context and people influence when students build and create some behavioral patterns to acquire stimuli so as to produce answers.

In addition, Berko Gleason (1989) claimed that children are exposed to listen to every kind of linguistic forms and they tend to imitate and repeat. These processes could help them to create vocabulary forms during the first stages of life. When they possess cognitive maturity, they can introduce them gradually depending on the social context they are, in order to express, communicate and relate our context emphasizing on the learning of communicative forms rather than grammatical elements. When children grow up, they analyze, internalize and use new linguistic elements to improve their knowledge of the L2. Imitation and repetition exercises are not feasible at any level, because linguistic forms are more comprehensible if those are analyzed by means of a cognitive process that goes beyond a simple word definition, that is, to know where to use it.

Interactionist theory

In addition, learning and comprehending a second or foreign language, the connection between the brain and the way human beings process and express their ideas have been the main paths whereby researchers established their assumptions. One of the pioneers who worked on the field of cognitive science was Professor Jacques Mehler, who devoted his life analyzing the brain processes carried out by children and adults. In one of his studies Cutler and Mehler (1993) established that newborn babies are able to identify some linguistic patterns around them. In this study, Mehler's studies were the same as those proposed by Jean Piaget (1969) in his Interactionist theory, where Hatch (1992), Teresa Pica (1994) and Michael Long (1983) among others as cited in Lightbown and Spada (1999), have pointed out that acquisition of both L1 and L2 takes place through interaction.

Interactionists proposed one theory in which Snow and Fergusson (1977) cited in Lightbown and Spada (1999) held that one process that takes place is known as *Child-Directed Speech (CDS)*, this is the language used by adults when they address children, *CDS* implies speech changes such as:

- *Comprehension checks*. Teachers must assure that student have understood what was mentioned.
- *Clarification requests*. Students make questions in order to clear what was not understood. For example: *teacher, I don't understand! Could you please repeat?* This kind of question takes teachers to a further explanation.
- *Paraphrasing*. Teachers explain what was said, but in a single and comprehensible way.

From an Interactionist view, children acquire language partially through mediation and help from the others, it is not just a mental process exerted by the adults. Therefore, interaction is highlighted, rather than exposure. Also children cannot acquire a language by just watching adults speaking. Interactionists consider *CDS* important, because if teachers make some adjustments when they talk to children, it will be possible to divide the oral speech and decipher language during learning phase. In this way, children are individuals who acquire language as a means to accomplish their needs to communicate with other people. What students really need is not only simplification and explanation of the elements of a language, but interaction. Using the forms already learned in the context they are placed.

Michael Long (1983) proposed the term Modified Interaction. It makes reference to some adjustments that teachers use to refer to students, this process implies creativity, a slower rate of pronunciation, or use the environment as a tool to explain and convey meaning. These similar observations took Mehler and researchers (1993) to investigate the hypothesis that languages are

classified into classes based on their rhythmic and prosodic properties. That is, there are some sounds and lexical chunks more comprehensible by children than others. According to Mehler (1993) this hypothesis also helped to explain how children that grow up in a multilingual environment might discover that there are several languages being spoken around them.

Behaviorist theory

Another SLA theory is Behaviorism, it is a theory of learning which was known between the 40s and 50s, especially in the United States. Lado (1964) quoted in Lightbown & Spada (1999) discussed that traditional behaviorists believed that learning an L2 was the result of imitation, practice, feedback and habit formation. Children imitate the sounds and patterns around them, and then they receive positive reinforcement, that means how acceptable was the utterance and what corrections are necessary to make. Thus, pushed by the environment, children continue to imitate and practice these sound patterns until they get habits about how to make a good use of language. According to this theory the quality and quantity of linguistic forms acquired – reinforced by the exposure to the environment – should have an optimal effect during language acquisition.

Contrastive analysis hypothesis

Behaviorism is sometimes related to Contrastive Analysis Hypothesis (CAH), which was developed by linguists in Europe and North America. Lado (1957) argued that CAH points out that when there are similarities between L1 and L2 structure learners do not have problems contrasting both of them. However, when there are structural changes, some problems could appear. For example, in simple structures such as: using object pronouns, in the expression “yo los veo”, the learner would say “*I them see*”, the same form as in Spanish. The rule claims: object pronouns are placed after the verb: “*I see them*”

As a conclusion, behaviorist language acquisition view offers a path to understand how children learn some of the routine and regular aspects of language. Nevertheless, learning more complex grammatical structures, it goes beyond a simple imitation and repetition process.

Innatist theory

However, the field of children speech perception research was still working on how to measure infants' speech perception capabilities. For this reason, Peter Eimas et al. (1971) established the fact that infants could perceive phonetic contrasts long before they ever produced them (Eimas, 1974, 1975; Eimas et al., 1971). Suddenly, language acquisition researchers began to take seriously the possibility that infants are biologically prepared to acquire language. This assumption was supported by American linguist Noam Chomsky (1959) cited in Lightbown & Spada (1999) argued that children are biologically prepared to learn a language and it is developed like any other biological function. For example: children walk while they perform other movements, at first slow, then when they grow up, those are precise. For Chomsky acquisition happens in the same way, the environment children are exposed make a basic contribution. In this case people around him/her and the grammatical structures in the brain do the rest.

