

Remarks on (Non-)Coreference: A Minimalist Perspective of the Binding Theory*

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1. Introduction

It is nearly forty years since (referential) indices were introduced into the syntactic representation for the first time in Chomsky (1965), and the way they are used has undergone various modifications in accordance with the development of Generative Grammar. Under the earlier version of the Binding Theory proposed by Chomsky (1980), for instance, indices are merely used for assigning interpretations or, more precisely, semantic values to anaphoric expressions: expressions bearing the same index are assigned the same semantic value (i.e. coreference) by the interpretive rule; expressions bearing the different index are assigned the different semantic value (i.e. disjoint reference).¹ When the speaker utters a sentence containing nominal expressions bearing indices, his/her intention concerning the referential relation can be captured by indices among them. In other words, the speaker's intention to express the referential possibilities as to whether or not they denote the same referent is reflected on the indices (or, broadly speaking, on the syntactic representation). This use of the index is fundamentally carried over to its succeeding version proposed by Chomsky (1981), but the index has come to play another role in this framework: it determines the syntactic distribution of nominals with the aid of the Binding Conditions. That is, the nominals are freely assigned indices and their

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¹ In this note, we will tacitly assume the device for semantic interpretation proposed by Larson & Segal (1995). According to their terminology, the semantic value assigned to the pronominal corresponds to its referent in the actual world. Under their proposal, moreover, the assignment of a semantic value is implemented by choosing a referent from the set that consists of individuals in the discourse (i.e. σ -sequence). This assignment is called "valuation." More precisely, the individuals in the discourse are ordered in the σ -sequence, and the index assigned to a pronominal corresponds to the position in the σ -sequence. Thus, the individual assigned to that position will be the referent of the pronominal. For instance, if the pronominal bears an index 2, then the individual assigned to the second position in the σ -sequence will be the referent of the pronominal. Adopting this interpretive device, we take for granted that the referent for anaphoric expressions is determined by valuation.

distribution is restricted by the Binding Conditions. So by this time, the index has come to play two roles in the syntactic representation: it determines the distribution of nominal expressions and expresses the speaker's intention about the interpretation of indices.

As the Minimalist Program is advocated by Chomsky (1993) and later developed by Chomsky (1995, 1998, 1999), the semantic interpretation has come to be determined by the syntactic representation without the mediation of intermediate linguistic levels (i.e. D- and S-structures). Thus, the Binding Conditions have come to be applied solely at LF (Chomsky (1993: 43)), and have ultimately come to be defined in interpretive terms, with indices dispensed with. Given the interpretive version of the Binding Conditions, the interpretation of the referential possibility of nominals, but not their distribution, has come to be in focus. In other words, the Binding Conditions assign an interpretation to nominals which satisfy the c-command and domain restrictions. Thus, under the minimalist assumption, indices play no role in binding, since free indexing, which introduces new elements during the course of derivations, would violate the inclusiveness condition (Chomsky (1995: 228)). Now if indices are abandoned in the Minimalist Program, one may wonder how the roles indices played should be carried over to other devices. Then a question arises as to whether or not the speaker's intention represented by indices can also be dispensed with, that is, whether or not the speaker's intention should be represented in the syntactic representation. This is one of the questions this note addresses.

With respect to the case of coreference, Fiengo & May (1994) introduces a new concept about the index, namely indexical type. The occurrence of an identical index is divided into two types: α -occurrences and β -occurrences. Fiengo & May relate this difference in the indexical type to the difference in the way of valuation (i.e. assignment of a semantic value to nominals). Valuation of the anaphoric expression bearing a β -occurrence of a certain index is dependent on the (grammatical) subject which bears the same index; valuation of the anaphoric expression bearing an α -occurrence of a certain index is independent of the subject.² This difference in the valuation can be further related to the difference in the subject's awareness.³ If the subject is aware of the referent of the anaphoric expression, its valuation is dependent on the subject. Conversely, if the subject is not aware of the referent of the anaphoric expression, it is assigned a semantic value independently of the subject. Thus, the difference in the subject's awareness is reflected in the difference in the indexical type. At this point, another question arises as to whether or

² According to Fiengo & May (1994), valuation is not always dependent on the grammatical subject, but on the nominals in general as long as it meets certain conditions. But since we are dealing with awareness, which is inherent to the grammatical subject, we limit our attention to the case of dependency on the grammatical subject.

³ The correlation between the valuation and the subject's awareness seems vague and it is not explicitly stated in Fiengo & May (1994). Nevertheless, we have reached a consensus in the class discussion that they are indeed correlated, and we will tacitly assume this correlation.

not the distinction in the subject's awareness can also be dispensed with in narrow syntax, that is, whether or not the subject's awareness should be represented in the syntactic representation. This is another of the questions this note addresses.

The aim of this note is to review the changes in the Binding-Theoretic treatment of the speaker's intention and the subject's awareness, and discuss the problems related to the status of the speaker's intention and the subject's awareness in the Minimalist Program. In particular, this note is concerned with the correlation between these distinctions and Condition B, and tries to provide answers to the questions posed above. Specifically, this note argues that neither the speaker's intention nor the subject's awareness is represented in narrow syntax, and shows that certain linguistic phenomena, which have been explained with the use of indices, can be dealt with in the Minimalist Program without recourse to indices. Since both the speaker's intention and the subject's awareness are closely related to the Binding Theory, this note also considers whether they should be reflected in the Binding Theory.

