THE BIOLOGICAL WAYS OF CHILD LANGUAGE ACQUISITION ALTERNATIVE THEORIES TO THE INNATENESS THEORY

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Abstract: *The similitude among language acquisition stages across diverse people and languages shows that children come from birth with some special abilities about what generalizations to look for and what to ignore and, also, how to discover the regularities of their native language. Learning a language, as well as learning to walk, is quite different than learning to read or to ride a bicycle. The main difference may be that the first two processes are based on acquisition, while the latter are sustained by learning to do something. The theories discussed in this article are the innateness theory and its alternatives – the empiricist alternative and the theory formation. Both come with new arguments against the innateness theory and, thus, they may easily be considered as rather opposite than alternative ones.*

Keywords: *regularities, acquisition, learning*

General Remarks

One may find extremely phenomenal and interesting the way in which children form their own complex rules and construct a grammar of their own of the language around them in a relatively short time. The similitude among language acquisition stages across diverse people and languages shows that children come from birth with some special abilities about what generalizations to look for and what to ignore and, also, how to discover the regularities of their native language. Because the major source of data is the child's own productions, we often do not know what a certain word or grammatical construction means to the child when he uses it because they may mean different things to children than they mean to adults. Common, however, are the constructions which express relationships between objects or events. There has been a general belief that children comprehend more than they can produce at any point in their linguistic development. It has been stipulated that children learn language more or less in the same way as they learn to sit up or stand or crawl or walk. They are not taught to do these things, but all normal children begin to do them at around the same age. Learning a language, as well as learning to walk, is quite different than learning to read or to ride a bicycle. The main difference may be that the first two processes are based on acquisition, while the latter are sustained by learning to do something. Thus, many people never learn to read because they are not taught to do so and not because they do not have the ability to read; there are also large groups of people in different parts of the world that do not have any written language. However, they do have language. There are different theories or hypotheses to sustain the ability of children to acquire language, like *The Innateness Theory/Hypothesis* or *The Critical Age Hypothesis.*

Alternatives to Innateness Theory

'What accounts for the ease, rapidity and uniformity of language acquisition even if the data is quite impoverished?' – this is a question that was first posed by Chomsky in trying to explain the ways in which a child acquires language as a result of a natural process. They do not have to be shown or taught the complex rules of

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language, while a student of linguistics will probably find very difficult to solve a syntax problem in another language.

The process of acquisition in children is quite rapid; for example, a child acquires the major part of the grammar in more or less two years (that is, from the age of one – when the child produces his/her first words – till the age of three years old – when the child knows almost all grammatical complex structures in his/her native language). Apart from being rapid, acquisition is also a very uniform process across children and languages (Fromkin/Rodman, *An Introduction to Language*). Thus, children all over the world, learning thousands of languages, go through the same stages of phonological, morphological and syntactic rules acquisition in spite of the fact that children hear a great number of utterances, the language heard is incomplete, noisy and unstructured, the sentences have slips of the tongue, false starts and even ungrammatical and incomplete information. What is so intriguing about this process is that children actually learn (or mysteriously know) aspects of grammar for which they receive no information at all – the so-called ***impoverished data*** or ***poverty of stimulus***.

The basic idea is that children develop their every day knowledge of the world by using the same cognitive devices that adults use in science. Particularly, children develop abstract, coherent systems of entities and rules, especially causal ones (i.e. they develop theories). These theories enable children to make predictions about new evidence and also to interpret and explain it. Children explore the world, testing the predictions of the theory and gathering relevant evidence. There has been suggested that children are born with initial innate theories, as postulated by Chomsky. Thus, the Chomskyan theory of innateness can be 'translated' as: *a theory is a particular kind of system that assigns representations to inputs, in the way that the perceptual system assigns representations to visual input or how the syntactic system assigns representations to phonological input.*

It is worth noting that the generative program appears to be less concerned with developmental issues per se than with articulating the abstract principles of the universal grammar held to underlie language development. Given this difference in explananda, one finds corresponding differences in approach to the empirical data -- for example, the bits of language that serve as the child's input stimuli. For a theory of maturation, the relationship between the input stimuli and resulting language competence consists in the triggering of a set of pregiven constraints, while for a theory of learning the relationship is instead considered to be an inductive one. (One might expect that the relative importance each approach attributes to the input stimuli in explaining language competence will differ accordingly as well.)