Language acquisition device

Chomsky (1959) claimed that children's minds are not only receptors to be filled with information they listen around them, instead, they are born with a special ability to discover by themselves language rules. For this reason, he referred to this ability as a Language Acquisition Device, (LAD). This device was described as a kind of black box which exists in some part in the human brain. It was believed that inside this box the basic principles of all languages were contained. Language is activated depending on the environment children are exposed to.

Besides, Chomsky's Innatist principles were compatible to those of the biologist Eric Lenneberg (1967), a linguist and neurologist who pioneered ideas on language acquisition, and cognitive psychology, particularly in terms of the Innatist theory principles. Lenneberg (1964) published "The Capacity of Language Acquisition", which establishes arguments about the human biological capacity for language, ideas which were discussed with Noam Chomsky. Then, on his second publication *Biological Foundations of Language* (1967), he argued the hypothesis of a critical period for language development in which he compared the ability to talk like the ability to walk. Children could experiment some problems when they try to walk, but if those problems are corrected quickly, a child can normally continue with his/her life.

Lenneberg watched that the ability to develop a normal behavior and knowledge in a variety of contexts does not continue indefinitely and those children who never were in contact with language, because of deafness or extreme isolation, they never developed appropriate language forms. The reason is that LAD, like any other human function, must be stimulated. Therefore, if there are no external stimuli that reinforce interaction, it is probable that language problems appear in the future. From this point of view, Innatist theory proposes natural elements in the process of acquisition. All the human beings possess both cognitive and neurological abilities to develop language elements. This is a process that would not work by itself, because despite the fact that people have this ability, it is necessary interaction so as to complete both speech and comprehension.

Thus far, three well-known theories were briefly explained in order to show how acquisition process takes place. Behaviorists hold that L2 is acquired by means of imitation and repetition that could help to know the process of vocabulary and morpheme acquisition. Interactionists argue that language acquisition happens by means of relating form and meaning into language and also make an appropriate use of language. Innatists argue that language is

innate, since birth humans are biologically programmed to develop language forms, making it useful within the process of grammar complex construction. The previous theories gave us a brief explanation of how languages are acquired, next the Critical Period Hypothesis (CPH) will be explained to show how age influences on acquiring a first language and learning a second one. This theory should be taken into consideration into the bilingual program because one of the features that this program should include is the age factor. That is the appropriate stage of life in which English should be taught.

Critical Period Hypothesis (CPH)

Based on the Innatist principles, this theory had its origins in 1967 by Lenneberg (1920-1975) a linguist and neurologist who pioneered ideas on language acquisition and cognitive psychology, particularly in the field of Innatism. In 1964 Lenneberg published *The Capacity of Language Acquisition*, which established arguments about the human biological capacity for language, his ideas were discussed with Noam Chomsky. Then, on his second publication *Biological Foundations of Language* (1967) he argued the hypothesis of a critical period for language. As a general concept a critical period makes reference to a limited time in which something important can occur. In terms of language acquisition it is the period of time where a person in the early stages of age, develops certain linguistic forms through appropriate stimuli. After this period, it is impossible to create a well-based speech. At first, the Critical Period only existed for first language acquisition, but then researchers considered a critical period regarding second language acquisition.

First Language Acquisition CPH

In relation to first language acquisition CPH, Penfield and Roberts (1959) made some studies about how the brain produced language and what happened after childhood. They held that the brain becomes stiff and rigid at the age of nine, and then it is impossible to create clear language forms. This study tried to demonstrate that age and brain development influence on language production. However, Lenneberg (1967) decided to propose further information whereby he pointed out that CPH had a beginning (age two) when the process of lateralization begins to take place, then at puberty stage, the brain will have finished its process of lateralization. Based on Lenneberg's view, other researchers decided to add new information about CPH. Molfese (1977) claimed that the process of lateralization when developing phonetic or phonological features could be developed in the first year of life, but the early cognitive structures of syntax and semantics are developed in both hemispheres later.

However, many studies were carried out so as to explain how first language acquisition takes place. In some research they used animals exposing them to periods of stimuli deprivation at different stages of development. Then, they emphasized on studying children who had suffered illnesses or social isolation. Based on these studies, Curtiss (1989) and Lenneberg (1967) asserted that children's brain is more plastic in childhood, children learn or recover language even though any hemisphere of the brain is damaged or surgically removed. The problems appear when adults who have passed through lateralization process suffer brain damage, such as strokes which often leave adults with losses in language or permanent aphasia.

Lateralization is a process in which different functions of the brain tend to take place in different areas in the brain, either right or left hemisphere. Those parts of the brain which control language are usually in the left hemisphere. One area in the left hemisphere is known as Broca's area, or the speech centre, because it is an important area involved in speech. Another area called

Wernicke's area is thought to be involved in understanding language. Regarding first language acquisition, Pulvermuller and Schumann (1994) gave a further explanation in the field of neurobiology. They held that as the brain matures, the axons of neurons are progressively wrapped by glial cells - this process was called myelination – because of the substance contained in those cells. According to those researchers, this process causes plasticity reduction in those areas which produce language around puberty stage.

Also there are other causes that constrain a person to develop language, for this Tallal, Ross, & Curtiss (1989) claimed that there is an inherited set of syndromes called Specific Language Impairment which is noticeable by difficult production of language, difficulties in articulation in childhood, and problems in understanding, producing, and judging grammatical sentences.

