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MINIMALISM AND INFORMATION STRUCTURE: A CASE OF ELLIPSIS IN JAPANESE

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1. Introduction¹

It is an important minimalist thesis that syntactic derivations are constrained by “computational efficiency”; derivations proceed in the most economical way (Chomsky 1992, 1995, 2004, etc.). The relevant notion of “economy” has been explored extensively. The original formulation of *Minimal Link Condition* (Chomsky 1992),² for example, involves the comparison of candidate convergent derivations. There are, on the other hand, strongly derivational approaches in which such comparison of derivations is not allowed because it brings in serious computational burden. For instance, by means of Attract, the optimal derivation is automatically selected without comparing of candidate derivations.³ Reinhart (2006), however, proposes a mechanism, as a part of our knowledge of language, which allows the comparison of candidate syntactic structures at the interface, and argues that relevant information of the conceptual-intentional (CI) performance system may affect an application of syntactic operations. In this paper, I will argue that a case of functional analysis of Japanese ellipsis and word order (Kuno 1978, Kuno 1995, Kamio and Takami 1998, etc.) may receive a principled explanation in terms of **reference set computation** in the sense of Reinhart (2006): that is, under well-defined conditions, a more economical

¹ This is a revised version of the paper presented at Workshop on Altaic Formal Linguistics (WAFL) 5, held at SOAS, University of London, May 23-25, 2008. Earlier versions were presented at Sapporo University (General Meeting of English Literary Society, Hokkaido Branch), October 2007, and at Kanda Institute of Foreign Languages, January 2008. I am grateful to the audiences there for invaluable questions, comments, and suggestions. I especially thank Jun Abe, Asako Uchibori, Shigeru Miyagawa, Nobuko Hasegawa, Kazuko Inoue, Masanobu Ueda, and Kimihiro Ohno. All errors are mine.

² Chomsky (1992:48): [G]iven two convergent derivations D_1 and D_2 with the same LF output, ... D_1 blocks D_2 if its links are shorter.

³ Chomsky (1995: 297): K attracts F if F is the closest feature that can enter into a checking relation with a sublabel of K.

derivation blocks an alternative “less economical” derivation with the identical numeration. In a broader perspective, the present analysis provides a specific case to bridge formal syntax (economy based computational system) and functional syntax (discourse-dependent system) in a significant way.

The organization of the paper is as follows. In Section 2, I will give an overview of the idea developed in Reinhart (2006) as the preliminary to the discussion that follows. Next in Section 3, I will review a functional analysis of ellipsis in Japanese put forth by Kuno (1978, 1995), and point out a serious conceptual/technical problem with it. Specifically, I will claim that the exact mechanism to compare and assess marked and unmarked cases is not explicit in the traditional functional analysis. Our proposal, in Section 4, provides a deeper account of Kuno’s *Markedness Principle for Discourse Rule Violations*, and gives an empirical support of Reinhart’s idea of reference set computation. Section 5 summarizes the paper and discusses some interesting consequences.

2. Preliminary: Main Stress and Focus Projection in English

In this section, I will introduce Reinhart’s (2006) system of reference set computation, employing the relationship between main stress and focus interpretation in English.⁴ It has been known that a sentence with the same main stress assigned may allow more than one focus interpretation (Cinque 1993, Zubizarreta 1998, Szendrői 2001, etc.). Consider the following examples taken from Reinhart (2006, chapter 3). **Bold face** indicates the main stress throughout this paper.

- (1) My neighbor is building a **desk**.