2. Interpretive Possibilities

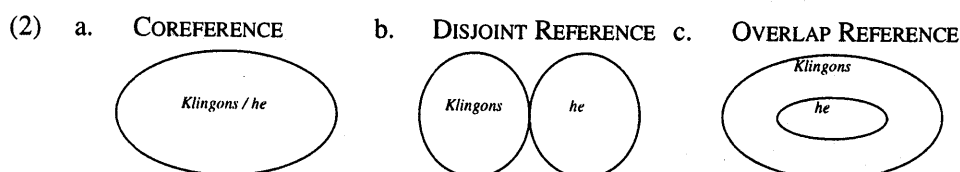
When a pronominal appears in the same syntactic environment with its potential antecedent, especially when a pronominal follows its potential antecedent, it has various interpretive possibilities with respect to its semantic value, which can be divided into two major classes: whether or not the speaker is committed to deciding the referent of the pronominal.⁴ If the pronominal follows another nominal outside of its local domain (i.e. in the non-local domain), for instance, it can refer to the individual denoted by this nominal or some other individual. That is, it can be either coreferential with this nominal or disjoint from it:⁵

- (1) a. Picard thinks that he will win.
- b. Klingons think that he will win.

⁴ We will tentatively follow Kayne (1994) in assuming that precedence is defined in terms of the hierarchical notion "(asymmetric) c-command." Thus X precedes Y iff X asymmetrically c-commands Y (i.e. X c-commands Y and Y does not c-command X); X c-commands Y iff (i) the first branching node dominating X dominates Y, (ii) X does not dominate Y, and (iii) X is not equal to Y. Note, however, that Kayne's original version of LCA is not tenable in the Minimalist Program because it crucially relies on non-branching projection (and the distinction between terminal and non-terminal). It has to be modified to fit the Minimalist Program, as the one proposed by Chomsky (1995).

⁵ The notion of a local domain for an anaphoric expression is equal to that of a governing category here. Many proposals have been made for its definition, but following Chomsky (1986), we tentatively assume that the governing category for an anaphoric expression is a minimal Complete Functional Complex (CFC) that contains it.

In (1a), *he* can refer to either Picard (i.e. coreferential with *Picard*) or some individual other than Picard (i.e. disjoint in reference from *Picard*). Concerning (1b), since *Klingons* denotes the plural number of individuals, the state of affairs is a little bit more complicated than in (1a). If it were the case of coreference, the set denoted by *Klingons* would be entirely identical with the one denoted by *he*, which is impossible in (1b) since this is incompatible with the intrinsic lexical meaning of *Klingons*. In the case of disjoint reference, the set denoted by *Klingons* is totally different from the one denoted by *he*. Moreover, (1b) has another interpretive possibility: *he* can partially refer to Klingons (i.e. overlap reference). Thus, the set denoted by *he* can refer to a proper subset of the set denoted by *Klingons*. Those logical interpretive possibilities in (1b) can be schematized as follows:



Thus, when the speaker utters the sentences in (1a), he/she intends the coreference or disjoint reference of pronominals. When the antecedent nominal denotes the plural number of individuals, as in (1b), the speaker only intends the disjoint reference (see below for overlap reference).

If the pronominal follows another nominal in its local domain, on the other hand, it cannot be coreferential with this nominal. Moreover, it has to be disjoint in reference:

- (3) a. Picard loves him.
b. Klingons love him.

In (3), two instances of *him* cannot be coreferential with *Picard* nor *Klingons*, since both of the (potential antecedent) nominals are in the local domain of pronominals. In (3a) *him* has to refer to some individual other than Picard, and in (3b) *him* also has to refer to some individual other than the one denoted by *Klingons*. Thus, when the speaker utters the sentences in (3), he/she intends the disjoint reference of pronominals.

It should be noted here that the two instances of *him* in (3) can refer to Picard or one of Klingons under a certain circumstance. And this circumstance is free reference under which the speaker can be uncommitted to deciding the referent of the pronominal and it is left open to the hearer. Suppose the speaker is not sure about the referents of the two instances of *him* in (3), and he/she leaves them open to the hearer. Then the hearer may accidentally consider *him* in (3a) to be referring to Picard and *him* in (3b) to be referring to Klingons. This is what

Reinhart (1983) calls accidental coreference. Thus, coreference or overlap reference of the pronominal is actually possible in (3), too: although the speaker's intended coreference is impossible, the accidental coreference and overlap reference under free reference are allowed on the hearer's side. Furthermore, the accidental coreference and overlap reference under free reference are also possible in (1a) and (1b) respectively even though the intended coreference is also allowed in the former case.⁶ Note that free reference is the only way overlap reference interpretation obtains (but see footnote 8). In other words, overlap reference is always accidental, but not intended. Note also that the subclasses of free reference are the distinction made by the hearer, since the speaker leaves the referent open to the hearer and he/she is the one who decides the referent of the pronominal. Thus, besides intended coreference and disjoint reference, free reference is the sole option available to the speaker, but not its subclasses.

Thus far, we have seen that there are three interpretive possibilities for pronominals: (i) (intended) coreference, (ii) disjoint reference, and (iii) free reference (including accidental coreference, accidental disjoint reference and overlap reference). They are dependent on the syntactic environment and the speaker's intention: whether a potential antecedent appears in the local domain or outside of it and which interpretation the speaker intends.

