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# Critical period hypothesis in language acquisition

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Find sources: “Critical Period Hypotheses” â news Â· newspapers Â· books Â· scholar Â· JSTOR (April 2013) (Learn how and when to remove this template message) (Learn how and when to remove this model message) The critical period hypothesis is the subject of a long-standing debate in linguistics[1] and language acquisition insofar as the ability to acquire language is biologically related to age. The hypothesis states that there is an ideal time window for acquiring the language in a linguistically rich environment, after which the further acquisition of the language becomes much more difficult and challenging. The critical period hypothesis was first proposed by Montreal neurologist Wilder Penfield and co-author Lamar Roberts in their 1959 book Speech and Brain Mechanisms,[2] and was popularized by Eric Lenneberg in 1967 with Language Biological Foundations. [3] The critical period hypothesis states that the first years of life is the crucial moment when an individual can acquire a first language if presented with appropriate stimuli, and that first language acquisition is based on neuroplasticity. If the language input does not occur until then, the individual will never reach a full command of the language. [3] There is much debate about the timing of the critical period in relation to SLA (second language acquisition), with estimates ranging from 2 to 13 years of age. [4] The critical period hypothesis derives from the concept of a critical period in life sciences, which refers to a set period in which an organism must acquire a skill or capacity, or said organism will not be able to acquire it later in life. Strictly, the experimentally verified critical period refers to a period of time during which damage to the development of the visual system may occur, e.g. if the animals lack the binocular input required for the development of stereopsies. Preliminary research on the critical period hypothesis has investigated brain laterization as a possible neurological cause;[5] however, this theoretical cause has been largely discredited as laterization necessarily increases with age, and no definitive connection between language learning ability and laterization has ever been determined. Recently, it has been suggested that if a If it exists, it may be due, at least in part, to the delayed development of the prefrontal cortex in human children. Researchers suggested that a delay in the development of prefrontal cortex and an associated delay in the development of cognitive control can facilitate conventional learning, allowing small children to learn language much more easily than mature adults and older children. This prefrontal development model is unique in man among the similar species of mammals (and primates), and could explain why human beings “and not chimpanzees” are so proficient in language learning.[6] The discussion of the critical period of language is complicated by the subjectivity in determining the linguistic competence similar to that of the natives, which includes things such as pronunciation, prosody, syllabic stress, time and articular approach. [7] Some aspects of language, such as fonemi tuning, grammar processing, joint control and vocabulary acquisition, have weak critical periods and can be significantly improved with training at any age.[8][9] Other aspects of language, such as prefrontal synthesis, have strong critical periods and cannot be acquired after the end of the critical period. [10] Acquisition of the second language The theory has often been extended to a critical period for the acquisition of the second language (SLA), although this is much less accepted. David Singleton states that in learning a second language, “young = better in the long run”, but points out that there are many exceptions, observing that 5% of the adult bilingual masters a second language even if it begins to learn it when you are in full adult age, long after the critical period is supposedly at the end.[11] Jane H. Hill has speculated that many researches on the SLA have focused on the monoling communities. For example, second-language adult students almost always retain an immediately identifiable foreign accent, including some showing a perfect grammar.[13] A possible explanation of why this foreign accent remains is that pronunciation, or phonology, is susceptible to the critical period.