All the evidence mentioned above and also factors like the ease, rapidity and uniformity with which a child acquires his/her first language (despite little input of language from outside) have led to the ***Innateness Hypothesis,*** stating that the human species is both genetically prewired to acquire language and also that the language it uses is of a determined kind. At the basis of this theory also stands the Chomskyan UG (Universal Grammar) representing the principles that are at the base of the unconscious, acquisition of any language in the world. UG underlies the specific grammars of all languages. It is what we refer to as the genetically determined language faculty of the left hemisphere. The innateness hypothesis predicts that all languages tend to conform to the principles of UG. Still, there is a long way until researchers understand the full nature of UG. Thus, if one investigates some language in which the UG principles have been violated, one has to correct the above theory and substitute other principles.

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For example, children at an early age learn to form questions and this rule does not seem too hard for them, i.e. to move the auxiliary verb to the beginning of the sentence. But, this does not always work. Given the situation:
Statement: 'Jill who is my sister is going up the hill.'
Question: '*Is Jill who__ my sister is going up the hill?'
'Is Jill who is my sister __ going up the hill?'

In this case, it is not the first auxiliary verb which must be moved, but the auxiliary verb of the main clause. This may lead one to the conclusion that the rules constructed by children are ***structure-dependent*** (children use syntactic rules that depend on more than their knowledge of words). They also rely on their knowledge of syntactic structures, although the latter are not overtly marked in the sentences they commonly hear. This process is more obvious when dealing with the rules for *wh*-question-formation.

e.g. ***Statement1:*** 'Jack and Jill went home.'
Question1: 'Jack and *who* went home?'
Statement2: 'Jill ate cookies and ice-cream.'
Question2: 'Jill ate cookies and *what*?'

What one may conclude from the examples above is the fact that the child learns to replace the noun-phrase (NP) Jill and ice-cream with the appropriate *wh*-question word *who* or *what*. It seems that the *wh*- phrase can replace any NP subject or object. But, in coordinate structures, the *wh*- word must stay in the original NP, as it cannot be moved. Although sentences like '*Who did Jack and __ go up the hill?'/ '*What did Jill eat bagels and __?' are considered ungrammatical, yet the following are accepted:
Statement: 'Jack went up the hill with Jill.'
Question: 'Who did Jack go up the hill with __ ?'

In almost all languages in the world, including English, there seems to be a so-called ***coordinate structure constraint*** that makes impossible the movement of a *wh*-phrase out of a ***coordinate structure.*** Although children make lots of mistakes in their early sentences, they do not produce sentences that could not be sentences in some human language. However, the range of theories that can be postulated is very much wider than the limited set of representations possible on innateness view.

Empiricist Alternatives -- there have been postulated other alternative and even opposite theories to the innateness hypothesis. Thus, Alison Gopnik (*The Theory Theory as an Alternative to the Innateness Hypothesis,* internet published article – the connected site is given in the *References* section) gives arguments in favour of the empiricist views in that if one does not specify just which learning mechanisms are talked about (and one knows for sure that there are not any other possible learning mechanisms), one cannot be certain that such capacity is innate. Thus, the poverty of the stimulus seems not to be such a strong argument as there may be general-purpose learning mechanisms that could account for the development of a particular type of knowledge. Putnam made this sort of argument many years ago, when Chomsky first formulated the innateness theory. Piagetians also argue that vague, possible, general-purpose processes of *assimilation* and *accommodation* can account for cognitive development. Chomsky is right in thinking that these are weak arguments as it seems little satisfactory to prefer an unspecified and vague general-purpose learning mechanism (that may or may not exist) to a specific proposal to an innate structure.

