Full Title:  Japanese topic-constructions in the minimalist view of the syntax-semantics interface

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Abstract

This paper discusses Japanese topic-constructions from the point of view of a minimalist syntax-semantics interface, concentrating on a *nara*-construction. In particular, an interpretative mechanism of the Semantic Component is proposed for the interpretation of Japanese topic-constructions. It is argued that this interpretative mechanism requires the syntax to utilize a split CP (Rizzi 1997), and that this should be treated as an Interface Condition. It is also shown that the analysis advocated here further supports the Strong Minimalist Thesis (Chomsky 2001 and 2004a) and Ontological Minimalism (cf. Martin and Uriagereka 2000 and Chomsky 2004b).

1. Introduction

Since Rizzi (1997), there has been much interest in the CP-domain and many authors raise issues about the split-CP hypothesis (cf. E. Kiss 1998, Puskas 1997, Rizzi 2004 and Belletti 2004). However, few authors pay attention to the relationship between the split-CP hypothesis and the semantic interface. Namely, which kinds of requirements of the semantic interface necessitate a split CP? If we can give an answer to this question, it is clearly a favorable move in view of the Minimalist Program, which seeks to derive the properties of the syntactic computational mechanism of the Language Faculty from the requirements of the semantic interface (cf. Chomsky 1994 and 2004a).

In this paper, I will discuss Japanese topic-constructions from a minimalist viewpoint of the syntax-semantics interface, concentrating on a *nara*-construction, which exhibit a very rich interpretation. Also, I will attempt to specify the requirements of the semantic interface which demand a split CP. Specifically, I will show that the interpretation of Japanese topic-constructions is deeply connected to the semantic interpretative mechanism in the Semantic Component and that Interface Conditions are responsible for the availability of the very rich interpretation which the *nara*-construction expresses.

Also, I will suggest that the semantic interpretative mechanism is a hierarchical four-dimensional structure (cf. Uriagereka 2002) and that, given this four-dimensional semantic interpretative mechanism, the syntactic computational mechanism must utilize a split CP. In Section 5, it will be indicated that this interpretative mechanism has an interesting implication in that it is built based
on a topological mechanism and seems to give supporting evidence for the claim that Ontological Minimalism (cf. Martin and Uriagereka 2000 and Chomsky 2004b) is on the right track.

2. *nara*-construction in Japanese

In this section, I will describe some peculiarities of the *nara*-construction in Japanese, comparing it with a topic *wa*-construction and a nominative-*ga* copula construction. After that, I will analyze the *nara*-construction based on Carlson (1989).  

2.1 *nara*-construction and other copula constructions

An example of the *nara*-construction, which receives a conditional and irrealis interpretation, is given below:

(1) *nara*-construction in Japanese

<table>
<thead>
<tr>
<th>genogogakusya</th>
<th>nara</th>
<th>daihyoo(-da).</th>
</tr>
</thead>
<tbody>
<tr>
<td>linguist</td>
<td>NARA</td>
<td>representative(-COPULA)</td>
</tr>
</tbody>
</table>

‘As for linguists, given their characteristics, it is appropriate for them to be representatives.’

Also, there are two other copula constructions in Japanese: a nominative-*ga* copula construction in (2a) and a topic-*wa* construction in (2b):

(2) a. *gengogakusya ga* daihyoo-da.

<table>
<thead>
<tr>
<th>linguisit</th>
<th>NOM</th>
<th>representative-COPULA</th>
</tr>
</thead>
</table>

‘A linguist is a representative.’

b. *gengogakusya wa* daihyoo-da.

<table>
<thead>
<tr>
<th>linguist</th>
<th>TOP</th>
<th>representative-COPULA</th>
</tr>
</thead>
</table>

‘As for a linguist, he/she is a representative.’

As can easily be seen, the *nara*-construction in (1) expresses a very rich meaning including such information as linguist’s appropriateness as a representative, unlike the nominative-*ga* copula construction and the standard-*wa* topic copula construction. Given the apparent similarity of the surface
form of the sentences, other than the presence of *nara*, *wa* and *ga*, *nara* ought to serve a more complex function than *wa* or *ga* to create the interpretative differences between (1) and (2). Also, the *nara*-construction in (1) is irrealis in the sense that it refers to some conditional but hopeful and desirable environment and it is true even if there is no linguist who is a representative in the actual world, whereas the sentences in (2) have existential import. The relevant interpretations of the *nara*-construction are summarized in (3):

(3) Japanese *nara*-construction³

[NP1 *nara* NP2-da]

NP1 - Individual/entity, embodying properties abstracted from *Intensional Object* (Carlson 1989) & Topic-marked phrase

NP2 - Individual/entity, embodying properties abstracted from *Kind* (Carlson 1989)

As seen in (3), NP1 preceding *nara* bears intensionality, which will be explained in 2.2, whereas NP2 has a generic import, which makes it possible that the *nara*-construction expresses much richer interpretation than the sentences in (2) as a whole.

Before I give a concrete analysis of the *nara*-construction, I will briefly review Carlson (1989) and illustrate what is meant by *Intensional Object* and *Kind*.

2.2  *Carlson (1989) and nara-construction*

According to Carlson (1989. 168), individuals are *Intensional Objects*, which are “the sorts of things that can appear at different times and places (and in different worlds) and still be the same even if the instances themselves are distinguishable”. I give examples involving *Intensional Object* in (4):

(4)  a. A guard stands in front of the queen’s palace.             (Carlson. 1989. (7b))
    b. John eats when he gets hungry.                     (Carlson. 1989. (35))

In (4a), the subject *a guard* is existentially interpreted.⁴ In this case, a guard may exist at different times and places (= different instances), which are distinguishable themselves such as one in front of the entrance gate in the early morning and one near the palace in the afternoon, yet it is still the same guard. Nonetheless, this subject NP is intensional at the same time in the sense that it cannot be automatically replaced with *the person who I am pointing my finger at*, even though the person I am pointing at is this
guard and its extensional meaning is the same. Likewise, in (4b), the subject NP John may refer to different instances whenever John gets hungry and all of these different instances refer to John as individual. This subject is also intensional as a guard in (4a). Due to this, Carlson calls this sort of individual an Intensional Object and regards it as intensional. An existential interpretation of the subject NP is possible with an Intensional Object, because the individuals are quantified over at given points (instances) of references (Carlson 1989. 186) and it becomes possible to pick up different instances of the individuals.

Also, he mentions another kind of individual, a Kind. For example, nominal expressions such as bears represent, like a proper name, an individual. Yet, this kind of expression, as a kind, is able to “denote multiple simultaneous instances at distinct locations in the same world” (Carlson 1989. 169). Thus, bears in (5a), unlike John Smith in (5b), can “appear simultaneously” in South Pole and the Indianapolis Zoo, whereas Smith can be in one of those places at a given time:

(5) a. Bears hibernate. 
(5) b. John Smith hibernates.

Essentially, a Kind interpretation is a standard generic interpretation.

Carlson ascribes the difference between Intensional Objects and Kinds to the reading of the NP itself and claims that there are two levels of intensionality. Especially, he suggests that the unbounded reading is related to the Intensional Object interpretation, whereas the bounded meaning is responsible for the Kind interpretation. To clarify the distinction between bounded and unbounded readings, consider the sentence in (6):

(6) Every friend of John’s likes sweets. 
(6a) a. There is a necessary characteristic to like sweets on all friends of John’s potential friends as well as his present ones. unbounded / Intensional Object 
(6b) b. A common characteristic of all John’s present friends is to like sweets. bounded / Kind

In (6a), the sentence is understood to express a requirement for anyone who might be a friend of John’s and this applies to both all present friends and potential friends of John. In a word, the subject NP is interpreted as intensional, though each instance of a friend of John’s is extensional. Carlson suggests that the interpretation (6a) may be derived, if the nominal phrase every friend of John’s covers
all *unbounded* instances of John’s potential friends in the relevant context (cf. John’s life). According to him, the *unbounded* generic interpretation attributes the generic property of liking sweets to the meaning of the subject NP *every friend of John’s*, as shown in (7):

\[(7) \quad [Gn(\text{likes sweets})](\forall x: \text{friend of John’s}(x)). \quad \text{(Carlson 1989. (45))}\]

In this paper, I tentatively assume that there is an intensional operator in the semantic representation corresponding to (7), which gives intensionality to NPs (the individuals involving entities) when these NPs are bound by this operator.\(^{6}\)

In (6b), the sentence, on the other hand, describes a common characteristic of all John’s present friends. For example, suppose that John has three friends. In this case, the generalization in (6b) may hold if we look at each of John’s three friends and find that each likes sweets, whereas we cannot determine whether John’s potential friends are required to like sweets by looking at these three friends. In that sense, the subject *every friend of John’s* covers *bounded* finite instances of John’s friends and all instances refer to tokens of different friends in different locations at the same period.

Here, I assume, following Diesing (1992) that this type of a generic interpretation is induced when a generic operator is introduced in the semantic representation. An NP is interpreted as *Kind* when it is bound by a generic operator in the restrictive clause, as discussed later.\(^{7}\)

Let us turn to the *nara*-construction in (1), which is repeated below:

\[(8) \quad \text{gengogakusya} -\text{nara} \quad \text{daihyoo(-da)}.\]

‘As for linguists, given their characteristics, it is appropriate for them to be representatives.’

As I said, NP1 preceding *nara* has an intensionality and NP2 following *nara* seems to have generic import, which I tentatively attributed to the assumption that NP1 embodies *Intensional Object* and NP2 *Kind*. Given the denotations of *Intensional Object* and *Kind* discussed above respectively, the relevant interpretation listed in (3) is now restated as follows. First, the subject (NP1) *gengogakusya* ‘linguists’ expresses their noticeable properties and behavior, abstracted and generalized from every distinguishable instance of different linguists in their whole history like instances of linguists thinking always critically, knowing several linguistic phenomena in several languages and working very hard on their own research, that is, the properties of linguists abstracted from *Intensional Object*. As a whole, it conveys their noticeable characteristics and habits like diligence.

On the other hand, *daihyoo* ‘representative’ (NP2) expresses its typical characteristics,
abstracted from general properties of multiple instances of representatives at different scenes at different places in the same time like a representative of United Nations, a representative of Microsoft and a representative of Harvard University, namely, the characteristics of representatives abstracted from Kind. As a result, it yields typical characteristics of representatives like the general necessity of diligence and leadership. As a whole, the sentence in (1) means that linguists, given their attributes and behavior, are appropriate individuals of a representative since they possess the preferable properties for being a representative.

This analysis of the nara-construction is supported by the following contrasts between the nara-construction in (9) and other copula constructions in (10-11):8

(9)  a. MIT nara Chomsky(-da).
    MIT NARA Chomsky(-COPULA).
    ‘As for MIT, given its properties and environment, it is really appropriate for and has strong association with Chomsky.’

b. kekkon nara gaisikei(-da).
    marriage NARA foreign-owned(-COPULA)
    ‘As for marriage, given my future and married life, it is appropriate to marry with a person who works at foreign-owned companies and I want to do.’

    #‘MIT is Chomsky.’

b. *kekkon ga gaisikei-da.
    #‘Marriage is a foreign-owned company.’

(11) a.9 *MIT wa Chomsky-da.
    #‘As for MIT, it is Chomsky.’

b. *kekkon wa gaisikei-da.
    #‘As for marriage, it is a foreign-owned company.’

As shown in (9-11), the nara-construction is possible in many contexts, where the nominative copula construction and the standard-wa copula construction would receive quite anomalous meanings. This contrast is easily explained by the analysis proposed above. Because the NPs in the nara-construction is interpreted as an Intensional Object and a Kind and behave as if they receive a much
more sophisticated interpretation than a mere argument NP or predicative NP, a sentence involving the nara-construction can receive a special meaning which cannot be obtained in other copula constructions, whereas an NP in other copula constructions is given no special interpretation and receives a trivial interpretation, resulting in somewhat odd interpretations, as the translations show.

In this section I started by describing the properties of the nara-construction. Then, I gave a brief review of Intensional Object and Kind in Carlson (1989) and attributed the rich interpretation of the nara-construction in (8) to the assumption that NP1 obtains an Intensional Object interpretation and NP2 obtains a Kind interpretation, which is also responsible for the occurrence of the nara-construction in several contexts. I summarize the peculiarities of the nara-construction in (12):

(12) Peculiarities of nara-construction
i. quite richer interpretation than typical copula constructions with ga and wa
   - NP1 (NP preceding nara) with the interpretation abstracted from Intensional Object
     (Carlson 1989)
   - NP2 (NP following nara) with the interpretation abstracted from Kind (Carlson 1989)
ii. felicitous interpretation within several sentences (cf. (9))

Hereafter, I will investigate into a mechanism which gives rise to the peculiarities of the nara-construction and into the licensing conditions which allow this mechanism to work in such a way. The next section will introduce the Mapping Condition and the hierarchalized restrictive clause as a starting point to determine the mechanism which is the source of the unique properties of the nara-construction.

