

BINDING THEORY AND ITS CONSEQUENCES FOR MINIMALIST SYNTAX*

Cristiano BROCCIAS

1. Introduction: Formal and Semantic Features

The distinction drawn by Chomsky (1995) between **formal features** (henceforth FFs) and **semantic features** (henceforth SFs) poses a crucial question for Binding Theory (BT): does covert movement allow new (i.e., compared to the ones existing before Spell Out) binding options¹? Minimalist approaches diverge with regard to this question; Lasnik's (1996) answer, for example, is negative, while Fujita (1996), and Kitahara (1997), among others, try to demonstrate that the opposite is true. I shall refer to the former approach as the **pre-Spell Out hypothesis** (FFs moved at LF do not license new binding relations) and to the latter as the **LF hypothesis** (FFs moved at LF are relevant for BT). I will discuss both options, beginning with the LF hypothesis. I will show that only the latter hypothesis is consistent with the variety of facts I will take into consideration. Secondly, I will argue that we need to distinguish two types of accusative Case (at least for the languages examined in this paper): **verbal accusative Case** and **prepositional accusative Case**, the former being checked overtly and the latter covertly. Thirdly, it will emerge from this discussion that while minimalist syntax can handle most forward binding facts satisfactorily, a minimalist account of backward binding is at best problematic. In particular, as for the nature of backward binding, I will suggest that we distinguish between **internal** and **external backward binding**, a distinction clearly visible in Norwegian. Finally, I will

* I would like to thank Luigi Rizzi for his useful comments and Helge Iodrup for his judgements on the Norwegian examples.

¹ I adhere to the traditional view that A can bind B if A c-commands B. On the role of indexes in minimalist syntax see section 3.2.3.

briefly comment on the importance of the ‘move-all’ hypothesis (i.e., the idea that the heads of subcategorized phrases enter into a checking relation with subcategorizing heads) for minimalist syntax and the relation between syntax and binding.

2. The LF Hypothesis

The LF hypothesis claims that BT is satisfied at LF. Of course, we must specify whether BT is satisfied at LF *at the latest* (‘weak’ version of the LF hypothesis) or whether BT always looks only at LF structures to determine the possible binding relations in a given sentence (‘strong’ version of the LF hypothesis). I think that we reduce computational complexity (a goal, as Chomsky (1995) himself points out, a minimalist theory should aim at) if we choose the former option over the latter (see below). Furthermore, as we shall see, we are encouraged to opt for the ‘weak’ version of the LF hypothesis not only on theoretical grounds, but also on empirical grounds. A very simple, yet problematic, example can illustrate this point:

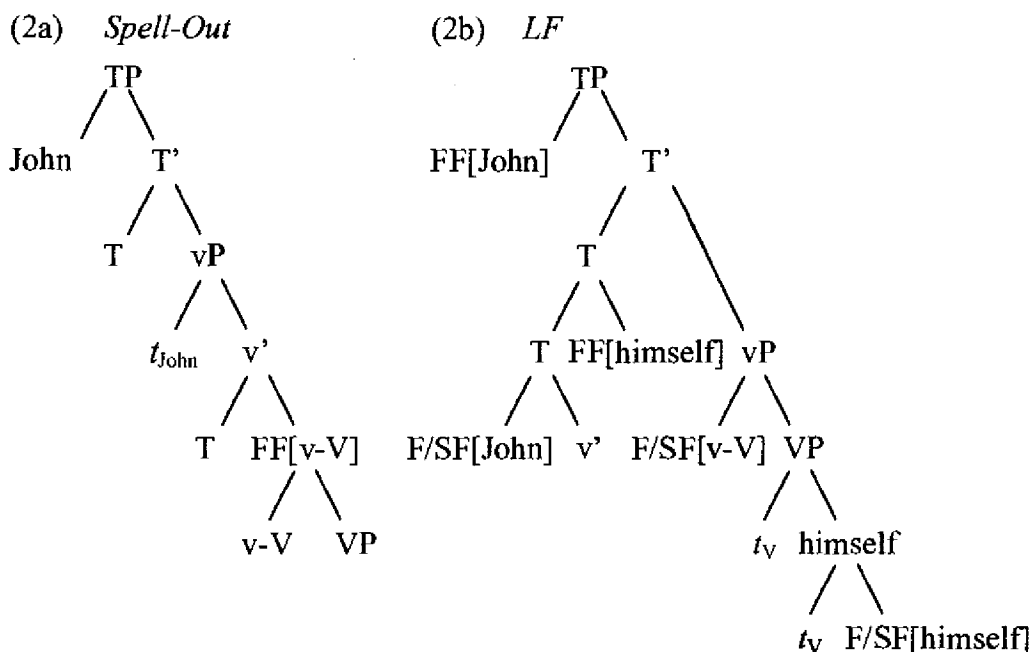
- (1) John killed himself.