[11] The pronunciation of vocal sounds is based on neuromuscular function. Adults learning a new language will hardly reach a convincing native accent, as they have surpassed the primary age to learn new neuromuscular functions and thus pronunciation. Producers have suggested a more critical ageFor the learning of the phonology that for morphemes and syntax. [What writers?] Singleton & Lengyel (1995) report that there is no critical period to learn a vocabulary in a second language because the vocabulary is consciously learned using the declarative memory [14] The of procedural memory with age results in an increase in the use of declarative memory to learn new languages, which is a completely different process from L1 (first language) learning. The plasticity of the procedural memory is dismissed after the age of 5. The plasticity of the procedural memory inhibits the ability of a L2 user to automatically speak their second language. You can still take a conscious effort even if they are exposed to the second language since age 3. This effort is observed by measuring brain activity. L2 users who are exposed to their second language at an early age and are everyday users show lower levels of brain activity when using their L1 than when using their L2. This suggests that additional resources are recruited when talking about their L2 and is therefore a more tiring process. The hypothesis of critical period in SLA follows an approach "use then lose it", which said that as a mature person, excess neural circuits used during learning L1 is essentially divided. [15] If these neural structures remain intact, it would cost unnecessary metabolic energy to maintain. The structures necessary for use L1 are maintained. On the other hand, a second "use or lose" approach says that if a L2 user starts learning at an early age and continues to live through their lives, then their language learning circuit should remain active. This approach is also called "exercising hypothesis". [16] There is a lot of debate about the time of the critical period compared to the SLA, with estimates ranging from 2 to 13 years of age. [4] However, some studies have shown that "even young L2 beginners become a native language detail. " [17] Some writers argued that the hypothesis of the critical period does not apply to SLA, and that competence in the second language is determined by time and effort put in the learning process, and not the age of learning. [18] Robertson (2002) harvtxt error: multiple goals (2×): CITEREFRobertson2002 (help) noted that factors other than age can be even more significant in second language learning success, such as personal motivation, anxiety, input and output skills, and the learning environment. A combination of these factors often leads to individual variation in second language acquisition experiences. [19] In reviewing the published material, Bialystok and Hakuta (1994) conclude that second-language learning is not necessarily subject to biological critical periods, but "on average, there is a continuous decline in ability to learn with age". Experimental and Observative Studies As children acquire the mother tongue (L1) and the relevance of this to the foreign language (L2) learning has long been discussed.If the tests for L2 learning ability declining with age is controversial, a common notion is that children learn L2 easily, while older students rarely achieve fluency. This hypothesis derives from the ideas of “critical period” (CP). A PC Disclosed by Eric Lenneberg in 1967 for the acquisition L1, but remarkable interest now surrounds the effects of Ethã about the second language acquisition (SLA). The SLA theories explain the learning processes and suggest the causal factors for a possible CP for the acquisition of the second language. These SLA-CP theories mainly seek to explain the apparent differences in the linguistic attitudes of children and adults through distinct learning paths, and clarifying these differences discussing psychological mechanisms. The research explores these ideas and hypotheses, but the results are different: some demonstrate that pre-peak children easily acquire language, and some that the older students have the advantage, while others focus on the existence of a CP for SLA . Recent studies (eg Mayberry and Lock, 2003) recognized some aspects of the SLA can be affected by age, while others remain intact. The goal of this study is to investigate whether the capacity to acquire vocabulary decreases with age. Other works have questioned the biological approach; Krashen (1975) has reviewed the clinical data used as proof and concluded brain specialization occurs much before LenneBern calculated. Therefore, if there is a CP, it does not coincide with the lateralization. Despite the worries with the original evidence of Lenneberg and the dissociation of the latterization from the idea of CP language, however, the concept of CP remains a valid hypothesis, which later the work explained and motivated better. Effect of aging A revision of SLA theories and their explanations for the differences linked to the drink is necessary before considering empirical studies. The most reductionist theories are those of Penfield and Roberts (1959) and Lenneberg (1967), which derive from L1 and cerebral damage studies. Children who suffer from disabilities before puberty generally recover and (re-) develop normal language, while adults rarely recover completely, and often do not repurchase verbal abilities beyond the point reached five months after the inconvenience. Both theories agree that children have a neurological advantage in learning languages, and that pubert is correlated with a turning point in the ability. They claim that