COGNITIVE READINESS AND FIRST LANGUAGE ACQUISITION: COMPARING THE MENTALIST AND BEHAVIORIST EXPLANATIONS[1]

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INTRODUCTION

First language is sufficiently acquired by children when they reach the age of five (Elliot, 1987). The ability to acquire a complex system at such a very young age is an amazing feat. It is more amazing when the acquisition happens without any formal teaching or instruction. And, much more amazing when research shows that the language data, which are available to children, are limited and chaotic, with the right and the wrong data mixed together.

Children's acquisition of their first language is an amazing phenomenon. Different linguistic aspects – phonology, the lexicon, grammar and semantics – all seem to be acquired automatically and with little effort. And all normal children acquire their native language if they are sufficiently exposed to it. Despite 'the poverty of stimulus' (using Hornstien and Lightfoot's 1981 term), most children become efficient users of their native language by the age of five (Elliot, 1985).

This general phenomenon occurs in all cultures at all time, whatever the language of their people may be. By the age of five, most children have overcome the most difficult obstacle in the process of language acquisition. Indeed, the language proficiency of five years old children is often the envy of the adult second language learner who has been struggling for years to master the language (Steinberg, 1994).

The above facts have led many linguists to propose that children are born equipped with an innate device to acquire language. They propose that children do not learn their first language from scratch but what they have to do is to adapt an innate Universal Grammar to the grammar of the language being acquired. The proponents of this hypothesis have

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proposed many arguments and provided much evidence to support their claim. This paper will look at two sources of arguments and evidence, and evaluate their cogency in accounting for first language acquisition. The discussion will first begin on arguments and evidence, which support The Innateness Hypothesis.

Evidence Which Support The Innateness Hypothesis

The innateness or nativist ideas said that children are born with an innate propensity for language acquisition, and that this ability makes the task of learning a first language easier than it would otherwise be. The Innateness Hypothesis view language as a fundamental part of the human genome, as the trait that makes humans human (Wikepedia, 2003).

Evidence and arguments which can support the innateness hypothesis are many, but in this paper, only two categories of evidence which can support the idea that children are innately endowed with LAD which control the processes during their first language acquisition will be presented and analyzed. The two categories of evidence are work on sign languages and work on the mental lexicon. I will start the discussion on the work on sign languages, followed by work on the mental lexicon.

Claims From Work on Sign Languages

Researches on various sign languages have provided concrete evidence to show that sign languages are not only made up of pictorial and iconic gestures: but like verbal languages, they have their own complex linguistic systems, and that they also have arbitrary characteristics as verbal languages. Newport (1982:480) says, "According to our linguistic analysis, sign language (at least American Sign Language) have the same kind of analytic character as spoken languages". Researches on British Sign Language also show that sign languages are equivalent to spoken languages (see Deuchar, 1984).

Researches on sign languages also show that they are not parasitic on the verbal languages. This means, the British Sign Languages are not parasitic on 'British Spoken English', and the American Sign Language is not dependent upon 'American Spoken English'. Sign languages are real languages, just like verbal languages. According to

Deucher (1987:328), "The results so far show clearly that sign languages can be considered 'real' languages from a structural point of view".

Since sign languages are systematic, the acquisition of their systems is requisite to children acquiring these languages. But how do deaf children acquire these systems? Researches have shown that the percentages of deaf children who have deaf signing parents are small. According to Newport (1982:481), ninety per cent of the deaf population in the United State is first generation, deaf children born to hearing parents, and the same percentage is reported in Britain (Deucher, 1984:157).

Despite the very limited exposure to sign language data, research have found that most deaf children who have the chance to socialize in a deaf society such as those who went to school for the deaf can acquire a complex and efficient system of sign language. The input data from family members are surely minimal and unsystematic because there are not many 'speaking people' who have acquired a sign language sufficiently to enable them to provide a good input data to deaf children. Besides, the percentage of their peers who have acquired sign language sufficiently is only ten percent because the same proportion of their parents is signing deaf.