When pronominals are allowed to be coreferential with the preceding nominal that resides outside of its local domain, their semantic value can be determined in two distinct ways: the valuation is dependent or independent (cf. Larson & Segal (1995); also see footnote 1). Under the way valuation is dependent, the pronominal is valued by the (grammatical) subject and it is given its semantic value by the subject: the valuation of the pronominal is dependent on the subject (see footnote 2). Under the way valuation is independent, on the other hand, the pronominal is valued by contexts and it is given its semantic value pragmatically: the valuation of the pronominal is independent of the subject. Consider the following example:

(4) Worf loves his mother.

The valuation of *his* in (4) can be either dependent on *Worf* or independent of it. When Worf is aware that the one he loves is his own mother, the semantic value of the pronominal is given by *Worf*. When Worf is not aware whose mother he loves but the speaker

⁶ There may be a subtle difference in meaning between intended and accidental coreference of pronominals. Even if it exists, it is trivial and our argument does not hinge on this distinction. Hence we will leave it aside in this note. The only difference between intended and accidental coreference seems to be that the former is a representation on the speaker's side while the latter is a consequence of the hearer's decision in choosing a referent that is left open by the speaker.

recognizes that Worf loves his own mother, the semantic value of pronominal is given pragmatically, but not via *Worf*. Noteworthy, the speaker has to be also aware that the one Worf loves is his own mother in the former case, otherwise the disjoint or free reference will result. Thus, when the pronominal is coreferential with the subject, its valuation can be either (i) dependent on the subject or (ii) independent of it.

To sum up, we have seen in this section that three types of interpretations are possible for pronominals with respect to the speaker's intention: (i) (intended) coreference, (ii) (intended) disjoint reference, and (iii) free reference (including accidental coreference, accidental disjoint reference and overlap reference). Availability of these interpretations hinges on the environment where the pronominal appears (i.e. in its local domain or non-local domain). We have seen, moreover, that two types of (intended) coreference are possible with respect to the subject's awareness: when the pronominal is coreferential with the (grammatical) subject, its valuation can be either (i) dependent on the subject or (ii) independent of it. In the subsequent sections, we will turn to the way these distinctions have been dealt within the domain of the Binding Theory.

3. The Representation of the Speaker's Intention

We have seen in the previous section that various interpretive possibilities of pronominals which reflect speaker's intention and subject's awareness. Since semantic interpretation is implemented on the basis of syntactic representations (or LF representations), one may wonder whether such various interpretive possibilities are differentiated at syntactic representations. And when they are, one may wonder how they are represented. In this section, we will take a brief look at three proposals made for the representation of speaker's intention, and summarize their theoretical differences.

3.1. Chomsky (1980)

Utilizing indices in his paper "On Binding" (henceforth, OB), Chomsky (1980) proposes a set of rules in order to account for the interpretive possibilities of pronominals shown in the previous section. Under the OB approach, anaphors are coindexed with its antecedent by rules of construal, which is not our primary concern here. What we are concerned about is the indexing of nonanaphors such as pronominals (apart from the bound idioms) and lexical NPs. After the rules of construal are applied to anaphors in the interpretive component, nonanaphors still remain to be assigned indices. Thus, the indexing rule is applied to the full sentence "from top to bottom" to assign indices to the remaining NPs.

The index of each nonanaphor is a pair of the referential index and the anaphoric index

in this order. The referential index is an integer and the anaphoric index is a set of integers. If the nonanaphor in question is already assigned an index by a movement rule, this index will be its referential index; otherwise it will be assigned some new referential index. The anaphoric index itself consists of the referential index of NPs c-commanding the nonanaphor. So under the OB approach, the sentences in (1) will be assigned indices in the following way:⁷

- (5) a. Picard₂ thinks that he_(3, {2}) will win.
 b. Klingons₂ think that he_(3, {2}) will win.

The integer in the anaphoric index means that the pronominal is disjoint in reference from the NP which bears it as a referential index. For example, *he* in (5a) and *he* in (5b) are disjoint from *Picard* and *Klingons*, respectively, and hence, the representations in (5) yield the disjoint reference.⁸ Thus, the speaker's intention to express (intended) disjoint reference is successfully represented under the OB approach.

It remains to derive the coreference and free reference. In order to account for the free reference under the OB approach, Chomsky (1980) proposes opacity rules applying to the outputs of the initial indexing rules. When a pronominal is free(*i*) in an opaque domain, *i* is deleted from its anaphoric index, where "free(*i*)" means "not c-commanded by NP_{*i*}" and the opaque domains are the c-commanding domain of a subject and nominative NP. After the application of the opacity rule, (5) will have the following representations:

- (6) a. Picard₂ thinks that he_(3, ∅) will win.
 b. Klingons₂ think that he_(3, ∅) will win.

In (6), neither of the two instances of *he* bears the anaphoric index, and hence both of them are free to refer to any individual. Then they are free to (partially) refer to the subject, too. The speaker's intention to express free reference is also successfully represented under the OB approach, especially in this case the intended meaning of (1b) (i.e. overlap reference) is properly represented. Note that in (3) the two instances of *him* cannot be free(*i*), since neither of them is in the opaque domain and their anaphoric indices cannot be deleted.

⁷ Within the OB framework, the integer 1 is reserved for arbitrary reference. Hence the indexing to nonanaphors starts from the integer 2.

