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A Note on Labeling Algorithm in the Left Periphery

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ABSTRACT. In this paper, following Chomsky (2013, 2015), I investigate how Labeling Algorithm (LA) is applied to ellipsis phenomena of the left periphery in sentences such as German Colloquial Topic-Drop, Subject-drop in English, and Particle-Stranding Ellipsis in Japanese. In particular, in the {XP, YP} problem, I propose a third way of label determination: delete XP or YP.*

Keywords: Labeling Algorithm, Topic-drop, Subject-drop, Particle-Stranding Ellipsis, {XP, YP}

1. Introduction

Under *Free Merge* (Chomsky 2013, 2015), syntactic features do not trigger syntactic movement and "projection" is separated from Merge. "Projection" is derived from *Labeling Algorithm* (LA), which determines *Labels* of syntactic objects constructed by Merge (we will see the details of LA in section 2). Chomsky (2013, 2015) focuses on core phenomena of structure building while he does not deal with peripheral phenomena of syntactic structure. It is important to see whether LA can be applied to the peripheral phenomena because we are to indicate LA theoretically reasonable and to deepen the linguistic theory.

When we address the phenomena, we must bear the problem of learnability in mind. It is difficult to give peripheral phenomena a simple principled explanation because the phenomena seem to have construction-specific properties, which only the simple principled one cannot analyze. If explanations for these phenomena are complex and construction-specific, it is hard to formulate a simple theory of language learning. If explanations for these are simple and derived from the application of Free Merge and LA, we can expect to seek a simple theory of language learning.

In this paper, I examine how LA is applied to ellipsis phenomena of the left periphery in sentences such as German Colloquial Topic-Drop, Subject-drop in English, and Particle-Stranding Ellipsis in Japanese, which appear in the left periphery of sentences. These constructions are not dealt with in Chomsky (2013, 2015). In section 2, I review the

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LA proposed by Chomsky (2013, 2015). In section 3, I propose one possible application of LA to syntactic peripheral phenomena. In section 4, I show how my proposal applies to those ellipsis phenomena of the left periphery. Section 5 concludes the paper.

2. Labeling Algorithm (LA)

Chomsky (2013, 2015) argues that syntactic objects (SOs) constructed by Merge must have labels to be interpreted at both the *Conceptual-Intentional* (C-I) interface and the *Sensorimotor* (SM) interface, but the operation Merge just combines two SOs and forms a set of them, so Merge cannot determine labels of SOs. In Chomsky (2013, 2015), labels of SOs are determined by the Labeling Algorithm (LA), which is minimal search and is separated from Merge. Chomsky (2013, 2015) indicates how LA applies to (1)[1].

(1) a. $\{_{\alpha}$ H, XP$\}$

b. $\{_{\alpha}$ XP, YP$\}$

(2) a. $\{$YP, Z $\{_{\alpha}$ XP, $t_{YP}\}\}$ → α = XP

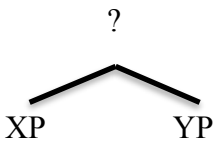
b. $\{_{\alpha}$ $XP_{<F>}$, $YP_{<F>}\}$ → α = <F, F>

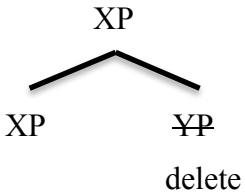
In (1a), SO is a set of the head H and the maximal projection XP. LA selects H as the label. In (1b), SO is a set of two maximal projections XP and YP, which are not a head. In this case, the label is determined by one of two ways. One is that one of the SOs YP "moves" and the remaining copy of YP becomes invisible to LA. As a result, XP is the label as shown in (2a). The other is that the most prominent feature F, which both XP and YP have, becomes the label of the set as shown in (2b). This is *feature sharing* (FS). Chomsky (2013, 2015) argues only these two methods of label determination in the {XP, YP} problem. In the next section, I explorer a third method of label determination.