In order to analyze how BT works with respect to (1), we must take a preliminary decision regarding how accusative Case is checked in English. Some linguists have argued that accusative Case is checked overtly (Koizumi 1993), while others (Chomsky 1995, Kitahara 1997, *inter alia*) adhere to the more traditional view that accusative Case checking is covert. I shall discuss both options in the following subsections, always keeping in mind that we are interested in establishing what structure is relevant for BT (i.e., any structure created during the derivation or the structures created by overt syntax or the structures created by covert syntax).

2.1. Covert Accusative Case Checking

Let us assume that the covert accusative Case checking hypothesis is correct. (2) illustrates the structure to which Spell Out applies and the final LF configuration for (1), respectively².

² V stands for the lexical verb (*killed* in our example) and v represents a light verb (see Chomsky 1995).



As for LF movement, we follow Chomsky (1995) in assuming that LF movement of heads takes precedence over that of non-heads. Consequently, FFs[*himself*] adjoin to T after the light verb *v* has adjoined to T to check the verbal feature of T. (2b) also illustrates that SFs (as well as PFs) are interpreted only once (as suggested by Kitahara 1997³). We assume that SFs are erased in the landing site when Spell-Out applies, while FFs are associated with both the head and the tail of a chain⁴.

An undesirable result of our theory is that FFs[*himself*] c-command SFs[*John*]⁵. If we state that anaphors (or, better, their features⁶) cannot c-

³ Kitahara (1997) extends the copy-theory of movement to all kinds of movements, while Chomsky (1995) hypothesizes that only A'-movement leaves a full trace behind.

⁴ When an XP in a diagram is not accompanied by either FF or SF, XP is intended as being associated with all three kinds of features (SFs, FFs, and phonological feature). This is the case of *John* and *himself* in (2a). I use *t* when the distinction between FFs and SFs is not relevant for the discussion.

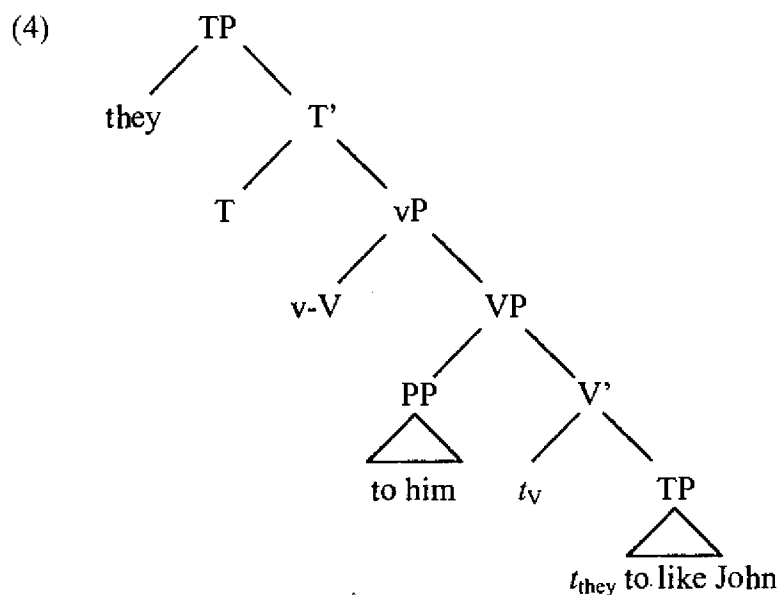
⁵ I adopt the following definition of *c-command* (from Kitahara 1997: 13):