⁸ The notion of overlap reference is not subsumed under that of disjoint reference in this approach. It is rather subsumed under the notion of free reference. For the way how the interpretation of overlap reference is represented, see the discussion below. Note, however, that it is subsumed under the notion of disjoint reference in the framework of Chomsky (1993). See §3.3 for this change in the notion.

Under the OB approach, the speaker's intention to express (intended) coreference and overlap reference can be regarded as the application of rules of construal, but they can be applied only to anaphors, and pronominals are exempted from their application. Thus, the coreference and overlap reference of pronominals are left for the notion "free(*i*)," and the speaker's intention to express them is not representable. In other words, only the accidental coreference and overlap reference are represented as free reference in this approach, but not the intended coreference. It should be noted, moreover, that accidental disjoint reference is also possible under free reference, which amounts to saying that accidental disjoint reference is also represented as free reference. Thus, intended disjoint reference is distinguished from accidental disjoint reference in this approach.

3.2. Chomsky (1981)

Retaining the use of indices but largely simplifying the mechanism in his book *Lectures on Government and Binding* (henceforth, LGB), Chomsky (1981) proposes the following Binding Conditions:⁹

(7) BINDING CONDITION

- A. An anaphor is bound in its governing category.
- B. A pronominal is free in its governing category.
- C. An r-expression is free.

(Chomsky (1981: 188))

The change from the OB approach to the LGB approach is taken merely for the technical simplification (also see Lasnik (1989)). Thus, the anaphoric index is abandoned, and only the referential index is retained. Under Condition B in (7), for instance, the sentences in (1) and (3) will be represented in the following way:

- (8) a. Picard_i thinks that he_{i/2} will win.
- b. Klingons_i think that he_{i/2} will win.
- (9) a. Picard_i loves him_{*i/2}.
- b. Klingons_i love him_{*i/2}.

In (9), two instances of *him* are c-commanded by *Picard* and *Klingons* respectively in their governing categories. Therefore, they must bear an index distinct from *Picard* and

⁹ As mentioned in footnote 2, the definition of a governing category in Chomsky (1981) is somewhat different from what we are assuming here. But for the ease of exposition, we still continue to assume the governing category to be a minimal CFC.

Klingons, respectively; otherwise they would be bound in their governing category, and the Principle B violation would result. In (8), on the other hand, two instances of *he* are c-commanded from the outside of their governing categories; they can be exempted from Condition B in (7) even if they are coindexed with the NPs c-commanding them. They can also bear an index distinct from that of *Picard* and *Klingons*, since the conindexing does not hinge on Condition B in (7).

Under the LGB approach, the speaker's intention to express pronominal coreference is captured in the syntactic representation: as long as coindexing is licit under Condition B, coreference is allowed. The speaker's intention to express intended disjoint reference, accidental coreference, accidental disjoint reference and overlap reference is vaguely represented by conindexing, since this is implemented in a single syntactic representation. Specifically, if pronominals bear an index distinct from that of c-commanding NPs, they indicate the (intended) disjoint reference or free reference, the latter having a possibility for accidental coreference, accidental disjoint reference and overlap reference. The first two interpretations are indeed possible with (1a) and (3a), and the last two interpretations are possible with (1b) and (3b), as represented in (8) and (9).

Under the LGB framework, overlap reference still remains subsumed under the free reference. Thus, overlap reference is always accidental in some sense under the LGB (and OB) approach, since it obtains only under the free reference. If this interpretation were considered as the intended one, as in Lasnik (1989), the theory equipped with a single occurrence of the index would have to make some stipulation to rule in the possibility of overlap reference in (1b) and rule out its impossibility in (3b) at the same time. Thus, overlap reference cannot be intended.¹⁰

3.3. Chomsky (1993)

As the linguistic theory develops, the role of the Binding Theory also changes. This is just what took place in the Minimalist Program (henceforth, MP). As the significance of the

¹⁰ But see Chomsky & Lasnik (1993). They propose the notion of set indices to handle the possibility of intended overlap reference in (1b) and its impossibility in (3b). The set indices consist of (more than two) primitive indices, and by this notation, the plurality of the referent can be expressed as a set of individuals assigned to the positions in the σ -sequence that correspond to the primitive indices. Thus, the possibility of the (intended) overlap interpretation of (1b) and its impossibility in (3b) can be represented as follows:

- (i) a. Klingons_{1, 2, 3, ..., n} think that he_i will win
- b. *Klingons_{1, 2, 3, ..., n} love him_i

The overlap reference in (ib) is properly ruled out since it violates Condition B. It seems that the notion of set indices can capture the possibility/impossibility of the (intended) overlap reference, but we will not pursue this matter for an expository reason.

linguistic level comes to be restricted to LF (and PF), the Binding Conditions have come to be applied at the LF interface, and ultimately they have come to be defined in interpretive terms. The following is the definition of the Binding Conditions (D, the relevant local domain) proposed by Chomsky (1993):¹¹

(10) BINDING CONDITION

- A. If α is an anaphor, interpret it as coreferential with a c-commanding phrase in D.
- B. If α is a pronominal, interpret it as disjoint from every c-commanding phrase in D.
- C. If α is an r-expression, interpret it as disjoint from every c-commanding phrase.