3. Mapping Condition

In this section, I will introduce the Mapping Hypothesis (Diesing 1992) and generalize it along with the recent proposal of the split CP hypothesis by Rizzi (1997). Also, I will propose that the restrictive clause is actually hierarchicalized. The generalized Mapping Hypothesis and the hierarchicalized restrictive clause will be used to analyze the nara-construction in Section 4.
3.1 Generalized Mapping Condition

According to Diesing (1992), the interpretation of bare plural subjects may be ambiguous depending on whether a sentence involves a stage-level predicate or an individual-level predicate. For example, the bare plural subject *firemen* in (13b), which contains a stage-level predicate, is ambiguous between a generic interpretation and an existential interpretation, whereas *violinists* in (13a), which contains an individual-level predicate is unambiguous. This bare subject has only a generic interpretation:

(13) a. Violinists are intelligent.
    b. Firemen are available.

Given these facts, Diesing (1992) proposes the Mapping Hypothesis in (14):

(14) Mapping Hypothesis (Diesing 1992. 10. (14))

i. Materials from VP are mapped into the nuclear scope.

ii. Materials outside VP are mapped into a restrictive clause.

Considering the Mapping Hypothesis in (14) in the present context, bare plurals are interpreted differently depending on whether they are located within VP or outside VP. When bare plurals are positioned within VP, they are mapped into the nuclear scope and bound by an existential closure, assigned an existential interpretation. On the other hand, when bare plurals are positioned outside VP, they are mapped into the restrictive clause and bound by a generic operator, assigned a generic interpretation. Diesing suggests that the subject of an individual-level predicate is base-generated in IP-Spec and PRO stays in VP-Spec to be \( \theta \)-marked, whereas the subject of an stage-level predicate is base-generated in VP-Spec and moved into IP-Spec for case reason, as schematically shown below:

(15) a. \([_{ip} \text{Violinists}_i \text{are} \; _{vp} \text{PRO}_i \text{intelligent}]\)
    b. \([_{ip} \text{Firemen}_i \text{are} \; _{vp} t_i \text{available}]\)

Then, she derives the differences of the interpretational ambiguities of bare plural subjects between (13a) and (13b) from the schematic structures in (15). Because bare plural subjects of an individual-level predicate can occur only within IP-Spec, it must be mapped into the restrictive clause and bound by a generic operator, obtaining a generic interpretation. For this reason, the bare plural subject *violinists* in (13a) is unambiguous. On the other hand, bare plural subjects of a stage-level predicate have a reconstruction option and may be positioned in either IP-Spec or VP-Spec at LF, mapped into the nuclear...
scope or the restrictive clause, depending on whether they undergo reconstruction. When they are
reconstructed, they are mapped into the nuclear scope and obtain an existential interpretation, while when
they remain in IP-Spec, they are mapped into the restrictive clause and obtain a generic interpretation.

The Mapping Hypothesis does a good job in simple cases, yet it may not be enough when one
considers a syntactic projection above IP. As seen above, it nicely distinguishes syntactic materials within
IP, but does not say anything about syntactic materials above IP, especially, the CP-domain.\(^\text{11}\)

Recently, several authors, such as Rizzi (1997) and E. Kiss (1998), have explored the domain
of CP in detail. In particular, Rizzi proposes that CP is divided into four functional projections (hereafter,
the split CP hypothesis), as shown in (16):\(^\text{12}\)

\[(16) \quad [\text{ForceP Spec Force} [\text{TopP Spec Top}^0 [\text{FocP Spec Foc}^0 [\text{FinP Spec Fin}^0 [\text{IP} \ldots]]]]]]
\]

If every semantic operator is correlated with a particular syntactic projection based on its own property, it
seems plausible to assume that each functional projection within the CP-domain is associated with a
corresponding operator. For instance, FocP is associated with a focus operator (cf. Rizzi 1997) and TopP
is associated with a topic operator (cf. Huang 1984). If so, it is easy to think of a complex case where
more than one operator co-occur and multiple variables are necessitated and, correspondingly, it seems
that more than one restrictive clause are necessary. Clearly, these multiple occurrences of operators,
variables and restrictive clauses make the semantic representation quite complicated and make it difficult
to relate an operator to a variable and a restrictive clause appropriately. Also, in that case, it may be
possible that an operator could bind two variables, one of which should be bound by another operator,
which seems to violate the Bijection Principle in (17):

\[(17) \quad \begin{align*}
\text{a.} & \quad \text{An operator must locally A'-bind one and only one variable.} \\
\text{b.} & \quad \text{A variable must be locally A'-bound by one and only one operator.}
\end{align*} \]

(Koopman and Sportiche 1982)

To avoid this kind of a problem, I would like to generalize the Mapping Hypothesis, taking the
split CP hypothesis in (16) by Rizzi (1997) into consideration. Additionally, it is natural to assume that the
restrictive clause is also hierarchicialized to be compatible with the split CP hypothesis. To achieve this
revision, I generalize the Mapping Hypothesis as in (18) and hypothesize the hierarchicalized restrictive
clause as in (19):

\[(18) \quad \text{Generalized Mapping Hypothesis (Mapping Condition)}^{\text{13}}
\]
The height of syntactic elements corresponds in general to the kind of interpretation they receive and functional projections higher than T are mapped into the restrictive clause.

(19) Hierarchicalized restrictive clause (cf. Chierchia 1995)\textsuperscript{14}

i. The restrictive clause is hierarchicalized along with the functional projections of the CP domain and each restrictive clause corresponds to different functional projections within the CP-domain.

ii. If $x$ moves to Spec-FP, there is an operator $\alpha$ corresponding to the functional head F and, then, $y$ is the restrictive clause of $\alpha$.

Following the recent proposal of Chomsky (2001 and 2004a), I assume that this generalized Mapping Hypothesis and the hierarchicalized restrictive clause, properties of LF, follow from Interface Conditions (IC). Especially, I will refer to this generalized Mapping Hypothesis in (18) as the Mapping Condition (MC). I will restate the MC and the hierarchicalized restrictive clause in Section 5 by making use of the proposal by Uriagereka (2002) and make them more suitable theoretical notions within the Minimalist Program.

Before moving to the next section, I have one thing to note. As I said in the introduction, the split CP hypothesis should be motivated by the requirements of the semantic interface. However, what I said in this section is that the split CP hypothesis forces the restrictive clause to be hierarchicalized and the MC to be changed accordingly, which is the other ways around from what I said in the introduction and clearly lacks the minimalist spirit. Nonetheless, as I implied in the beginning of this section, I conveniently modified the Mapping Hypothesis and the restrictive clause for the analysis of the \textit{nara}-construction in Japanese. In Section 5, I will motivate the MC and the hierarchicalized restrictive clause on minimalist ground and revise these two proposals to be incorporated within the minimalist framework by adopting Uriagereka’s (2002) idea that the Language Faculty may utilize a hierarchical four-dimensional structure. Before doing this work, I will analyze Japanese topic-constructions first.

In the next section, I will try to analyze topic constructions in Japanese and give support for the hierarchicalized restrictive clause and the MC.

4. Analysis
In this section, I will explain the peculiarities of the nara-construction in terms of the MC by comparing the standard-wa topic construction and the nara-construction. After analyzing topic-constructions in Japanese, I will try to argue for my analysis, especially for syntactic positions of NP1 (NP preceding nara), nara and NP2 (NP following nara). The data presented supports the hierarchicalized restrictive clause and the MC.

4.1 Topic Constructions with wa

Before discussing the nara-construction, I would like to analyze the standard-wa topic construction first. An example of the standard-wa topic construction is given below:

(20) gengogakusya wa daihyoo-da.

linguist TOP representative-COPULA

‘As for a linguist, he/she is a representative.’

In the literature, topic phrases are commonly thought to be located in Spec-TopP (cf. Rizzi 1997 and Watanabe 2003). Assuming wa is a functional element marking a common topic in Japanese and occupies Top-head, NP-wa is located in TopP, as in (21):15

(21) \[
\text{TopP} \ \text{linguist} \ \text{Top wa} \ \text{TP t} \ \text{vP T} \ \text{TP}\]

By the MC, NP-wa is mapped into the restrictive clause of a topic operator and bound by this operator, as informally illustrated in (22):

(22) (Top)\{ x is linguist \} (\exists y \text{ y is a representative } \& \ x = y.

In contrast, I assume an NP with ga is located in Spec-TP (cf. Kuroda 1992) and mapped into the nuclear scope, bound by an implicit existential quantifier.17 An example of the nominative copula construction is given in (23):

(23) gengogakusya ga daihyoo-da.

linguist NOM representative-COPULA

‘A linguist is a representative.’

The syntactic structure of the nominative copula construction in (23) is given in (24a) and its semantic
4.1 *nara*-construction

As discussed in Section 2, the interpretation of the *nara*-construction, an example of which is repeated below, is very rich:

(25) *gengogakusya nara daihyoo-da.*

linguist NARA representative-COPULA

‘As for linguists, given their characteristics, it is appropriate and suitable for them to be representative.

Since, as shown in Section 2, the interpretation of NP-*nara* is in some ways similar to that of NP-*wa*, I assume it is mapped into one of the restrictive clause, not the nuclear scope. However, since NP-*nara* clearly functions as more than a mere topic, I would like to claim that the *nara*-construction differs from the topic *wa*-construction in the following two respects. First, in the *nara*-construction, not only the NP preceding *nara* (NP1) but the NP following *nara* (NP2) move to high functional projections FP, unlike the standard-*wa* topic construction (see (21)). \(^{18}\) Clearly, this entails that these NPs may be mapped into the restrictive clause and bound by quantificational operators due to the movement. In addition, I claim NP1 is interpreted as a topic as well as an *Intensional Object* in the *nara*-construction.

More specifically, I claim that in the *nara*-construction NP1 (here, *gengogakusya* = ‘linguists’) is located in Spec-FP1 where it is bound by an intensional operator in the restrictive clause of this operator and NP2 (*daihyoo* = ‘representatives’) is located in Spec-FP2 where it is bound by a generic operator, as shown in (26), resulting in their interpretations as *Intensional Object* and *Kind* respectively: \(^{19}\)

(26) \([FP1 \text{ linguists}, nara [FP2 \text{ representatives}, F2 Top [TP t_i \text{ Top } [TP t_i [\text{Top } t_i [sc t_i \text{ da} \_v \text{ T}]]]]]]\)

These mappings are assured by the MC and the hierarchicalized restrictive clause. \(^{20}\) An intensional operator is positioned in a quantificational domain where it can bind variables in the highest place and a
generic operator binds variables in the next highest place, as in (27):\textsuperscript{21}

\begin{equation}
(27) \quad (\text{Int})_x, (\text{Gen})_y, (\text{Top})_z \ [x \text{ is a linguist}, \ y \text{ is a daihyoo} \; [z \text{ is a trace of } x] \; \ldots \; \ldots \ r \; x \text{ is } y.
\end{equation}

Also, I attribute the dual interpretations of NP1 with a topic and an Intensional Object to the fact that it moves first to Spec-TopP and then to Spec-FP1, as in (26). Then, the lower copy of NP1 in Spec-TopP is bound by a topic operator and NP1 in Spec-FP1 is bound by an intensional operator, as illustrated in (27). Though this binding relationship might violate Chain Uniformity, I speculate that the Chain Uniformity is maintained unless the Uniformity Condition in (28) is violated:\textsuperscript{22}

\begin{equation}
(28) \quad \text{Uniformity Condition}
\end{equation}

\[ \text{Chain Uniformity of } \alpha \text{ is satisfied unless elements of a chain of } \alpha \text{ are bound both in either of the restrictive clauses and the nuclear scope simultaneously.} \]

Now, it is a good place to ask why the nara-construction has the peculiarities in (12), which are repeated below:

\begin{equation}
(12) \quad \text{Peculiarities of nara-construction}
\end{equation}

\begin{enumerate}
  \item quite richer interpretation than typical copula constructions with \textit{ga} and \textit{wa}
  \item \begin{enumerate}
    \item NP1 (NP preceding \textit{nara}) with the interpretation abstracted from \textit{Intensional Object} (Carlson 1989)
    \item NP2 (NP following \textit{nara}) with the interpretation abstracted from \textit{Kind} (Carlson 1989)
  \end{enumerate}
  \item felicitous interpretation within several sentences (cf. (9))
\end{enumerate}

First of all, why does the nara-construction have the rich meaning? This is due to the two properties of \textit{nara}, discussed above. It is because \textit{nara} moves NP1 and NP2 into FP and these NPs are mapped into the restrictive clauses of the relevant operators. Given the MC and the hierarchicalized restrictive clause, these NPs are bound by the relevant quantificational operators, due to which NP1 can receive the \textit{Intensional Object} interpretation and NP2 can receive the \textit{Kind} interpretation, enabling the \textit{nara}-construction to express the very rich interpretation as a whole, unlike other copula constructions.