the acquisition of language occurs mainly, possibly exclusively, during childhood as the brain loses plasticity after a certain age. It then becomes rigid and fixed, and loses the capacity of adaptation and reorganization, making the language difficult (re-) learning. Penfield and Roberts (1959) claim that children under nine can learn up to three languages: the early exposure to different languages activates a reflection in the brain allowing them to pass between languages without confusion or translation into L1 (Penfield, 1964) . LENNEBERG (1967) that if you don’t learn the language from puberty, you can’t learn it in a normal and functional way. It also supports Penfield and Robertsâ (1959) proposal of neurological mechanisms responsible for change in maturation in language learning abilities. This, Lenneberg maintains, coincides with the lateralization of the brain and and SPECIALIZATION FOR ANCIENT LANGUAGE TREA TREVENDE: Newborn’s ability and linguistic and linguistic abilities develop simultaneously, but by age thirteen out of thirteen the brain hemispheres worked and became set, making linguistic acquisition extremely difficult (Lenneberg, 1967). Cases of deaf and wild children of deaf and wild children provide evidence for a biologically determined cp for L1. [10] Wild children are those not exposed to childhood/infancy language due to being raised in the wild, in isolation and/or confinement. A classic example is “Genie”, a victim of child abuse who was deprived of social interaction from birth until she was thirteen years old. Her father had judged her to be born retarded and had chosen to isolate her. She was held tied to a potty chair and forced to wear diapers. He was completely speechless. His case presented an ideal opportunity to test the theory that a nutritious environment could somehow compensate for the total lack of language over the age of 12. After seven years of rehabilitation genius he still lacked linguistic competence, although the degree to which he acquired the language challenged. [20] Another case is “Isabelle”, who was imprisoned with his deaf-mute mother until the age of six and a half (pre-pubescent). He also did not have language skills, but, unlike Genie, he quickly acquired normal language skills through systematic specialist training. [21] Detractors of the critical period hypotheses point out that in these examples and others like them (see wild children), the child has just grown up in a nurturing environment, and that the lack of language acquisition in later life may be due to the results of a generally abusive environment rather than be specifically due to a lack of exposure to the language. These studies are problematic; Isolation can lead to general delays and emotional distress, which can confuse conclusions about language skills. Studies of deaf children learning American Sign Language (ASL) have fewer methodological weaknesses. Newport and Supalla [22] studied ASL Acquisition in deaf children who differ in age of exposure; Few have been exposed to ASL since birth, most of them learned it for the first time in school. The results showed a linear decline in performance with increasing age of exposure; Those exposed to ASL from birth performed best and the worst “student delay”, on all production and comprehension tests. Their study thus provides direct evidence for the ability to learn the language, which decreases with age, but does not add to Lenneberg’s CP hypothesis as even the oldest children, the “latest students”, have been exposed to ASL for four years, So he had not reached puberty, the proposed end of the CP. Furthermore, the declers have been demonstrated linear, without sudden "falling" of ability to a certain age, as it would be provided for by a strong hypothesis of the CP. That significantly worse children can suggest that the CP ends before initially postulated. However, this decline in It can also be attributed in part to the limits of the second linguistic acquisition to listen to parents who learn ASL. [21] Behavioral approaches contrary to organic sight, behavioral approaches claim that languages are learned as any other behavior, through conditioning. Skinner (1957) Details As conditioning operating Forms Connections with the environment through the interaction and, next to O. Hobart Mowrer (1960), applies ideas for the acquisition of the language. Mowrer hypothesizes that languages are acquired through imitation rewarding models Ã ¢ â,¬ Ã ¢ â,¬ â "¢; The model must have an emotional connection to the student (E.G. parent, spouse), as imitation then brings pleasant feelings that work as a positive reinforcement. Because the new connections between behavior and the environment are formed and reformed for life, it is possible to obtain new skills, including languages (l), at any age. To explain the differences in learning the languages observed between children and adults, children are postulates to create innumerable new daily connections and can manage the language learning process more effective than adults. This hypothesis, however, remains not tested and is not a reliable