(Chomsky (1993: 43))

Since introducing new elements in the course of derivation (i.e. computation) violates the inclusiveness condition (Chomsky (1995: 228)), the MP approach cannot resort to indices to account for the three types of interpretive possibilities for pronominals vis-à-vis the speaker's intention (i.e. coreference, disjoint reference and free reference). Thus, under Condition B in (10), the sentences in (3) will receive only a disjoint interpretation. There is no room for (3a) to receive an accidental coreference interpretation and for (3b) to receive an overlap reference interpretation. The sentences in (1), on the other hand, can receive any kind of interpretation, since Condition B in (10) says nothing about the relation between the pronominal and the c-commanding DP outside of the relevant local domain. That is, any interpretation is allowed. For (1a), both the accidental coreference and accidental disjoint reference are possible. For (1b), the overlap reference is allowed as well as the (accidental) disjoint reference. Note that in the MP framework the accidental overlap reference is incorporated in the domain of disjoint reference in the sense of distinct reference (Chomsky (1993: 43)).

Thus, under the MP approach, pronominals c-commanded by a DP within its local domain bear only a disjoint interpretation, whereas pronominals c-commanded by a DP outside of its local domain allow any interpretation as long as the c-commanding DP is compatible with the interpretation. Consequently, the intended coreference does not obtain

¹¹ We believe that the assumption made by Chomsky (1993) is maintained in his subsequent work (i.e. Chomsky (1995)) and in the largely modified version of the Minimalist Program (i.e. Chomsky (1998, 1999)). If we adopt the latter framework, the relevant local domain may be defined derivationally, namely in terms of (strong) phases. But this definition may pose a problem to the view that considers the DP as a relevant local domain. See §5 as well.

in this approach, and only the accidental coreference prevails. Moreover, this approach, in effect, has reintroduced another distinction: intended disjoint reference and accidental disjoint reference (under free reference). In this respect, the MP approach ends up returning to the OB approach, as Chomsky (1993) notes. The MP approach, however, differs from the OB approach in that under the former approach none of the referential possibilities noted above cannot be represented in narrow syntax since this approach abandons the referential index entirely. In other words, the speaker's intention cannot be represented under the MP approach.

3.4. *Summary*

We have thus far seen the changes in the Binding-Theoretic treatment of the way the speaker's intention to express the referential possibilities of pronominals is represented. Under the OB approach, (intended) disjoint reference is represented by using the anaphoric index. Deletion of this index by opacity rules makes it possible to represent free reference; accidental coreference, accidental disjoint reference and overlap reference can be captured as well. Note that opacity rules do not apply to the pronoun c-commanded by the NP in its local domain, hence free reference is impossible in this case. Moreover, intended coreference cannot be represented in this approach. Overlap reference is subsumed under free reference, hence this interpretation is also treated by deletion of the referential index by opacity rules.

Under the LGB approach, the intended coreference is represented by the use of the referential index and is constrained by Condition B. The (intended) disjoint reference and the free reference (including accidental coreference, disjoint reference and overlap reference) are captured in the same syntactic representation. Thus, the distinction between the intended and accidental disjoint reference cannot be made in this approach. Moreover, intended overlap reference (if possible) cannot be represented adequately without recourse to the notion of set indices (see footnote 10).

Under the MP approach, disjoint reference is distinguished from other interpretations only in the case where the c-commanding DP is in the local domain of pronominals. When the c-commanding DP is outside of the local domain of pronominals, only the free reference is possible; thereby accidental coreference, accidental disjoint reference, and overlap reference are allowed. As in the OB approach, intended coreference is not representable in this approach. As the free reference comes to be determined by Condition B, overlap reference has become a subcase of disjoint reference in the sense of distinct reference. Note, however, that none of these interpretive possibilities is explicitly represented in narrow syntax under the MP approach since the nominal is assigned its semantic value without

recourse to the indices.

This theoretical modification of the Binding-Theoretic treatment is summarized as in (11) for the pronominal in the local domain and as in (12) for the pronominal in the non-local domain below.¹²

(11) REPRESENTATION AND INTERPRETATION OF PRONOMINALS IN THE LOCAL DOMAIN

	SYNTACTIC REPRESENTATION	SEMANTIC INTERPRETATION
OB	*Nominal ₂ ... Pronominal ₂	#intended coreference
	Nominal ₂ ... Pronominal _{(3, (2))}	intended disjoint reference
	*Nominal ₂ ... Pronominal _(3, ∅)	(#)accidental coreference (#)accidental disjoint reference (#)overlap reference
LGB	*Nominal ₁ ... Pronominal ₁	#intended coreference
	Nominal ₁ ... Pronominal ₂	(intended) disjoint reference accidental coreference (accidental) disjoint reference overlap reference
MP	Nominal ... Pronominal	#intended coreference intended disjoint reference (#)accidental coreference (#)accidental disjoint reference (#)overlap reference

¹² The asterisk (*) indicates that the syntactic representation in question is ruled out by some syntactic reason. The sharp (#) indicates that the interpretation in question is unavailable. The sharp in the parentheses ((#)) indicates that the interpretation cannot be represented under the framework in question. The term “intended/accidental” in the parentheses indicates that the distinction in the interpretation is not representable.