Second, why can the nara-construction appear in a wide range of environments? Because NP1 and NP2 are mapped into the restrictive clauses of the relevant quantificational operators and bound by these operators, receiving an intensional interpretation and the \textit{Kind} interpretation respectively, these NPs express much more than their inherent meanings and thus contribute to the rich interpretation of the \textit{nara}-construction. As a result, the \textit{nara}-construction can exhibit the rich and licit interpretation of the
sentences like ‘given my future and married life, I want to marry with a person who works at foreign-owned companies’, as in (9).

In contrast, NPs in the nominative copula construction are mapped into the nuclear scope and bound by an implicit existential quantifier, unable to express more than their inherent meanings. Due to this poor mapping, the nominative copula construction in (10) exhibit quite strange meanings like ‘marriage is foreign-owned’, inducing unacceptability. Similarly, even if one of NPs is mapped into the restrictive clause in the standard-wa topic construction, it is bound by a topic operator and receives only a topic interpretation. Thus, this NP is interpreted as a topic with an existential meaning. Therefore, (11) are bad due to this poor mapping, leading to an anomalous LF interpretation like ‘for marriage, it is foreign-owned’.

Clearly, the MC and the hierarchicalized restrictive clause explain the peculiarities of the nara-construction and the distribution of copula constructions in Japanese. In the next section, I will discuss the mapping phenomena in the nara-construction and show that the analysis in this subsection is actually reasonable. In addition, I will give a piece of evidence supporting the MC and the hierarchicalized restrictive clause.

4.2.1 Evidence for mapping in the nara-construction

According to Diesing (1992), the following sentences in (29) may have an interpretation where variables introduced by the indefinites Japanese and violists may be bound by a quantificational adverb, an operator adjoined to TP by Quantifier Construal, giving rise to a quantificational interpretation:

   ‘Many Japanese read newspaper.’

b. Violists seldom play the piano.
   ‘Few violists play the piano.’

Diesing claims that a quantificational interpretation is obtained in (29) because the subject may be mapped into the restrictive clause and bound by the quantificational adverb (adverbial quantificational operator), resulting in the following semantic representation:

(30) a. often, [x is a Japanese] x reads newspaper.

b. seldom, [x is a violist] x plays the piano.
As discussed in the previous subsection, NP1 in the *nara*-construction is mapped into the restrictive clause of an intensional operator, where it is bound by this operator. This means that this NP is not bound by a generic operator, which implies that it is moved into the highest position in narrow syntax and escapes from binding by a generic operator given the MC and the hierarchicalized restrictive clause. If so, it should be the case that NP1 escapes from binding by an adverbial quantificational operator in a Japanese sentence corresponding to (29), whereas the NP preceding *wa* should be bound by this operator.

These predictions are borne out. Consider the sentences in (31):

(31)  
(a) *seijika nara taitei guutara-da.*

    politician NARA mostly laziness-COPULA

    ‘If some person is a politician, given its properties, it is mostly the case that this person has a general property of laziness.’

(b) *seijika wa taitei guutara-da.*

    politician TOP mostly lazy-COPULA

    ‘As for politicians, most ones are lazy.’

c. *seijika ga taitei guutara-da.*

    politician NOM mostly lazy-COPULA

In (31a), *seijika ‘politician’ escapes from binding by an adverbial quantificational operator created by *taitei ‘often’.* Given its interpretation in (31a), it is bound by the intensional operator as usual. On the other hand, the NP preceding *wa* does not escape from binding by an adverbial quantificational operator and receives a quantificational interpretation in (31b). I assume that (31c) is bad, because there is no NP movement involved in this sentence and nothing is mapped into the restrictive clause. Consequently, an adverbial quantificational operator has nothing to bind, resulting in vacuous quantification. The relevant informal semantic representations are given below:

(32)  
(a) {Int, [x is a politician] Gen, [y is laziness]} \ldots x is y. \quad (= (31a))

(b) *taitei (often), [x is a politician] x is lazy. \quad (= (31b))

c. *taitei [ \ldots ] x is a politician, y is laziness & x is y. \quad (= (31c))

*Vacuous quantification*

Notice that the sentences in (31) and their semantic presentations in (32) lend a support for my analysis of the *nara*-construction as well as the MC and the hierarchicalized restrictive clause, because, as...
my analysis predicts, each of the relevant quantificational operators correctly binds its corresponding variable introduced by bare plurals, depending on the syntactic positions of bare plurals.

4.2.2 Evidence for places of NPs in nara-construction

Another piece of evidence for our analysis of the nara-construction comes from so-called kagiru-sentences. In Japanese, several types of sentences require the topic-construction with wa. The following type of sentences A-wa B-ni kagi-ru ‘As for A, B is best’ (kagiru-sentence KGS) is one of them. Examples of KGS are given below:

(33) a. maguro wa sasimi ni kagi.ru.
    tuna TOP raw.fish DAT best
    ‘As for tuna, raw tuna is best.

b. American shorthair wa silver ni kagi.ru.
    American Shorthair TOP silver DAT best
    ‘As for American shorthair, silver ones are best.’

Interestingly, nara can select and embed KGS under it as in (34), whereas multiple-topicalizations are impossible as in (35), indicating that the genuine topic-construction may not select and embed KGS.

(34) a. sakana nara maguro wa sasimi ni kagi.ru.
    fish NARA tuna TOP raw.fish DAT best
    ‘As for fish, given its properties and characteristics, raw tuna is best among tuna dishes.’

b. neko nara American shorthair wa silver ni kagi.ru.
    cat NARA American shorthair TOP silver DAT best
    ‘As for cats, given their characteristics, silver ones are best among American shorthair.’

(35) a. *sakana wa maguro wa sasimi ni kagi.ru.

b. *neko wa American shorthair wa silver ni kagi.ru.

The fact that standard-wa topic-construction can be embedded in the nara-construction may suggest that nara occupies the head of the highest functional projection (i.e.FP1), and that, in turn, NP1, which precedes nara, is positioned within FP1-Spec. Also, it is natural to think that NP2 in (34) occupies
the same position as NP-\textit{wa} in (33) maybe because of the selectional properties of \textit{nara}. Assuming that it should be the case that generic topic phrases are positioned above TopP and a generic operator quantifies variables in the higher hierarchicalized restrictive clause than a topic operator due to the MC, it follows that NP-\textit{wa} in (33) and NP2 in (34) occupy the position above TopP, FP2-Spec.\textsuperscript{26} I take this as evidence indicating that NP2 is positioned within FP2-Spec in general in the \textit{nara}-construction.\textsuperscript{27}

In this section, I analyzed copula constructions in Japanese, concentrating on the \textit{nara}-construction. Especially, I claimed that in the \textit{nara}-construction, \textit{nara} moves both NP1 and NP2 into higher functional projections and enables these NPs to be mapped into the higher restrictive clauses. As a result, NP1 is bound by an intensional operator and NP2 is bound by a generic operator, obtaining the \textit{Intensional Object} interpretation and the \textit{Kind} interpretation respectively and giving rise to the very rich interpretation of the \textit{nara}-construction. For this reason, the \textit{nara}-construction can appear in several contexts, unlike other copula constructions. Also, I provided two pieces of evidence (quantificational adverbs and KGS) for the analysis of the \textit{nara}-construction advocated here, which seem to argue for the MC and the hierarchicalized restrictive clause, too.

In the next section, I will modify the MC and the hierarchicalized restrictive clause along with Uriagereka’s (2002) idea that the Language Faculty may utilize a hierarchical four-dimensional structure, proposing that the semantic interpretative mechanism of the semantic interface (i.e. the Semantic Component) makes use of a four-dimensional structure. I will return to the analysis of the \textit{nara}-construction in Section 6.

5. \textbf{Split CP and the semantic interpretative mechanism}

In this section, following Uriagereka’s (2002) idea that the Language Faculty utilizes a hierarchical four-dimensional structure, I will propose that the semantic interpretative mechanism of the Semantic Component consists of a hierarchical four-dimensional structure, incorporating the hierarchicalized restrictive clause into this four-dimensional semantic interpretative mechanism. Especially, I will argue that this four-dimensional semantic interpretative mechanism is theoretical favorable from the minimalist viewpoint (especially, in the view of the Strong Minimalist Thesis) in that
the four-dimensional semantic mechanism may be built based on the topological mechanism, which Uriagereka (2002) suggests can be thought of as one of the general properties of natural science.

Also, I will attribute the existence of a Split CP to the properties of the four-dimensional semantic mechanism. Simply put, different semantic dimensions demand different types of functional heads within the CP-domain and, thus, it is necessary to divide CP in accordance with this mechanism. Here, the MC plays a role. The MC is (at least, conceptually) necessary to bridge the split CP in narrow syntax and the four-dimensional semantic interpretative mechanism.

In Section 5.3, I will briefly touch on what Uriagereka call warping operations, which will be discussed in more detail in 6.2. I will begin by reviewing Uriagereka (2002).

5.1 Uriagereka 2002

In Section 3, I proposed the hierarchicalized restrictive clause for the semantic representation to be compatible with the Split CP Hypothesis (Rizzi 1997). As admitted, this is only a speculation and equivalent to saying that because it is empirically preferable that syntactic structures of the CP-domain are complicated as Rizzi and other authors argue, the semantic representation is accordingly complicated, which is a mere descriptive account without any concrete evidence and conceptual motivation. Needless to say, this is not a minimalist account and, to say more, it is very strange in the view of Interface Conditions that the semantic interface component observes the properties of narrow syntax, not vice versa, though this account may explain the nara-construction and other copula constructions in Japanese. 28 Thus, we should ask why the semantic representation is complicated in the way the syntactic structure of the CP-domain is and why there exists such a parallel correspondence between narrow syntax and the semantic interface.

To solve these problems in a principled way, I would like to specify the properties of the semantic interpretative mechanism with the help of Uriagereka (2002).

Uriagereka (2002) suggests that the Language Faculty utilizes the hierarchical four-dimensional structure, which is derived from the algebraic structure of numbering systems. 29 Conceptually, this suggestion is quite reasonable if the Language Faculty is a mental organ, because it is clear that other cognitive systems make use of the hierarchical four-dimensional structure. Not only
mathematical cognitive systems dealing with number (cf. Chomsky 2004b) and topological objects (cf. diagrammatical objects), but also the visual system makes use of the four-dimensional structure. Let us look at the use of the four-dimensionality of the visual system by taking diagrammatic objects as an example.

Among diagrammatic objects, lines are topologically dimensional objects and are an essential topological unit, functioning as atoms for every diagrammatic object. By topological operations applying to diagrammatic objects, lines are incrementally arranged into sides, stretching over space, and made into two dimensional objects, forming a part of sides. We often see this topological operation in the actual world. For example, if three straight strings are connected with one another at each end, we can easily visualize them as a triangle with area, a two dimensional object. Likewise, sides are multiply arranged into solids, expanding over area, and made into three dimensional objects, also forming a part of solids by topological operations. In fact, this topological operation can be achieved without difficulty in the actual world. When one makes a paper round, one can visualize this paper as a pillar, a three dimensional object. Moreover, topological operations can make a four-dimensional object which spreads over a sequence of time by putting solids into a successive continuation over a temporal sequence, again making solids a part of a created four-dimensional object. Interestingly, we can easily do even this topological operation. A rounded paper, which is visually recognized as pillar, can be visualized as the four-dimensional objects moving continuously over a sequence of time by squashing and stretching this paper constantly.

To summarize, n-dimensional diagrammatic objects are made into the next higher n+1 dimensional objects by topological operations (cf. add area, space or time to diagrammatic objects), forming a part of the n+1 dimensional objects. Thus, topological operations organize a hierarchical structure. We have seen that these topological operations are easily achieved in a daily life with the help of the visual system. This implies that the visual system is equipped with a device dealing with a four-dimensional structure. In turn, it could be hoped that the Language Faculty may similarly utilize a four-dimensional structure with topological operations, as claimed above.