explanation for the attitude of children for learning L2. The problematic of the behaviorism approach is its assumption that all learning, verbal and non-verbal, takes place through the same processes. A more general problem is that, as a note Pinker (1995), almost all the voices of any sentence is an original combination of words, never pronounced, so a language cannot only consist of combinations of words learned through repetition and the conditioning; The brain must contain innate means to create infinite quantities of grammatical phrases from a limited vocabulary. This is exactly what Chomsky (1965) (reprinted like Chomsky (1969)) supports with its proposal for a universal grammar (UG). The Chomsky Universal Grammar (1969) states that environmental factors must be relatively not important for linguistic emergency, since so many different surround factors surround children who acquire L1. Instead, Chomsky states that linguistic students possess innate principles by building a "linguistic acquisition device" (boy) in the brain. These principles indicate limited possibilities for variation within the language and allow students to build a grammar out of "raw entrance" collected by the environment. The input alone cannot explain the acquisition of language because it is degenerated with features characteristics such as the tatters and lack corrections from which students discover incorrect variations. Singleton and Newport (2004) demonstrate the function of UG in their "Simon" study. Simon learned ASL as his As parents who had learned it as L2 after puberty and gave him imperfect models. The results showed Simon learned normal and logical rules and was able to build an organized linguistic system, although he is exposed to inconsistent input. Chomsky has developed UG to explain the acquisition data L1, but keep it maintain it applies to L2 students who reach almost native fluidity not attributable only to entry and interaction (Chomsky 1969). Although it does not describe an optimal age for SLA, the theory implies that younger children can learn languages more easily than older students, since adults must reactivate the principles developed during learning L1 and create a SLA path: Children can learn different languages at the same time as the principles are still active and are exposed to enough language samples (Pinker, 1995). The parents of the Singleton and Newport patient (2004) also had language skills in line with these age-related predictions; They learned the ASL after puberty and never achieved complete fluidity. Problems within UG theory for L2 acquisition There are, however, problems with the extrapolation of UG theory to SLA: L2 students cross different stages of pronunciation types that are not similar to their L1 or L2 they feel. Other factors include cognitive maturity of most L2 students, who have different motivations to learn language, and already speak fluently. Other studies also highlight these problems: Stanislas Dehaene investigated how brain circuits used to manage a language adapt for efficient storage of two or more. [23] He reports observations of brain activation when he reads and translates two languages. They found the most active brain areas during their tasks were not generally associated with the language, but rather those related to spelling to phonology. They conclude that the left temporal lobe is the physical base of L1, but the L2 is 'stored' elsewhere, thus explaining cases of bilingual aphasia where a language remains intact. They argue that only the languages learned simultaneously from birth are represented, and cause activity, in the left hemisphere: any L2 learned later is stored separately (perhaps in the right hemisphere), and rarely activates the left temporal lobe. This suggests that L2 can be qualitatively different from L1 due to its dissociation from the regions of the 'normal' language brain, so the extrapolation of L1 studies and theories to SLA is questioned. A further disadvantage of the UG is that the support of empirical data is taken from a limited sample of syntactic phenomena: a general theory of language acquisition should cover a wider range of phenomena. Despite these problems, several other theorists have based their own language learning models on it. These ideas are supported by empirical evidence, which consequently supports Chomsky's ideas. Due to this support and its descriptive and explanatory force, many theorists consider UG as the best explanation of language, and in particular grammar,UG and Critical Period hypothesis A key question about the relationship of UG and SLA is: is the language acquisition device posited by Chomsky and his followers still accessible to students of a second language? TheThe hypothesis of the period suggests that it becomes inaccessible to a certain age and that students increasingly depend on an explicit teaching. In other words, even if the whole language can be governed by UG, older students may have great difficulties in accessing the basic rules of the target language only with positive input[24]. Piaget Piaget (1926) is a reluctant psychologist to