(i) A c-commands B iff every category dominating A dominates B, A ≠ B, and neither dominates the other.

command their antecedents (Condition C of BT), the hypothesis that BT applies only to the final LF configuration rules (1) out. But if we think of BT as applying to every stage of the derivation, that is if BT applies to every structural description created by the computational system, we can take an alternative, more advantageous route. We could argue, for example, that the **FF-SF relation** between the anaphor and the R-expression in (2b) (i.e. the c-command relation between the FFs of the anaphor *himself* and the SFs of the R-expression *John*) is irrelevant for BT because the c-command relationship between the antecedent and the anaphor required by Condition A of BT is satisfied earlier in the overt syntax (see (2a)). This corresponds in a sense to reducing computational complexity (i.e., a derivation which leads to a binding theory violation is blocked as soon as possible). However, we are not saying that FF-SF relations do not count for BT. Kitahara (1997) discusses, for example, how minimalist syntax can handle a sentence like:

(3) *They seem to him_i to like John_i.

(4) shows the stage that the derivation has reached immediately before Spell Out.



⁶ I omit the labels FF and SF when they are irrelevant for the discussion. As far as the conditions of BT are concerned, I take them to involve non-phonological features (i.e., they can indifferently involve FFs or SFs or a combination of the two (see section 3.2.1)).

Note that when an XP in a tree is not accompanied by the label FF or SF, such an XP is usually intended as having both FFs and SFs.

Chomsky (1995) assumes that *to him*, being an optional argument, is the specifier of the projection headed by *seem*⁷. Crucial to Chomsky's analysis is the fact that he takes the preposition *to* as being adjoined to, rather than being the head of, the simple NP *him*⁸. Since *to* is adjoined to *him*, *to* turns out to be invisible as far as c-command relations are concerned and the disjoint reference correctly obtains between *him* and *John*. But Chomsky (1995: 305) himself points out that his analysis does not explain why the movement of *they* does not result in any violations of computational principles: *him* is closer than *they* to the target of movement, the matrix T, because the former c-commands the latter and they are in distinct minimal domains. The notion of *closeness* is defined as follows:

- (5) β is closer to $H(K)$ (i.e., the head of the target K) than α iff β c-commands α , and β is not in the minimal domain of CH, where CH is the chain headed by γ , and γ is adjoined to $H(K)$. (Kitahara 1997: 15)

The domain and the minimal domain of CH are defined in (6) and (7), respectively:

- (6) The domain $\delta(CH)$ of CH is the set of categories included in $\text{Max}(\alpha)$ that are distinct from and do not contain α or $t(\alpha)$. (Kitahara 1997: 12)
- (7) The minimal domain $\text{Min}(\delta(CH))$ of CH is the smallest subset K of $\delta(CH)$ such that for any $\gamma \in \delta(CH)$, some $\beta \in K$ reflexively dominates γ . (Kitahara 1997: 12)

Given the above definitions, $\text{Min}(\delta(CH))$, where CH is the trivial chain headed by the feature [+D] adjoined to T (i.e., $H(K)$), is {vP}. Hence, $\beta = \textit{him}$ is closer than $\alpha = \textit{they}$ and, by moving *they*, a violation of the *Minimal Link Condition*⁹ would incur.

Kitahara (1997) offers an attractive solution to this apparent paradox. He argues that we need not invoke any special adjunct configuration; *to* takes *him* as its complement, as usual. Consequently, neither *him* nor *they* c-commands the

⁷ This assumption, however, is not theoretically motivated.