Based on the above facts, many researchers on the acquisition of sign languages by deaf children believed that they themselves invented most of the systems of their languages. This they did when they had the chance to interact for a relatively long period in a deaf community. The process of creating a systematic sign language from a very limited sign data is said to be similar to the process of creating a Creole language from a pidgin. Deucher (1984:151) says, "Children learning BSL in deaf school are similar to the first generation Creole speakers, that they are at least partially inventing their own linguistic system".

The creolization process that occurs during the acquisition of a sign language provides another strong evidence for the existence of an innate bio-programmed for language acquisition. The characteristics shared by pidgins, creoles and sign languages suggest that they are likely to be genetically programmed. From a very poor input (qualitatively and quantitatively), they can create a system, which is able to sufficiently fulfill their communicational needs. If they were not endowed with the innate bio-programmed for language acquisition, the creolization process would be impossible. Amazingly, the

creolization process seems to reoccur for every deaf generation. Schlesinger and Namir (In Deucher, 1984:157) say, "Sign language is a form of communication which is used in every community of deaf persons and seems to be invented anew by them whenever such a form has not been previously established". The result of the research on various sign languages is clearly more in support of the innateness hypothesis rather then the inductive mechanism.

Claims from Work on the Mental Lexicon

In her analysis of various research on the mental lexicon, Aitchison (1987:7) conclude that, "The number of words know by an educated adult, then, is unlikely to be less than 50, 000 and may be as high 250, 000". This is a very great sum. The questions are how can a person acquire such an enormous vocabulary? Do human beings acquire all these words through rote memorization or are they specially equipped with a special device to acquire these words without much effort?

If the acquisition of vocabulary is seen at an older age, that is when children already started schooling, we may argue that they acquire their vocabularies through formal teaching in classroom or from their various reading materials, we cannot deny the fact that children do learn various scientific, technical and cultural words from classrooms and personal reading materials.

But what about children who are still not experiencing any form of formal schooling, that is those below five years of age. They also do not have the change to venture into any written material because most of them are still not able to read. And most parents and caretakers are usually not able to spend much of their time defining the meanings of various words to children. Besides, children at this age prefer to spend their time in games and play rather that memorizing the meanings of words.

But much research has shown that children at this age acquire vocabulary at an amazing rate. Chomsky (1988:27) says, "the child masters words at an astonishing rate, perhaps a dozen a day or more'; and according to Miller and Gildea (1987:86), "The average child learns at the rate of 5,ooo words per year or about 13 per day. Children with large vocabularies probably pick up new words at twice that rate".

How do they perform this feat? If this happens through rote memorization, children will have to spend most of their time everyday learning and memorizing various definitions of words or concepts. But we all know that this does not happen to children, they acquire their vocabularies without much effort and usually without even the realization of their guardians. Compare this to the efforts of an adult if he is made to acquire new words at an average of a dozen a day constantly for a few years. How much effort and time has he to spend? How many techniques will he utilize? And how many adults are able to accomplish this task?

But all normal children can accomplish this task and they do not need any sophisticated technique to succeed. Furthermore, this is done under the condition of a very deficient database because usually adults do not define the meanings of words or repeat a word for a number of times when they speak to children. Because of the above facts, it is difficult to deny Chomsky's claim that:

> The speed and precision of vocabulary acquisition leaves no real alternative to the conclusion that the child somehow has the concepts available before experience with language and basically is learning labels for concepts that are already part of his or her conceptual apparatus (1998:28).

Beside the above facts, the ability to acquire language is said to be species-specific because this ability is only confined to human. For example, research done by Gardner and Gardner (in Elliot, 1987: 19-23) on a chimpanzee named 'Washoe' showed that its ability to sign [2] is very limited, after teaching it extensively and intensively from eleven months to five years of age, its sign vocabulary is only about 132.

Research have also shown that the chimpanzee perform its signs in a very redundant manner compared to the way children acquire their early language which is concise and non-redundant. Terrace, Petito, Saundres and Bever (in Elliot, 1987: 21-2) reported that, "When they looked closely at their video-tapes they realized that most of the utterances produced by their signing chimp were prompted by a prior utterance by his teacher".

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[2] They chose the chimp's natural manipulation skill instead of the verbal behavior.

When we compare the chimpanzee's ability with the children's ability to acquire vocabulary at an average of a dozen words a day or more, it is clear that the linguistic ability is species-specific. This means only human beings are equipped with the special LAD to acquire language.