attribute specific language skills to children: considers the brain a homogeneous computational system, in which the acquisition of language is part of general learning. He agrees that this development could be innate, but argues that there is no specific module of language acquisition in the brain. It instead proposes external influences and social interactions trigger the acquisition of language: the information collected from these sources build symbolic and functional patterns (models of thought or behavior). According to Piaget, cognitive development and language acquisition are active processes throughout life that constantly update and reorganize the patterns. It proposes that children develop L1 while building a sense of identity in relation to the environment and describes phases of the general cognitive development, with processes and models that change systematically with age. Piaget believes that language acquisition is part of this complex cognitive development and that these development phases are the basis for an optimal period for language acquisition in childhood. Approaches interactionists derived from Piaget ideas support his theory. Some studies (e.g. Newport and Supalla) [22] show that, rather than abrupt changes in the ability of SLA after puberty, the ability of language decreases with age, coincident with the decline of other cognitive abilities, thus favoring Piaget. Krashen Although Krashen (1975) criticises this theory, he does not deny the importance of age for learning of the second language. Krashen (1975) proposed theories for the closure of the PC for L2 in puberty, based on the cognitive stage of Piaget of formal operations that begin in puberty, since the “ability of the formal operative thinker to build abstract hypotheses to explain phenomena” inhibits the natural ability of the individual to learn language. The term "language acquisition" became commonly used after Stephen Krashen opposed it with formal and non-constructive "learning". Today, most scholars use "language learning" and "language learning" interchangeably, unless they turn directly to Krashen's work. However, ‘learning a second language’ or ‘SLA’ has become the preferred term for this academic discipline. Although SLA is often considered part of applied linguistics, it generally concerns the systemand the learning processes themselves, while applied linguistics can focus more on the learner’s experiences, particularly in the classroom. In addition, the SLA focused on naturalistic acquisition, where students acquire a language with little formal training or teaching. Search directions Analogue effect practically all search results on SLA to date are based on data from literacy students. CATONE, BIGELOW & HANSEN (2009) find significantly different results during standard SLA studios with low-literate L2 students. In particular, students with lower alphabetic literacy levels are significantly less likely to notice corrective feedback on the module or to perform required imitation activities accurately. These results are consistent with research in cognitive psychology that shows significant differences in phonological awareness among literary and illiterate adults. [25] An important direction for SLA research must therefore involve exploring the impact of alphabetism on cognitive processing in the acquisition of the second language. Empirical research tried to explain detailed variables from SLA theories and provide a vision of L2 learning processes, which can be applied in educational environments. The recent SLA surveys have followed two main directions: one focuses on the couplings of L1 and L2 which make the acquisition L2 particularly difficult, and the other investigates some aspects of the language that can be seasoned. Flege, MacKay & Piske (2002) examined the bilingual domain to evaluate two explanations of the L2 performance differences between bilinguals and monolingual-L2 speakers, ie a CP or interlinguistic interference maturationly defined. The Dominanza Bilingue Flege, Mackay & Piske (2002) has investigated whether the participants in which the participants learned the English dominance influenced in Italian-English bilinguals, and found that the first bilinguals were English (L2) dominant and the Late Italian bilingual (L1) dominant. Additional analyzes showed that dominant Italian bilinguals had detectable foreign accents when they spoke English, but the first bilinguals (predominant English) had no accents in both languages. This suggests that, even if the interling effects of interference are not inevitable, their appearance, and the bilingual domain can be correlated to a CP. SebastiÃ¡n-GallÃ © S, EcheverrÃa & Bosch (2005) has also studied bilingual and underlines the importance of early linguistic exhibition. They examined the elaboration of vocabulary and representation in Spanish-Catalan bilingual exposed to both languages simultaneously from birth with respect to those who had learned L2 later and were both Spanish- or Catalan-dominant. The results showed 'from bilingual birth' had significantly difficulty distinguishing the Catalan