In addition, two well-known cases regarding brain lateralization and lack of language production were those of Genie and Victor of Avreyon. The former was caused by social isolation and bad treatment, the latter was about a boy, who lived in the forest most of his childhood. Then researchers tried to teach him language structures but he was unable to speak, he only emitted some grunts in order to be understood. In those cases, both psychological factors and lack of positive evidence affected the acquisition process Curtiss (1977) & Itard (1799). As we could see, first language acquisition CPH includes important aspects in relation to acquire and develop language, it is essential to be exposed to meaningful input since birth, although this process can be hindered by psychological, physical, cognitive or social problems.

Despite these situations, cognitive problems could be possibly solved if the human brain is treated with an appropriate medical therapy. The treatment is effective only if a person is treated at the early years of age, because the brain has more opportunities to compensate a damaged part of the brain. Psychological and social problems are sometimes together when

causing problems in individuals. However, psychological treatments are not always effective when helping a person to establish personal relationships, because the brain sometimes suffers emotional shocks or traumas causing internal malfunctions. Then, humans are not able to develop language, even if they have reached any stage in life.

Thus far, first language acquisition CPH showed how age affects the process of acquiring a language. The internal processes carried out in the brain are crucial in our performance and process of language structures. Next, the critical period regarding second language acquisition will be explained. CPH regarding second language acquisition should be taken into consideration in Colombia Bilingüe Program, because of the importance of the teaching of English during the early stages of life.

Second Language Acquisition CPH

Previously, some of the main features about first language acquisition CPH were presented. It is demonstrated that learning a language since birth is essential in order to take part in the society. Once humans create an appropriate L1 instruction since birth, they are able to recognize some linguistic patterns of other languages and interact with people. However, there have been some aspects related to the existence of maturational constraints showed by learners who learn a foreign language. One of these aspects can be found in developing native-like accent when speaking in English. Second language CPH aroused much interest among researchers, because learning second language after puberty also have its implications found in pronunciation, grammar, syntax etc.

The studies developed by Diller (1981) claimed that authentic accent can be developed only by young children, whereas structural forms of a L2 can be learned by mature people. It can be said that accent is more easily learned by young students than adults, because of brain's plasticity. It is noticeable that children brains grasp little language forms knowledge but they are

able to develop good levels of pronunciation. Conversely, adults can display some difficulties when acquiring foreign accent, it does not mean that they are unable to acquire it, but they could develop it only by making efforts and receiving an appropriate and continuous instruction.

Accent is also linked to pronunciation, this aspect is the most studied by researchers because of its complexity to be attained. Some researches carried out by Pinker (1994) then Birdsong (1999) stated that accurate acquisition of any language for children is at the age of six, during this period, it is possible to develop appropriate pronunciation. Nonetheless, to acquire native-like pronunciation after puberty is almost impossible because of the maturational changes in the brain. Those changes are presented because of the brain matures and the process of lateralization takes place around puberty. It is noticeable that the internal changes carried out in the brain affect the process of obtaining a precise pronunciation.

Besides, pronunciation could be something achieved by early learners because the brain is more receptive and processes L2 input quickly. Lenneberg agreed with Diller's study (1967) he pointed out that after puberty, foreign language accents cannot be acquired easily, and those have to be developed by means of a well-labored instruction. This study demonstrated that it is possible to get an optimal pronunciation level, but in those cases is also necessary that teachers in schools and parents are committed to take part in this process of foreign language learning. For this reason, the principles that Scovel (1988) discussed are important because he highlighted the importance of developing good levels of pronunciation in childhood because it requires more efforts after puberty. In addition he argued that vocabulary and syntax are acquired by formal instruction, but pronunciation is an internal process that depends on each individual's practice.

Researches developed by Bongaerts, Planken and Schils (1995) showed that individuals who started foreign language instruction after the critical period spoke the L2 without a foreign accent. This study demonstrated that adults could be proficient in mastering grammatical

structures, but young students' pronunciation was more accurate. In 1990 Long gave a different perspective about how language is acquired trying to give a more detailed explanation regarding pronunciation. At the age of six children are able to speak an L2 without accent. Then they can speak it with a foreign accent at the age of 12. But, during this period of time going between the ages of 6 and 12, Long (1990) explained that morphology and syntax have to be taught to children in order to associate words order and also how a determined group of words are pronounced.

However, Bongaerts, Van Summeren, Planken and Schils (1997) proved that accurate pronunciation is a complex process, making of it something unattainable. In their studies they examined a group of Dutch teenagers' learners of English and French. The purpose was to demonstrate that native-like pronunciation after puberty was impossible to develop. They were asked to pronounce aloud a series of sentences that contained difficult words to pronounce. After a while, they were able to accurately read many words, but in the upper pronunciation level control these subjects expressed some pronunciation failures. Despite these students had an appropriate native-like pronunciation and proficiency level in these languages, this research showed that it is not possible to develop accurate accent patterns after puberty.

Nonetheless, Mehler (1971) believed that classifying developmental changes in language abilities would not be of much use in explaining the mechanisms underlying language acquisition. Instead, he proposed a framework that would study language competence at the two extreme endpoints. In a newborn baby, the study would be called the "initial state", this makes reference to the language acquisition device before having any exposure to the environment. On the other hand, the study applied on adults would be called the "stable state", when the language acquisition device has already processed a language system that is established and unchanging. Mehler's study was shared by Schwartz (1998); Schwartz and Eubank, (1996)

Schwartz and Sprouse (1994) they established two obvious differences between first and second language acquisition.

