

Reconsideration of L1 acquisition data from the perspective of information structure

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Abstract

In this paper* I reconsider in detail first language (L1) acquisition data from the point of view of information structure. I argue that only either syntax-based or pragmatics-based approaches are insufficient to account for the totality of L1 acquisition, claiming that acquisition of syntactic rules proceeds simultaneously with that of information-structural rules. I make detailed reanalyses of L1 acquisition data taken from Steinberg et al. (2001), based on the information structure theory (Lambrecht 1994). I formulate the ability that a child acquires as a native speaker as the ability to ‘formalize’ information that he both receives and sends appropriately on the syntax of his native language.

1. Introduction

Every child passes through a two-word utterance term in the course of language acquisition. A lot of data of this term have been presented, among them Bates (1976), Clahsen (1991), Clark (2003). See the next examples of a child’s utterance in Table 1 taken from Steinberg, Nagata, and Aline (2001, hereafter Steinberg et al.)¹:

- (1) a. Where doll? (= (M))
- b. Truck table. (= (N))

Assuming that the child’s utterances are elliptical versions of the adult forms, Steinberg et al. argue that an adult would utter the following sentences in the same situation as (1):

- (2) a. Where is the doll? (= (M))
- b. The truck is on the table. (= (N))

When we observe the data, we will raise the following two questions. The first one will be as follows:

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¹ The leftmost items in Table 1 are typical two-word utterances of a child, next possible translations into sentences produced by an adult speaker, third purposes for which a child produces the utterance, and the rightmost ones indicate the semantic relations which components in the utterance exhibit.

(3) Why did a child utter those two words among all the sentential elements?

In other words,

(4) Why did he delete the sentential components other than those words?

In my opinion, for a child to utter the two words among several sentential components means that he chooses the words motivated by a principled rule dominating information structure. It seems that a child who utters (1) has already acquired information-structural rules. Therefore, the question above concerns the linguistic knowledge of information structure.

One word is necessary to clarify what ‘acquisition of information-structural rules’ means. Here, I suppose that what a child acquires regarding information-structural rules is the ability to understand the utterance contexts as well as a rule dominating information structure. Consider the following case: a child utters ‘Mommy’s chair’ meaning ‘this is Mommy’s chair’ as an answer to the question ‘Whose chair is this?.’ First, the child knows that he is asked to identify the thing that is in front of him (understanding of the utterance contexts). Second, it seems that the child understands what is presupposed and focalized in the question sentence. Namely, in *wh*-interrogative a *wh*-phrase is always focalized so that an addressee can identify the relevant part in the following answer, while the rest part is presupposed (Lambrecht 1994). Since the child understands the information structure of *wh*-interrogative and knows that he is required to identify the *wh*-part in his answer (understanding of information-structural rules), he can appropriately give an answer that fills the *wh*-part of the question, dropping the rest optionally.

The second question will be the following:

(5) Why did he utter those words in that order?

Comparing the child’s utterance (1a) with its adult version (2a), the child appears to have already acquired an obligatory movement rule (Chomsky 1981, 1995) of *wh*-interrogative in his native language. Then, this question concerns the linguistic knowledge of syntax.

It appears to be clear from the observation above that a child acquires syntactic rules simultaneously with information-structural rules,² that is, acquisition of syntactic rules proceeds simultaneously with that of information-structural rules. I focus on the two-word utterance term, and make reanalyses of L1 acquisition data mainly taken from Steinberg et al. (2001), from the point of view of information structure, following Lambrecht (1994). I formulate the ability that a child acquires as a native speaker of a language as the ability to ‘formalize’ information that is presented to the speaker, appropriately projecting it on the syntax of his native language.

The paper is organized as follows: in Section 2 I present the information structure

² What a child acquires includes other rules of language than syntax and information structure: phonology, semantics, morphology, and so on. Here, I concentrate on acquisition of syntactic and information-structural rules.

theory (Lambrecht 1994), which the data analyses made here are based on. In Section 3 I introduce two approaches to L1 acquisition, pragmatics-based and syntax-based theories. In Section 4 I make reanalyses of L1 acquisition data taken from Steinberg et al. (2001) from the perspective of information structure, following Lambrecht (1994). In Section 5 I present a formulation of the native speaker's ability that a child acquires. In Section 6 I make a brief summary of this paper.