words from non-words that differ in specific vocals compared to the Catalan dominants made (measured by reaction time). These difficulties are attributed to a phase around eight months in which I bilingual are insensitive to vocal contrasts, despite the language they feel most. This affects the way words are subsequently represented in their vocabulary, highlighting this as a decisive period in the acquisition of the language and showing that the initial exposure of the language forms the linguistic transformation for life. Life.EcheverrÃa & Bosch (2005) also indicates the meaning of the Fonology for L2 learning; They believe that the learning of a L2 once the L1 phonology is already internalized can reduce the capacities of individuals to distinguish new sounds that appear in L2. Most studies on the effects of EtÃ on specific aspects of the SLA focused on grammar, with the common conclusion that is highly bound by age, more than semantic operation. Harley (1986) compared the achievement of French students in early and late immersion programs. She refers to after 1000 hours of exposure, late students had better control of French and syntax verb systems. However, comparing early immersion students (age 6.917 years) with native speakers of age, have identified areas of common problems, including the plurals of third person and the forms of "vous". She suggests that grammar (in L1 or L2) is generally acquired later, perhaps because it requires abstract cognition and reasoning. [26] B. Harley also measured the achievement of any and found that the two groups of ages have committed similar errors in the syntax and lexical selection, often confusing the French with the L1. The general conclusion from these investigations is that the different elderly students acquire the various aspects of the language with different difficulties. A certain variation of grammatical performance is attributed to maturation, [26] However, all participants started diving programs before puberty and so they were too young for a strong hypothesis of a critical period to test directly. This corresponds to the UG theory of Noam Chomsky, which states that while the principles of acquisition of the language are still active, it is easy to learn a language, and the principles developed through the acquisition L1 are vital for learning a L2. Scherag et al. (2004) also suggest that you learn some syntactic processing features and lexical access can be limited by maturation, while semantic functions are relatively unchanged from age. They studied the effect of late SLA on the understanding of the speech by the German immigrants to American and American immigrants in Germany. They found that the native-English-English who have learned German as adults have been disadvantaged on certain grammatical tasks, but performed at almost native levels on lexical tasks. Acquisition of semantic functions A study that specifically mentions the acquisition of semantic functions is thatBer-Fox & Neville (1996). Their results showed that Chinese-English bilinguals that had been exposed to English after puberty, learned vocabulary at a higher level of competence than the syntactic aspects of the language. However, they report that judgment in detecting semantic abnormalities were altered in subjects that were exposed to English after sixteen years of age, but were affected by a lower degree than the grammatical aspects of language. It was speculated by Neville & Bavelier (2001) and Scherag et al. (2004) that the semantic aspects of language are based on associative learning mechanisms, which allow Learning, considering that the syntactic aspects are based on computational mechanisms, which can be constructed only during certain periods of age. Consequently, it is reasoned, the semantic functions are easier to access during the comprehension of an L2 and therefore dominate the process: if these are ambiguous, the comprehension of the syntactic information is not facilitated. These assumptions would help to explain the results of the study by Scherag et al. (2004). Benefits of bilingual education for children It is commonly believed that children are better suited to learning a second language than adults. However, the general search for the second language failed to support the critical period hypothesis in its strong form. According to Linda M. Espinosa, especially in the United States, the number of children growing up with a home language that is not English, but Spanish is constantly increasing. [27] Therefore, these children must learn English before kindergarten as a second language. It is best for young children to keep both their home language and their second language. Cultivating their home language, children create their own cultural identity and become aware of their roots. This raises the question of whether having the ability to speak two languages helps or harms young children. Research shows that acquiring a second language in early childhood confers several benefits, notably increased awareness of language structures. In addition, it is advantageous for small children to grow up builtibly