(12) REPRESENTATION AND INTERPRETATION OF PRONOMINALS IN THE NON-LOCAL DOMAIN

	SYNTACTIC REPRESENTATION	SEMANTIC INTERPRETATION
OB	*Nominal ₂ ... Pronominal ₂	(#)intended coreference
	Nominal ₂ ... Pronominal _{(3, (2))}	intended disjoint reference
	Nominal ₂ ... Pronominal _(3, ∅)	accidental coreference accidental disjoint reference overlap reference
LGB	Nominal ₁ ... Pronominal ₁	intended coreference
	Nominal ₁ ... Pronominal ₂	(intended) disjoint reference accidental coreference (accidental) disjoint reference overlap reference
MP	Nominal ... Pronominal	(intended) coreference (intended) disjoint reference (accidental) coreference (accidental) disjoint reference overlap reference

Under the OB and LGB approaches, the impossibility of intended coreference in a local domain is due to the ill-formedness of syntactic representation, which is ruled out by the syntactic principle. In other words, some referential possibilities are excluded in syntax. The impossibility of interpretation is attributed to the ill-formedness of the syntactic representation under these two approaches. Under the MP approach, on the other hand, syntactic principles are irrelevant to the impossibility of intended coreference. The impossibility of this interpretation is a result of the application of the interpretive version of the Binding Conditions at LF. Under the MP approach, the intended coreference is ruled out independently of the well-formedness of the syntactic representation.

Concerning the intended disjoint reference in a local domain, the OB and MP approaches distinguish it from other interpretive possibilities. Under the former approach, it is represented by the combination of referential and anaphoric indices. Under the latter approach, it is the only one permissible interpretation determined by the interpretive version of Condition B. Under the LGB approach, the intended disjoint reference is represented by contraindexing.

However, intended disjoint reference cannot be differentiated from free reference under the LGB approach, since they are captured in the same syntactic representation (i.e. contraindexing). Free reference under the OB approach is unavailable because of the ill-formedness of the relevant syntactic representation. It is also unavailable under the MP

approach, since the interpretive version of Condition B forces the pronominal in the local domain to receive a disjoint reference interpretation. Thus, under both the OB and MP approaches, some of the logically possible interpretations are unavailable for a syntactic reason or for a Binding-Theoretic reason, respectively.

For the correspondence between syntactic representations and logically possible semantic interpretations of pronominals in the non-local domain, the reader should refer to table (12) and discussion above.

Now one may wonder whether those interpretive possibilities discussed above should be really represented in narrow syntax or LF under the minimalist approach. Or one may conjecture that they should be represented if the representation has can provide an explanation for some syntactic phenomena. We will get back to this issue in §5.

4. The Representation of the Subject's Awareness

Let us turn now to another distinction introduced by Fiengo & May (1994). We have seen in §2 that when pronominals are coreferential with the preceding nominal, their valuation is either dependent on the nominal or independent of it. When valuation is dependent, the pronominal is valued in accordance with the value of the preceding nominal. From the speaker's point of view, this valuation indicates that the individual denoted by the preceding nominal is aware of who the pronominal refers to, that is, that he himself is referred to by the pronominal. When valuation is independent, on the other hand, the pronominal is valued by contexts and it is given its semantic value pragmatically. In this case, the individual denoted by the preceding nominal is not aware that he himself is referred to by the pronominal.

Fiengo & May (1994) relates this difference to the distinction in the indexical type. When the valuation of the pronominal is independent, it bears an α -occurrence of indices. When its valuation is dependent, it bears a β -occurrence of indices. Thus, the sentence in (4) can be represented in the following way, depending on the way the pronominal is valued:

- (13) a. Worf $^{\alpha}_i$ loves his $^{\alpha}_i$ mother.
 b. Worf $^{\alpha}_i$ loves his $^{\beta}_i$ mother.

In (13a), *his* bears an α -occurrence of the index, and hence its valuation is independent of *Worf*. Worf is not aware that he himself is referred to by *his*. In (13b), on the other hand, *his* bears a β -occurrence of the index, and hence its valuation is dependent on *Worf*. Worf is aware that he himself is referred to by *his*. As is obvious from the representations in (13), the distinction in the valuation, namely the distinction in the subject's awareness is made in

the syntactic representation.

Representation of the subject's awareness yields various consequences. One of them is an explanation for interpretive possibilities of the pronominal involved in VP ellipsis. Consider the following example:

- (14) Kirk saw his mother, and Spock did, too.

(14) is ambiguous: it can receive a strict or sloppy interpretation. Under the strict interpretation, (14) means that Kirk saw his own mother and Spock saw Kirk's mother too. Under the sloppy interpretation, (14) means that Kirk saw his own mother and Spock saw his own mother too. Fiengo & May attributes this ambiguity to the difference in the way of valuation, namely the distinction in the type of indices. For ease of exposition, let us assume that VP ellipsis is a deletion procedure that takes place in the PF component.¹³ Following Fiengo & May, we assume further that the identity between antecedent and elided VPs in the semantic value of pronominals (for α -occurrences) or in the dependency of valuation (for β -occurrences) is required for VP ellipsis. Thus, the representation of (14) before the application of the deletion procedure can be illustrated as follows:

- (15) a. Kirk₁ ^{α} saw his₁ ^{α} mother, and Spock₂ ^{α} saw his₁ ^{α} mother, too.
b. Kirk₁ ^{α} saw his₁ ^{β} mother, and Spock₂ ^{α} saw his₂ ^{β} mother, too.