They argued that in spite of adult learners already know at least one other language, children are able to reach appropriate mastery of whatever language they are exposed to. Also Schwartz (1998) claimed that many adults exposed through long periods of exposure to a second language showed some degrees of imperfection. This study was also confirmed by Sorace (1993) whereby she argued that native-likeness performance is almost impossible to achieve and some linguistic forms differ considerably from those of native speakers.

Taking into account that young learners are in advantage than adults regarding language acquisition, one of the objectives was to learn more about the nature of the mechanisms underlying children speech perception capacities. In the first study carried out by Jusczyk et al., (1980), (1983); Mehler and Bertoncini, (1979) it was demonstrated that exist some parallels in how young infants process speech and non speech sounds. Then Mehler also showed that children are better at discriminating a contrast in well-formed than in unformed syllables Bertoncini and Mehler, (1981). The purpose was to measure children's capabilities at birth and to what extent these capabilities enable them for acquiring language. In this way, it was demonstrated that not only did these findings support the view that children are engaged in some specialized processing of language but they also helped to support the principle that syllables play a crucial role in early speech processing. In another series of studies, Mehler et al. (1978) showed that two-week babies use such information when they establish a difference between their own mother's voice from that of a stranger Mehler et al., (1978).

Moreover, the previous study was supported by Flege et al., (1999); Weber-Fox and Neville, (1996) they developed a research by demonstrating how people were able to identify some linguistic contrasts. The purpose of that study was to assess people who had to learn and

identify new phonemic categories and other aspects of language. Depending on their ability to classify those contrasts, the results would reflect the high degree of plasticity their brain had. Thus, this study demonstrated that for all foreign language learners, very early exposure is necessary to learn foreign language sounds.

Teaching foreign language sounds in childhood is an important aspect to be considered, because when both phonemic and phonological native structures are once established, those cannot be altered except for phonemes in a foreign language that do not take place in the mother tongue. In a research work, Weber (2000) showed that proficient German-English bilinguals were sensitive to both native German and non-native English phonological sequences. They were given nonsense words in German and English and had to detect the word “*luck*”. English speakers first detected the word *luck* in “*moyshluck*”. This happened because “*shl*” - is not a possible sound in English, which made it more noticeable than the other possibilities (*moysluck* and *moyfluck*). German-English proficient bilinguals more easily detected the word *luck* in the word *moysluck*.

Moreover, they detected the word *luck* in the word *moyshluck* faster than in the word *moyfluck*, demonstrating that bilingual listeners can notice and make differences among many words they have to listen and they can draw the hiding word more easily than a monolingual speaker because they can process two languages at the same time. Talking about awareness, Doughty (2003) pointed out that bilinguals are able to notice the phonologic patterns in the input coming from two languages, because of the advantage they possess when analyzing input coming from two different languages. This aspect can be found in the Fundamental Difference Hypothesis proposed by Bley-Vroman (1988) as cited in Matsuoka, R. & Smith, I. (2008) this theory holds that children are able to learn a language in an implicit way, that is by means of an unconscious exposure to language. They can store the language in the same way people acquire

their first language, making of that learning as a mechanical process rather than using techniques of memorization.

Although it is true that the earlier the exposure, the slighter the foreign accent, there seems to be a top limit to the capacity to acquire foreign sounds. According to Lively (1994); and McClelland et al., (1999) these observations are matter of research because some linguistic features can be learned through short and intensive training. A recent research developed by Flege, Yeni-Komshian, and Liu, (1999) has shown that when learning a second language, not all aspects of the linguistic knowledge are equally hard to master. Furthermore, age of acquisition seems to have different effects on different types of linguistic abilities, and phonology has been identified as a particularly difficult skill. This is a domain that had already received a great deal of attention and several models have been proposed to establish that some foreign sounds are more easily learned than others.

The studies previously developed have also been carried out in machines in order to explain how the brain activates language and how this process is represented in the brain, by means of Positron Emission Tomography (PET), Functional Magnetic Resonance Imaging (fMRI), and Event-Related Potential (ERP). All the studies developed by Dehaene et al., (1997); Perani et al., (1996); Yetkin et al., (1996) as quoted in Newport, Bavelier & Neville (2001) indicated strong left hemisphere activation for both native and foreign language in bilinguals. However, according to Dehaene et al., (1997); Kim et al., (1997); Perani et al., (1996); Weber-Fox and Neville (1996); Yetkin et al., (1996) as cited in Newport, Bavelier & Neville (2001), when second languages are learned late after the age of seven years, the regions and patterns of activation partially or completely coincide with those for the native language.

Besides, another study by Kim et al. (1997) in which he argued that the internal brain structures show that bilinguals who learn a foreign language after learning an L1 possess two centers of activation for each language in the brain. Nevertheless, there are some differences related to how late learners process languages, because it tends to be lateralized and displays a high degree of variability from individual to individual. On the other hand, simultaneous bilinguals possess a single center of activation, allowing them to be more proficient when using and shifting the two languages learned. These studies demonstrated that adults use first their L1 structures to process foreign language ones, falling into an erroneous process at the moment of identifying some foreign language patterns. On the contrary, children are faster when processing both languages input quickly.

