

Children’s Innate Capacity of Learning the First Language: an Overview of Structure-dependent Rules

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Abstract

How children acquire their first language has always been a question of debate between generativists and cognitive functionalists. Crain and Nakayama (1987) attempt to support the notion that children are innately equipped with syntactic rules and such rules are not learned by the child. They want to persuade functionalist linguists with the rightness of the innateness of the structure-dependent hypothesis (i.e. Universal Grammar/UG and poverty of the stimulus notion). To be precise, Crain and Nakayama discuss the Chomskyan “movement transformation” hypothesis (i.e. subject/aux inversion in structures with relative clauses). They claim that children do not make errors when attempting to make polar interrogatives from relative clauses; as a result, they reserve the verb inside the relative clause and move the auxiliary in the main clause to the front. For example, children would not form structures like **Is the author who writing this task is confused?* This is attributable to the claim that children are innately wired with structure-dependent rule. That is to say, children

resort to what so-called innate schematism (UG principles) when they form yes/no questions. This assertion is based on nothing more than the claim that no structure-dependence errors were found so far in the child's speech. Also, they conclude that grammar and meaning are disconnected from "the autonomy of syntax". To support their view, Crain and Nakayama conducted a study on thirty children whose age ranged from three to five. This paper is primarily intended to critically review Crain and Nakayama's article and discuss the structure-dependence rule in favour of both a formalist and cognitive functionalist point of view.

Keywords: structure-dependent, language acquisition, universal grammar, .

A. Introduction

It would be so useful, before discussing the three experiments conducted by the researchers, to consider the two hypotheses introduced in their first two experiments: hypothesis 1 (to form a yes/no question in a declarative, move the first verb to the beginning of the sentence) and hypothesis 2 (to form yes/no question in a declarative, the helping verb "in the main clause is inverted with the SNP"). The two hypotheses are regarded as structure-independent and structure-dependent respectively. Crain and Nakayama argue against the former structure as it restricts its validity to the simple sentences. Complex sentences as (6, p. 525) rule out (violate) structure-independent notion because they lead to a production of ungrammatical structure as in (7, p.252). However, hypothesis 2 fits both simple and complex sentences as it is based on abstract relations of words, but not on a linear order. Below is a discussion of the three experiments:

In the first experiment, the sample which consists of children whose mean age is 4.7 years old is divided into two groups according to their age. The first group's age ranges from 3.7 to 4.7 and the second is of a mean age of 5.3. This is done to account for the claim of the poverty of the stimulus (POS) based on the fact that the younger group are exposed to a smaller amount of input. Likewise, it then supports the claim of the innate principles. The experiment aims to indicate whether participants utilize Hypothesis 1(H1) or Hypothesis 2 (H2) when forming yes/ no questions in complex clauses with two copulas of the same kind. To make sure that the children comprehend that task, they are given a pre-test exercise as in (9, page 528) in which they appear to be competent, except two two-year old children. This indicates that even young children have acquired a rule for yes/no question.

In this experiment, children are shown a photo corresponding to the question. In case of 10a for example, a picture of two dogs were shown to the child, the first one is sleeping on a blue bench and the second is standing up. The researcher first points to the corresponding photo and then tell the child to ask a puppet called "Jabba", following a certain schema as *ask Jabba if* _____.

For instance, ‘ask Jabba if the boy who is watching Mickey mouse is happy’. Six questions of different kinds were given to the child, which means a total of 180 question were delivered.

The experiment shows that applying H1 by moving the first helping verb to the beginning of the sentences results in ungrammatical utterances such as “*Is the dog that sleeping is on the blue bench*”. Seventy-two children out of 180 make ungrammatical errors: 62 % and 20 % for group 1 and 2 respectively. The ungrammaticality of the utterances by the younger group depends on the kind of the sentence, which supports the claim that such kind of mistakes is not attributable to the utilization of generalization rule. Group 2, on the other hand, produces a small number of ungrammatical responses of the same kind. By analysing the mistakes, they show that none of the children apply H1 (i.e. move the verb in the relative clause). Therefore, no single child produces an ill-formed structure as in (3). Based on the ungrammatical responses, children produce two kinds of errors as in (1) and (2) below:

- 1- “**Is the boy who is being kissed by his mother is happy?*” [Type 1]
- 2- “**Is the boy that is watching Mickey Mouse, is he happy?*” [Type 2]
- 3- **Is the boy that watching Mickey Mouse is Happy?*” [Type 3]

In Type 1, the child copies the auxiliary at the front of the sentence, without deleting the copied verb as in (1). This kind of mistake poses a challenge to the researcher to decide which (is) the child copies as the auxiliary appears two times in the fragment. If the child copies the auxiliary inside the relative clause, this means that the child make structure-dependent error (which the authors dispute). The second mistake where the child produce a grammatical “fragment of a question” followed by another question consisting a referent as in (2) above.