I assume that the basic word order of English is SVO.³ In addition, if the utterance of a child displays the same syntactic rule as that of an adult, I regard it as evidence that the child has already set the parameter with regard to the relevant grammatical item in his native language. For example, in (1a) above a child puts a *wh*-phrase in the sentence-initial position in the same way as an adult speaker does in a *wh*-interrogative sentence. It might be premature to conclude that the child has already acquired obligatory *wh*-movement, since it could not be judged whether *wh*-movement is in effect obligatory for a child who has uttered the sentence like (1a): we cannot abandon the possibility that the word order of the child has not yet been established. Taking into consideration the data in Table 1, say (P-Q), however, it is clear that the child has already acquired the basic word order. Therefore, I regard the utterances that deviate from the basic word order of English as evidence that a child has already acquired movement property of English, namely, set the relevant parameter (i.e., the parameter of *wh*-movement in this case).⁴

Concerning terminologies, I use *pragmatics* to mean conversational aspects, but *information structure* to mean discursal ones, as I make clearer later introducing Lambrecht's (1994) information structure theory. Distinguishing Lambrecht's theory from others, I use *information structure theory* to refer to his, while I use *pragmatics-based approaches* to refer to others.

2. Information structure theory (Lambrecht 1994)

I stated in the previous chapter that acquisition of syntactic rules seem to proceed simultaneously with that of information-structural rules. A theory will be necessary with which these two rules can be dealt with at the same time. As such, I introduce in this chapter the information structure theory of Lambrecht (1994), which I would like to base data analyses on. Lambrecht distinguishes discourse pragmatics from conversational pragmatics, and argues that in the former 'the relationship between a given sentence form and the function of the sentence in discourse is directly determined by GRAMMATICAL CONVENTION' (Lambrecht 1994:5). He defines information structure as follows:

- (6) INFORMATION STRUCTURE: That component of sentence grammar in which propositions as conceptual representations of states of affairs are paired with lexicogrammatical structures in accordance with the mental states of interlocutors who use and interpret these structures as units of information in given discourse contexts (Lambrecht 1994:5).

³ Some literature has argued that basic word order is universally SOV. See Fukui and Takano (2000).

⁴ Concerning detailed data analyses of L1 acquisition of *wh*-movement, see Guasti (2002). Also see note 8.

Lambrecht regards the information-structural component as part of the grammatical ability. According to him, a language has an individual way to express information structure in its own syntax (Lambrecht 1994:223). See the following examples:

- (7) What happened?
- a. My CAR broke down.
 - b. Mi si è rotta (ROTTA) la MACCHINA.⁵
to-me itself is broken the car
(Lambrecht 1994:223, (5.12))

(7a-b) is a *sentence-focus*⁶ construction, which conveys ‘event-reporting’ (Lambrecht 1994:234). Following Lambrecht, English has a rigid word order but has a flexible prosodic system. Therefore, with word order unchanged, the subject CAR receives the focus accent (7a). In Italian, on the other hand, word order is loose, but the accent position is relatively fixed. Thus, a subject is inverted with a predicate, and the former receives a focus accent at the last position (7b) (Lambrecht 1994:319).

Lambrecht’s theory is suggestive, since it implies that the way of expressing information structure is always related to sentence structure of an individual language. Take (7b) for example. Two questions will arise when this sentence is heard in the context above: i) why does the speaker choose a sentence form of subject-predicate inversion? ii) how does the speaker know the way of performing the operations involved in subject-predicate inversion in Italian? An answer to i) is because the speaker knows that subject-predicate inversion is the way of expressing event-reporting in Italian, that is he/she has the linguistic knowledge of information structure. An answer to ii) is because the speaker has already mastered the syntactic rules in Italian, namely he/she has the linguistic knowledge of syntax. Consequently, Lambrecht’s information structure theory can account for (acquisition of) information-structural rules simultaneously with (acquisition of) syntactic rules, which is desirable for a current destination. In the next chapter I introduce both syntax-based and pragmatics-based theories, which I argue are insufficient to account for the totality of L1 acquisition. I would like to emphasize the importance to analyze L1 acquisition data based on Lambrecht’s information structure theory.