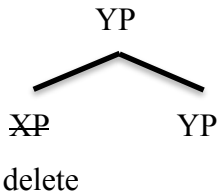
3. Proposal

In this section, I show a third possibility of label determination by LA. In the {XP, YP} problem, neither XP or YP are a head and therefore the label of this structure cannot be determined. In this case, Chomsky (2013, 2015) solves the problem by the two ways of LA: "move" and FS. In addition to these, I propose a third method of LA: delete XP or YP, as shown in (3).

[1] In this paper, I do not deal with the case {H, H}; SO is a set of two heads.

(3) a. 

b. 

c. 

In (3b), since YP is deleted and becomes invisible to LA, the label becomes XP. In (3c), the label becomes YP since XP is deleted and invisible to LA. I also assume that the deletion can be applied if and only if syntactic derivations converge and the deleted elements occupy the sentence initial position. As we will see below, the syntactic environment applied to the deletion seems restrictive and occurs in the left periphery of sentences.

4. Ellipsis Phenomena of the Left Periphery

In this section, I show how my proposal analyzes ellipsis phenomena of the left periphery in sentences such as German Colloquial Topic-Drop, Subject-drop in English, and Particle-Stranding Ellipsis in Japanese. These phenomena have similar properties. The deleted elements are given in discourse and have a topic interpretation. These occur only in the left edge of sentences. In the environment which the deletion can be applied to, these ellipsis are optional, not obligatory. In what follows, I show properties of these ellipsis phenomena and how my proposal explains these.

4.1. *German Colloquial Topic-Drop*

In this section, we consider German Colloquial Topic-Drop (Topic-Drop) as shown in (4):

(4) a. Ich hab' ihn schon gesehen.
I have him already seen
'I saw him already.'

b. Ø Hab' ihn schon gesehen.
have him already seen

'Ø (=I) saw him already.'

c. Ø Hab' ich schon gesehen.
have I already seen
'I saw Ø (=him) already.'

(Huang (1984: 546))

Given (4a), the subject in (4b) is a topicalized element because it is given information in context (4a). In (4c), also, the object is a topicalized element and then gets given information in context (4a). Each element moves from its base position into the left edge of sentences. German is a verb second (V2) language and topicalized elements move into the specifier of CP.

Topic-drop has two structural properties. First, Topic-drop can only occur in the left edge of sentences.

(5) a. *Ihn hab' Ø schon gesehen.
him have already seen
'Ø (=I) saw him already.'

b. Ich hab' Ø schon gesehen
I have already seen
'I saw Ø (=him) already.'

(Huang (1984: 547))

In (5a), the subject is dropped and the overt object moves into the left edge. In (5b), the object is deleted and the subject occupies the left edge of the sentence. These become ungrammatical.

Second, Topic-drop cannot occur in an embedded clause even when a topicalized element occupies the initial position in the embedded clause. This is illustrated in (6):

(6) a. *Hans glaubt [Ø habe es gestern gekauft].
Hans believe have it yesterday bought
'Hans believes that Ø (=I) bought it yesterday.'

((Rizzi (2005: 90))

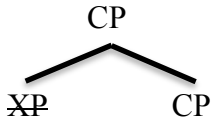
b. *Hans glaubt [Ø habe ich gestern gekauft].
Hans believe have I yesterday bought
'Hans believes that I bought Ø (=it) yesterday.'

(Yoshida (2004: 296))

Based on my proposal, let us consider these properties. In (5), the dropped subject or object is not the left edge of the sentence. Therefore, the deletion cannot be applied to these elements and these sentences become ungrammatical. In (6), the deleted subject or object occupies the left edge of each embedded sentence, but this position is not the sentence initial position when the derivations converge. Therefore, the deletion cannot be applied to these elements and these sentences become ungrammatical.

When Topic-drop can occur, topicalized elements are deleted in the left edge of sentences as shown in (7).

(7)



Topic

Delete

The interpretation of deleted elements gets given information from context and is recovered from it.