Finally, I note that Uriagereka calls these kinds of topological operations warping operations, which boost an n-dimensional diagrammatic object into the next higher n+1 dimension. Thus, cognitive systems equipped with a four-dimensional structure may resort to warping operations to boost some object from a lower operation into a higher dimension.
In the next subsection, I will investigate the semantic interface and attempt to specify the interpretative mechanism, taking Uriagereka (2002) into consideration.

5.2 Four-dimensional structure and the semantic interface

As a starting point, I would like to seriously inquire into what kind of linguistic elements function as elementary unit in the Semantic Component. This elementary unit is thought to express a propositional meaning given that a proposition is an essential unit for the calculation of meanings. Normally, syntactic expressions that convey a propositional meaning are (full or embedded) sentences, which always contain predicates. Here, following Davidson’s (1967) claim that predicates of natural languages are predicates of events (see also Tenny and Pustejovsky 2000), I assume that sentential predicates predicate events. Thus, it follows that sentences expressing propositional meaning always involve a predication of events. If so, it is plausible to think that an atomic unit which expresses propositional meaning involves events and events as well as proposition function as an essential unit in the Semantic Component.

Now, it is a good place to introduce a semantic interpretative mechanism with a hierarchical four-dimensional structure. I refer to it by the term the hierarchical Four-Dimensional Structure (4DS). I assume that 4DS is responsible for the semantic interpretation in the semantic interface, the Semantic Component. As mentioned above, events function as an essential unit in the Semantic Component. For this reason, I assume that events function as elementary elements in 4DS and, consequently, are simple one-dimensional (1D) objects, which function as atoms for every semantic expression, as lines function as atoms for diagrammatical objects.

Also, I assume here that it is necessary for events to be anchored to a specific time to be assigned a truth-value (Ogihara to appear and Parsons 1990). This suggests that linguistic objects in 1D syntactically correspond to the projection of T (TP), given that T or the projection of T functions as anchoring events to a specific time. Following Ogihara (to appear), I assume that this specific tense anchor gives an existential interpretation to a whole sentence involving events and event participants. Thus, the interpretation which is given to syntactic objects (actually, syntactic elements within TP and TP itself) in 1D in 4DS is an existential interpretation, which goes along with Uriagereka’s (2002) suggestion
that 1D consists of simple materials given that an existential interpretation is semantically simple. For this reason, I propose that TP is a lexical maximal projection. In addition TP may be considered a lower syntactic projection than functional projections within the CP-domain, it is natural that MC requires that syntactic materials within TP are mapped into 1D in Multiple Transfer.

Moreover, this presumption is compatible with the MC. The MC suggests that TP corresponds to the nuclear scope in the semantic representation, where an existential closure is applied and variables are given an existential interpretation. TP corresponds to 1D where an existential interpretation is obtained, as in the nuclear scope. This suggests that the nuclear scope might be replaced with the lowest dimension within 4DS.

This assumption is both empirically and conceptually supported. Historically, TP is often thought of as the basic syntactic projection where all lexical syntactic properties are satisfied. For example, Chomsky (1986) suggests that TP corresponds to a Complete Functional Complex in which all grammatical roles like the subject and the object are satisfied. Additionally, Hale and Keyzer (1993) assume that TP is the syntactic projection where the Lexical Relational Structure, a definition of which is given below, is fully expressed:

\[(36) \text{Lexical Relational Structure (LRS)}\]

The structures that express the relation among the arguments of lexical categories are characterized by the operation of two fundamental defining principles:

a. Unambiguous Projection
b. Full Interpretation

It might be said that TP, where a specific tense anchor appears syntactically, is the extended \(vP/v^*P\)-projection, where the event structure of predicates is expressed and an event argument and all arguments are base-generated. Furthermore, given that \(vP\) and \(v^*P\) is the extended projection of VP which is the projection of a lexical head, and that TP is the syntactic projection where all lexical properties are satisfied, as Chomsky (1986) and Hale and Keyser (1993) argue, the assumption made in this paper that TP is a lexical maximal projection is supported. This seems a reasonable result within the 4DS framework. Uriagereka (2002) states that “it is not unreasonable that the complexity we see on one side should correspond to the complexity we see in the other”. One may reverse this statement. Namely, it is not mysterious that the simplicity we see on one side (the Semantic Component) should correspond to
the simplicity we see in the other side (narrow syntax). If so, it is natural that TP is syntactically the lexical maximal projection and semantically the simple dimensional syntactic object in 4DS. The lexical projection only contains simple syntactic elements such as lexical heads and relevant functional heads like T and v/v* which might be called extended lexical functional heads. In this sense, T and v/v* are different from functional heads within the CP-domain like Topic or Force in that the former have grammatical functions connected to lexical heads such as case-marking and the assignment of an external θ-role, whereas the latter do not have such grammatical functions. Similarly, 1D objects also consist of simple elements like events and a specific time anchor and receive a simple existential interpretation. Perhaps, the MC assures this relationship between the lexical maximal projection and 1D objects by requiring that TP is mapped into 1D.

Next, I would like to offer a conceptual support for 4DS. In 5.1, I noted that lines are 1D objects in topology, which are fixed to a specific surface spot. Likewise, 1D syntactic objects are fixed to a specific time (maybe, for a long time interval as thick lines occupy a rather large surface area) in 4DS and receive an existential interpretation, giving rise to an existentiality in this world at the fixed specific time, which enables its truth-value to be evaluated with respect to this world at this specific time. Seemingly, lines and 1D syntactic objects are formed in a similar way, fixed to a specific point on area or in time. If so, we can treat lines and 1D syntactic objects (cf. TP) similarly, which implies that 4DS in the Semantic Component defines one-dimensional objects in the same way as topology does. Consequently, it might be safe to think that the Semantic Component utilizes the four-dimensional structure by applying similar operations to topological operations. If right, this is conceptually desirable, because it is indicated that the semantic interpretative mechanism 4DS makes use of topological operations based on topological notions and the Language Faculty does resort to this kind of operation creating a four-dimensional structure, which is assumed to be generally used by other cognitive systems.

Now, we have specified 1D in 4DS, which is summarized in (37):

(37) i. 1D is the lowest dimension of 4DS, which is the semantic interpretative mechanism of the Semantic Component.

ii. 1D is a dimension which consists of simple elementary elements.

iii. 1D is a place where only an existential interpretation is obtained and corresponds to the nuclear scope of the MC.
iv. 1D involves an elementary object functioning as atoms for linguistic objects (1D objects).

v. 1D objects express events which are anchored to a specific time.

vi. 1D objects are syntactically maximal extended lexical projections where all lexical properties like case and θ-role are satisfied, that is, TP.

vii. 1D objects are defined with topological notions as lines.

viii. The MC requires that TP is mapped into 1DS.

Let us enter the investigation into the multiple-dimensions of 4DS based on (37). As we saw above, multiple-dimensional objects are created from n-1 dimensional objects via topological operations. Then, it may be that the Semantic Component creates multiple-dimensional objects in 4DS from n-1 dimensional objects via similar topological operations.

Before entering the discussion, I would like to clarify, though informally, what each of the multiple-dimensions denotes. As indicated, 1D objects express an event structure. This suggests that 1D denoted a domain where an event structure and its arguments are represented with respect to a specific time. If so, it may be safe to assume that an event structure and its arguments belong to this domain. Likewise, each of the multiple-dimensions denotes the domain where semantic objects like topic and generic are represented. Then, it can be said that these semantic objects belong to one of these domains. Also, it seems that some kind of applications is necessary in order that these semantic objects assign relevant semantic interpretations to their arguments, as a semantic functional application based on an event structure gives a propositional meaning in 1D. Here, I assume that these applications are semantic functional applications. Also, I tentatively assume that every functional application needs to be associated with one of dimensions in 4DS. For instance, if a certain functional application assigns an interpretation of a semantic object which belongs to the domain that 2D denotes, this functional application is associated with 2D. Consequently, its arguments and the interpretation resulting from it also belong to 2D and are represented in this dimension.

Returning to 2D, it is noted that 2D is built based on 1D. Similarly, 2D objects are created from 1D objects. In 1D, a specific tense anchor plays an important role in defining a 1D object. Also, 1D diagrammatic objects (e.g. lines) are incrementally arranged into 2D diagrammatic objects (cf. sides).
More informally, topological operations stop fixing lines at a specific surface spot, yet instead spread (i.e. place) these diagrammatical objects over a continuous sequence of (unbounded) points, making lines into sides. As a result, 2D consists of a continuous sequence of lines.

If a similar kind of topological operation is utilized in 4DS, events (cf. sentences which correspond to TP, representing events with respect to the specific tense) should be spread over a continuous sequence of times, not fixed at a specific tense anchor and made into 2D linguistic objects. If a similar kind of topological operation is utilized in 4DS, events (cf. sentences which correspond to TP, representing events with respect to the specific tense) should be spread over a continuous sequence of times, not fixed at a specific tense anchor and made into 2D linguistic objects.

Then, a question arises. What are 2D linguistic objects? One immediate candidate that comes to mind is discourse-oriented elements. I pursue this possibility here. As written above, 2D consists of a continuous sequence of 1D diagrammatic objects in topology. Likewise, a discourse consists of a sequence of sentences, an actual linguistic embodiment of 1D objects (i.e. events) in our terms. Also, discourse-oriented elements spread over a sequence of sentences, in the same way as 1D diagrammatic objects spread over a continuous sequence of (unbounded) points. For this reason, I assume that 2D is a discourse and 2D linguistic objects contain discourse-oriented properties like topic and focus, which is equivalent to saying that discourse-oriented properties are assigned to any linguistic objects in 2D, involving arguments of an event structure of predicates.

Having defined 2D and 2D linguistic objects, I would like to turn to consider 3D in greater detail. As we have seen above, 3D and 3D linguistic objects are created based on 2D and 2D linguistic objects, namely a discourse and discourse-oriented properties. If so, 3D should consist of a continuous sequence of discourses. Then, it follows that 3D linguistics objects spread over a continuous sequence of discourses, which are made from 2D linguistic objects (i.e. discourse-oriented linguistic objects). However, it is not clear what a sequence of continuous discourses is.

It may be helpful to reconsider the properties of a discourse and events in more detail. As I said, a discourse is a sequence of sentences. Also, events, 1D linguistic objects, are anchored to different specific tense anchors to be evaluated with respect to a truth-value, forming sentences. However, there is one problem with this proposal. Events of a stage-level predicate like available and play a violin need to be evaluated in a more specific context, a specific place as well as a specific time. For example, assuming that Real Madrid, the famous soccer team in Spain, visit Japan now, the sentence Real Madrid are visiting this country now may be true or false depending on where one utters this sentence. The sentence is true if uttered in Japan but false if in Korea. Thus, when events are a stage-level, they must
be anchored to both a specific time and specific place in 1D to be evaluated with respect to a truth-value. This additional condition for events which stage-level predicates express might be attributed to their event structure in that a place argument is obligatory for an event structure of a stage-level predicate (see Krifka et al. 1995 and the papers in Carlson and Pelletier 1995 for the discussion). Of course, it is not the case that all 1D objects (i.e. events) must be anchored to a specific stage, given the existence of individual-level predicates.

Let us return to a discourse. A discourse is a sequence of sentences and itself covers a sequence of times, not a stage or a place. For instance, a single discourse may continue over a bounded continuous sequence of times at one specific shared place, but not at multiple places let alone over a continuous sequence of places. In short, it spreads (i.e. continues) over sets of stages across a sequence of times at a specific place. If so, topological operations should incrementally arrange (i.e. spread) a sequence of discourses over a continuous sequence of places. As a result, a sequence of discourses should cover sets of stages which are thought to be a combination of a continuous sequence of times and a continuous sequence of places.

This is what I propose for the definition of 3D. 3D consists of sets of a continuous sequence of stages. This continuous sequence of stages seems enough to cover all events in every time at every place throughout the real world and to represent this real world (one of possible world), when all stages in this possible world (= the real world) are included. Thus, I will assume that 3D corresponds to the possible world. Also, I assume that 3D linguistic objects may receive a generic interpretation, obtaining a generic import, because 3D denotes a whole possible world and it suffices to examine it in order to evaluate how generic a certain characteristic is for entities or things as a whole. Regarding this point, discourse is not enough since one cannot evaluate to what extent a certain characteristic of a certain entity or thing can be generalized to other entities or things of the same class by looking at a discourse (a sequence of sentences). Moreover, if this continuous sequence of stages is unbounded, it should cover all sets of stages within one world over every time and every place. Thus, at the extreme, 3D is equivalent to all sets of stages in one possible world. In this case, 3D linguistic objects are assigned to an interpretation of universal truth like *humans are mammals*.