Another fact of the lexical acquisition phenomenon, which can support Chomsky's idea of the existence of an innate device for language acquisition, is the creativity phenomenon in which children are creating new words to fulfill their communicational needs. They create a lot of new words based on the vocabularies they already have. According to Clark (1982:391), "Children learn very early that the lexicon can be used creatively and that this knowledge plays an important role in acquisition".

Children invent new compound words such a 'plate-egg' and 'cup-egg' to differentiate between fried and boiled eggs. They create adjectives such as 'toothache', 'windy' and 'bumpy'. The also create comparative and superlative words such as 'salter' (more salty) or 'sliverest seat' (describing a bench), and they use nouns as verbs such as 'scaled' (instead of weighed) and 'lawning' (for mowing the lawn) (Clark, 1982:390). According to Chomsky (1988:32), "It is beyond question that acquisition of vocabulary is guided by a rich and invariant conceptual system, which is prior to any experience".

Evidence, Which Are Against the Innateness Hypothesis

In the following section, I will analyze and discuss two categories of arguments, which contradict the belief that children are endowed with the innate ability to acquire their first language. These two categories of arguments come from two sources, from work on 'motherese' and 'connectionism'.

Claims from Work on 'Motherese'

The main concern of research under the concept of motherese is to redefine the source of language acquisition that is not to attribute it to the child but rather to the environment, which the child is constantly in contact with. If the researchers who work within this concept can prove that motherese is the main cause for the success of first language acquisition, they would have then proved that children's first language are being acquired through induction

process whereby the simplified and suitably presented data which the children receive from their caretakers, have enabled them to induce the linguistic rules easily. This will then weaken the innateness hypothesis which says that the database for first language acquisition are chaotic and limited and first language can only be acquired under the guidance of an innate device. Brown (1977:20) claims that, "Parental speech is well formed and finely tuned to the child's psycholinguistic capacity. The corollary would seem to be that there is less need for an elaborate innate component than there were at first seems to be". Elliot (1987:51-2) gives the characteristics of motherese as follows:

(1)   Paralinguistic features – High pitch and exaggerate intonation.

(2)   Syntactic features – Shorter mean length of utterance (MLU), fewer verb forms and modifiers, fewer subordinate clauses/embedding per utterance, shorter mean proverb length, more verbs less utterances, more content words and fewer function words.

(3)   Discourse feature – More interrogatives and imperatives, speech more fluent and intelligible and more repetitions, whether complete, partial or semantic.

The strong form of this hypothesis claims that motherese language are necessary for language to develop properly, the absence of these motherese features would be predictive of a child's language difficulty. The weak form of the hypothesis claims that these linguistic features assist a child's language development (Carroll, 1994).

Anyway, the ideas, which were proposed by the proponents of motherese, have been under strong critique. From the result of the research, Shatz (1982) concludes that form-function relations are not materially simplified to young learners and that children are quite insensitive to whatever gesture supports to comprehend their parent. The result of Shatz's research put into question the validity, a claimed, of the existence of motherese in children-caretakers communication.

Research also showed that, not only children's speech which are not so much influenced by the way their caretakers speak to them, even the overt corrections made by adults do not have much effect on the way they acquire their first language. For example, McNeill (in Wanner and Gleitman, 1982:13) reported the result of his research on a two-year

old subject. When the two-year old subject remarked, "Nobody don't like me." his mother corrected him: "No, say 'nobody likes me'". The child mulishly repeated himself. The mother stubbornly recorrected. This interchange repeated itself seven times. On the eight corrections, the child said "Oh: nobody don't likes me". The result of this research shows that formal instruction or planning does not have much effect on first language acquisition.

Even if for the sake of argument, the occurrence of motherese in the children-caretakers interactions is accepted, still it is questionable whether this type of database does really assist children in the acquisition process of their first language. Many linguists deny the truth of this claim. Modgil and Modgil (1987:43) say, "Insofar as caretakers do modify their speech to children, those changes may be more harmful than helpful".