⁸ I shall use labels such as NPs, DPs, etc. for convenience's sake. These categories, in fact, have no independent status in minimalist syntax.

⁹ I adopt the following definition of the *Minimal Link Condition*:

(i) *Minimal Link Condition*

$H(K)$ attracts α only if there is no β , β closer to $H(K)$ than α , such that $H(K)$ attracts β .

(Kitahara 1997: 14)

other, and both are equidistant from the target T; hence, no violations of the *Minimal Link Condition* occur if *they* is attracted. The observed disjoint reference between the pronoun and the R-expression can be explained if we assume, as is quite natural, that *him* checks its Case feature at LF by adjoining to the preposition *to*. Such an LF configuration causes *him* to c-command *John*¹⁰, thus excluding coreference between the two (Condition C of BT).

Although Kitahara's solution accounts for (3), it turns out to be problematic in the light of (1) on the assumption that LF is the relevant level for the application of BT. We have at least three options. (A) We appeal to what I shall call the *Principle of Anaphoric Saturation* (PAS), which "freezes" possible binding relations at some point in the derivation and which corresponds to the idea that binding relations are satisfied at LF at the latest (section 2.2). (B) Accusative Case checking takes place covertly with prepositions, but overtly with verbs (section 2.3). (C) Contrary to what we have tacitly assumed so far, the subject position in (1) is actually higher than in (2). I shall refer to (C) as the **Split Subject Hypothesis** (section 3). Let us consider these options in turn.

2.2. The PAS: Italian vs. English

Motivation for (A) comes from the following pair (an example of backward binding (henceforth BB)):

- (8) a. *John showed herself_i to Mary_i.
b. John ha mostrato se stessa_a a Mary_i. (Italian translation of (8a)¹¹)

We could argue that in English, but not in Italian, as soon as a c-command relation between an anaphor and an R-expression is established in the derivation, any further legitimate c-command relation between these two elements¹² is ruled

¹⁰ Minimalist syntax allows the head of a PP to c-command outside its projection because the features of the PP are those of its head or, more precisely, those of a sublabel of $H(PP)^{0_{max}}$. Consequently, when *him* adjoins to the head *to*, the PP will also include, among its features, the ones of *him* (see also section 3.2.3).

¹¹ Contrary to the judgements reported in Den Dikken (1995: note 42, p.224) and attributed to M.T. Guasti, I find (i) perfect.

(i) Ho mostrato Maria_a a se stessa_a.

¹² This analysis does not pose any problems for the unacceptability of (i):

(i) a. *Himself_i killed John_i.
b. *Se stesso_i uccise John_i.

At this point of the discussion, we can say that (ia) is unacceptable because of the PAS, while (ib) is plausibly ruled out by the fact that *John* will never c-command the sub-

out. In other words, even if we assume that at LF *Mary* c-commands *herself* because the former ends up in an appropriate position (see Fujita 1996, Broccias 1996), the existence of an already established relationship between the two elements under consideration excludes the LF legitimate possibility. On the other hand, in Italian the c-command of an R-expression by an anaphor is not a sufficient condition to rule out further “rescuing” relationships at LF¹³. In the light of these remarks, consider (9):

(9) ?John showed [each other]_i's friends to [Bill and Mary]_i.

The contrast between (8a) and (9) is due, first of all, to the fact that *each other* does not c-command *Bill and Mary*. It may also be the case that, as the derivation proceeds, the *i*-indexed NP in (9) ends up in a position from which it can c-command the reciprocal (see section 3.2.1).

Note that under the PAS hypothesis, (1) is perfect because, prior to Spell-Out, *John* already c-commands the anaphor satisfying Condition A. Therefore, the PAS is an ‘earliness’ principle.