4.2. *Subject-drop in English*

In this section, I focus on Subject-drop in English (Subject-drop). Subject-drop has four properties. First, only subjects may be dropped, as shown in (8). These examples show that only subjects can be deleted whereas objects or pairs of subjects and objects cannot.

(8) What did Rufus do with the ball?

a. He threw it.

b. Threw it.

c. *He threw.

d. *Threw.

(Schirer (2008: 49))

Second, phi-features of the subject, like the person, number, and gender features, have no effect on the availability of Subject-drop. In particular, these features ({masculine and feminine}, {singular and plural}, and {1st person, 2nd person, 3rd person}) have no relation to the application to Subject-drop, as shown in (9)-(11).

(9) What did [I / we] do yesterday afternoon?

a. You washed the car.
b. Washed the car.

(10) What did [he / she / it / they] do yesterday afternoon?
a. [He / She / It / They] washed the car.
b. Washed the car.

(11) What did you do yesterday afternoon?
a. [I / We] washed the car.
b. Washed the car.

(Schirer (2008: 65))

Third, Tense, present or past, is insensitive to implementation of Subject-drop, as shown in (12) and (13).

(12) What did she do on Friday afternoon?
a. She washed the car.
b. Washed the car.

(13) What does she normally do on Friday afternoons?
a. She washes the car.
b. Washes the car.

(Schirer (2008: 58))

Finally, Subject-drop is applied in sentences which contain modal auxiliaries such as *should*, *might*, *must*, etc., as shown in (14)-(16).

(14) Why aren't you coming to the party?
a. I should do my math homework.
b. Should do my math homework.

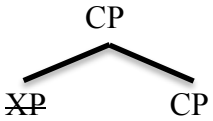
(15) Do you have any plans this weekend?
a. I might go to the fair.
b. Might go to the fair.

(16) Will he graduate this semester?
a. He must finish his thesis first.
b. Must finish his thesis first.

(Schirer (2008: 62))

Based on my proposal, let us consider these properties. The subject occupies the specifier of TP in syntactic derivations. Following Chomsky (2013, 2015), the label of TP is determined by FS. At that time, phi features of the head T is agreed with the subject through FS. Therefore, as these example show, agreements between the subject and the head T occurs as usual. What happens when Subject-drop is applied? I suppose that the deleted subject does not occupy the specifier of TP, but the specifier of CP. After FS at the specifier of TP, the deleted subject moves into the specifier of CP and then the deletion is applied to the subject. The deleted subject gets a given interpretation from an antecedent sentence and its interpretation is recovered from its context. When Subject-drop is applied, the position of the subject is important in the period of converging syntactic derivations. In other words, the subject occupies the left edge of sentences. Therefore, properties of phi features, tense, and modal auxiliaries have no relation with Subject-drop.

(17)



Subject
Delete

4.3. *Particle-Stranding Ellipsis (PSE) in Japanese*

In this section, I consider Particle-Stranding Ellipsis (PSE) in Japanese, which is illustrated in (18):

(18) Speaker A: Tanaka-kun wa?
Tanaka-TIT TOP
'How about Tanaka?'
Speaker B: Ø-Wa ne, kaisha-o yameta yo.
TOP TAG company-ACC quit EXCL
'Oh, (he) quit (his) company!'

(Sato (2012:495))

In this discourse, Speaker B recognizes *Tanaka-kun* in Speaker A's question as a topicalized element because it is an given information, and therefore he may reply without the topicalized NP. In Speaker B's answer, only the topic-marker *wa* is overtly pronounced. The topic-marker has an intonational boundary which is realized as comma intonation.

Sato (2011, 2012) observes two structural properties of PSE in Japanese. First, PSE in Japanese can only occur in the sentence initial position.