Now, 3D is defined as a possible world, which consists of a sequence of discourses (i.e. all sets of stages), suggesting that 3D linguistic objects spread over all stages of a possible world.
Finally, I would like to specify the fourth-dimension (4D) and four-dimensional linguistic objects. From the discussions above, 4D should be an unbounded sequence of possible worlds. If so, it follows that 4D linguistic objects spread over a continuous sequence of possible worlds.

Semantically, an unbounded sequence of possible worlds is equivalent to sets of all possible worlds, which are enough to represent an intensional world. Thus, I assume that 4D consists of sets of all possible worlds, which we might call an intensional world, where 4D linguistic objects are given an intensional interpretation and obtain intensionality.

We specify each of multiple-dimensions of 4DS, namely 2D, 3D and 4D, and the linguistic objects of each dimension. I summarize the properties of each of these dimensions below:

(38) Multiple Dimensions in 4DS

2D: a sequence of sentences → discourse: sets of stages over a sequence of times

A dimension where discourse-oriented interpretations like topic and focus are given to 2D linguistic objects.

3D: sets of a continuous sequence of stages (a combination of a specific time and specific place) in one world

→ a whole possible world: cf. universal truth and genericity

A dimension where a 3D-related interpretation such as a generic interpretation and an interpretation of universal truth is given to 3D linguistic objects.

4D: sets of possible worlds → an intensional world: intensionality

A dimension where an intensional interpretation is given to 4D linguistic objects.

Clearly, the interpretations which are available in multiple dimensions are those normally reflected within the CP-domain in narrow syntax, as Japanese topic constructions indicate. Then, it seems natural to assume that multiple-dimensions correspond to functional projections within the CP-domain, as the simple dimension 1D corresponds to the lexical maximal projection TP. Further, this correspondence between the syntactic projections in narrow syntax and 4DS has an implication that the latter, a property of the Semantic Component, characterizes the syntactic structures in the former. If so, the MC, which is revised as in (39), should be conceptually necessary because the latter imposes the MC on the former to assure this correspondence and an appropriate mapping, pertaining to the Strong Minimalist Thesis that the Language Faculty is an optimal solution to IC:
Syntactic materials are mapped into the appropriate dimension, depending on their syntactic height.

Probably, the MC reflects what Uriagereka (2002) intends when he says, “it is not unreasonable that the complexity we see on one side should correspond to the complexity we see on the other”. The MC in fact requires that, when syntactic materials are positioned in the highest syntactic position, arguably as a result of some complex syntactic operations, they are mapped into the highest dimension 4D in 4DS, which is the most complex dimension in 4DS.

Also, we get two welcome results by specifying the multiple-dimensions of 4DS. First, the hierarchicalized restrictive clause proposed in Section 3, which is repeated below, is nicely incorporated into 4DS:

(19)

i. The restrictive clause is hierarchicalized along with the functional projections of the CP domain and each restrictive clause corresponds to different functional projections within the CP-domain.

ii. If \( x \) moves to Spec-FP, there is an operator \( \alpha \) corresponding to the functional head \( F \) and, then, \( y \) is the restrictive clause of \( \alpha \).

As observed in Section 4, there is a so-called operator hierarchy, which is regulated by (19ii). Due to (19), an intensional operator binds variables in the highest restrictive clause, a generic operator binds variables in the next highest restrictive clause and a topic operator binds variables in the lowest restrictive clause. Though this operator hierarchy appears to be supported empirically by the analysis of the nara-construction in Section 4, it was mysterious why such an operator hierarchy exists.

The multiple-dimensions of 4DS give an answer to this question and conceptual support for the hierarchicalized restrictive clause. Given that quantificational phenomena are dealt with by the semantic interface (that is, the Semantic Component), it seems necessary that every quantifier is associated with one of the multiple-dimensions in 4DS, where it has a quantificational domain. Because 4DS involve hierarchy in nature, an operator-hierarchy should be observed. For example, the dimension of an intension (i.e. 4D) is the highest dimension in 4DS in (38). Also, if a quantificational domain of every quantifier is determined depending on its quantificational characteristics and it is necessary that every quantifier quantifies variables in the corresponding appropriate dimension in the multiple-dimensions, the restrictive clause needs to be hierarchicalized in accordance with the multiple-dimensions in 4DS. For example,
because 3D is the dimension of genericity and the next highest dimension in 4DS, a generic operator binds variables in the next highest restrictive clause (in the present term 3D), whereas because a topic operator is discourse-oriented, it is necessary that its quantificational domain is the lowest multiple-dimension 2D, the dimension of discourse-oriented properties.

The second welcome result of 4DS is more conceptual. As discussed in 5.1, topological operations may generally be used to build a four-dimensional structure of other cognitive systems, not only mathematical systems but the visual system. In this subsection, I have pursued the possibility that the Language Faculty incorporates algebraic structure of mathematics (i.e. the topological mechanism), also utilizing the same kind of topological operations to build the four dimensional structure in the Semantic Component (see note 46). Interestingly, it has also been shown that the Language Faculty might create the four dimensional structure 4DS of the Semantic Component including linguistic dimensional objects in a similar way that the topological system creates the diagrammatic four-dimensional structure and the diagrammatic objects. If this is real, the Language Faculty might be said to observe general properties of natural science (cf. algebraic structures), which could argue for the Strong Minimalist Thesis (especially, in the sense of “principled explanation beyond explanatory adequacy” in Chomsky 2004a) and Ontological Minimalism (Martin and Uriagereka 2000 and Chomsky 2004b).

Now, I would like to summarize the whole architecture of 4DS, which is illustrated in (40) and schematized in (41):

(40) Architecture of 4DS

a. 4DS

i. the semantic interpretative mechanism of the Semantic Component equipped with the hierarchical four-dimensional structure, which consists of the lowest dimension 1D and the multiple higher dimensions 2D, 3D and 4D.

ii. the Language faculty utilizes general operations of natural science (topological operations) to create 4DS in a similar way as the topological system does.

iii. The MC assures the structural correspondence between the syntactic structures in narrow syntax and 4DS.

b. Simple Dimension – 1D
Before closing this subsection, I will consider the question why a split CP is necessary. As we saw, 4DS contains multiple dimensions which correspond to functional projections within the CP-domain. The multiple-dimensions consist of three different dimensions which cover different semantic domains,
exhibiting different interpretations. Consequently, these dimensions deal with different semantic functions (cf. introducing different types of quantifiers). For example, 2D is different from other multiple-dimensions in that 2D expresses discourse-oriented properties in a sequence of sentences and only deals with referents anchored to a specific stage in the real world. Also, it does not deal with other than discourse. Since they are distinctive in semantics, it seems natural that these three dimensions demand different functional projections in order to map syntactic materials appropriately into one of these dimensions. This is also reasonable given the MC. Accordingly, the CP-domain, which corresponds to multiple-dimensions, should be divided into at least three or more projections. In other words, a split CP may be said to be semantically motivated.

In addition, it is argued here that the Language Faculty utilizes the hierarchical four-dimensional structure 4DS in the Semantic Component. Also, it is indicated that the topological methodology and semantic considerations, which constitute the procedure creating 4DS, necessitate that in the architecture of 4DS, the simple dimension correspond to the lexical maximal projections TP, whereas the multiple-dimensions correspond to the functional projections within the CP-domain. If this is right, CP may need to be split into at least three projections to observe the parallelism between narrow syntax and the Semantic Component in the Language Faculty. Consequently, a split CP is also conceptually required.

This is a welcome move from the viewpoint of the minimalist framework. Actually, 4DS necessitates the split CP by imposing the MC on narrow syntax. This indicates that narrow syntax is characterized by the MC and the semantic interface (i.e. the Semantic Component), conforming to the Strong Minimalist Thesis.

5.3 warping operations and 4DS

At the end of 5.1, I implied that the Language Faculty may make use of a warping operation, which boosts an n-dimensional object into the next higher n+1 dimension. In this subsection, I will briefly discuss such warping operations and try to specify their role in the Language Faculty. In Section 6, I will argue that they are restricted to syntactic operations in narrow syntax. In particular, I will claim that the only possible warping operation is *Throwing in*, the lexical insertion of functional heads directly from the
Lexicon.

According to Uriagereka (2002), each dimension is connected with the next dimension by a relevant warping operation (an operation warping relevant elements from one dimension to the next higher dimension). Then it follows that warping operations are restricted to those applied to vertical cuts, across dimensions. As we saw, vertical cuts in 4DS are restricted to those from a simple lowest dimension (syntactically, the lexical maximal projection TP) into the higher complex multiple-dimensions (syntactically, functional projections within the CP-domain) and those within the multiple-dimensions. In other words, a warping operation may boost 1D linguistic objects, which are supposed to receive existential interpretations, into the multiple-dimensions in order that these 1D objects may pick up new additional discourse-oriented properties or receive totally new semantic interpretations, such as genericity or intensionality. In addition, a warping operation enables multi-dimensional objects to obtain new semantic interpretations in the relevant multiple-dimensions and boost them into new different linguistic objects, which cannot be done if these objects remain in the lower multiple-projections. For example, when a 2D object is warped into 3D, this 2D object is assigned a new interpretation related to 3D, which cannot be given in 2D, spreading over all sets of stages in a possible world, not merely a sequence of sentences.

In the previous subsection, I argued that the parallelism between narrow syntax and the Semantic Component necessitates the existence of functional projections within the CP-domain in order for syntactic materials to be mapped into multiple-dimensions. Given the MC, syntactic materials should be placed within the projections of these functional heads in narrow syntax in order for these syntactic materials to be mapped into the multiple dimensions and obtain the relevant interpretations in these dimensions. If so, a warping operation is possible only when functional heads within the CP-domain are syntactically projected. When there are no functional projections within the CP-domain, applications of a warping operation violate this parallelism and the MC. In other words a warping operation in 4DS should be restricted to syntactic operations and presupposes the existence of functional heads and functional projections within the CP-domain.

Here, it is helpful to consider the following comment by Uriagereka (2002. 300): “if expression X is syntactically more complex than expression Y, we expect expression X to correspond to a semantically more complex object than expression Y.” Taking this comment seriously, and provided that a
warping operation is restricted to narrow syntax, it is safe to assume that a warping operation is syntactic operations that make syntactic structures more complex.\textsuperscript{57} Plausible candidates for this kind of syntactic operations are merge and move.\textsuperscript{58} As discussed above, functional heads within the CP-domain are the key in a warping operation. Given this, it is reasonable to think that warping operations in 4DS are restricted to syntactic merge or move involving functional heads within the CP-domain. When a specifier position of functional heads needs to be filled (for instance, for EPP reason), syntactic materials are merged with the specifier position of these functional heads via movement or base-generation and warped (mapped) into the multiple-dimensions, where these receive semantic interpretations.

I will propose in 6.2 that an only possible warping operation in the Language Faculty is the lexical insertion of functional heads directly from the Lexicon, which I call \textit{Throwing in}.

In this subsection, I claimed that the semantic interpretative mechanism of the Semantic Component utilizes the four-dimensional structure, with the help of the idea from Uriagereka (2002) that the Language Faculty may utilize a four dimensional structure. This implementation of the semantic interpretative mechanism with the four-dimensional structure (4DS) has several interesting consequences, which conform to the Strong Minimalist Thesis and Ontological Minimalism. For example it is indicated that there is a possibility that the Language Faculty uses a topological mechanism, which can be thought as a general property of natural science, to build 4DS. In addition, it is suggested that there is the parallelism between syntactic structures and 4DS and the MC, one of IC, regulates this parallelism relationship. Namely, narrow syntax is characterized by IC and 4DS of the Semantic Component. Furthermore, I showed that a split CP is semantically and conceptually motivated, given the MC. I will continue the discussion of syntactic warping operation in the next subsection. In particular, I will claim that \textit{Throwing in} is the only syntactic warping operation.

6. Further Issues

In Section 4, I gave the analysis of the \textit{nara}-construction, explaining its peculiarities based on the MC and the hierarchicalized restrictive clause. Specifically, I argued that \textit{nara} triggers movements of NP1 preceding \textit{nara} and NP2 following it, enabling them to be mapped into the higher restrictive clauses
and bound by an intensional operator and a generic operator respectively, which result in the rich interpretation of the nara-construction.

Though the proposed analysis may explain the peculiarities of the nara-construction, I did not give any explanation to why these movements are possible. In the previous section, I replaced the hierarchicalized restrictive clause with 4DS. As implied in 5.2, the analysis of the nara-construction may be translated into 4DS in the following way. Assuming that nara triggers movements of NP1 and NP2 into the higher functional projections as before, NP1 is moved into FP1-Spec and NP2 into FP2-Spec, as repeated below:

(25)  
\[ \text{gengogakusya nara daihyoo-da.} \]  
linguists NARA representative-COPULA  
‘As for linguists, given their characteristics, it is appropriate and suitable for them to be representative’.