2.3. Covert Checking of Verbal Objects

The discussion so far has demonstrated that we cannot do away with the LF hypothesis, whether ‘strong’ or ‘weak’ (*contra* Lasnik 1996). A sentence like (3) would otherwise not be accounted for. On the other hand, if we rely only on the strong LF hypothesis, we are at a loss to explain why (1) does not violate Condition C: we need the PAS. Nevertheless, if we assume that the Split Subject Hypothesis is not correct (as I shall show in the following sections), we have to explain why (10) is ungrammatical:

(10) *The article about himself_i attacked John_i.

Under the hypothesis that accusative Case is checked covertly, the LF configuration for (10) is similar to (2b). But, unlike (2b), the c-command configuration established between the anaphor and its intended antecedent by virtue of LF

ject (because, for example, accusative case is overt in Italian). If we accept that accusative case is checked overtly by verbs (see next section), we can explain (ia) in the same way as (ib).

¹³ Luigi Rizzi (personal communication) notes that the solution sketched above in the text for the contrast in (8) (as well as the account proposed in 3.2.2 for the difference in acceptability between Norwegian and English with regard to the sentence *Mary showed those pictures of himself to John*, acceptable in English but not in Norwegian, with *hamselv* in place of *himself*) is problematic from an acquisitional point of view.

movement satisfies Condition C. We must therefore reject the claim that accusative Case of verbal objects is checked covertly. While it is true that **prepositional complements** check their case **covertly** (see (3)), we are forced to assume that **verbal objects** check their case **overtly**^{14,15} (see also section 3.2.3).

The order observed at PF (subject-verb-object) is explained if we assume that the verb adjoins overtly to T¹⁶. It is also necessary to postulate that the Case checking of the object precedes the merger of the subject, otherwise the object would end up c-commanding the subject (a point also raised by Chomsky (1995)).

Note that we still need the PAS if we want to account for the contrast in (8). Nevertheless, as the following sections will show, the exact nature of BB is difficult to establish and we may not wish to rely on examples like (8) to infer the necessity of the PAS. It is not obvious, in fact, that (8) involves “particular” syntactic processes such as “incorporation” (in the sense of Fujita 1996 and Broccias 1996) that allow new binding options to be available at LF. However, in the absence of alternative analyses, I will accept the PAS.

Despite having claimed that verbal accusative Case is checked overtly, I will often refer, in the rest of the discussion, to the opposite view, so as to offer a comprehensive analysis of the binding facts under discussion.

3.1. The Split Subject Hypothesis

Motivation for the Split Subject Hypothesis (henceforth SSH) comes from the following pair (another instance of BB, from Fujita 1996):

- (11) a. ?Each other’s pictures gave Bill and Mary a book.
b. *Each other’s friends gave Bill and Mary a book.