Sensitive period hypothesis

However, through the time some researchers considered that the critical period was too much strict regarding second or foreign language acquisition, because according to CPH principles it is impossible to learn any language appropriately after puberty. Therefore, other theories appeared in order to give a more reasonable explanation regarding critical period. First, it is the Sensitive Period hypothesis (SPH) which proposes that the internal sensitivity of a person tends to disappear progressively throughout the lifespan (late childhood, puberty and adolescence) rather than an abrupt way, as a result of individual's inefficiency or because of minor input received (Eubank and Gregg, 1999). This theory is more acceptable and reasonable in relation to L2 acquisition, because the human body gets old and loses some of its abilities through the time. The same happens with language, where biological factors affect the process of acquiring an L2, such as neurological illnesses: amnesia, senile dementia, loss of brain plasticity etc.

In accordance with the SPH theory, another important alternate explanation for the CPH can be found in the “less is more” or “starting small” hypothesis (Newport, 1990; Elman, 1993; Pitts Cochran, McDonald & Parault, 1999). Researchers of this hypothesis claim that age effects in language acquisition result from changes in working memory with maturation. These changes are also biologically determined, but they are not specific to language. The decrease in language learning ability, according to these authors, is due to an increase in working memory capacity. Having a small working memory capacity forces a person to process small units at once and this is claimed to help children to focus on details, such as specific morphemes. Adults, on the other hand, have a larger working memory capacity and try to analyze large parts at once. Due to the complexity of these larger units, details such as the phonological content of specific morphemes get lost.

In an attempt to test this hypothesis, Pitts Cochran (1999), conducted two experiments in which they compared two groups of adults English speakers who had to learn complex ASL (American Sign Language) verbs from a video-tape. The experimental groups had to count tones while learning the verbs, which limited their memory capacity for the language learning task. The control groups learned the verbs in silence. Although the control groups were better at reproducing signs they had learned, the experimental groups were better at combining morphemes from learned signs into new signs. This experiment suggests that having less working memory capacity available helps in learning morphology (at least in the initial stages of acquisition). It also suggests that under special circumstances the disadvantages of having a larger working memory can be compensated.

However, it could be argued that the differences found in this study are caused by a difference in conscious attention, rather than a difference in working memory capacity, because some people develop different ways to store a determined pattern of language in their mind. The

studies shown previously were intended to explain how the CPH affects both in L1 and L2 acquisition. It was noticed that CPH regarding L1 acquisition is more important within the process of developing language, because if people are not exposed to a possible, meaningful language instruction during the early stages of their lives, they will not be able to develop any language at any possible way. That is why people have to manage one language at least in order to create in the brain a kind of “language-based frame” to know how language works. In this way people can understand the different aspects of a language and establish comparisons among the new forms of L2 input.

In relation to L2 CPH, the problems a person could find are those related to acquiring L2 native-like pronunciation, phonology and morphosyntax. Obviously, there is a critical period, but it is less “harmful” than L1 CPH, because it is possible to learn a foreign language at any stage of life, but in proportion as the brain gets old, it loses its plasticity. Also the level of accurate pronunciation decreases, this is a well-known natural feature after childhood. On the other hand, children grasp L2 input faster and they can get accurate pronunciation, because they possess the ability to store, shift and speak two or more languages efficiently. That is the reason why this stage of life has to be profited, because adults can be proficient managing grammar structures, but they feel embarrassed at the moment of speaking.

Memorization techniques are common in adult learners, because they learn a foreign language in an explicit way. Explicit learning means that people acquire grammar rules, or vocabulary by means of evident strategies, such as techniques of memorization or repetition. Despite the little problems developed by adults learners found in pronunciation, grammar structure or speech, those ones could be called as “fixable failures” because by means of an appropriate instruction and constantly practice on the side of the learner could be possible to attain an appropriate level of English as well.

Assumptions for the Language Classroom

Cognitive aspects

As it was seen, the influence of CPH is important within the process of acquiring both an L1 and an L2. But here, in Colombia, it is necessary to emphasize on how the learners learn a foreign language. For this reason, in this paper some aspects that could help the Colombia Bilingüe program to foster foreign language learning were explained. Colombia Bilingüe program was carried out by the Ministry of Education and Colombia government, because the goal is that in all educational establishments English is taught appropriately. But it is mandatory that teachers realize the importance of encouraging and involving the new generations of learners into an appropriate English teaching. For this reason, it is important to teach a foreign language since the early stages of life, because young children are able to store first language and second language information in a coordinate way so they can switch both languages quickly.

It is known that adult learners have a slower process of learning because they store first language and second language knowledge together, this is because adults tend to combine both English and Spanish syntax when learning a foreign language, making of this a slow process. Nonetheless, Lightbown & Spada (1999) claimed that everybody possess an innate ability to grasp a determined language input, but this input has to be enhanced in order to be meaningful for a person when learning an L2. Also there are some maturational factors that affect this process, those problems are found in the natural process made by the brain throughout life. The older the brain becomes the less the ability to develop some language patterns.