This sentence can be used truthfully in the following three different contexts, for instance:

- (2) Context A
 a. What’s that noise?
 b. My neighbor is building a **desk**. (Focus = [My neighbor is building a desk])
- (3) Context B
 a. What’s your neighbor doing these days?
 b. My neighbor is building a **desk**. (Focus = [building a desk])
- (4) Context C
 a. What’s your neighbor building?
 b. My neighbor is building a **desk**. (Focus = [a desk])

With respect of focus interpretation, in (2b) as an answer to (2a), the whole sentence is the new information focus. In (3b) as an answer to (3a), the verb phrase *building a desk* is the new

⁴ I am not going to discuss what “focus” is in the relevant sense here. Following Reinhart (2006), I simply assume that “the focus is always computed against a set of alternatives.” See Rooth (1985, 1992). I also assume that the notion “most important information” of a sentence (Kuno 1995) discussed in Sections 3 and 4 below is equivalent to “focus” here.

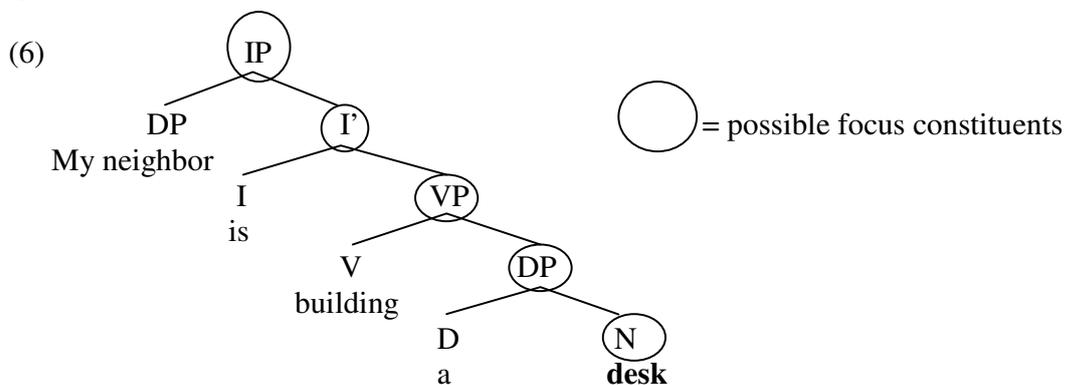
information focus. Likewise, the noun phrase *a desk* in (4b) is the new information focus as an answer to (4a). Sentence (1) with the main stress on *desk*, therefore, allows (at least) three different focus interpretations. In other words, a single structure of a sentence can correspond to (at least) three different semantic interpretations.

To account for this, Reinhart proposes (5).

- (5) *Focus Set* (Reinhart 1995, 2006. See also Cinque 1993)

The focus set of a derivation D includes all and only the constituents that contain the main stress of D.

Let us take (5) as a kind of interpretive rule which maps a syntactic structure (with the main stress assigned) to a set of candidate focus interpretations. Given (5), (1) may have five possible focus constituents as shown in (6) and in (7), among which are those in (2-4). In other words, assuming that (5) is a part of our knowledge of language, we can account for the fact that a single syntactic structure can be properly used in different contexts which require different focus interpretations.



- (7) *Focus set* for (1)

{<desk>, <a desk>, <building a desk>, <is building a desk>, <my neighbor is building a desk>}

In the following discussion in this paper, for expository conveniences, I will use only the following three members in (7); {<a desk>, <building a desk>, <my neighbor is building a desk>}.

However, if the main stress falls on something other than *desk* in (1), the focus projection is restricted. Look at (8), for example, in which the main stress is on the verb head *building*.

- (8) My neighbor is **building** a desk.

(8) cannot be used in the contexts A, B, and C.⁵

- (9) Context A

- a. What's that noise?
- b. # My neighbor is **building** a desk.

⁵ # indicates that the sentence is anomalous in the provided discourse.

- (10) Context B
- a. What's your neighbor doing these days?
 - b. # My neighbor is **building** a desk.

- (11) Context C
- a. What's your neighbor building?
 - b. # My neighbor is **building** a desk.