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Besides alternative mechanisms to the innateness theory, we can also bring into discussion some opposite proposals. These arguments typically have the following form: a particular mechanism explains some particular type of learning; in this type of learning, inputs are transformed into representations that are at least somehow more abstract, complex and highly structured than the inputs themselves. The actual representations generated by such mechanisms are not so abstract, complex or highly structured as the representations of language or of every day thought. Therefore, if the reinforcers and the stimuli and responses are complex enough, operant conditioning could get us to language and every day cognition. It was also the argument of *association*, by which one could get from two specific simple experiences to a more complex representation, by associating the simple experiences. Therefore, all representations could be achieved if the system turns to be sufficiently complex.

The most recent version of this argument invokes connectionist learning systems. These ones generate often surprisingly abstract and complex representations from repeated patterns of input. The learning mechanisms these systems employ are more powerful than the ones of simple association or conditioning. Nevertheless, the representations these systems generate still look very different as they lack the componential and inferential character of the representations of ordinary language and thought.

Theory-Formation -- the theory formation alternative presents, in contrast, a different argument. Scientific theory-formation is a kind of demonstration proof that there exist learning mechanisms in the universe that are powerful enough to generate the representations we want from the input we know we have. These learning mechanisms can be and, moreover, have been imbued in human brains here on earth.
Theory-formation does not represent a vague-general purpose learning mechanism that may or may not exist. Nor it is a specific learning mechanism that may or may not be able to generate sufficiently abstract, complex, highly-structured representations. It is indeed a mechanism that generates the right kind of knowledge from the right kind of input.

The classical empiricist views, as well as contemporary connectionist ones, assume that all representational structure comes from the nature of input and the learning mechanisms themselves and, thus, it can be reduced to input. As a contrast, scientific theory change never seems to involve non-interpreted data as theories themselves build on, revise or replace earlier theories. The earlier theories enable us to select and interpret the evidence that will eventually lead to new theories. According to scientifically opinions, the origin of this first theory is kind of obscure. But if one thinks about theory-formation as a mechanism of cognitive development, the origin of the first theories is quite simple. They represent the theories that we are literally born with. Therefore, children learn by modifying, revising and eventually replacing earlier theories with later ones. The idea that human beings are born with such substantive theories is also sustained by the empirical evidence of the last thirty years of infancy research.

There is, however, a very important difference between this kind of innateness and the chomskyan innateness hypothesis. These first theories of formation are subject to radical revision in the light of further evidence. (Gopnik& Meltzoff, 1997) By the time one reaches adulthood, the theories may look almost nothing like the initial theories we had at birth and further revision of these theories in organized science may lead to still further radical changes. These changes are not arbitrary, they are inferred

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from the evidence of the experience we accumulate in the course of development. This is very different from Chomsky's innateness hypothesis and from classical rationalism. On those views, innateness is a claim about the constraints on the final slate of the system and not about the slate the system starts with. On the other hand, if one sees Chomsky's real contribution as being cognitive naturalism, then the influence of his ideas is both broad and important. They have allowed us to make real progress in solving the problem of how we come to understand the world around us, the myriad devices we use to get to the truth about the world around us, from human vision to science itself. It has helped us to begin to solve the ancient problem of knowledge.

Conclusions

The similitude among language acquisition stages across diverse people and languages shows that children come from birth with some special abilities about what generalizations to look for and what to ignore. Thus, children comprehend more than they can produce. Alongside with the *innateness theory* provided by Chomsky (stating that children do come with an innate ability to learn a language), there have also been stipulated other alternatives, among which I found most interesting the following ones:

- the *empiricist alternatives* – is considered not only an alternative, but an opposite to the innateness theory; thus, it sustains that if one does not specify just which learning mechanisms are talked about, one cannot be certain that such capacity is innate and, in this way, the poverty of the stimulus seems not to be such a strong argument.
- the *theory-formation* -- demonstration proof that there exist learning mechanisms in the universe that are powerful enough to generate the representations we want from the input we know we have. Theory-formation does not represent a vague-general purpose learning mechanism that may or may not exist.

Regardless of these alternative theories, nothing has been proved yet and scientists are still researching for sustainable proofs and arguments. So far, the Chomskyan innateness theory is the most argumentative, but other ways of acquiring the native language are indeed involved in the process of language acquisition.

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