As the dependency of valuation for the pronominal bearing a β -occurrence of indices cannot be intersentential but has to be intrasentential (Fiengo & May (1994: 54)), the valuation for *his* in the elided VP of (15b) has to be dependent on *Spock*: it takes *Spock* as its antecedent, thereby yielding a sloppy interpretation. And since the dependency of *his* in the elided VP is identical to that of *his* in the antecedent VP, VP ellipsis is possible in (15b). On the other hand, *his* in the elided VP of (15a) bears an α -occurrence of the index, hence its valuation is independent of the intrasentential subject and it can be coreferential with either *Kirk* or *Spock*. But for the VP ellipsis to be possible in (15a), *his* in the elided VP must have the same semantic value as *his* in the antecedent VP, and hence it takes *Kirk* as its antecedent, thereby yielding a strict interpretation. Thus, the ambiguity between strict and sloppy interpretations

¹³ Fiengo & May (1994) are neutral in determining the status of VP ellipsis. Since they advance their argument in the GB framework, the levels relevant to interpretation are D- and S- structures and LF. In this framework, the representations of LF and PF do not interact with each other. The outcome of PF operation does not have any effect on semantic interpretation. Similarly, the outcome of LF operation does not affect the phonological matrix. Thus, VP ellipsis can be considered either as a deletion procedure in the PF component or as a reconstruction in the LF component.

in VP ellipsis can be explained in terms of the distinction between the α - and β -occurrences of indices.

To sum up, under the proposal of Fiengo & May (1994), the (grammatical) subject's awareness of pronominals' antecedent can be also captured in the syntactic representation with the indexical type, namely α - and β -occurrences. The distinction in the indexical type can account for various syntactic phenomena such as the ambiguity of the strict/sloppy interpretation in the VP ellipsis context.

5. Issues

We have seen in §3 how the speaker's intention can be captured in the syntactic representation and how its treatment has developed as the framework of generative theory has changed (cf. OB, LGB and MP). We have also seen in §4 how the subject's awareness can be represented. Now, if one accepts the MP proposed by Chomsky (1993, 1995, 1998, 1999), there arises a problem as to whether these distinctions are really captured in the syntactic representation. As the definition of the Binding Conditions under the MP approach virtually does not represent or distinguish the interpretive possibilities (see (11) and (12)), the answer turns out to be negative. Even if the distinction in intention and awareness is not considered as virtual-conceptual necessity, the distinction needs to be represented in narrow syntax if some syntactic phenomena can be adequately accounted for in terms of the representation of the distinctions.

As far as the intention is concerned, it appears that its distinction does not have to be represented at the LF interface under the earlier version of the MP approach (Chomsky (1993, 1995)): to the best of our knowledge, representation of the distinction plays no role in accounting for any syntactic phenomenon other than referential possibilities. As we have seen in §3.3, moreover, the pronominal c-commanded by a DP outside of its local domain is given only the free reference because the interpretive version of Condition B (cf. (10)) allows it to receive any interpretation with respect to the c-commanding DP. In some cases, even the referential possibilities do not have to be represented: they are left open for pragmatics. Thus, it is highly unlikely that the speaker's intention is captured in the syntactic representation at the LF interface, and hence it is possible to say that the interpretive version of the Binding Conditions is supported.

Concerning the awareness, we have seen in §4 that Fiengo & May (1994) makes distinction in the syntactic representation so as to account for various syntactic phenomena such as the strict/sloppy ambiguity in the VP ellipsis context. Recall, however, that under the minimalist assumption introducing new elements either in the lexicon or during the derivation leads to a violation of the inclusiveness condition (see §3.3). Therefore, indexical

types as well as indexical occurrences cannot be carried over to the minimalist assumption. Moreover, the distinction in awareness always entails that the pronominal is coreferential with some nominal, but as we have mentioned above, the coreference interpretation of pronominals in non-local contexts cannot be explicitly represented at the LF interface. Hence, even the notion of the subject's awareness need not be available in narrow syntax or at the LF interface under the minimalist assumption.

To maintain the MP approach and to account for the interpretive possibility in the VP ellipsis context without recourse to the indexical type or the indexical occurrence. Let us see Fox's (2000) proposal. He proposes that VP ellipsis observes the following principle:

(16) NP PARALLELISM

NPs in the antecedent and elided VPs must either

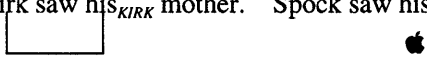
- a. have the same referential value (Referential Parallelism) or
- b. be linked by identical dependencies (Structural Parallelism).

(Fox (2000: 117))

Under Fox's approach, permissible/unavailable interpretations of (14) can be correctly explained by the principle in (16). For ease of exposition, let us again assume here as well that VP ellipsis is a deletion procedure that is applied in the PF component (see footnote 12). Then, the relevant representation of (14) before the application of VP ellipsis can be illustrated as follows:^{14,15}

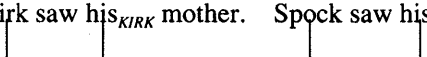
(17) a. STRICT INTERPRETATION

Kirk saw his_{KIRK} mother. Spock saw his_{KIRK} mother.



b. SLOPPY INTERPRETATION

Kirk saw his_{KIRK} mother. Spock saw his_{SPOCK} mother.



¹⁴ For ease of exposition, we represent the semantic value of pronominals with the capital subscript in italics. But note that this representation is nothing more than a notational device and it does not bear any theoretical meaning: it is merely a notational variant. Note also that Fox (2000) adopts the notation used in Higginbotham (1983) for the representation of dependency. We tacitly assume this notation as well.