The outcomes demonstrate that children’s correct responses are simply due to existence of the grammatical competence; however, the ill-formed responses are as a result of the complexity of the test clauses. For instance, participants tend to make smaller number of errors in simple relative clauses with intransitive verb in comparison to the complex ones containing transitive verbs.

The second experiment is a follow-up study to experiment 1 to decide whether Type 1 mistake is structure-independent or structure-dependent mistake using different kinds of sentences containing two types of auxiliary verbs namely a copula and a modal as in (21a:d, p. 535). The participants who make Type1 mistake take part in the study. After practicing the pre-test sentences, the children are given four sentences. In the first couple of sentences, the auxiliary occurs first and the modal appears second (labelled IM as in 21a+b), and vice versa in the second couple (labelled MI as in 21c+d). The researchers propose three possible ways of forming yes/no questions which they referred to as *S1*, *S2* and *S3* (p. 534). In this task, children appeared to be less competent as the

number of errors increased by 14% compared to experiment 1. This can be owed to the psychological status of the children as some seem to be less enthusiastic about the task and others reject participation.

The results reveal that S1 errors (Type 1) which is based on the copy of leftmost auxiliary do not occur as a result of structure-independent rule (S1), but they are possibly as a result of applying either S2 or S3 strategies stated in page 534. This conclusion supports the innateness of UG principles, which in turn, provides an evidence for the poverty of stimulus account.

The third experiment aims to argue in favour of the idea that syntax and semantics are disconnected. Crain and Nakayama challenge Stemmer 1980's proposal that structure-dependent is learned and acquired in the general cognitive ability of the child (i.e. no UG). To put it another way, Stemmer says that the acquisition of interrogatives is semantically based, which Crain and Nakayama oppose. It would be so useful to give a general overview of Stemmer's assumption cited in page 537 before discussing the experiment. The assumption rests on the idea that yes/no interrogatives are made by placing the auxiliary, which comes after "the first compound that refers to a particular object, before the compound". This notion seems to work with most of the English examples in experiment 1+2 mentioned above, but fails to comply with those such as in (26.a+b, p.537) in which the first compound refers to an action and not an object. In this experiment, the researchers introduce different types of SNP which also violates Stemmer's assumption such as in (27, a+b). The two dummy pronouns/predicates (or expletives), *there* and *it*, refer to nothing. The sample comprises of 14 children whose mean age is 3.9. The same methodology was adapted as in experiment 2. After performing a validity test as in 28, the sentences are divided into two groups. Both of SNP's in the first group (29, a+b) has no expletives like in the second group (29, c+d+e), they instead referred to as "an action and an obstruction". Each sentence in the second group has a very similar counterpart referred to as a control. The findings elucidate that the pre-test sentence lead to the production of more errors, particularly those containing modals, compared to the test sentences. Likewise, although the participants are of a younger age, they produce fewer errors compared to their counterparts in the first two experiments. This means that relative clause structures are more difficult to process than the constructions used in this experiment. To be precise, the participants' mistakes in the first two experiments are as a result of "failure of processing, not grammar". The children have a difficulty in forming questions using *should*. It seems that they substitute *should* with other verbs like *need* and *is*, assuming that such kind of mistakes is attributed to that *should* is less frequent in yes/no questions. The overall conclusion of this experiment is that the semantic features of the NP's play no role when forming questions. In other words, syntax and semantics are not related. The fact that the children succeed in

forming questions consisting of *expletives* and no single child can successfully produce a question using *should* violate Stemmer's assumption.

B. Discussion

Crain and Nakayama (1987) support their argument from a formalist/nativist perspective, limiting their focus to the structure-dependent as one of the grammatical principles that govern the formation of yes/no question. Their overall results show that structure-dependence errors do not exist in the child's speech because they are innately stored in their LAD.

One of the weaknesses of the test questions presented in experiment 1 is that they consist of two auxiliary verbs of the same kind (i.e. *is*) except the one in (10.f) which comprises of two copulas (*is*, *was*). According to constructivists, the evidence suggests that such kind of trials could be seen as a weak one as it is very simple compared to a complex one with a combination of other kind of auxiliaries rather than *be*. To spell out what is meant by this, they may minimize the probability of the children making errors. Additionally, children tend to make more errors when forming questions with *are* than others with *is* (Ambridge et al. 2006: 521). When analysing the data, it is very hard to determine which (*is*) the child copies. Also, it would be a problematic to decide if the child fills a kind of schema like *Is.....?* or not (usage-based not UG).