What is most interesting here is the fact that sentence (8) cannot be used when the discourse requires the whole sentence to be the focus, or the verb phrase *building a desk* to be the focus. The verb phrase *building a desk* is a constituent which contains the main stress element *building*; likewise, the whole sentence is a constituent which contains the main stress. Therefore, given (5), it would be expected that (9b) and (10b) should be natural in their discourse, contrary to the fact. The only context in which (8) is naturally uttered is the one in which the head verb *building* alone is the focus as in (12).

- (12) Context D
- a. Has your neighbor bought a desk already?
 - b. No, my neighbor is **building** a desk. (Focus = [building])

Therefore, the descriptive fact so far is that, given one element with the main stress, the focus projection is possible in some cases as in (1) (the main stress on *desk*), while it is impossible in other cases as in (8) (the main stress on *building*). Why is it so?

Reinhart (1995, 2006) proposes the following to answer this question. First, (1) has the unmarked main stress. Second, (8) has a marked main stress. Third, reference set computation compares the focus set of (1) and the focus set of (8). Finally, a marked structure is allowed only when it provides an interpretation that the corresponding unmarked structure cannot (economy consideration). Let us review what makes the main stress unmarked, and what makes it marked.

Following Cinque (1993) and Szendrői (2001) among others, Reinhart assumes that “Nuclear Stress Rule” (NSR) assigns the main stress on the most deeply embedded element of the derivation.⁶ Since the main stress assignment in a sentence is a phonological bare necessity (a sentence with no main stress causes a PF crash, at least in English), this main stress assignment is an automatic/costless operation (see also Chomsky and Hale 1968, Chomsky 1971, and Hale and Vergnaud 1987). Reinhart assumes that the main stress on some other element than the most deeply embedded element in a sentence is assigned by an additional operation “Stress Shift.” Hence, it involves a costly derivation. That is, (8) with the main stress on *building* has one extra derivational step which the corresponding unmarked structure (1) does not have. Note that the relevant distinction between “marked” vs. “unmarked” structures is explicitly defined in terms of derivation (i.e., computation in “narrow syntax”), not by means of “naive intuition.” Given a numeration, a derivation with the minimum syntactic operations for the interface convergence (i.e., the most economical derivation) is rendered as “unmarked,” and if it involves further syntactic operations which are not necessarily required for the interface convergence, the sentence is considered to be “marked” in the technical sense.

Now, reference set computation comes into work and compare two focus sets: one for (1) and the other for (8).

⁶ See Szendrői (2001) for technical details.

- (13) a. Focus set for (1)
 {<a desk>, <building a desk>, <my neighbor is building a desk>}
 b. Focus set for (8)
 {<building>, <building a desk>, <my neighbor is building a desk>}

Notice that the second and the third members of the set in (13b) are the focus candidates that are already available in (13a) which is provided by the less costly derivation. Therefore, sentence (8) is admitted only in a context which requires the head verb *building* alone to be the focus, as shown in (12). In the contexts which require <building a desk> or <my neighbor is building a desk> to be the focus, (8) cannot be used because (1) (the less costly derivation) can give the relevant focus interpretations. We have seen that this is the case in (9) and (10) above. The less costly derivation blocks the more costly derivation when both give the same focus interpretation. By reference set computation, therefore, the second and the third members in focus set for (8) are not admitted, which I crossed out as in (14b).⁷

- (14) a. Focus set for (1)
 {<a desk>, <building a desk>, <my neighbor is building a desk>}
 b. Focus set for (8)
 {<building>, ~~<building a desk>~~, ~~<my neighbor is building a desk>~~}

Having introduced the basic conception of Reinhart's reference set computation, let us now turn to a case of Japanese ellipsis, and Kuno-type (1995) functional analysis of it.

3. Ellipsis in Japanese: A Functional Analysis

It has been observed that English has a tendency to have the focus at the end of the sentence (See Quirk *et al* 1972: 943, for instance). Specifically, Kuno (1995 [originally in Kuno 1978]⁸) proposes the following discourse principle.⁹

⁷ Note that it is not the case that "marked" main stress due to the Stress Shift operation will never allow focus projection. Look at (i), for example, which is a natural discourse pair.