(26)  
\[ [\text{FP1 linguists}, \text{nara } [\text{FP2 representatives}], F2 [\text{TopP } t_i \text{ Top } \{ \text{TP } t_i [\text{SC } t_i t_j] \text{ da } r \} \text{ T}]]] \]

Then, the MC requires that NP1 and NP2 be mapped into the appropriate dimensions depending on their syntactic height. In addition, because nara induces intensionality (see the discussions in Section 2 and Section 4), it should be mapped into 4D, where it obtains an intensional interpretation. Given that NP1 is located in Spec of FP1 whose head nara occupies, it is mapped into 4D and bound by an intensional operator, receiving an intensional interpretation, as required. Also, we saw in Section 4 that NP2 is positioned in the next higher functional projection FP2. If so, NP2 should be mapped into the next higher dimension 3D, where it is bound by a generic operator and receives a generic interpretation, as desired. Finally, a lower copy of NP1 left in TopP-Spec is mapped into the discourse dimension 2D and bound by a topic operator, receiving a topic interpretation. As a result, the nara-construction expresses the very rich interpretation. I schematized the analysis of the nara-construction with 4DS below:

(42)  
\[  \begin{array}{c}
  \text{4D} \\
  \text{3D} \\
  \text{2D} \\
  \text{1D}
  \end{array} \text{[linguists]}_x, \text{[representatives]}_y, \text{[linguists (copy)]}_z, \text{Top}_i \]

\[ \text{Int}_x, \text{Gen}_y, \text{Top}_i \]

4DS is clearly responsible for the unique interpretations of nara and relevant NPs.
However, there remains an important question: why does nara trigger movements of NP1 and NP2? Actually, these movements result in boosting NP1 linguists and NP2 representatives from the simple lowest interpretation 1D into the multiple-dimensions in 4DS, suggesting that a warping operation is relevant to these movements since only this operation boosts a lower-dimensional linguistic object into higher dimensions.59

As argued in 5.3, a warping operation should be restricted to syntactic merge or move of functional heads within the CP-domain. When a specifier position of functional heads needs to be filled, syntactic elements are merged into the specifier position of these functional heads through movement or base-generation. Interestingly the same syntactic operations are observed in the analysis of the nara-construction here. The functional head nara is merged into the head of FP1 and NP1 and NP2 are subsequently moved into within the functional projections within the CP-domain. For this reason, I assume that the merge of nara into F1-head and the subsequent movements of NP1 and NP2 are warping operations.

Now, the question becomes general. What drives warping operations? Given the observation of Japanese copula constructions in Section 2, a warping operation should be optional.60 If so, a warping operation needs to satisfy IC (Chomsky 2001 and 2004a) to apply.

In the following subsection, I will specify IC which justifies optional syntactic operations, taking the analysis of Object Shift (OS) in Chomsky (2001) as starting point. In 6.2, I will propose that an only possible warping operation is Throwing in, which inserts functional heads within the CP-domain from the Lexicon into a syntactic derivational workspace. Also, I will indicate that Throwing in exhibits a couple of interesting and desirable consequences. Finally, I will close this section by noting the parallel consistency of syntax-semantics and asymmetry between the numeration/TP/simple dimension on one side and Throwing in/CP/multiple-dimensions on the other side.

6.1 New Outcome Condition

OS is an optional movement operation observed in Scandinavian languages. Examples of OS are given below:
Examples of OS

a. *Jag kysste henne inte
   [VP t, t].
   I kissed her not
   ‘I did not kiss her.’

b. *Jag har henne inte
   [VP kysst t].
   I have her not kissed

c. *Jag har inte
   [VP kysst henne].
   I have not kissed her

‘I have not kissed her.’

Swedish

As is well known, OS can only apply when certain conditions are met. The most familiar condition is Holmberg’s Generalization (Holmberg 1986) in (44):

(44) OS is possible iff there is a V-T movement.

Holmberg (1999) replaces (44) with the new generalization in (46) by raising the contrasts in (45), which indicate that OS is impossible when an indirect object remains within VP:

(45) a. *Jag gav inte
   [VP t, Elsa den].
   I gave not Elsa it
   ‘I did not give Elsa it.’

b. *Jag gav den inte
   [VP t, Elsa t].
   I gave it not Elsa

c. Vem gav du den inte
   [VP t, t0 t0].
   Who gave you it not
   ‘To who did not you give it?’


(i) OS is a phonological operation that satisfies the condition (ii) and is driven by the semantic interpretation of the shifted object (new information specificity/ definiteness, focus, etc.; call the interpretive complex INT).

(ii) OS cannot apply across a phonologically visible category asymmetrically c-commanding the object position except adjuncts.

However, this new Holmberg’s generalization faces a conceptual problem, because it requires look-ahead
Thus, Chomsky abandons it and assumes that OS is a movement operation of object into v*P-Spec, proposing the following analysis (2001. (60-61)):

(47) Optional operations can apply only if they have an effect on outcome: in the present case, v* may be assigned an EPP-feature to permit successive-cyclic Ā-movement or Int (under OS).

i. v* is assigned an EPP-feature only if that has an effect on outcome.

ii. The EPP position of v*P is assigned Int.

iii. At the phonological border of v*P, XP is assigned Int'.

Because the optional operation OS only applies when the EPP position of v*P is assigned Int, the application of OS should create a new interpretation and have an effect on outcome. Thus, OS applies, only when the EPP position of v*P is assigned Int and creates new semantic outcome under Chomsky’s proposal.

Given that optional syntactic operations are constrained in that they can apply freely only when satisfying IC, it is theoretically preferred to generalize Chomsky’s proposal into other cases syntactic operations. I restate Chomsky’s proposal as the New Outcome Condition in (48) by limiting my attention to an influence on the outcome of the Semantic Component:

(48) New Outcome Condition (NOC)

An optional syntactic operation applies freely only if its application influences the interpretation of this output by the Semantic Component.

I assume that a warping operation is possible only if its application satisfies the NOC, because it is optional.

6.2 Throwing in as a warping operation

From the discussion in the previous subsection, it is natural to think that a warping operation is possible only when its application satisfies IC, such as the NOC, because it is an optional operation. Given 4DS, it is clear that it applies freely when available; since it always results in boosting syntactic materials into the higher dimensions in 4DS and these syntactic materials pick up new interpretations in these dimensions, its application always influences the interpretation of the output by the Semantic Component. It follows that a warping operation always satisfies the NOC. However, this does not answer
the first question: what drives warping operations?

As argued in the beginning of this section, a warping operation is restricted to syntactic merge (and move) of functional heads within the CP-domain. Thus, in order to answer what drives a warping operation, it may be helpful to investigate into the trigger of syntactic merge of these functional heads.

First, one may argue that these functional heads should be merged with an existing syntactic object, because they appear in the numeration. However, this argument is somewhat questionable. Normally, it is assumed that the numeration is a lexical selection from the Lexicon (Chomsky 1995). Given that lexical items are initially merged in 0-positions (cf. Chomsky 1995, 2000 and 2001), this choice is presumably based on selectional requirements and 0-properties of syntactic heads (cf. Chomsky 2000 and 2004a, Collins 2002 and Uriagereka 1999).64 Because selectional requirements and 0-properties are necessarily satisfied, lexical verbal heads and their arguments always appear in a sentence. The same thing is applied to light verbs: light verbs should appear always when selectional requirements require the external argument and Agent 0-role is selected in an event structure (or an argument structure). Thus, the numeration should consist of only syntactic elements which an event structure (or an argument structure) of lexical heads necessitates (see Chapter 2 in Munakata 2005 for the discussion). In addition, given that events are needed to be anchored to a specific time as argued in 5.2, it is natural to think that the numeration contains T, suggesting that a syntactic structure created from the numeration is TP, not CP. This is reasonable given 4DS, because the simple lowest dimension 1D corresponds to the lexical maximal projection TP, where all of lexical properties are satisfied, which functional heads within the CP-domain are irrelevant.

On the other hand, functional items within the CP-domain are optional. It is generally unnecessary for them to appear. The sentence may be uttered without a sentential-topic and a focus element, for example. In addition, these functional items may freely appear in the structure, whatever selectional requirements and 0-properties are. Thus, it is unnatural for the numeration, which is considered to be based on lexical requirements and 0-properties of syntactic heads, to contain these functional items within the CP-domain, since nothing seems to require these functional items to always appear and to be contained in the numeration. If so, these functional items need to be inserted derivationally by some syntactic operation.

Here, following Munakata (2005), I assume that functional heads within the CP-domain can be
inserted only by *Throwing in*, the lexical insertion of functional heads. Essentially, *Throwing in* inserts functional heads within the CP-domain directly from the Lexicon into the syntactic computational workspace, generating functional projections within the CP-domain. In addition, I propose that *Throwing in* is available only when syntactic elements in the numeration are exhausted and the lexical maximal projection TP is formed.

Because functional heads within the CP-domain are inserted only by *Throwing in*, it follows that only *Throwing in* can create functional projections within the CP-domain. Then, the syntactic computational mechanism must resort to *Throwing in* to map syntactic materials into the multiple dimensions in 4DS. If so, it follows that applications of *Throwing in* is indispensable in order that the Language Faculty lets syntactic materials obtain the interpretations only available in the multiple-dimensions, for example, discourse-oriented properties, genericity and intensionality. In short, *Throwing in*, which is an only possible warping operation, is syntactically responsible for the mapping of syntactic materials into the multiple-dimensions. This application of *Throwing in* clearly satisfies the NOC.

Moreover, *Throwing in* explains why the interpretations in multiple-dimensions are optional. This is because *Throwing in* is a warping operation which is optional and only it can give rise to the interpretations involved in these dimensions.

Finally, let us explain the *nara*-construction with *Throwing in*. the example of the *nara*-construction is repeated below:

(25) gengogakusya nara daihyoo-da.
linguists NARA representative-COPULA

‘As for linguists, given their characteristics, it is appropriate and suitable for them to be representative’.

(26) [FP1 linguists, nara [FP2 representative, F2 [TopP t, Top [TP t, [v P t, [sc t, t] da, v] T]]]]

As said at the top of this section, due to its inherent intensionality, *nara* is the functional head which must be interpreted in 4D in 4DS. An application of *Throwing in* to *nara* results in moving NP1 (gengogakusya ‘linguist’) preceding and NP2 (daihyoo ‘representative’) following *nara* into the functional projections within the CP-domain. This application of *Throwing in* clearly satisfies the NOC, because it results in warping *nara* and these NPs into higher dimensions in 4DS. In particular, NP1 is
moved into the Spec-FP1, perhaps because *nara* necessitates its specifier position to be filled due to its selectional requirement, and mapped into 4D, receiving an intensional interpretation. Supposing that *nara* selects the next higher functional head F2, Spec-FP2 is available because F2 is projected onto FP2. As a result, NP2 is moved into FP2-Spec and mapped into 3D, where it obtains a generic interpretation.

In this subsection, I proposed *Throwing in*. In particular, I claimed that only *Throwing in* can generate functional projections within the CP-domain. In addition, I maintained that an only possible warping operation is *Throwing in*, which might suggest that a warping operation (i.e. *Throwing in*) is triggered by the demand to generate functional projections within the CP-domain and, consequently, map syntactic materials into the multiple-dimensions in 4DS.

Before closing this section, I would like to discuss the parallel consistency between narrow syntax and the semantic component and the asymmetry between numeration/TP/simple dimension and *Throwing in*/CP/multiple dimensions, as well as why *Throwing in* exists.

### 6.3 Parallelism and Asymmetry

In the previous subsection, I suggested that the numeration corresponds to the lexical maximal projection TP. TP corresponds to 1D in 4DS, linguistic objects of which function as the basis of every linguistic dimensional object and receive an existential interpretation. Also, I claimed that a lexical choice in the numeration is based on selectional requirements and θ-properties of a lexical head and thus the numeration is obligatory. For this reason, the numeration is the source of TP, where these lexical properties are satisfied. In turn, TP is the source of 1D, where I assume syntactic arguments of an event structure must be reflected.

On the other hand, I maintain that functional heads within the CP-domain may be introduced into the syntactic derivational workspace only by *Throwing in*, which means that only this syntactic operation is able to generate functional projections within the CP-domain. Also, I assumed that syntactic materials within these functional projections are mapped into multiple-dimensions in 4DS due to the MC, which suggests that these functional projections correspond to the multiple-dimensions in 4DS. Moreover, I argued that *Throwing in* is optional and thus needs to satisfy the NOC to apply, which results in the optionality of the functional projections within CP-domain. Because these functional projections are
optional, the corresponding interpretations in multiple-dimensions are optional, which also derives from the fact that *Throwing in* is optional, because it is the only possible warping operation.