Lambrecht (1994) proposes the following three types of information structures. See the next examples:

- (8) a. What happened to your car? - My car broke DOWN.
b. I heard your motorcycle broke down? - My CAR broke down.
c. What happened? - My CAR broke down.
(Lambrecht 1994:223)

⁵ A background assumption is that basic word order is SVO both in English and in Italian.

⁶ I turn to Lambrecht’s focus structure system shortly below.

He classifies the sentence structures above in the following way: (8a) *predicate-focus structure*, an unmarked subject-predicate (topic-comment) sentence type, in which the predicate is focus and the subject (plus any other topical elements) is in presupposition; (8b) *argument-focus structure*, an identificational type, in which focus identifies a missing argument in a presupposed open proposition; (8c) *sentence-focus structure*, an event-reporting or presentational sentence type, in which focus extends over both the subject and the predicate (minus any topical non-subject elements) (Lambrecht 1994:222).

Lambrecht also proposes the following general phrasal accent rule:

- (9) GENERAL PHRASAL ACCENT PRINCIPLE: A phrasal accent marks the right boundary of a syntactic domain expressing a pragmatically construed portion of a proposition (Lambrecht 1994:247).

Following him, in the answer sentence of (8a) ‘my car broke DOWN,’ it is expected that the focus accent falls on *DOWN* as shown by small block capitals, since it is situated in the rightmost position of the focalized predicate *broke down*. In the answer (8b) *my car* is focused contrastively with *your motorcycle* in the question. Thus, the focus accent falls on *CAR*, which is the rightmost boundary of the focalized domain *my car*. In the answer (8c) *CAR*, part of the subject, receives a focus accent, contrary to a prediction: assuming that the whole sentence is focalized, *down*, which is a rightmost element, should receive the focus accent. Lambrecht proposes that English has *prosodic inversion*, which contrasts with word order inversion as in Italian stated above. He argues that English compensates for rigidity of word order with a flexible prosodic system to convey information structure of sentence-focus, which leads the focus accent to fall on the sentence-initial subject *CAR* (8c).

3. Pragmatics- and syntax-based approaches to L1 acquisition

Before going to data analyses of L1 acquisition based on Lambrecht’s (1994) information structure theory, I introduce in this chapter two approaches to L1 acquisition: pragmatics- and syntax-based theories. I confirm that a child undoubtedly acquires the knowledge of syntax simultaneously with that of information structure, therefore the totality of L1 acquisition cannot reasonably be accounted for with only either pragmatics- or syntax-based theories.

3.1. Pragmatics-based theory (Bates 1976)

It is a well-known fact that pragmatic aspects affect L1 acquisition. Clark (2003) states that a child tends to utter what is new rather than what is old (Clark 2003:97), and utter the former more clearly than the latter when he utters both (Clark 2003:127). Among pragmatics-based theories, I especially refer to Bates (1976). She argues that ‘the child who has learned to encode will encode the most informative elements from a structured situation precisely because those are the elements that keep his attention’ (Bates 1976:104). She continues in the following way: the situation serves as the topic, and the child provides the

comment. After the child has developed his capacity for symbolic processing, he will utter both the topic and the comment parts (Bates 1976:105). Following Bates, it will be possible to answer to the question (3) in Chapter 1: why did a child utter those two words among the whole sentential elements?' We will say that this is because the two words that a child utters are the most informative elements.