The reason for them to say this is that motherese language gives further degeneration and limitation to the already degenerated and limited data. Motherese language is a biased language, because motherese does not represent the language data, which have to be acquired by children. What children have to acquire is not motherese language but the real adult's language, the language which adults used to communicate among them. According to Wanner and Gleitman (1982:40), "It seems reasonably obvious that learning should be more difficult from limited and biased ("degenerate" in Chomsky's wording) data than from rich and unbiased data".

Generally, it is a fact that not many parents are able to spend much of their time talking to their children so as to provide a sufficient motherese, especially in poor countries where most parents have to work hard to earn their living. Small children are left with their elder brothers and sisters who are usually too busy with their games and activities. Under such circumstances it is expected that these children will experience retardation in their firs language development. But facts clearly reveal the contrary. Elliot (1984:10) says, "Almost all children by age 5 have learned the basic structures of their language, despite considerable differences in intelligence as measured by IQ scores and differences in the richness of the learning environment".

If claims about motherese are right that children learn their first language through inductive processes, there will surely be a lot of difference in a child's first language development, because the development will depend on the quantity and quality of motheres

that they were exposed to. Children who are exposed to good motherese will be more advanced in their first language development compared to children who are exposed to poor motherese. But these differences do not occur, because research have shown that all normal children undergo the same stages of language development at about the same time, and are not much influenced by language input data as long as the data are rich enough to give exposure to their innate grammar.

Another fact which contradicts the concept of motherese is that, the language input which form the data base for first language acquisition are not confined to the input which are directed to children. It is a fact that children are mimics. They imitate whatever they hear without much consideration to the source of the data. They not only imitate speech that is directed to them but any language data that reach their ears and within their abilities to imitate. According to Hornstein and Lightfoot (1981:14):

> By our observations, young children are great mimics and often imitate the speech of adult or older children who are paying no attention to them. Therefore, there is no factual basis to claim that children 'register'' only what is filtered for them through 'motherese',

From the above description and discussions, it is clear that the idea that children acquire their first language through motherese cannot be plausibly defended. And it seems that the polemics between the proponents of motherese and the innateness hypothesis turn out to be exactly the opposite to what the motherese proponents had wanted it to happen.

Claims from Work in Connectionism

The connectionist methods in general are not developed under the discipline of linguistics but they are generally introduced and developed by researches under such experts as David Rumerlhart, James McClelland, Geoff Hinton and Colin Biggs[3] who have done many researches to prove that machines can also be taught language systems, and the ability which the machines acquire are said to be equal and sometimes even more than that of children.

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[3] See Rumelhart and McClelland, 1987 and Biggs, 1987 for details.

Since machines are invented and programmed by experts, the quantity and quality of output produced by them are dependent on how they are programmed by their inventors. Since they are machines, they cannot be claimed to possess the innate ability to acquire language. Because the experts who worked in this area claimed that the machines, which they programmed, have the same ability in learning language as human children, they then claimed that children acquire their language ability through learning. The connectionist theorist reject the idea that in children' minds, there exist an innate grammar which is universal in nature. According to Johnson-Laird (1987:153):

> A more radical thesis is defended by 'connectionist' theorist, who assumed that there is no tacit rules represented in the mind, but only relational patterns embodied in neuronal systems from which such rules are emergence properties.

In the connectionist model, language inputs are processed parallels – the parallel distributed processing. That is, when given any language input, the language-processing device will look at all possible answers and at the same time, choose the best choice according to the judgment of their programmes. Many types of machines have been invented to prove that this claim is true. For example, Rumelhart and McClelland invented a machine, which they claimed have acquired the mastery of English past tense rules in a similar way to the acquisition of these rules by children. Rumelhart and McClelland (1987:245) say, "We have shown that our simple learning model shows, to a remarkable degree, the characteristic of young children learning the morphology of the past tense in English". Rumelhart and McClelland have shown that the machine, which they programmed, can process linguistic data at a remarkable speed and the stages, which it follows to master, this processing ability is the same as those followed by human children.

It is true that the machine programmed by Rumelhart and McClelland can acquire the mastery of past tense rules of English, but do this mechanical-electrical system which they have programmed realize the relations between the uses of present and past tense which hold the concept of time division. What can be noticed presently is that, this machine has very limited ability. It is only able to give an output when there is an input such as come-came, give-gave, take-took, live-lived etc. But it does not realize that come, give, take, look etc refer to the present which are different with the came, gave, took and looked which refer to the past. This is due to the fact that the intelligence it possesses is artificial and can only

function according to the programme, which has been set by the programmer. As such, in no way can this type of intelligence be equal to the intelligence possessed by children.