Looking into issues discussed above more seriously, we can see that there exists an interesting asymmetry between obligativeness and optimality across input, syntax and semantics, which I call the parallel consistency and asymmetry, as illustrated below:

(49)

<table>
<thead>
<tr>
<th>Input</th>
<th>Syntax</th>
<th>Semantics</th>
</tr>
</thead>
<tbody>
<tr>
<td>obligatory</td>
<td>numeration</td>
<td>TP (lexical projections)</td>
</tr>
<tr>
<td>optional</td>
<td><em>Throwing in</em></td>
<td>CP (functional projections)</td>
</tr>
</tbody>
</table>

As we saw, the parallel consistency of syntax and semantics is rather natural because it is regulated by the MC and, perhaps, comes from the internal consistency within the Language Faculty, whose source is not certain. However, there are few reasons why there exists the consistency between the numeration and 1D, even though the syntactic computational mechanism maps syntactic elements in the numeration into 1D via TP. Also, there is some doubt as to why there is the consistency between *Throwing in* and multiple-dimensions. Seemingly, we need a principled explanation.

Actually, there is a hint for this consistency. As seen in the previous subsection, lexical choice of the numeration is determined based on selectional requirements and relevant θ-properties of an event structure of a certain lexical head. Since TP is generated from syntactic items in the numeration, it may be said that it syntactically corresponds to an event structure. Also, 1D is required to reflect every argument of an event structure and an event structure itself. This is reasonable given that TP, which syntactically reflects all arguments of an event structure, is mapped into 1D because of the MC. Thus, an event structure and its selectional requirements are responsible for the obligatory characteristic of the numeration, TP and 1D and the parallel consistency among these. Now, one question arises. Why does an event structure need to be satisfied?

Note that an event structure and relevant lexical properties involving θ-properties and selectional requirements are conceptual matters of language (cf. Uriagereka 1999). In addition, given that a sentence is supposed to express an event, syntactic elements which an event structure selects and θ-marks are obligatory in nature and should be always reflected in the numeration. Then, it is natural to think that the external system requires that the Language Faculty satisfy selectional requirements of an
event structure in some way as an IC (cf. Uriagereka 1999 and Munakata 2005).

Here, I propose that the Conceptual-Intentional System is actually divided into a Conceptual-System and an Intentional System, following Uriagereka (1999). In particular, I assume that the Conceptual System is connected to the numeration, whereas the Intentional System is connected to the Semantic Component. Then, it is natural that the numeration is formed based on selectional requirements and θ-properties of lexical heads, if the Conceptual System requires that the numeration should reflect conceptual matters. Also, we can give a principled explanation to why an argument NP must be initially merged into a θ-position, if the Conceptual System imposes an IC regulating an initial merge of an argument NP on the syntactic computational mechanism through the numeration and this IC requires that narrow syntax strictly reflects conceptual matters such as selectional requirements and θ-properties of a lexical head, forcing the syntactic computational mechanism to initially merge an argument NP based on the θ-grid. This is why the consistency among the numeration, TP and 1D is captured and the selectional requirements and θ-properties of an event structure are observed among them (see Chapter 2 in Munakata 2005 for the discussion).

How about the optional side? An optional side reflects intentional matters, which are also linguistically optional in that people does not express intention. For example, people do not always use a sentential topic or refer to a focused element even though these can be expressed by a topic-marker and a focus-related position and belong to discourse-oriented properties in 2D in 4DS, which are clearly intentional matters. The optional syntactic operation *Throwing in* is also relevant to intentional matters, because its application results in creating the intentional interpretations available in the multiple dimensions of 4DS. Thus, it is safe to assume that the Intentional System deals with the optional side of the Language Faculty, necessitating the consistency among *Throwing in*, functional projections within the CP-domain and multiple-dimensions in 4DS.

Here, I would like to answer why *Throwing in* is necessary and intimately related to functional projections within the CP-domain and multiple-dimensions in 4DS. In order for the external cognitive systems to reflect its relevant properties on narrow syntax, an input is necessary. Because the Conceptual System is connected to the numeration, which is an input to narrow syntax, it can reflect its properties.

On the other hand, because the Intentional System is connected to the Semantic Component, which receives a syntactic output from narrow syntax, there is no input corresponding to the properties of
the Intentional System. Thus, the Language Faculty should resort to other syntactic operations which may function as input to narrow syntax in order to reflect the properties of the Intentional System in narrow syntax. This syntactic operation is *Throwing in* functional heads within the CP-domain. Then, the Intentional System can reflect its properties only through *Throwing in* and the Language Faculty satisfies these properties of the Intentional System by this syntactic operation. Therefore, *Throwing in* is necessary. For this reason, it is optional because the properties of the Intentional System are optionally expressed in language unlike the properties of the Conceptual system. Also, it has only influences on the properties of the Intentional System reflected by the multiple dimensions in 4DS, because *Throwing in* always results in warping relevant syntactic elements into these multiple-dimensions.

I have established the new parallel consistency and asymmetry, which is illustrated below:68

(50)

<table>
<thead>
<tr>
<th>Obligatory Side</th>
<th>Optional Side</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relevant External System</td>
<td>Conceptual System</td>
</tr>
<tr>
<td>Input</td>
<td>Numeration/ lexical items</td>
</tr>
<tr>
<td>narrow syntax</td>
<td>TP/ lexical maximal projection</td>
</tr>
<tr>
<td>Semantic Component</td>
<td>1D/ simple dimension</td>
</tr>
</tbody>
</table>

As shown, this parallelism consistency and asymmetry originates from IC and the properties of the external systems. On the obligatory side, conceptual matters are indispensable for language and consequently the Conceptual System always requires that conceptual properties are reflected in narrow syntax and 1D, whereas on the optional side, intensional matters are optionally expressed in language and thus the Intentional System sometimes necessitates that intentional properties are reflected in narrow syntax and the multiple-dimensions in 4DS.

Again, the picture in (50) seems to pertain to the Strong Minimalist Thesis, showing that the Language Faculty is an optimal solution to IC. We can give a principled explanation to the asymmetry and consistency depicted in (50).

7. **Conclusion**
In this paper, I dealt with Japanese copula constructions, focusing on the nara-construction. In particular, I specified the characteristics of the nara-construction based on Carlson (1989) and the differences between the nara-construction and the other copula constructions. Also, I have analyzed the nara-construction as well as the standard-wa topic-construction and the nominative copula-construction, utilizing the MC and the hierarchicalized restrictive clause.

Then, I proposed the semantic interpretative mechanism 4DS. In particular, I suggested that the Language Faculty uses a topological mechanism, which can be thought as a general property of natural science, to build 4DS. This is a really interesting result in view of the Strong Minimalist Thesis and Ontological Minimalism. Also, I argued that 4DS semantically and conceptually motivate the split CP.

Moreover, I proposed Throwing in. Especially I argued that only Throwing in can generate functional projections within the CP-domain. Also, I suggested that it is an only possible warping operation, which warps lower dimensional linguistic objects into higher dimensions in 4DS, where they receive new interpretations.

Finally, I derived the parallel consistency and asymmetry observed within the Language Faculty from IC and the different properties of the Conceptual System and the Intentional System, as summarized in (50). The result is consistent with the Strong Minimalist Thesis that the Language Faculty is an optimal solution to IC.

To conclude this paper, generative linguists may utilize the Strong Minimalist Thesis and Ontological Minimalism as useful compasses to investigate the Language Faculty and to study linguistic phenomena. Finally, beyond explanatory adequacy is not illusion, but a true research object in the linguistic study, which we can achieve in future based on the Strong Minimalist Thesis and Ontological Minimalism.

Notes

* This paper is presented at the Workshop of Minimalist Theorizing held at Indiana University. I would like to thank the audience for helpful comments and suggestions: especially I am thankful to Yoshihisa Kitagawa. Also, I am very grateful to Cedric Boeckx for his editorial work. Moreover, I appreciate Yoshio Endo, Daisuke Inagaki, Maya Kobayashi, Roger Martin, Toshiyuki Ogihara, Christopher Tancredi, Yuji Takano and Akira Watanabe for their helpful comments and suggestions. Especially, I am very grateful to
Yoshio Endo, Roger Martin and Christopher Tancredi for very insightful discussions. Finally, I am thankful to Keiko Inada and Akira Nakayama for getting me notice nara-constructions. Needless to say, all remaining errors are of my own.

1 The extended version of Section 2 and 4 appears in Section 3.1 in Munakata (2005), though I do not adopt Carlson (1989) and have changed the analysis of the nara-construction. In particular, I reanalyze the nara-construction based on Kratzer (1991) and extend the analysis to the other type of the nara-construction. Also, I do not give any special status NP following nara and attempt to derive a peculiar interpretation of this NP from a implicit modal interpretation of the copular part. See Munakata (2005) in details.

2 Nara-constructions also seem to have a non-irrealis interpretation in the following sentences in (i-ii):

(i)  
Hideki nara daihyoo o si.ta.  
Hideki NARA representative ACC did  
‘As for Hideki, given his properties and behavior, it was appropriate that he served as a representative.’

(ii)  
Hideki nara gakkoo-da.  
Hideki NARA school-COPULA  
‘As for Hideki, given his habit and characteristics, it is probable that he is at school.’

(iii)  
sin-da nara yuruso-o.  
die-Past NARA allow-let.  
‘If one died, I would forgive him.’

Though I do not discuss this type of nara-constructions here, I attribute the lack of the irrealis reading of daihyoo to the lack of movement of this NP. Even in these sentences, nara-constructions express rather rich meanings and the NP preceding nara seems to bear irrealis. Also, I concentrate on nara-constructions appearing in copula sentences in this paper, though I admit that I should change my analysis to deal with nara-constructions with verbal predicates or other types of predicates like (iii), because only nominal phrase can be interpreted as Kind and predicates do not express a Kind in any sense. Thanks to Chris Tancredi for reminding me of this point.

3 Actually, the nara-construction licenses counter-factual unlike topic-constructions with wa, as shown below:

(i)  
(During a trip to England)  
Nihon nara pro susi ga tabe-rare-ru-noni.  
Japan NARA pro sushi NOM eat-can-counter factual  
‘If this was in Japan, we could eat sushi.’

(ii)  
*Nihon-wa pro susi ga tabe-rare-ru-noni.  
Thanks to Toshiyuki Ogihara for pointing this out to me.

4 This sentence also has a standard generic interpretation every guard stands in front of queen’s palace, where the subject is interpreted universally. Though this is false, Carlson says that this generic interpretation of a guard comes from a Kind interpretation of this subject. Carlson says that it is necessary to understand these two levels of intensionality in dealing with the interpretation of certain NPs. Also, according to him, the interpretation of intensionality is related to the aspect of predicates and elements from discourse and, possibly, other respects of context, which I ignore in this paper.

5 To be compatible with Carlson (1989), I will say that an NP is interpreted as intentional, when an intensional operator binds it. Due to this, it can refer to its different stages (i.e. instances) at different places and at different times.

6 Actually, Carlson posits the following representation for Kind and assumes that the generic predicate like sweets applies to each of John’s friends:

(i)  
∀x: friend of John’s (x) [[Gm(like sweets)](x)]  
In this paper, I do not take the Carlson’s analysis in (i).

Also, Carlson assumes that Kind individuals can also be interpreted intensionally. However, as discussed, the unbounded reading is distinct from the bounded reading in that the former clearly expresses intensionality. One relevant fact supporting this idea is that the Intensional Object interpretation is easily available when there is an extra sentential constituent in the sentence, which he calls the related constituent, helping pick out instances of an NP assigned an Intensional Object interpretation (cf. the adverbial clause in (4b)). Also, in a typical generic sentence with wa in Japanese, the subject does not denote its properties, unlike in the nara-construction in (1). Rather it refers to instances of the subject,
like a Kind subject, as seen in (ii):

(ii)  _imu wa jujun-da._
dog TOP obedient-Copula
‘Dogs are obedient.’

For this reason, I assume in this paper that Intensional Object has the more special status than Kind and use intensionality to refer to only an interpretation of Intensional Object (i.e. the unbound reading of NPs).

8 In Japanese, _gaisikei_ ‘foreign-owned’ is used to refer to a ‘foreign-owned company’. It is important to notice that _gaisikei_ can refer to employees of a foreign-owned company in the _nara_-construction as shown in (9b), which is impossible in the typical copula constructions in (10-11). I attribute this apparent mysterious reference to the _nara_-construction in general and speculate that _gaisikei_ refers to multiple instances of the individuals/entities associated with a foreign-owned company as well as multiple instances of different foreign-owned companies at the same period, though I will not discuss it here due to the limit of space.