However, her analyses will be problematic for the case of a *wh*-interrogative like (M) on Table 1. Namely, it will be difficult to give a reasonable answer to the question (5): why did he utter those words in that order?' As this example shows, a child did put the *wh*-phrase in the initial position in the same way as an adult does. Movement of a *wh*-phrase to the sentence-initial position in a *wh*-question is not an optional but an obligatory operation in the relevant language. She leaves aside the case of an obligatory movement like *wh*-interrogative, focusing only on an optional subject-verb inversion case in Italian, for the cognitive control over new-old information mastered by a child will more clearly be reflected in the VS inversion order than in the rigid order in *wh*-interrogative (Bates 1976:183-5). She definitely argues that syntax is secondary while semantics/pragmatics are primary, and that syntactic aspects appear in a later stage of language acquisition than semantic and pragmatic aspects (Bates 1976:161-2). Following her, however, the fact that a child has already set the parameter of the relevant grammatical item in his native language, in this case an obligatory movement in *wh*-interrogative, will not be accounted for. In general, pragmatics-based theories will be insufficient to explain the totality, especially concerning word order, of acquisition of syntax.

3.2. Syntax-based theory (from learnability theories to parameter-setting accounts)

In this section I introduce syntax-based theories. Since Chomsky's 'Review of Skinner's *Verbal Behavior*' (Chomsky 1959), innateness of the linguistic faculty has been argued. Efforts have been made to solve Plato's problem – the problem of poverty of stimulus, 'how can every child reach a uniform state of the linguistic faculty despite limited empirical data?': a mechanism has been studied which enables a child to acquire the linguistic knowledge through his limited experience. Learnability theories, represented by Wexler and Culicover (1980) within a generative framework and Pinker (1984) based on Lexical-Functional Grammar (LFG),⁷ idealize the acquisition process as instantaneous, abstracting away from the actual time course. Clahsen (1991) summarizes the main points of learnability theories as follows: learnability theories (i) define the set of possible grammars, one of which is that of a target language, (ii) define a linguistic input necessary to acquire (i), and (iii) involve acquisition mechanisms which describe operations performed by a language learner in acquiring one among (i), based on (ii) (Clahsen 1991:20). Also, competing theories are evaluated in terms of theoretically motivated learnability constraints: '[p]riority is given to

⁷ Some literature regards frameworks like LFG as branches of generative grammar (e.g., Carnie 2002). Taking into account the origin and motivation of the LFG architecture (Bresnan 2001), however, it will be appropriate to regard those theories as independent of each other. Here, I take a standpoint that LFG has a status as a grammatical theory independent of generative grammar.

that grammatical description which fulfills the constraints of learnability' (Clahsen 1991:20).

Since the Principles and Parameters model was proposed (Chomsky 1981), it has been supposed that cross-linguistic differences are due to different choices of parameters. Language acquisition has been accounted for in terms of parameter setting. For instance, Italian allows a subject to be empty, while English does not. It is observed, however, that an English child drops a subject freely. Hyams (1986) proposes that the difference lies in null subject parameter setting. Namely, as the parameter is always set positively, a child does not have to change the value with data consistent with it (i.e., Italian). If the child is exposed to data inconsistent with the value, on the other hand, the child has to reset the value (i.e., English).

According to syntax-based theories, it will be possible to account for acquisition of obligatory movement as in *wh*-interrogative exhibited in (M) in Table 1, that is to provide an answer to the question presented in (5): why did he utter those words in that order?' Namely, the fact that a child correctly puts a *wh*-phrase in the sentence-initial position in *wh*-interrogative in the same way as an adult does will result from his mastery of the relevant grammatical item of the target language, whether we follow learnability theories or parameter setting accounts.⁸

Syntax-based theories, however, will have difficulty in accounting for several cases of a fragmentary speech. First, a problematic case is when utterances that are used for different purposes and in different semantic relations have the same surface forms, as shown in (E-G) in Table 1: the form '*Mommy chair*' is used to convey respectively (in the order of purpose-semantic relations) warning-possession (E), answer-possession (F), and answer-location (G), following Steinberg et al. (2001). This is because the difference in purpose or use of the utterance cannot be accounted for unless the contexts of the utterance is taken into consideration: a factor that determines purposes and uses of the utterances is beyond syntactic properties. It could be possible to say, as suggested by Anders Holmberg (personal communication), that the utterances of the same surface form are derived from different sentences. For instance, the utterance '*Mommy chair*' could have three original structures, *Mommy (has a) chair*, *(This is) Mommy('s) chair*, and *Mommy (is sitting in the) chair*, corresponding to (E-G) respectively. However, it is doubtful whether each fragmentary expression always has its own origin different from others. (E) has the same semantic relation as (F), as we saw above; the former is different from the latter only in the purpose relation. It will be natural to assume that the basic sentence structure of (E) is not different from that of (F) and the account for those utterances should be given in terms of factors beyond syntax.