The studies developed by Ullman (2007) demonstrated that adult learners could get an appropriate native-like proficiency in a foreign language. Nevertheless, in this process it is necessary appropriate teachers' instruction and also a great deal of efforts coming from the learners' side. But those problems mostly appear in some language features such as

pronunciation, vocabulary use and morphosyntax. Those could be considered “fixable failures” because learners can get an optimal level of pronunciation and use of a L2 even in adulthood. But according to some researchers, they have argued that teenagers have more capability to learn an L2 easily, because they possess language awareness, they are able to recognize some language structures that children could not understand and they can get optimal levels of proficiency in the L2. This is possible by a constant practice and also by analyzing the structure of the language.

The Fundamental Difference Hypothesis proposed by Bley-Vroman (1988) as cited in Matsuoka, R. & Smith, I. (2008) should be taken into consideration in the Colombia Bilingüe program, because children could have the opportunity to learn a language through implicit mechanisms, it means in the same way they acquire their first language. Also the language process studies developed by Kim (1997) gave evidence that children’s brain create one point of activation for both languages, children could shift and process one or more language faster than adults. On the other hand, the adults learning process is slower, because adults lose their ability to learn a language in an implicit way, so they have to repeat and memorize grammar rules. The purpose of learning a foreign language is to analyze the structure of the language in order to learn it instead of repeating and memorizing. Also this hypothesis implies that only adults with a high level of “verbal analytical” ability will be able to succeed when learning any language.

It is noticed that both children and adults can learn a language, but the processes are different. Lightbown and Spada (1999) argued that children who learn a foreign language in the early stages of life are able to process the two languages in a coordinate way. While adults’ internal process is slower because they use first the mother tongue structure in order to understand the foreign language structures. Unfortunately, this process is the worst because learning a foreign language is not about translating structures, but analyzing when to use a determined word or structure. Another common aspect that normally occurs in our context and

could threaten the learning process is Language attrition. According to Ullman (2007) this makes reference to the gradual loss of a second or foreign language after instruction. This situation is common in settings where the foreign language is not used in the community due to factors such as age, social psychological factors, and language setting.

Both Language attrition and Fundamental Difference Hypothesis share the same principles regarding early and late language instruction. It is important that children take early language instruction in our country, because it would allow them to increase their internal abilities to process and understand two languages. The studies developed by Bialystok (2006) stated that for general language proficiency, bilingual children might have a smaller vocabulary in each language than monolingual children, but the bilinguals' understanding of linguistic structures can allow them to have a better comprehension than monolinguals' understanding. Also, Bialystok (2006) added that bilingual children who can manage two languages show an accelerated progress when processing information. Moreover, bilingual children who share two language systems (e.g. English and French) can show also a progress in learning to read and write.

Despite the fact bilingual children show little difficulties when they share two different language systems (e.g. English and Chinese), they do not show any deficit related to monolinguals. It is noticeable the positive effect of bilingualism in children, also with evidence that bilingual children are not cognitively handicapped, on the contrary they could be ahead of monolingual ones. These assumptions could be taken into account in Colombian schools in the moment of providing a means for these children to improve their language skills in the school language so that they can be full participants in the classroom and take advantage of the most positive aspects from their educational experience. However, this process could be possible by

means of an appropriate and continuous instruction, otherwise people would tend to forget all the instruction received, falling into Language attrition.

Finally, according to Bialystok (2006) bilingual children are more accurate when they have to solve problems that require a lot of attention. These studies demonstrated that learning a determined language at an early stage could allow students to become bilinguals. In addition, the next table displays and summarizes how the cognitive aspects mentioned previously influence on children, teenagers and adults.

Table 2			
<i>Cognitive and Language abilities developed at different stages of life</i>			
Cognitive characteristics	Children	Teenager	Adults
Plasticity	+	+/-	-
Switching both first and second languages	+	-	-
Brain's point(s) of activation	1 point for the 2 languages	2 points of activation	2 points of activation
Language in use			
Negotiating input	-	+	+
Metalinguistic awareness	-	+	+
Identifying L1 and L2 phonological patterns	+	+/-	+/-
Translating structures	-	+	+
Nervousness	-	+	+
Note. The plus (+) mark means that a determined aspect is present, whereas the minus (-) mark means that a determined aspect is not present. The (+/-) mark this means that some characteristics can vary depending on each individual.			

Educational factors

Regarding educational factors, an appropriate English class should integrate all the main skills (listening and speaking, reading and writing), but not teaching them in a separate way, but teaching them gradually, first listening and speaking (including vocabulary and pronunciation) because learners have to be exposed to a foreign language input, at first repetitive, allowing them to grasp a determined knowledge by means of activities that attract students' attention. In order to summarize this aspect, the next table shows how children, teenagers and adults perform in the different skills.

Table 3			
<i>Developing skills at different stages of life</i>			
Skills	Children	Teenagers	Adults
Listening	+	+/-	+/-
Speaking	+	+/-	+/-
Reading	-	+	+
Writing	-	+	+
Sub-skills			
Grammar	-	+	+
Pronunciation	+	+/-	+/-
Vocabulary	+	+	+
<p>Note. The plus (+) mark means that a skill can be easily acquired, whereas the minus (-) mark means that a skill cannot be easily acquired. However, there is also a (+/-) mark this means that some skills can be developed appropriately even after puberty or can require more efforts coming from each individual.</p>			

It is necessary to notice that these aspects are not absolute, because children can outperform adults and teenagers in grammar, reading and writing. This process can be explained as “the tortoise and the hare” effect based on Aesop’s fable. At the beginning, children instruction could be slow because it requires a lot of students’ attention and efforts. After a gradual process children could get an optimal management of all the skills after puberty. No matter how proficient adults are in grammar, other skills such as speaking including pronunciation and words accent will not be developed appropriately. For this reason children will always be in advantage when learning the skills.