9 This sentence is ungrammatical with genuine topic reading, though grammatical with a contrastive reading under a pair-list context. In this paper, I will only deal with _wa_ which is used to express genuine topic reading or a thematic topic reading, ignoring the focalized contrastive topic reading induced by _wa_ (see Munakata 2002 for discussion of this type of _wa_).

10 In the current framework, it may be good to replace VP with _vP_ within the Spec of which an external argument is base-generated.

11 Actually, this is not a fault of the Mapping Hypothesis itself, as commented by Chris Tancredi (p.c.). Thus, it is not necessary that this hypothesis deals with syntactic materials within the CP-domain, though this paper tries to incorporate these materials within the CP-domain into the Mapping Hypothesis.

12 I omit the iterative TopP.

13 I assume that syntactic materials outside TP, not VP (_vP/v*P_), are mapped into the restrictive clause. The reason I choose TP rather than VP in (18) will be made clear in Section 5. See also note 10.

14 I thank to Chris Tancredi for helping me formulating the hierarchicalized restrictive clause in (19).

15 In this paper, I will ignore the concrete analysis of small clauses and tentatively use a flat structure of small clause for convenience. See Heycock (1994) and Cardinatti and Guasti (1995) for the analysis of small clause.

16 It is controversial whether a Japanese NP-_wa_ is base-generated (cf. Hoji 1985, Saito 1985 and 1987 and Tateishi 1991) or derived by movement (cf. Kuroda 1992 and Watanabe 2003). Although I assume a movement approach to _wa_ in (20), there is no problem for my analysis even if NP-_wa_ is base-generated.

17 In this point, I depart from Diesing (1992) who claims that the nuclear scope corresponds to VP/_vP_. I will explain why TP, not VP/_vP_, corresponds to the nuclear scope in Section 5.

18 In Munakata (2005), I do not assume that NP2 is moved into FP2-Spec. Instead, I assume that it is quantified by a modal operator in-situ.

19 In this paper, I only speculate that an intensional operator is associated with FP1 and a generic operator is associated with FP2. Also, I do not identify what F1 and F2 are. Rather, I tentatively assume that F1 is the functional head within the CP-domain related to intensionality and F2 is that related to genericity.

20 As Yoshio Endo pointed out to me, this analysis cannot be applied to the complements of intensional verbs like _look for_, where intensional verbs cause the complements to bear intensionality. I will leave this to a future research.

21 I will give an answer to why an intensional operator binds variables in the highest restrictive clause and a generic operator binds variables in the next highest one in Section 5.

22 There is no violation of the Bijection Principle, given that NP1 moves through TopP-Spec into FP1-Spec, leaving a trace within TopP-Spec. This trace is changed into a variable and the MC assures that this variable is bound by a topic operator, because it is positioned within TopP, which corresponds to the restrictive clause of a topic operator in the semantic representation.

23 In the _nara_-construction, it seems that the quantificational adverb _taitei_ does not serve as an operator. Rather, this adverb modifies a logical relationship between NP1 and NP2 (if _x_ is NP1, then _x_ has the relevant properties to NP2). Also, NP2 seems to be bound by a generic operator not an adverbial quantificational operator in (31a), avoiding vacuous quantification by a generic operator, which indicates that NP2 is positioned above TP and mapped into the restrictive clause.

24 See note 23 for what a role _taitei_ ‘mostly’ plays in (32a).

25 In Japanese, multiple topicalizations are possible, though the second topic can be only interpreted as
Contrastive-Topic, whose status is controversial as to whether it is truly a topic marker (see Saito 1985, Watanabe 2003 and others).

Evidently, it is equivalent to say that the position of NP-wa differs depending on whether it receives a generic interpretation or a mere topic interpretation, which implies that there are two types of wa. I have little to say about this issue in this paper.

It might be said that KGS also lent support to MC and the hierarchicalized restrictive clause, because it clearly shows that nara occupies a higher position than wa both syntactically and semantically, which these proposals would predict.

The same complaints apply to MC: the Mapping Hypothesis is generalized into the MC because a restrictive clause is hierarchicalized. This is a trivial restatement of the relationship between the Mapping Hypothesis and the restrictive clause.

Muromatsu (1998) and Castillo (2001) instantiate Uriagereka’s idea in the nominal domain. Also see Uriagereka (2002) for a possible implementation of this idea in the verbal domain.

More specifically, generative functions of the rules of Euclidean space are applied.

Here, I assume that the visual system is a cognitive system and mean that this system can depict these diagrammatical objects as image in the actual world. See also note 54.

Admittedly, lowering operations are also plausible in this context and Uriagereka seems to imply that this kind of operation is possible, though I do not deal with this kind of operation in this dissertation.

This is a reasonable assumption, because truth-values are usually computed at the level of a proposition.

Small clauses are another candidate, though it is uncertain whether they express a proposition. Rather, it may be plausible to think that it simply expresses an event. As below, I will claim that an event needs to be anchored at some specific time (I will assume that an infinitival to, whose tense is discussed in detail in Chomsky and Lasnik (1993) and Martin (1996), also expresses a specific time. Because small clauses lack a tense value (cf. Parsons 1990. 15) and their tense should be provided by a matrix or an embedded tense, I exclude it as a possible candidate here.

Note that events cover states within the Davidsonian framework.

Actually, events are not an appropriate term. Here, I mean an event structure, which contains a conceptual representation of an event, an event argument, argument structure and necessary arguments involved in this event (see Munakata 2005 for the relevant issue). Throughout this paper, I refer to an event structure by events.

It is normally assumed that T selects vP/v*P, which express events, as its complement.

Ogihara assumes that this specific tense anchor is an implicit temporal adverb like in the past. See Ogihara (to appear) for details.

Later, I will claim that event participants (namely, arguments) can be boosted up into the higher dimensions by a warping operation, which enables these arguments to obtain more complex interpretations only available in the higher dimensions. See the discussion in the next subsection.

Also, I assume that only an extensional interpretation is assigned in 1D, which entails that a proposition is extensional in general.

Thanks to Roger Martin for pointing this out to me.

According to Hale and Keyser (1993), they partly mean by Unambiguous Projection that the LRS representations embody biunique structural-thematic relationships for all lexical items.

This is reasonable given that 0-properties of an event structure are satisfied within vP/v*P.

Ideally, the semantic types that functional applications yield are fixed, depending on which dimension functional applications are associated with. Though I think that this possibility is worth pursuing, I do not discuss this in this paper and will leave it to future research.

I speculate that TP, which is equivalent to a proposition in this approach, may be taken as argument of functional applications associated with any dimension, even if it does not belong to this dimension, because of the fact that it is a 1D linguistic object.

As will be made clear below, I will claim that 2D and 3D denote extensional worlds like 1D, whereas 4D denotes an intensional world. This indicates that 2D and 3D significantly differ from 4D in semantics. Though I leave this issue to future research, it may be important to consider the following topological rule stated by Uriagereka (2002 (4)):

(i) If operation ~O is not closed in system X, applying ~O to the objects x of X creates new sort of objects x', so that a new system X' is created with the x' objects, such that X is a part of X'.
If 4DS is created by topological operations observing a similar rule to (i), multiple-dimensions in 4DS are linked to the next dimension in a part-of-relation, which seems to suggest that there is not so much difference among these dimensions. Here, I assume that a specific tense anchor, not a specific place point, functions as a starting point from which events spread over, because events are anchored to this tense anchor in definition (also see the discussion below). I will discuss what events looks like if events are spread over a sequence of places below. Also, I assume a discourse is analyzed in terms of File Change Semantics (cf. Heim 1983). For example, a topic element spreads over (cf. appears in) a sequence of sentences across time (namely, discourse) and a selection of topic is possible when the discourse is established. Individual-level predicates, which describe events (more appropriately, state) originating from individual characteristics like tall or intelligent, raise no problems in this respect because the truth-values of individual-level predicates are evaluated with respect to tense but not place. For example, it is John that is tall everywhere (cf. #John is tall in Japan but not in America) in the actual real world but it is probable that John was not tall when he was a baby.

Also, a generic interpretation of a stage-level predicate is excluded here. As made clear soon, I assume that a generic interpretation is a by-product of 3D. Because of the existence of now, time is fixed to an utterance time. I call a combination of a specific tense and specific place as stage. Thus, it is appropriate to say that, when stage-level predicates express events, it must be anchored to a specific stage for its truth value to be evaluated. Here, I use a possible world instead of a real world, because language can refer to an imaginary entity of a possible world and this entity may have a generic import, as indicated in (i) (see Heim and Krazer 1998):

i. Unicorns have a horn.

One may wonder why the upper limit of the dimensional structure of the Semantic Component is 4D and there is no higher dimension than 4D, even though it is mathematically possible to create much higher dimensional objects than 4D and dimensional objects higher than 4D physically exist in the actual world. One possibility is that the cognitive systems of human being cannot deal with the dimension higher than 4D and the same restriction is applied to the Language Faculty, one of the cognitive systems. For example, the visual system may be able to deal with 4D-images but it seems that it cannot handle higher dimensional objects than 4D.

Another possibility is that because language does not contain higher dimensional linguistic objects than 4D, the Language Faculty does not need to deal with this kind of dimensional objects. In fact, it seems that there is no linguistic object that requires higher dimensions than intensionality. Or maybe 4D is conceptually suitable and easy for the cognitive system to deal with. For this reason, objects like image and language are fitted into the four-dimensional structure. Consequently, the Language Faculty makes use of 4DS. The answer to this question is quite complicated and seems an empirical matter. In addition, it is possible that cognitive systems differ in this point (see also Uriagereka 2002 for the discussion). Thanks to Roger Martin and Chris Tancredi for the discussion of this issue.

In the case that CP is split into more than three projections, these must be distinguished into three zones of functional projections to be mapped appropriately into the multiple-dimensions in 4DS. In this light, if the forty seven functional categories which Cinque (1999) proposes turn out to be necessary, they should be categorized into three types.

As is clear, I also assume that a warping operation may boost an n-dimensional object into the higher n+α (4<α>1) dimension, which is mathematically possible and plausible. For example, lines can combine directly into 3-d shapes, as with axes. Thanks to Chris Tancredi for reminding me of this point.

Here, I understand Uriagereka to mean syntactic structures by “syntactic expressions” and take a “semantically more complex object” to be a warped object, though I might be wrong.

Agree and Delete are excluded here, because these syntactic operations rather simplify syntactic structures by valuing or deleting uninterpretable features. Also, I ignore copy and pied-piping which are assumed to be part of move. See Chomsky (2001), Nunes (2004) and Watanabe (to appear) for discussion. For example, if no movement is involved as in nominative-ga copula constructions, which repeated
below, the sentence and NPs can only get an existential interpretation:

(23)  
gengogakusya-ga  daihyoo-da. 
linguists-Nom representative-Copula 
‘Linguists are representatives.’

60 If obligatory, NP1 and NP2 are always moved and mapped into the higher dimensions, which makes it impossible that these NPs receive an existential interpretation, contrary to the facts.

61 In fact, Holmberg (1999) says that OS is a stylistic operation, applying a component of grammar called Stylistic Syntax, which deals with the output of what he calls Formal Syntax. According to him, movement in Stylistic Syntax is restricted to adjunction and so-called stylistic movement including stylistic fronting, which is normally assumed post-syntactic phenomenon. Because he says that OS is a PF-operation, his analysis of OS cannot escape from a look-ahead problem.


63 See Munakata (2005) for the detailed proposal of Throwing in and arguments for it.

64 Uriagereka (1999) correctly points out that some justification is necessary to explain why the numeration as well as an initial merge of lexical items is based on selectional requirements and 0-grids. He notes that this problem is solved if the numeration reflects conceptual matters (e.g. conceptual structure of lexical items), including an argument structure. See Uriagereka (1999) and Chapter 2 in Munakata (2005) in details.

65 I assume that the Lexicon contains the information about which dimension functional heads within the CP-domain are interpreted in.

66 I speculate that the insertion of F2 is triggered by Throwing in nara in the bottom-up fashion, perhaps due to its selectional requirement. Maybe, this selectional requirement is justified by the semantic representation of Intensional Object in (7). In (7), the generic property of liking sweets, which may be thought of as a 3D property and syntactically related to F2, is derived from the interpretation of Intensional Objects of the subject NP.

67 See Section 2.3 in Munakata (2005) in details.

68 I show in Munakata (2005) that the picture in (50) has several interesting consequences, including the formation of phases. See Section 2.5 in Munakata (2005) for this issue.

Also, note that the Intentional System always deals with the linguistic output (i.e. the semantic interpretation of sentences) accessing the Semantic Component.

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