Second, a problem arises concerning acquisition of the argument structure of a verb and a child's omission of an argument. See (P-Q) in Table 1. In both sentences a verb *push* is uttered. In (P) only a subject appears, while in (Q) only an object shows up. From this, we can safely suppose that the child has already acquired the argument structure of this verb, namely, agent and theme, though the object is missing in (P) and the subject does not appear in (Q).

⁸ Guasti (2000) argues that *wh*-in-situ is not an option for English children based on the data, according to which English-speaking children do not produce *wh*-in-situ interrogatives. She claims that 'syntactic *wh*-movement is operative as soon as the children produce their first questions' (Guasti 2000:108). Following her, the *wh*-movement parameter would be set positively from the beginning of acquisition for English children. I do not refer to this issue in more detail.

Both the subject (agent) and the object (theme), however, are essential sentential components: an adult native speaker of English is not allowed to omit them freely. Thus, if a child who has already acquired the argument structure of a verb optionally utters a certain element in some cases but deletes it in other cases in spite of the same argument structure, the child should have a motivation to choose the element that he intends to utter. Namely, a child's motivation to choose or omit a certain element in the utterance will not be accounted for, based on syntax-based theories. Bloom (1970) proposes a reduction rule, with which he makes an attempt to account for a child's fragmentary speech. However, he only states that an element that is deleted in a child's utterance is 'deletable,' whether omission is obligatory or optional (Bloom 1970:72). A child's motivation to utter/delete a certain element remains to be accounted for. Following parameter setting accounts, we could say that the child omits arguments because he is in the course of setting parameters: the child is engaged in setting both the null subject parameter and the null object parameter. However, null subject parameter does seem to exist in human languages (Chomsky 1981, Rizzi 1982), though we have no such a parameter as null object parameter. Consequently, omission of arguments only in (Q) will be given an account, while that in (P) remains to be explained, based on parameter setting accounts.

Finally, a case will arise in which word order that an utterance of a child displays is different from the order predicted from that of an adult. See the data (I) in Table 1. If a child intended to convey the meaning translated into 'mature speaker utterance,' that is, 'That car is red,' his more natural utterance would be '(That) car (is) red': the word order of his utterance would be 'Car red,' contrary to his actual utterance 'Red car.' Thus, this utterance may contain an optional movement, that is, movement of the adjective *red* to the left position. A child's motivation for an optional movement will remain to be explained.⁹

From what has been said above, it will be difficult to give a reasonable answer to the question (3): why did a child utter (or delete) those two words among all the sentential elements? That is, syntax-based theories are in general insufficient to account for a child's omission of a word and for the optional movement in a given utterance situation. Information-structural rules have been either not taken into account or simply ignored, attributed to pragmatic and processing factors, as stated in Pinker (1984:124, 161).

Summarizing the discussions in this chapter, the totality of L1 acquisition cannot be accounted for in terms of only either pragmatics-based or syntax-based approaches. In the next section I reanalyze acquisition data, based on the information structure theory (Lambrecht 1994) introduced in the previous chapter.

4. Reanalysis of language acquisition data from the perspective of information structure

In this section I make reanalyses of L1 acquisition data, based on information structure theory by Lambrecht (1994) introduced in chapter 2. One word is necessary to the following analyses. The problem is that we do not know how the child pronounced the sentences: we do

⁹ This point may be problematic also for pragmatics-based approaches: if the utterance contains (optional) movement at all, the utterance must be given a syntactic account, in addition to a pragmatic account.

not know the stress pattern in each utterance. Therefore, we cannot but rely on the transcriptions of a child's utterances, their translations into the adult versions, and the descriptions of the contexts of the utterance. The translations and the descriptions of the utterance contexts, however, will give a strong indication regarding the analyses of a child's utterances in most cases. In ambiguous cases I pick one reading. The aim of analyses here is to show that real life data of language acquisition can be analyzed in the following way, given information of utterance contexts.