(19) Speaker A: John-wa kyoo nani-o si-teiru no?
John-TOP today what-ACC do-TEIRU Q
'What is John doing today?'
Speaker B: a. Ø-wa, Mary-ni daigaku-de a-tteiru ne.
TOP Mary-DAT university-LOC meet-TEIRU TAG
'Intended: Ø (=John) is meeting Mary at a university.'
b. *Mary-ni Ø-wa, daigaku-de a-tteiru ne.
Mary-DAT TOP university-LOC meet-TEIRU TAG
'Intended: Ø (=John) is meeting Mary at a university.'
c. *Mary-ni daigaku-de Ø-wa, a-tteiru ne.
Mary-DAT university-LOC TOP. meet-TEIRU TAG
'Intended: Ø (=John) is meeting Mary at a university.'
(Sato (2012:496))

In (19b,c), the word order is derived from the unmarked order of (19a), but these are ungrammatical.

Second, PSE in Japanese cannot occur in an embedded clause even when a topicalized element occupies the initial position in the embedded clause. This is illustrated in (20) and (21):

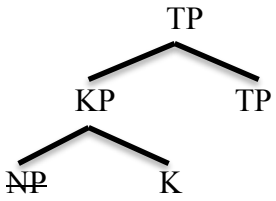
(20) Speaker A: John-wa sono-toki Taroo-o doo omotta no?
John-TOP that-time Taro-ACC how thought Q
'What did John think at that time about Taro?'
Speaker B: *John-wa sono-toki [$_{CP}$ Ø-wa, tensai-da-to] omotta yo.
John-TOP that-time TOP genius-COP-COMP thought TAG
'Intended: John thought at that time that Ø (=Taro) is a genius.'
(Sato (2011: 3))

(21) Speaker A: John-wa sono-toki Taroo-o dare-ga korosita-to omotta no?
John-TOP that-time Taro-ACC who-NOM killed-COMP thought Q
'Who did John think at that time that killed Taro?'
Speaker B: *John-wa sono-toki [$_{CP}$ Ø-wa, Mary-ga korosita-to] omotta yo.
John-TOP that-time TOP Mary-NOM killed-COMP thought TAG
'Intended: John thought at that time that Mary killed Ø (=Taro).'

(Sato (2012: 496))

Based on my proposal, let us consider these properties. I suppose that *wa*-phrases from KP. The Topic-marker *wa* occupies the head of KP and the topicalized NP, the specifier of KP[2]. The KP is in the sentence initial position and NP of KP is deleted when the derivations converge. In (19b, c), (20), and (21), the deleted NP of KP is not in the sentence initial position at the period of converging syntactic derivations.

(22)



Delete

This explanation has one problem. Why cannot become KP or K the label of this structure? Following Saito (2016), I can account for the problem. Saito (2016) argues that Case-particles are invisible to LA. In this structure, therefore, even when the deletion of NP is applied, KP or K is invisible to LA and TP becomes the label of the structure.

5. Concluding Remarks

In this paper, following Chomsky (2013, 2015), I indicated how LA is applied to ellipsis phenomena of the left periphery in sentences such as German Colloquial Topic-Drop, Subject-drop in English, and Particle-Stranding Ellipsis in Japanese, which are peripheral syntactic phenomena. In particular, in the {XP, YP} problem, I proposed a third way of label determination: delete XP or YP. I assume that the deletion is applied when the derivations converge and the deleted elements are in the sentence initial position. These ellipsis phenomena occur in the left edge of sentences and the deletion can be applied.

Chomsky (2013, 2015) does not argue the third possibility, the deletion XP or YP. It is important to explore whether other phenomena can be related with the third method. For example, Emoto (2013) investigates the obligatory deletion of XP or YP in LA. He explains VP ellipsis is obligatory when subject-aux inversion is triggered in comparative clauses. He shows the case that the deletion must occur in order to solve the {XP, YP} problem. In this paper, I indicated that the deletion can be optional. I need to see whether the deletion of XP or YP is obligatory or optional. Also, Totsuka (2019) proposes that topicalization has the

[2] For KP analysis, see Bošković (2014), Fukui (1986), Fukui and Speas (1986), Narita (2011), and Takahashi (2011).

unlabeled structure {XP, YP}, which has no label. I must investigate the relation between the unlabeled structures and the optionality of the deletion XP or YP. I leave these issues for future research.

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