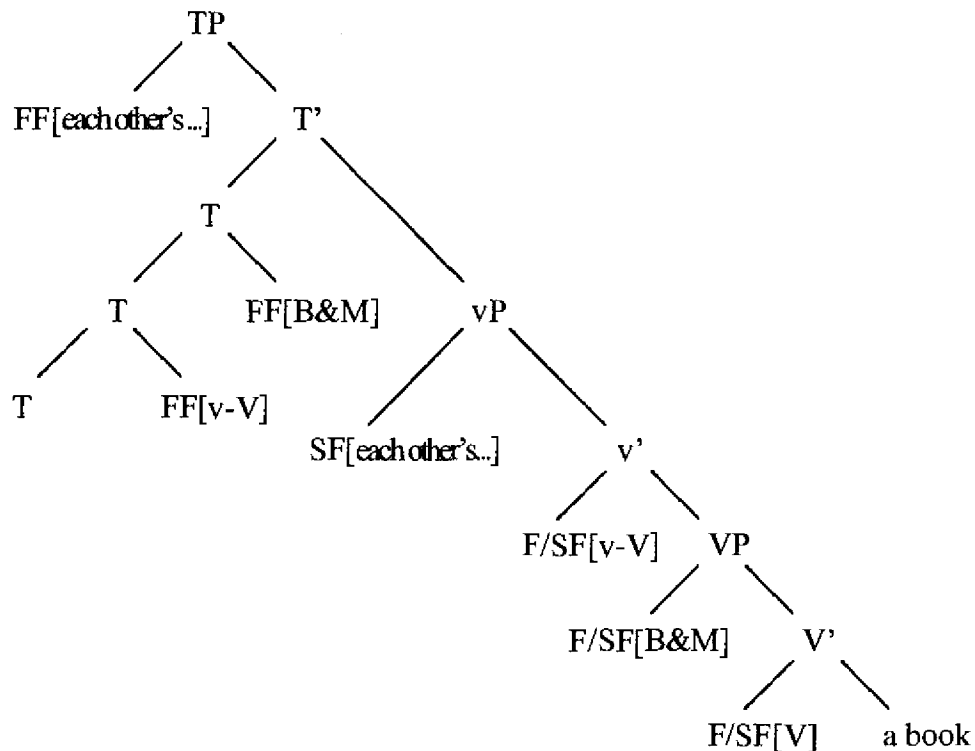
¹⁴ It is worth noting (see Allen 1995) that Middle English occasionally marked nominal prepositional objects, but not nominal verbal objects, with the old (i.e., Old English) dative ending *-e*. Allen (1995), on the basis of such evidence, draws a distinction between structural case assigned by verbs and structural case assigned by prepositions (what she calls “dative” case). It may well be that the distinction between structural verbal case and structural prepositional case, although no longer marked by morphology, has not been lost in the history of English.

¹⁵ I hypothesize that this distinction holds also for Norwegian and Italian.

¹⁶ Such a move forces us to reconsider the question of adverbial placement. But this problem lies outside the scope of the present work.

Assuming the covert accusative Case checking hypothesis, we obtain an LF structure similar to (2b). Consequently, we expect both sentences to be acceptable: FFs[*Bill and Mary*] c-command SFs[*each other's pictures*] as (12), the final LF configuration, illustrates¹⁷:

(12) *LF*



The non perfect status of (11a), compared to the complete unacceptability of (3), seems to indicate that LF relationships between an anaphor and an R-expression are not as “effective” as those established without LF movement. On the other hand, any violation of condition C is always bad, irrespective of the level at which it occurs (see (3)). Of course, such a line of reasoning does not explain why (11b) is as bad as (3).

In order to shed some light on the contrast between (11a) and (11b), we have to discuss BB in more detail. We are interested in trying to establish if backward

¹⁷ I assume that *a book* is assigned an inherent case. The crucial point here is, however, that the “direct” object in a double object construction (DOC) never c-commands the “indirect” object. Otherwise, the impossibility of internal backward binding (see section 3.2) would be problematic at best.

binding is a syntactic phenomenon or not. The definition of the exact nature of BB will allow us to evaluate the plausibility of the SSH.

3.2. Internal and External Backward Binding

I propose that we distinguish between **internal** and **external backward binding** (henceforth IBB and EBB, respectively). The former involves a binding relation between two internal arguments (in minimalist terms it concerns the arguments of a non-light verb), while the latter relates to the binding of an anaphor contained within the subject (i.e., the external argument or, in minimalist syntax, the specifier of a light verb) by an internal argument. They are illustrated in (12) (from Fujita 1996):

- (12) a. ?I showed [each other]_i's pictures to [Bill and Mary]_i. (IBB)
b. ?I showed [each other]_i's friends to [Bill and Mary]_i. (IBB)
c. ?[Each other]_i's pictures gave [Bill and Mary]_i a book. (EBB)
d. *[Each other]_i's friends gave [Bill and Mary]_i a book. (EBB)

The distinction is empirically motivated by the fact that IBB seems to be insensitive to the animate character of the NP that contains the anaphor. On the other hand, EBB clearly shows some sort of logophoricity effect ((12b) vs. (12d)).