¹⁵ Although Fox's approach (2000) can adequately account for the interpretive possibilities in the VP ellipsis context under minimalist assumptions, it is not without a problem either. Thus, when the deletion procedure applies in the PF component, it has to have access to the information on the referential value of pronominals in order to observe (16), but this is impossible since PF and LF do not interact each other. Our wild guess suggests that the referential value of pronominals has to be determined prior to Spell-Out so that it can be fed to the PF component.

c. UNAVAILABLE INTERPRETATION

*Kirk saw his_{KIRK} mother. Spock saw his_{SCOTT} mother.

The pronominals in (17a) observe the Referential Parallelism in (16a), and hence VP ellipsis is licit in this context, which leads to a strict interpretation. Similarly, the pronominals in (17b) observe the Structural Parallelism in (16b), and thus VP ellipsis is also licit in this context, thereby yielding a sloppy interpretation. Conversely, the pronominals in (17c) do not observe neither the Referential Parallelism nor the Structural Parallelism, which makes VP ellipsis in this context illicit. (17c) is ruled out by (16). Thus, Fox's approach can correctly derive the ambiguity of the strict/sloppy interpretation in the VP ellipsis context under the minimalist assumption, especially without recourse to the distinction in the indexical type (i.e. α - β -occurrences of indices).¹⁶ If this approach is on the right track, the awareness does not have any significance at least in accounting for the strict/sloppy interpretation ambiguity in the VP ellipsis context, and it does not have to be captured in the syntactic representation.

We have argued thus far that under the MP approach the distinction in the intention is virtually abandoned in narrow syntax and that the distinction in awareness can be also dispensed with in narrow syntax. This shows that we can maintain the interpretive version of the Binding Conditions in (10) in the MP approach. One remaining issue to be addressed with respect to (10) at this point concerns the definition of the relevant local domain, D.

Under the earlier version of the MP approach (Chomsky (1993, 1995)), the Binding Conditions apply to the (single) LF representation, and D, which can be regarded as a minimal CFC containing the anaphoric expression (see footnote 5), is defined at the LF interface.

Under the strong derivational approach of the MP advocated by Epstein et al. (1998), however, D cannot be defined at the LF interface because such representation is unavailable under their proposal: the application of the structure-building operations (such as Merge and Move) creates syntactic relations (such as c-command and sisterhood) derivationally, and upon this creation, those relations enter into the interpretive procedures without meditation of

¹⁶ There are subcases of the ambiguity in the VP ellipsis context that have to be explained under the approach of Fox (2000) without recourse to the indexical type or the indexical occurrence. Among them are what Fiengo & May (1994) call many-pronouns puzzle, many-clauses puzzle and Dahl's puzzle. In accordance with the MP approach, Fox is successful in accounting for the first puzzle by introducing the Rule H originally proposed by Heim (1998) (i.e. one of the economy/optimality principles under Fox's approach). The remaining two puzzles should also be explained without recourse to the indexical type or the indexical occurrence, which will be the topic of our future study.

linguistic levels. In other words, interpretive procedures are applied derivationally (at every point of the derivation), and the structure-building procedure provides information directly to the interface systems. Assuming so, Epstein et al. go on to argue that the interpretive version of the Binding Conditions apply within the derivational process itself, and they propose that the derivational application of the Binding Conditions is constrained by (18):

- (18) The application of “disjoint” interpretive procedures occurs at every point of the derivation, whereas the application of “anaphoric” interpretive procedures occurs at any single point of the derivation. (Epstein et al. (1998: 62))

If the Binding Conditions are applied derivationally, one may wonder how D is defined or computed. It cannot be computed derivationally, since every information is provided to the interface systems directly before it is entirely computed. The strong derivational model must guarantee that the derivation can store information at least for defining or computing D before the Binding Conditions are applied. But it is not at all clear how this is guaranteed under the strong derivational approach.

This problem is partially solvable under the weak derivational approach advocated by Chomsky (1998, 1999), where the notion of multiple Spell-Out is adopted. Under this approach, the derivation proceeds by (strong) phase (i.e. CP or v^*P), and Spell-Out takes place at the phase level.¹⁷ That is, interpretation/evaluation is implemented at the phase level. Thus, we can regard the phase as D, since both CP and v^*P are comparable to the CFC in that both of them realize all grammatical functions compatible with their heads: both CP and v^*P realize the subject and the object. Consequently, the Binding Conditions can be applicable to CP or v^*P , and their interpretive version is still tenable under the weak derivational approach. If DP also counts as phase, moreover, it can be D as well. Thus, the notion of the phase with respect to D is comparable to that of CFC. This indicates that defining D in terms of the phase comports with the interpretive version of the Binding Conditions, and that they are still tenable under the weak derivational approach.

6. Concluding Remarks

We have seen in this note how the distinctions in the speaker’s intention to express coreference/disjoint reference/free reference and in the (grammatical) subject’s awareness of the referent of anaphoric expressions is captured in the syntactic representation.

¹⁷ In Chomsky (1999), v^* is distinguished from v : v^* is ϕ -complete in a construction with full argument structure while v is not.

Specifically, we have shown that the intention and awareness can be represented in terms of indexical occurrences and indexical types, respectively. Dispensing with the distinctions in the intention and awareness, the MP approach (Chomsky (1993, 1995, 1998, 1999)) has presented an interpretive version of the Binding Conditions. This revision is *prima facie* problematic to explaining certain syntactic phenomena, but we have demonstrated that they can be explained without recourse to the indexical occurrences and indexical types.

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