Nonetheless, teaching and learning a foreign language is not an easy process. Many times a teacher needs to stand in front of a group of students, expecting all of them to have the same ability of speaking English in an even level of proficiency. Unfortunately, this is not the case in most Colombian classrooms, because learning a foreign language implies many aspects found inside the classroom and some schools that consider themselves bilingual. First of all, children’s success in school is strongly dependent on their proficiency in the language instruction. This situation is a common factor that takes children to fail because they do not improve their skills in the instructional language in schools. In order to change this view English should be taught 8 hours per week and at least three subjects should be taught in English following Content-based approach principles. Those aspects could be useful for schools, but it is also important to notice these aspects outside the school, that is the social context.

Social aspects

It is well-known that keeping students' attention in an EFL classroom like ours implies moving from imposition to attraction. The purpose is to change the "have to" attitude towards learning a foreign language. Instead, teachers have to foster a "want to" attitude in their students, also build inner motivation, foster interest and establish long term results that promote independent learners. It is also necessary to improve the standards of teaching and students preparation to communicate in English in an appropriate way. To accomplish these aspects, teachers have to face this challenge, because they are responsible of encouraging students to learn a foreign language appropriately. English is supposed to be used in a social context, in the real world. For this, people need to be prepared both psychologically and socially to adopt the culture of a foreign language. If this not the case, the bilingual program would fail and may encounter difficulties to be carried out.

Also, Cadavid, McNulty and Quinchía (2004) claimed that the management of this program has been criticized because the ideas proposed by ELT pedagogy have not been discussed and it was not taken into account the suggestions or reactions coming from teachers. Schools are often responsible because of poor teacher preparation and slow response to put into action effective plans of study. Another problem is that teachers and linguists consider incorrect the way this project is going to be applied in Colombia institutions, because according to them Bilingualism is a natural and spontaneous phenomenon, it cannot be imposed by any government. The proposal used by the ministry of education to foster a bilingual program in Colombia is limited to both administrative and economical dimensions. Thus, the objective is to analyze the context in which teaching and learning take place and then know the real needs of our teachers and students.

References

- Berko-Gleason, J. (1989). *The development of language*. Columbus, Ohio: Merrill.
- Bialystok, E. (2006). Second-Language Acquisition and Bilingualism at an Early Age and the Impact on Early Cognitive Development. *Encyclopedia on Early Childhood Development*. York University, Canada. (Revised October 15, 2008).
- Birdsong, D. (1999). *Second language acquisition and the critical period hypothesis*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Bongaerts, T., Planken, B., & Schils, E. (1995). Can late learners attain a native accent in a foreign language? A test of the critical period hypothesis. In D. Singleton & Z. Lengyel (Eds.) *the age factor in second language acquisition*. Clevedon, England: Multilingual Matters.
- Bongaerts, T., van Summeren, C., Planken, B., & Schils, E. (1997). Age and ultimate attainment in the pronunciation of a foreign language. *Studies in second language acquisition*.
- Cadavid, I. McNulty M. & Quinchía, D. (2004). *Elementary English Language Instruction: Colombian Teachers' Classroom Practices*. PROFILE 5, 37-55.
- Cárdenas, M.L. (2006). *Bilingual Colombia: Are we ready for it? What is needed?*, 19th Annual EA Education Conference 2006.
- Colombia bilingüe program (2009, October 19). Retrieved October 21, 2009, from <http://www.mineducacion.gov.co/.../article97495.html>
- Coppieters, R. (1987). *Competence differences between natives and near-native speakers* *Language*, 63, 544-573.
- Curtiss, S. (1989). The independence and task-specificity of language. In A. Bornstein & J. Bruner (Eds.) *Interaction in human development*. Hillsdale, NJ: Erlbaum.
- Cutler, A., and Mehler, J. (1993). *The periodicity bias*. *Journal of Phonetics*, 21, 103–108.
- Diller, K. (1981). Natural methods of foreign language teaching: can they exist? What criteria must they meet? In *native language and foreign language acquisition*, Harris Winitz. New York: the New York academy of sciences.
- Doughty, C. (2003). Instructed SLA. In Doughty, C., & Long, M. (Eds.) *The handbook of second language acquisition*. Blackwell.
- Dehaene, S., Dupoux, E., Mehler, J., Cohen, L., Perani, D., van de Moortele, P.-F., Leherici, S., and Le Bihan, D. (1997). In Newport, Bavelier & Neville (2001) critical thinking about critical periods. *Language, brain and cognitive development*. MIT press.