The two types of 'minds' do not have the same type of processing control. One is mechanically controlled while the other (children) is controlled innately by rules, which are sensitive to the nature of the input data and resulting output. It seem plausible and logical when Chomsky compares these two types processing to two missiles which have different controlling patterns, "One guided by trained pigeons, operating on Skinnerian principles and pecking so as to steer the missile to its destination, while the other is steered by a theory of planetary motion plus appropriate computations (quoted by Wilks, 1987:198)".

Besides the above facts, we noticed that the machines, which were programmed by connectionist theorists, needed a lot of training and negative evidence (feedback) to reorganize their internal knowledge. According to Rumelhart and McClelland (1987:203),

> When the actual output matches the target output, the model is doing the right thing and so none of the weight on the line coming into the unit is adjusted. When the computed output is 0 and the targets says it should be 1, we want to increase the probability that the unit will be active the next time the same input pattern is presented.

This is very different from the way children acquire their first language. Many researchers have provided evidence that overt corrections are rarely experienced by children and even if they do occur, they are usually ignored. Machines need corrections while children do not. This is because children already possess the innate device to guide them in their task of acquiring their first language. This method of acquisition is surely not equal to the acquisition processes of the machines, which are fully dependent on the training with negative evidence. It is therefore evident that the work by the connectionist theorist cannot invalidate the innateness hypothesis, which claims that children are innately endowed with LAD for their first language acquisition.

CONCLUSION

Based on the two categories of evidence, which support the innateness hypothesis and the discussion on the two contradicting ideas, it is clear that the innateness hypothesis is a strong hypothesis. It can give clear and logical explanation to many linguistic phenomena in first language acquisition, which seems to be puzzling such as the uniformity of stages and the ease and speed of the first language acquisitions, the existence of creolization in deaf children sign language acquisition etc.

The proponents of the inductive theory have proposed many theories and models to contradict the innateness hypothesis such as the ideas of 'motherese' and 'connectionism' based in the arguments about the nature of the database. The degeneration and limitation of data can still be argued by the inductive theories because although the data are degenerated and limited they are still there and this enable the proponents of the inductive theory to argue their ideas.

But the fact that people can attain the knowledge of the structure of their first language of which no evidence is available in the data base cannot be explained by inductive theory because inductive processed can only work when there is data base that can be worked upon. Without any data, inductive process cannot occur. The question is how do children acquire the aspects of their first language, which they have never been exposed to? The answer is children are innately endowed with linguistic knowledge exist prior to experience with linguistic data.

Infants are said to be born equipped with Language Acquisition Device (LAD), but then the location of LAD in the children's brain has yet to be ascertained (Rice, Bruehler & Specker, 2003). The proponents of innateness hypothesis differ on this matter. Lenneberg (in Elliot, 1987:24-8) for examples claims that device will be established in the left hemisphere of the brains after a child reaches 18 months of age. But according to other researchers, this is not so in every case. For some children, due to some reasons, it could be in the right hemisphere. Danchin (1987:31) says, "It certainly happens that such organization is reversed, and when serious lesions occur during early childhood in the left hemisphere, linguistic aptitude are recovered, in the right hemisphere this time".

The proponents of the innateness hypothesis have advanced further by claiming that the LAD in the human brain can be further divided into smaller parts where each part has a specific linguistic function. Three areas which have three different functions have so far been detected – the Broca's, Wernicke's and Exener's areas. Broca's area is claimed to function in speech production, Wernicke's area is connected with the auditory association and sense forming and Exener's area is associated with written language (Dancin, 1987:31). For first language acquisition, Exener's area is not very important. But the two other areas, namely Wernicke's and Broca's, do have a very important function to play.

Based on the analysis presented in this article, it is clear that the innateness hypothesis is a profoundly strong hypothesis, which can plausibly account for most of the phenomena in first language acquisition. Without the help of an innate LAD, children would be unable to acquire their first language the way they do.

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