I repeat below Lambrecht's General Phrasal Accent Principle as well as three focus structures introduced in chapter 2, which data analyses will be based on:

(10) GENERAL PHRASAL ACCENT PRINCIPLE: A phrasal accent marks the right boundary of a syntactic domain expressing a pragmatically construed portion of a proposition (Lambrecht 1994:247).

- (11) a. What happened to your car? - My car broke DOWN.
(*predicate-focus structure*)
- b. I heard your motorcycle broke down? - My CAR broke down.
(*argument-focus structure*)
- c. What happened? - My CAR broke down.
(*sentence-focus structure*)
(Lambrecht 1994:223)

Following Lambrecht's General Phrasal Accent Principle, it will be predicted that an element that does not occupy the right boundary of a syntactic phrasal unit does not receive a focus accent, therefore those elements including a non-focalized one as well as a topicalized one can be dropped in a child's utterance on the whole. The possibility that this prediction is tenable is testified by the result of Brown and Fraser's (1963) experiment, that is, the omission of the elements like function words. Since the function words carry subtle meanings and can be recovered from the context, they normally do not receive a focus accent. Brown and Fraser administered an imitation test of simple sentences to several children. They point out that the children tend to delete articles, prepositions, copular *be*, and auxiliary verbs, while they tend to keep content words like nouns. We have certain function words that are not omitted like *no* or *more*, as shown in (B), (K), and (L) in Table 1, though. It has been argued that quantificational phrases including those words can be focalized (e.g., Cinque 1990, Rizzi 1997). I leave aside those expressions here, only referring to the function words that have little meaning like auxiliary verbs. Bloom (1970) assumes a reduction rule to account for a child's fragmentary speech, as I stated previously. The aim of his reduction rule, however, is to account for the omission of an element that contributes to the meaning of the whole sentence. Therefore, since his theory cannot explain the telegraphic aspect of a child's utterance, he cannot but leave aside the issue of the omission of function words (Bloom 1970:139-141). Based on the information structure theory, however, it is unnecessary to separate the issue of deleting content words from that of omitting function words: it will be

predicted that an element that does not receive a focus accent tends to be dropped in a child's utterance, whether the element is a content word or a function word.¹⁰ That is, all the aspects of omission of words in a child's utterance can be accounted for in terms of the information structure theory.

Let us make reanalyses of the language acquisition data taken from Steinberg et al. (2001) in turn, based on Lambrecht's three focus structures. I make a sample analysis, taking (A) 'want cookie' for example. The adult version is 'I want a cookie,' following Steinberg et al. (2001). Therefore, predictable two-word utterances are 'I want,' 'I a,' 'I cookie,' 'want a,' 'want cookie,' 'a cookie.'¹¹ Since function words like articles tend to be omitted as stated above, 'I a,' 'want a,' and 'a cookie' disappear for the candidates of the resulting utterance. Given the information that the utterance is made to request, it turns out that the predicate part *want cookie*, which carries a new information when the child requests, is focalized, while the rest of the utterance is not: information structure of this utterance is predicate-focus, based on Lambrecht's focus structure. Thus, the candidates 'I want' and 'I cookie' disappear, in which the focalized predicate part appears incompletely despite the presence of the defocalized subject *I*. Consequently, the candidate utterance is appropriately predicted as 'want cookie,' as the actual data shows. In this way, not only resulting utterances are predictable but also the actual data are accounted for appropriately in terms of the interaction of three types of information structures with General Phrasal Accent Principle, regardless of which sentential element is omitted, based on Lambrecht (1994). In the following analyses I first represent the information structure of the sentence, after which I give a brief comment to each of the structure. The number is equal to that of Table 1.

(A) TOP [(I)] FOC [want (a) cookie] – predicate-focus

- The subject *I* is presupposed and deleted from the sentence, therefore, the utterance will be analyzed as predicate-focus.