- (i) a. Who is building a desk? (the expected focus is the subject constituent)
 b. [The man with the **apron**] is building a desk.

In (ib), the main stress is shifted from *desk* (unmarked structure) to *apron* (marked structure derived by Stress Shift). Nevertheless, the focus is the entire subject constituent that properly contains *apron*: that is, the focus projects. This state of affairs convincingly indicates that reference set computation is crucially involved. The focus projects automatically, following the rule Focus Set in (5). If a candidate focus interpretation given by (5) is NOT available in the competing more economical derivations, it is admitted as a legitimate interpretation even if it is obtained in the "marked" derivations (with Focus Shift, for instance).

⁸ The basic ideas explored in Kuno (1995) are originally stated in Kuno (1978) which was written in Japanese. For the reader's convenience, I will use Kuno (1995) as the source of reference.

⁹ This tendency may apply to many other languages. Further, the relevant factor may not be the linear order but rather the depth of embedding, as the Cinque/Szendrői-type analysis suggests. See Stjepanović (2007) for a related discussion in Serbo-Croatian.

(15) *Flow of Information Principle*

Elements in a sentence that does not contain emphatic stress or morphologically marked focus elements are ordinarily arranged in the order “less important information first and more important information last.” (Kuno 1995: 222)

Kuno further proposes that Japanese has the following version of the principle because “Japanese is a verb-final language,” he argues.

(16) *Flow of Information Principle for Japanese*

[I]n the case where the verb of a sentence does not represent the most important information, then [15] marks the element in the immediately preverbal position as the most important focus element in the sentence. (Kuno 1995: 222)

Given (16), Kuno proposes a deletion principle based on information structure:¹⁰

(17) *Pecking Order of Deletion Principle*

Delete less important information first, and more important information last.

(Kuno 1995:209)

(17) sounds very natural (it is extremely difficult to imagine the situation which does not follow it), and thus I will take it for granted that (17), or some version of the same spirit, must be part of our language faculty. What is at stake is how we determine the relative importance of elements in a sentence. Kuno claims that (16) is one of such principles for Japanese. Together with (16), *Pecking Order of Deletion Principle* (17) neatly accounts for cases like (18).¹¹

(18) a. *Taroo-wa Naomi-ni yoru denwa suru. Ken-wa Erica-ni ϕ denwa suru.
 T-TOP N-DAT night phone do K-TOP E-DAT ϕ phone do
 ‘Taro phones Naomi at night. Ken phones Erica.’ (Kuno 1995: 222)

b. *Taroo-wa Hamlet-o toshokan-de yomi, Jiroo-wa Lear Oh-o ϕ yonda.
 T-TOP Hamlet-ACC library-LOC read J-TOP King Lear-ACC ϕ read
 ‘Taro read Hamlet in the library, and Jiro read King Lear.’

(Kamio and Takami 1998: 132)

In the first conjunct clause of (18a), *yoru* ‘night’ is in the immediately preverbal position and hence carries the most important information. Assuming the parallelism, it is naturally expected that in the second clause in (18a), the temporal adjunct carries the most important information. However, it is “deleted” (or phonetically unrealized), while the less important element (i.e., the dative object) is retained as the contrastive element. Similarly in (18b), the most important element in the immediately preverbal position in the first conjunct, *toshokan-de* ‘library-LOC,’ is

¹⁰ In this paper, I understand “ellipsis/deletion” as a cover term to refer to the phonetically unrealized elements in question. Therefore, I am neutral whether they are derived by PF deletion or LF copy, or whether they are null pronouns of some sort. This does not affect the points in this paper.