It is worth bearing in mind that IBB takes place only with ditransitive verbs in the Prepositional Dative Construction (PDC), but not in the DOC:

- (13) a. ?I showed each other's friends/pictures to Bill and Mary.
b. *I showed each other's friends Bill and Mary.

Further evidence supporting the need to distinguish the cases of IBB from those of EBB comes from Norwegian¹⁸. As for IBB, Norwegian seems to pattern like English¹⁹:

- (14) a. ?Jeg viste beundrerne sine til John.
I showed admirers-the SE's to John
"I showed his (refl.) admirers to John."

¹⁸ I am indebted to Helge Lodrup for the judgements on the Norwegian examples.

¹⁹ I shall use the forms SE, SE's, SE SELF, HIM SELF to gloss, respectively, the morphologically simplex *seg*, the possessive anaphor *sin*, the morphologically complex *seg selv*, and the anaphor *ham selv*, which is formed with the third person singular pronoun *ham*, 'him'.

- b. *Jeg viste beundrerne sine John.
 I showed (to) admirers-the SE's John
 "I showed his admirers John."

The acceptability of Norwegian IBB depends, however, also on the choice of the anaphor: IBB is also possible with the reciprocal *hverandre*, 'each other', but fails with *seg*, 'SE', *seg selv*, 'SE SELF', and *ham selv*, 'HIM SELF'²⁰.

On the other hand, EBB is impossible even if one uses the possessive anaphor *sin*. Let us consider in more detail how Norwegian anaphors behave in a typical case of EBB²¹:

- (15) Bilder av *seg/*seg selv/*barna sine/?ham selv irriterer Tom.
 Pictures of *SE/*SE SELF/*children SE's/?HIM SELF annoy Tom

The reciprocal *hverandre*, unlike *sin*, is a possible option also for IBB:

- (16) ?Bilder av hverandre gav Bill og Mary en bok.
 Pictures of each other gave Bill and Mary a book.

We can sum up the Norwegian data in the following table²²:

²⁰ They would be used as complements of the preposition *av*, 'of':

- (i) *Jeg viste beundrere av seg/seg selv/ham selv til John.
 Note that in a simple case of forward binding such as (ii) (H. Lodrup, p.c.)
 (ii) Mick Jagger møtte en beundrer av seg.

Mick Jagger met an admirer of SE
seg is the only option. However, section 3.2.2 shows that *seg*, *seg selv*, and *ham selv* are all ruled out in the same way, independently of forward binding considerations.

²¹ Ottoson (1991) notes that SE SELF is impossible in Icelandic but he does not consider the other anaphors, nor does he analyze instances of IBB.

²² The contrast between IBB and EBB with regard to the possibility/impossibility of the possessive anaphor *sin* provides an interesting counterexample to a Pesetskian approach to BT (see Pesetsky (1995)). First, note that Norwegian, like English, rules (i) out:

- (i) a. *The article in *The Times* angered Tom at the government.
 b. *Atrikkelen i *The Times* ergret Tom paa regjeringen. (Norwegian translation of (ia))

Within a Pesetskian framework, the unacceptability of the above pair is explained in the following fashion. The Causer argument, 'the article in *The Times*', is generated (or is also generated, see Pesetsky 1995: 209) lower than the PP and must raise to the surface position indicated in (i). However, such a movement is blocked by the [-affixal]

(17)

Norwegian anaphors and BB

anaphor	IBB	EBB
<i>seg</i>	*	*
<i>seg selv</i>	*	*
<i>sin</i>	✓	*
<i>ham selv</i>	*	✓
<i>hverandre</i>	✓	✓

Unfortunately, things are more complex than the table in (17) entails. Consider (18):

- (18) a. ?I put each other's crowns on the king of France and the king of England.
 b. *Jeg satte hverandres kroner paa kongen av Frankrike og kongen av England.
 = Norwegian translation of (18a)
 c. ?Jeg ga hverandres kroner til kongen av Frankrike og kongen av England.
 "I gave each other's crowns to the king of France and the king of England."