- Eimas, P. D., Siqueland, E. R., Jusczyk, P., and Vigorito, J. (1971). Speech perception in infants. *Science*, 171, 303–306.
- Elman, J. (1993). Learning and development in neural networks: The importance of starting small. *Cognition* 48, 71-99.
- Eubank, L. & Gregg, K. R. (1999). Critical periods and second language acquisition. In D. Birdsong (Ed.) *Second language acquisition and the critical period hypothesis*. Mahwah, NJ: Lawrence Erlbaum Associates, 65-99.
- Flege, J. E., Yeni-Komshian, G. H., and Liu, S. (1999). Age constraints on second language acquisition. *Journal of Memory and Language*, 41, 78–104.
- Gass, S. & Selinker, L. (2001). *Second language acquisition: an introductory course*. Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.
- Guerrero, C. H: (2008). *Bilingual Colombia: what does it mean to be bilingual within the framework of the National plan of Bilingualism?*. PROFILE 10, 2008. ISSN 1657-0790. Bogotá, Colombia, 27-45-
- Johnson, J. S. & Newport, E. L. (1989). Critical period effects in second language learning: The influence of maturational state on the acquisition of English as a second language. *Cognitive psychology*.
- Johnson, J. S. (1992). Critical period effects in second language acquisition: The effect of written versus auditory materials on the assessment of grammatical competence. *Language Learning*, 42, 217-248.
- Jusczyk, P. W., Pisoni, D. B., Walley, A. C., and Murray, J. (1980). Discrimination of the relative onset of two-component tones by infants. *Journal of the Acoustical Society of America*, 67, 262–270.
- Kim, K. H., Norman, R, et al. (1997). Distinct cortical areas associated with native and second languages. In Singleton, D (2007). “*The Critical Period: some problems*” *Interlingüística* 17, 48-56.
- Kroll, J. F. & Sunderman, G. (2005). Cognitive Processes in Second Language Learners and Bilinguals: The Development of Lexical and Conceptual Representations in the *Handbook of Second Language Acquisition*. Doughty, J. and Long, M. (Eds) Blackwell Publishing.
- Lenneberg, E. (1967). *Biological Foundations of Language*. New York: John Wiley.
- Lightbown, P. M, & Spada, N. (1999). *How languages are learned*. Oxford: Oxford University Press.

- Lively, S. E., Pisoni, D. B., Yamada, R. A., Tohkura, Y., and Yamada, T. (1994). Training Japanese listeners to identify English /r/ and /l/ III. Long-term retention of new phonetic categories. *Journal of the Acoustical Society of America*, 96, 2076–2087.
- Long, M. (1990). Maturation constraints on language development. *Studies in second language acquisition*, 12, 251-285.
- Matsuoka, R. & Smith, I. (2008). *Age Effects in Second Language Acquisition: Overview*. J Nurse Studies N C N J. Vol. 7 No. 1 2008.
- Mehler, J., Bertoncini, J., Barriere, M., and Jassik-Gerschenfeld, D. (1978). Infant recognition of mother's voice. *Perception*, 7, 491–497.
- Molfese, D. (1977). Infant cerebral asymmetry. In *language development and neurological theories*, Sidney, J. Segalowitz & Frederic A. Gruber. New York: academic press.
- Multilingualism (2009, October 19). Retrieved October 21, 2009 from <http://en.wikipedia.org/wiki/Multilingualism>
- Newport, E. (1990). Maturation constraints on language learning. *Cognitive Science* 14/1: 11-28
- Newport, E., Bavelier, D. & Neville, H. (2001). Critical Thinking about Critical Periods: Perspectives on a Critical Period for Language Acquisition. In Dupoux, E. (eds.) *Language, Brain, and Cognitive Development*. MIT press.
- Penfield, W. & Roberts, L. (1959). *Speech and brain mechanisms*. New York: Atheneum.
- Pinker, S. (1994) the language instinct. New York: Morrow.
- Pitts Cochran, B., McDonald, J., & Parault, S. (1999). Too smart for their own good: The disadvantage of a superior processing capacity for adult language learners. *Journal of Memory and Language*, 41, 30-58.
- Pulvermüller, F. & Schumann, J. H. (1994). Neurobiological mechanisms of language acquisition. *Language learning*, 44, 681-734.
- Richards, J. & Schmidt, R. (2002). *Longman Dictionary of language teaching and applied linguistics 3rd edition*. Pearson: Pearson group limited.
- Schwartz, B. D. (1998). The second language instinct. *Lingua*, 106, 133-60.
- Schwartz, B. and Eubank, L. 1996: *What is the "L2 initial state"* *Second Language Research* 12, 1-6.
- Scovel, T. (1988). *A time to speak: a psycholinguistic inquiry into the critical period for human language*. Rowley, MA: Newbury house.

- Siegel, J. (2005). "Social Context." *The Handbook of Second Language Acquisition*. In Doughty, Catherine J. and Michael H. Long (eds). Blackwell Publishing, 2005.
- Singleton, D. (1989). *Language acquisition. The age factor*. Clevedon: Multilingual Matters.
- Tallal, P., Ross, R., Curtiss, S. *Journal of Speech and Hearing Disorders*, 54, 167
- Ullman, M. (2007). *Language attrition and the contributions of memory brain systems to second language*. The 17th European Second Language Association Conference. Newcastle University, UK.
- Weber, A. (2000) the role of phonotactics in the segmentation of native and non-native continuous speech. In A. Cutler & J.M. McQueen (Eds), *Proceeds of the workshop on spoken word access processes*.
- White, L. & Genesee, F. (1996) How native is near-native? The issue of ultimate attainment in adult second language acquisition. *Second language research*, 12, 233-265.