¹¹ The judgments here are Kuno’s (1995) and Kamio and Takami’s (1998). Some readers may not find sentences in (18) completely ungrammatical. However, there is a sharp contrast between them and sentences in (19) below which are way better. Hence, following Kuno, and Kamio and Takami, I take the contrast real; sentences in (18) are substantially degraded.

deleted in the second conjunct, while the less important element (i.e., the accusative object) is retained as the contrastive element. The unnaturalness in (18) follows from (16) and (17).

However, there are problematic cases as in (19).

- (19) a.(?) Taroo-wa yoru Naomi-ni denwa suru. Ken-wa asa ϕ denwa suru.
 T-TOP night N-DAT phone do K-TOP morning ϕ phone do
 ‘Taro phones Naomi at night. Ken phones in the morning.’ (Kuno 1995: 224)
- b. Taroo-wa toshokan-de Hamlet-o yomi, Jiroo-wa kenkyushitu-de ϕ yonda.
 T-TOP library-LOC Hamlet-ACC read J-TOP office-LOC ϕ read
 ‘Taro read Hamlet in the library, and Jiro read in the office.’
 (Kamio and Takami 1998: 133)

Here the immediately preverbal element (i.e., the alleged most important element) is deleted, while the less important element is retained, but nevertheless the sentences are good. It seems that the sentences in (19) are somehow immune from *Flow of Information Principle for Japanese* (16). The question is how. Kuno’s answer to this question is the following:

(20) *Markedness Principle for Discourse Rule Violations*

Sentences that involve marked (or intentional) violation of discourse principles are unacceptable. On the other hand, sentences that involve unmarked (or unintentional) violations of discourse principles go unpenalized and are acceptable. (Kuno 1995: 211)

(20) is intuitively very plausible and has substantial empirical supports (see Kuno 1987, for example, as well as Kuno 1978, 1995), but it is not clear how the faculty of language evaluates “unmarked” or “marked” violations. It is also not explicit what the relation is between (20) and structure building mechanism in narrow syntax. In other words, what is the exact mechanism to compare and assess marked and unmarked cases in our faculty of language? In the rest of this paper, I argue that reference set computation (in the sense of Reinhart 2006) is crucially involved in the current cases.

4. Minimalism Meets Information Structure

4.1 Proposals

Extending the idea that the most deeply embedded element receives the unmarked main stress and that it is the primary source to determine possible focus constituents in English, I will propose (21).¹²

¹² It is not very clear to me whether Japanese also has the requirement that the main stress must be assigned in the relevant element for the PF convergence as English does. Note that Miyagawa (2007), for instance, states that the direct object in Japanese receives the prominent stress in unmarked transitive structures. It is an important issue whether we can generalize (21) with the English Nuclear Stress Rule, but I will not get into this any further in this paper. Instead, I simply note that Reinhart (2006) argues that Dutch takes SOV word order like Japanese and requires the main stress assigned to the most deeply embedded element in the sentence. Hence, the immediately preverbal element (in transitive verb structures) is the source of the focus projection.

(21) *Focus Source*

The immediately preverbal element is the *focus source* in Japanese. (Cf. Kuno's (16))

Given (21), I also propose (22), generalizing Reinhart's Focus Set (5).

(22) *Generalized Focus Projection Rule*

The focus set of a derivation D includes all and only the constituents that contain the *focus source* of D.

Focus source: $\left\{ \begin{array}{l} \text{English} = \text{the element bearing the main stress} \\ \text{Japanese} = \text{the immediately preverbal element} \\ \dots \end{array} \right.$

I am going to show that (21) and (22) account for the relevant ellipsis facts in Japanese in a very explicit way. The general idea here is that there is an unmarked focus carrying element in a sentence and any constituents in the sentence which contain the focus carrying element can be the neutral focus at no extra cost. Now, let us consider how these proposals take care of the Japanese ellipsis phenomena we have been dealing with.