because they do not need to be taught systematically but learn languages intuitively. How quickly a child can learn a language depends on several personal factors, such as interests and motivations and their learning environment. Communication should be facilitated rather than forcing a child to learn a language with strict rules. Early childhood education can lead to an effective educational outcome for children of various cultural backgrounds. Another aspect worth considering is that bilingual children are often doing code switching, which does not mean that the child is not able to separate languages. The reason for switching the code is the child’s lack of vocabulary in a certain situation. Acquiring a second language in early childhood broadens children’s minds and enriches them more than it damages them. So not only are they able to speak two languages despite being very young, but they also gain knowledge about different cultures and backgrounds. You can master a language. This depends on how much time is spent to learn each language. [27] Evolutionary Explanations Hurford Model providing evidence for the evolutionary functionality of the critical period in language acquisition, Hurford (1991) generated a computer simulation of plausible conditions of evolving generations, based onCentral assumptions: language is an evolutionary adaptation that is naturally selected for. Any date of individual language can be quantified or measured. Various aspects of maturation and development are under genetic control, which determines timing for critical periods for certain capacity (ie polygenic inheritance). According to the evolutionary model of Hurford, linguistic acquisition is an adaptation that has a survival value for humans and to know a language positively related with the reproductive advantage of an individual. This discovery is in line with the opinions of other researchers like Chomsky [28] and Pinker & Bloom (1990). For example, Steven Pinker and Paul Bloom claim that, since a language is a complex design that serves a specific function that cannot be replaced by any other existing capacity, the section of the acquisition of the language can be attributed to natural selection. However, claiming that the language itself is adaptive and "has not" happened "" (P. 172), Hurford suggests that the critical period is not an adaptation, but rather a constraint on the language that emerged due to the lack of selection Pressures reinforce the acquisition of more than one language. In other words, Hurford explains the existence of a critical period with genetic drift, the idea that when there are no selection pressures on multiple alloys acting on the same stretch, one of the alleles will gradually decrease through evolution. As the simulation does not reveal any evolutionary advantage of acquiring more than one language, Hurford suggests that the critical period has evolved simply due to the lack of selection pressure. The dynamic system of Komarova and Nowak Komarova and NowakÃ ¢ (2001) supported the model of Hurford, but stressed that it was limited in the sense that he did not take into account the costs of learning a language. Therefore, they created its algorithmic model, with the following hypotheses: the linguistic capacity is related to the reproductive fitness of an individual the ability to learn the language is inherited there are costs to learn a language that their model is constituted From a population with a constant size, in which the linguistic capacity is a reproductive fitness predictor. The learning mechanism in their model is based on the linguistic theories of ChomskyÃ ¢ (1980, 1993) - the language acquisition device (LAD) and the notion of universal grammar. The results of their model show that the critical period for linguistic acquisition is an "evolutionary stable strategy (ESS)" (Komarova and Nowak, 2001, p.00 1190). They suggest that this ESS is due to two competing selection pressures. First, if the learning period is short, the language does not also develop, and therefore decreases the evolutionary physical form of the individual. Alternatively, if the period of language is long, it becomes too expensive to the extent that it reduces the reproductive opportunity for the individual, and thus limits the reproductive fitness. Therefore, the critical period is adaptive adaptive adaptive That maintains these pressures in balance, and aims at optimal reproductive success for the individual. See also child development child-oriented speech Individual variation in the acquisition of the second language Linguistic experiments Linguistic multi-competition multilingualism Notes ^ Ramscar & Gitcho 2007. ^ Penfield & Roberts 1959. ^ AB LENNEBERG 1967. ^ AB Paradis 1999, PP .Ã, 59Ã ¢ Ã, 60; Loewen & Reinders 2011. ^ Penfield, Wild (1965). Â «To condition the bark not committed to learning languages." Brain. 88 (4): 787â € 798. Doi: 10.1093 / brain / 88.4.787. PMIDÃ, 5 856 079. ^ Dye 2010. ^ Hill, Jane (1972). Â «On the evolutionary foundation of language." ^ Talal, p.; Miller, S. 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