There are a number of variables that may make the results unreliable. At this young age, children may not comprehend the task properly even if it seems they do. The sentences they produce may not reflect their competence as they may consider this task as a game. Another variable is the psychological status of the children. As in experiment 2, some children ignored the researcher's request and refused to participate.

Another variable could be the sampling method. It is not clear whether the sample is chosen randomly from different speaking backgrounds or not. As stated by Dabrowska (2012), native speaker of a particular language has different grammatical competence, depending on the environment and the amount of language exposure.

The evidence suggests that the conclusion drawn from experiment 1 and 2, which indicates that children do not experience a stage where they apply structure-independent rule in forming yes/no question, is somehow inadequate. Consider the following data from functionalist point of view.

Empiricists agree with Chomsky that hypothesis 2 stated above which based on the structural -dependent notion is the correct one rather than hypothesis 1. They also argue that structure-dependent constrains are not innately endowed in the child's mind, but they are rather learned from their experience and "their general capacities" (Stemmer, 1981:650).

Moreover, in his case study of his own daughter, Tomasello (2003: 158-159) argues that generativist provide an inadequate evidence for the acquisition

of interrogatives. What the children do is nothing more than filling the gap of a particular formula/schema such as “Where is *thing*? Where *thing* go? ...etc. This conclusion opposes formalists’ well-known claims of the innateness of UG and the poverty of stimulus. That is to say, children are exposed to enough examples that enable them to generalize (example-driven). Ambridge and Lieven (2011: 120-121) state that children learn the rules of forming interrogatives from the set of examples they store in their input. They maintain that the knowledge of the X-bar and structure-dependence of the adult speaker is not innate as it is only valid to certain languages. For instance, heads precede their complements in English while vice versa in a language like Korean. Moreover, Lewis and Elman (2001, cited in Reali & Christiansen, 2003:3) argues against the POV by stating that children encounter different kinds of structures during their first stage of language acquisition and is unlikely that they do not meet a sentence like below:

-“*Is the boy who was playing with you still there?*”

Furthermore, Pullum and Scholz (2002, cited in Reali & Christiansen: 2004) investigate “Wall Street Journal” in order to determine the frequency of “auxiliary fronting” in yes/no questions. Of the first 500 questions, 5 patterns are found. This provides some evidence against the over-stated assumption of no auxiliary fronting is found in the input.

Regarding the conclusions drawn from experiment 3, there is a plenty of evidence which supports these conclusions. In her qualitative study of the three sample cases, Curtiss (1981:651) concluded that syntax is autonomous from semantics and other cognitive abilities. Genie, who was not exposed to language till age 13, was able to produce meaningful sentences with poor grammar. In the case of Antony however, he produces syntactically appropriate utterances and semantically poor ones. Stemmer however, explains that when children form a question from a sentence like (a) below, the sentence are semantically analysed; assuming that words are semantically related and thus easily more noticeable by people. For instance, more attention is paid to the fact that the copula *is* comes between a compound which denotes to somebody and the compound that refers to a place. In other words, children learn words in chunks which are meaning-based.

a) *The man is in the room*

After having discussed the data above, Crain and Nakayama (1987) strongly argue in favour of the generativists’ assumption of nativism, which is presumably based on theoretical and abstract conclusions. They assume that children know all the possible structures of all language that enable them to produce grammatical utterances. However, it seems that the functionalists’ prospective and explanation of child’s acquisition of questions outweighs the nativist one. Functionalists believe that children have innate capacity of learning the language, but language is usage-based. That is to say, children generalize and manipulate structures based on their rich input.

C. Conclusion

This paper was primarily aimed at reviewing generativists' and functionalists' views on how children acquire their first language in the light of Crain and Nakayama's (1987) research. The study attempts to review whether child language acquisition is based on structure-dependence (UG). It was found that experiments 1 and 2 support Chomsky's theory of Universal Grammar because children's syntactic hypotheses are "tightly constrained". Children do not consider linear order in creating a rule for subject/Aux inversion. Meanwhile, Experiment 3 suggests that children's construction of yes/no question structures does not rely on semantics. In other words, syntax is independent from semantics as Chomsky argues that during the language acquisition, structure-dependent rules are formulated.

The experiments further justify the Universal Grammar proposal that children's language is innate, suggesting that the syntactic rules have been embedded in humans' genome, and it is available to them from birth (Comrie, 1989: 3). In addition, the conclusion drawn from the experiments is that syntax is independent from semantics. A study conducted by Curtis (1981) had also proven this. Antony, a seven-year-old boy who was mentally retarded, could produce well formed syntactic structures, but semantically inappropriate. In contrast, Genie, a 13-year-old girl who was isolated from any human language, could respond correctly to any questions, despite her grammatical deficit. All this evidence supports Chomsky's proposal of structure dependence in children's grammar.

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