4.2 Analysis

Let us first discuss the “unmarked” structure, the [adjunct – DO – V] order, following the general assumption that the locative adjunct is adjoined to VP. In (23a), the direct object *Hamlet-o* ‘Hamlet-ACC’ is the focus source since it is the immediately preverbal element (to which I add the double underline). Then, (22) gives the focus set of (23a) as in (23b).¹³

- (23) a. Taroo-wa [_{VP} toshokan-de [_{VP} Hamlet-o yom-]] da.
 T-TOP library-LOC H-ACC read PAST
 ‘Taro read Hamlet in the library.’
 b. Focus set: {<H-ACC>, <H-ACC read>, <library-LOC H-ACC read>}

The analysis is confirmed by the fact that (23a) can be used naturally in the following contexts.

- (24) a. Taroo-wa nani-o sita no? (the outer VP is the expected focus)
 T-TOP what-ACC did Q
 ‘What did Taro do?’
 b. Taroo-wa toshokan-de nani-o sita no? (the inner VP is the expected focus)
 T-TOP library-LOC what-ACC did Q
 ‘What did Taro do in the library?’
 c. Taroo-wa toshokan-de nani-o yonda no? (the object is the expected focus)
 T-TOP library-LOC what-ACC read Q
 ‘What did Taro read in the library?’

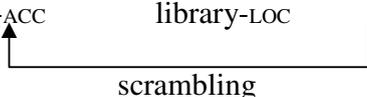
¹³ The subject here is marked by the topic marker *-wa*: Thus, it is not new information and not included in the focus set here.

Now, since the outer VP constituent [*library-LOC Hamlet-ACC read*] is a member of the focus set, sentence (23a) has an interpretation in which the relative importance between *library-LOC* and *Hamlet-ACC* is on a par. Neither of these carries more important information than the other. Hence, it is predicted that either can be deleted, retaining the other, without violating *Pecking Order of Deletion Principle* (17). The prediction is borne out, as shown in (25).

- (25) Taroo-wa toshokan-de Hamlet-o yomi ...
 T-TOP library-LOC H-ACC read
 ‘Taro read Hamlet in the library, and ...’
- a. Jiro-wa kenkyuushitu-de ϕ yon-da. (Kamio and Takami 1998: 132-133)
 J-TOP office-LOC ϕ read-PAST
 ‘Jiro read in the office.’
- b. Jiro-wa ϕ Lear Oh-o yon-da. (Kamio and Takami 1998: 134)
 J-TOP ϕ King Lear-ACC read-PAST
 ‘Jiro read in the office.’

Kamio and Takami (1998:133) state that when the elements are aligned in the basic word order, the relative importance between the adjunct and the complement cannot be determined in a uniform fashion. Either can be more important than the other. Likewise, under Kuno’s implementation, (23)/(25) does not have to obey a discourse principle, say, *Flow of Information Principle for Japanese* (16), because the sentence is aligned in the basic word order and thus the violation of (16) is “unintentional” and goes “unpenalized.” Both implementations of Kamio and Takami’s and Kuno’s fit the observation in (25) well, but they are not clear why this is the case. If the proposals in (21) and (22) are on the right track, however, we can explain why the relative importance between the adjunct and the complement is on a par in (23)/(25). The outer verb phrase itself is the most important focus information. Neither the adjunct nor the complement is more important than the other in this interpretation. We have a one step deeper account of the relevant ellipsis fact. The next question is why the focus interpretation is more restricted in the case of “marked” word order structures.

Following the tradition that [DO – adjunct – V] order is derived by VP-internal scrambling, I assume (26) as the structure of the first conjunct clause in (18b).

- (26) Taroo-wa [_{VP} Hamlet-o [_{VP} toshokan-de [_{VP} yom]]].
 T-TOP H-ACC library-LOC read

 scrambling

Now, let us compare the focus set of the “unmarked” word order structure and the “marked” word order structure. The focus source is doubly-underlined (I have simplified and omitted irrelevant details in the structures).