(B) TOP [(I)] FOC [(want some) more milk] – predicate-focus

- Since the element that is situated at the right boundary of the predicate, *more milk*, is uttered, the sentence is analyzed as predicate-focus, deduced from Lambrecht's General Phrasal Accent Principle. Anders Holmberg (personal communication) wonders whether the analysis would be the same if a child had uttered '*Want milk.*' The answer is affirmative: it will be assumed that the subject *I* is presupposed in the context, and that it will be understood from the context that a child wants 'more' milk. Either way, the fact that '*more*' *milk* is situated at the right boundary of the predicate is not different, therefore, both '*More milk*' and '*Want milk*' will be analyzed as

¹⁰ Modals and auxiliary verbs can actually have focus accent (Anders Holmberg, personal communication):

i) He HAS been here.

ii) I MUST go now.

Brown (1973) argues that auxiliary verbs are acquired quite later in the course of L1 acquisition. The child whose utterance data we will survey may not yet have acquired those verbs. I leave this issue aside here.

¹¹ Assuming inversion cases, the other candidate utterances would be 'want I,' 'a I,' 'cookie I,' 'a want,' 'cookie want,' and 'cookie I.' I leave this issue aside now. But inversion, especially movement, will be involved in the analysis of the utterance like (I), which I detail below.

predicate-focus.

- (C) _{FOC} [Joe] _{TOP} [see (you)] – argument-focus
– It will be presumed that a child intentionally uttered the subject, while he purposefully deleted the object. Therefore, the sentence will be assumed to be argument-focus, which requires the subject to be identified.
- (D) _{TOP} [(This is)] _{FOC} [my cup] – argument-focus
– This utterance will also be assumed to be argument-focus in the same way as (C), which requires the possessor of *cup* to be identified.
- (E) (in the sense of) _{TOP} [(This is)] _{FOC} [Mommy('s) chair] – argument-focus
– Deducing from the purpose of this utterance, it will be assumed that a child intended to mean 'this is Mommy's chair.' Thus, the utterance will be analyzed as argument-focus, which requires the possessor of *chair* to be identified.
- (F) (in the sense of) _{TOP} [(This is)] _{FOC} [Mommy('s) chair] – argument-focus
– It will be assumed that a child was asked the question like 'whose chair is this?' and asked to reply, in other words asked to identify, the part of 'whose.' Therefore, it will be presumed that a child meant 'this is Mommy's chair.' Then, the sentence would function as argument-focus, which requires the possessor of *chair* to be identified.
- (G) (In the sense of) _{TOP} [Mommy] _{FOC} [(is sitting in the) chair] – predicate-focus
– Deducing from the purpose of the utterance, it will be assumed that a child was asked to answer to the question like 'where is Mommy?' or 'where is Mommy sitting?' Therefore, in this utterance *Mommy* will function as a topic, while *chair* will be a part of the comment. Then, the sentence will be analyzed as predicate-focus, namely, a normal topic-comment structure.
- (H) _{TOP} [(I)] _{FOC} [(am a) big boy] – predicate-focus
– A child uttered the sentence for the purpose of bragging. The child, concerning himself (topic), gave a comment that he is a big boy. Thus, the utterance will be assumed to be predicate-focus.
- (I) (in the topicalization case) _{TOP} [red] _{FOC} [(that) car (is)] – topic-comment
(in the focalization case) _{FOC} [RED] _{TOP} [(that) car (is)] – focus-topic construction
– Predicting from the adult version 'That car is red,' the word order of a child's utterance would be 'Car red.' Therefore, the utterance should be analyzed as containing movement of the adjective *red*. We will have two possibilities to analyze this utterance. One is topicalization 'Red, that car is,' and the other is focalization 'RED, that car is.' If the sentence contains topicalization, it will have topic-comment structure. If the sentence includes focalization, however, it will be assumed to be a focus-topic construction. Anders Holmberg (personal communication) suggests the possibility that the utterance would be analyzed as derived from '(It's) red, (that) car.' In that case the adjective *red* would not be moved, but the noun phrase *car* would be postposed or adjoined as an afterthought.
- (J) _{TOP} [That] _{FOC} [(is a) car] – predicate-focus
– *That* will play a role of a topic, while *car* a part of the predicate. Therefore, the utterance will be analyzed as a predicate-focus.

- (K) (in the sense of) _{TOP} [(I)] _{FOC} [(want) no (more) sleep] – predicate-focus
 – It will be supposed that the utterance was intended to convey ‘I want no more sleep.’
 Thus, the utterance will be predicate-focus.
- (L) _{TOP} [(I)] _{FOC} [(am) not tired] – predicate-focus
 – The elements that are situated at the right boundary of the predicate, namely, *not tired*, are uttered. Therefore, the sentence will be assumed to be predicate-focus.
- (M) _{FOC} [Where] _{TOP} [(is the) doll] – focus-topic construction
 – Following Lambrecht (1994), a *wh*-phrase in *wh*-interrogative is focalized, while the rest part of the question is presupposed. Therefore, the utterance will be analyzed as a focus-topic construction, in which the *wh*-phrase *where* is situated in the initial position where it is focalized, while *doll* plays a role of a topic.
- (N) _{TOP} [(The) truck] _{FOC} [(is on the) table] – predicate-focus
 – *Truck* will be a topic, while *table* will be a part of the comment. Thus, the sentence will have a normal topic-comment structure, namely, predicate-focus.
- (O) _{FOC} [Daddy (is) run(ning)] – sentence-focus
 – It will be presumed that a child intended to report the event of Daddy’s running. Therefore, the sentence will be supposed to be sentence-focus, following Lambrecht.
- (P) _{FOC} [Joe] _{TOP} [push(ed the cat)] – argument-focus
 – It will be assumed that a child intentionally uttered the subject, while he deleted the object on purpose. Thus, the sentence will be argument-focus, which requires the subject to be identified.
- (Q) _{TOP} [(I)] _{FOC} [push(ed the) cat] – predicate-focus
 – It will be supposed that a child uttered only the predicate part but deleted the subject, since the subject was presupposed in the context. Therefore, the utterance will be analyzed as predicate-focus.
- (R) _{TOP} [(you)] _{FOC} [give (me the) candy] – predicate-focus
 – A child deleted the subject pronoun as well as the object pronoun but uttered only the informative elements of the predicate part. Thus, the sentence will have a predicate-focus structure.

In this way it is possible to analyze two-word utterance data neatly, based on the information structure theory. Note that it is unnecessary to have parameter setting like Hyams (1986), or deletion rules like Bloom (1970): omission of sentential elements is corollary of the prediction based on Lambrecht’s information structure theory, not one resulting from any stipulations. Lambrecht’s information structure theory focuses mainly on how information structure is reflected on syntactic structures of a language. Therefore, it is possible to deal with syntactic rules simultaneously with information structure rules, following his theory.

5. Formulation of the ability that a child acquires as a native speaker of a language

From the analyses made so far, let us formulate the ability that a child acquires as a native speaker of a language. I argued previously that acquisition of syntactic rules proceeds

simultaneously with that of information structure rules. If this is in the right direction, it can be said that at a two-word stage a child makes an effort to express, in other words, 'formalize,' information that is given to him or that he wants to convey onto the syntactic forms of his native language. Furthermore, we saw that a child utters a sentence that is compatible with syntactic properties of a language which he is exposed to: for example, a child who acquires English puts a *wh*-phrase in a sentence-initial position in *wh*-interrogatives, in the same way as an adult native speaker of English does. Accordingly, it will be argued that a child tries to express information 'appropriately' in the syntax of his native language.

Therefore, I propose to formulate the ability as a native speaker that a child acquires in the following way:

- (12) A native speaker has the ability to formalize information that is given to him as well as information that he intends to convey, projecting it appropriately on the syntax of his native language.

6. Conclusion

In sum, I argued in this paper that acquisition of syntactic rules proceeds simultaneously with that of information structure rules. I claimed that a child's utterance will neatly be analyzed in terms of the information structure theory following Lambrecht (1994), while only either syntax-based or pragmatics-based approaches are insufficient to account for the totality of L1 acquisition. Consequently, I argued that what a child acquires as the ability of a native speaker is the ability to formalize information projecting it appropriately on the syntax of his native language.

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