- (27) “unmarked” structure
- a. Taroo-wa [_{VP} toshokan-de [_{VP} Hamlet-o yom-]].
 T-TOP library-LOC H-ACC read
- b. Focus set: {<H-ACC>, <H-ACC read>, <library-LOC H-ACC read>}

- (28) “marked” structure
- a. Taroo-wa [_{VP} Hamlet-o [_{VP} toshokan-de [_{VP} yom]]].
 T-TOP H-ACC library-LOC read
- b. Focus set: {<library-LOC>, <library-LOC read>, <H-ACC library-LOC read>}

Here I propose that the reference set computation in the sense of Reinhart (2006) plays a significant role. First of all, both (27a) and (28a) are derived from the same numeration, the only structural difference being that (28a) involves VP-internal scrambling of the direct object. Notice that the last member of the focus set in (28b) is *logico-semantically identical* to the last member of the focus set in (27b). Notice also that “marked” structure (28a) involves scrambling; one additional step to the corresponding “unmarked” structure in (27a). Namely, (28a) is a more costly derivation than (27a). Hence, the last member in focus set (28b) is not justified as a legitimate focus element for (28a) because the identical interpretation has already been available in the more economical derivation in (27a). Let me represent the state of affair by crossing out the last member of the focus set as in (29).

- (29) “marked” structure
- a. Taroo-wa [_{VP} Hamlet-o [_{VP} toshokan-de [_{VP} yom]]].
 T-TOP H-ACC library-LOC read
- b. Focus set: {<library-LOC>, <library-LOC read>, <~~H-ACC library-LOC read~~>}

Now, looking at the survived members of the focus set in (29b), we can see that the adjunct (*library-LOC*) is always in a member of possible focus, but never is the direct object NP (*Hamlet-ACC*). Hence, deleting the adjunct and retaining the direct object as in (18b) (repeated here as (30)) violates *Pecking Order of Deletion Principle* (repeated here as (31)).

- (30) *Taroo-wa Hamlet-o toshokan-de yomi, Jiroo-wa Lear Oh-o ϕ yonda. (=18b)
 T-TOP Hamlet-ACC library-LOC read J-TOP King Lear-ACC ϕ read
 ‘Taro read Hamlet in the library, and Jiro read King Lear.’
 (Kamio and Takami 1998: 132)

- (31) *Pecking Order of Deletion Principle*
 Delete less important information first, and more important information last.
 (Kuno 1995: 209)

The same analysis applies to (32) and (33).¹⁴

- (32) a.(?) Taroo-wa yoru Naomi-ni denwa suru. Ken-wa asa ϕ denwa suru. (=19a)
 T-TOP night N-DAT phone do K-TOP morning ϕ phone do
 ‘Taro phones Naomi at night. Ken phones in the morning.’ (Kuno 1995: 224)

¹⁴ Masaya Yoshida (personal communication) asked what if the verb is a light verb: that is, which element is counted as “the immediately preverbal element,” the bare N incorporated in the light verb complex [N-V], or the phrase outside of the light verb complex. As shown in (33), the “immediately preverbal element” in the relevant sense here is the adjunct *yoru* ‘at night,’ not *denwa* ‘phone’. Therefore, the immediately preverbal element in (33) should be understood as the element right before the light verb complex [N-V].

- b. Focus set of the first conjunct clause:
 {<N-DAT>, <N-DAT phone-do>, <at night N-DAT phone-do>}
- (33) a. *Taroo-wa Naomi-ni yoru denwa suru. Ken-wa Erica-ni ϕ denwa suru. (=18a)
 T-TOP N-DAT night phone do K-TOP E-DAT ϕ phone do
 ‘Taro phones Naomi at night. Ken phones Erica.’ (Kuno 1995: 222)
- b. focus set of the first conjunct clause:
 {<at night>, <at night phone-do> <N-DAT at night phone-do>}

(33a) involves scrambling of the dative object to adjoin to the outer VP (an additional step which is not involved in the corresponding unmarked structure (32a)). Notice again that the last member of the focus set in (33b) is logico-semantically identical to the last member of the focus set in (32b). Since the identical interpretation is already available in the more economical derivation in (32), the last member of the focus set in (33b) is not admitted, which I crossed out in (34b).

- (34) a. *Taroo-wa Naomi-ni yoru denwa suru. Ken-wa Erica-ni ϕ denwa suru.
 T-TOP N-DAT night phone do K-TOP E-DAT ϕ phone do
 ‘Taro phones Naomi at night. Ken phones Erica.’ (Kuno 1995: 222)
- b. focus set of the first conjunct clause:
 {<at night>, <at night phone-do> <~~N-DAT at night phone-do~~>}

In (34), then, the dative object *Naomi-ni* ‘Naomi-DAT’ is not part of focus, while the temporal adjunct *yoru* ‘at night’ is always (part of) the focus, as shown in (34b). Hence, deleting *yoru* ‘at night’ and retaining the dative object as the contrastive element violates (31) and thus leads to the unnaturalness of the sentence.

5. Summary and Consequences

In this paper, I argue that cases of Japanese ellipsis receive a principled account by means of reference set computation. More specifically, the reference set computation analysis explains why the ellipsis of the immediately preverbal element is allowed when the structure is aligned in the basic (unmarked) word order while it leads to the serious degradation when the structure involves a marked word order. The current analysis, if it is on the right track, has various implications and consequences.

First of all, it gives an empirical support of Reinhart’s idea of interface strategies: specifically, reference set computation. There are cases in which “marked” structures involve more costly operations than their “unmarked” counterparts in a technical sense, and there is an explicit way to compare derivations, which blocks the “marked” option when the new information focus effect is identical to that of the “unmarked” option. Another important implication is that Japanese scrambling (at least VP-internal adjunct-object permutation) is a costly operation in a well-defined technical sense. The rather prevailing intuition that [adjunct – object – V] is the

unmarked order and [object – adjunct – V] is a marked order in Japanese receives an explicit theoretical endorsement.¹⁵

One of the information structure related effects Japanese scrambling brings about is to make some element appear in the immediately preverbal position. As a result, the possibility of focus projection is restricted. In this sense, scrambling is not a “free” operation, but rather it has information structure based motivation.

In a broader perspective, the minimalist program has started discussing seriously the mutual interaction between the “narrow syntax” and the conceptual-intentional (CI) performance system. Information structure of a sentence is a heavily discourse/context related property and thus must have a strong interaction with the CI performance system.

The crucial assumption, taken for granted in Kuno’s *Markedness Principle for Discourse Rule Violations* (20), is that it is possible to compare and evaluate candidate sentences in terms of informational importance. You cannot judge whether a sentence has a “marked” word order without comparing it with the “unmarked” word order of the comparable sentence.

The current analysis provides rather limited/well-defined comparison of derivations. Namely, the comparison of derivations is possible only when they are from the same numeration. However, Kuno’s (1978, 1995) discourse principles ((20) included) are supposed to apply to much broader empirical facts (see extensive discussions in Kuno (1987)). For instance, comparison between an active sentence and the corresponding passive sentence is under the scope of (20), Kuno argues. Such a comparison, however, is not allowed in the current analysis of mine as well as Reinhart’s. Since an active sentence and the corresponding passive sentence have different numerations (say, in terms of whether the numeration includes the passive morpheme); they belong to different derivations from the scratch. Hence, reference set computation is not possible. Nevertheless, since there has been a substantial amount of research in the “functional syntax” party, there would be more structures/phenomena which can be analyzed in terms of the reference set computation analysis explored in this paper. We can expect that more interesting collaborations between minimalist syntax (economy-based) and functional syntax (information structure oriented) to contribute to the better understanding of the human language faculty.

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¹⁵ See Miyagawa (1997) for a related discussion

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