(18b) differs from its English counterpart (18a) (pointed out to me by J. Romero p.c.) in that it lacks the relevant idiomatic reading of "crowning" (H. Lodrup p.c.). It simply means that the entities denoted by the referential NP

properties of the preposition *at*, and, hence, the sentence is ungrammatical. Pesetsky also supposes that binding relations are established prior to LF. Therefore, the reason why *ham selv* should be the only possible option in (15) is not clear: *Tom*, in (15) as well as in (i), c-commands, in fact, the Causer, *bilder av ham selv*, prior to its movement to the initial surface position.

A further problem with the Pesetskian approach is that it argues (Pesetsky 1995: note 213) that the underlying order of a PDC is as follows:

(ii) V to Goal *G* Theme

where *G* is a zero preposition. Given (ii) we would expect (14a) to allow the same anaphoric options as (15), a prediction which is clearly not borne out. In section 3.2.3, I shall discuss another case which casts serious doubt on the correctness of Pesetsky's approach.

kongen av Frankrike og kongen av England are to be construed as spatial locations.

Returning to the English examples, it is a well-known fact that IBB is blocked with a non dativizable verb (Zubizarreta 1992):

- (19) a. *John explained each other's articles to Bill and Mary.
b. *The director donated each other's pictures to the museums.
c. *John introduced each other's friends to Bill and Mary.
d. *John suggested each other's solutions to Bill and Mary.

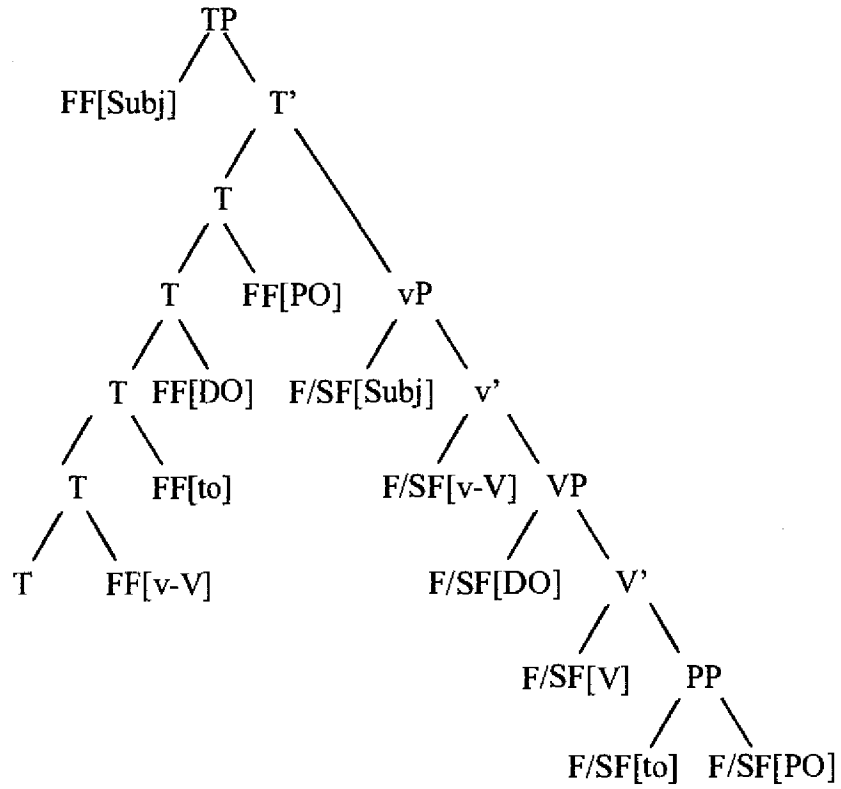
In the next two subsections I shall show that a syntactic solution to IBB is dubious and that EBB cannot be explained syntactically.

3.2.1. Internal Backward Binding

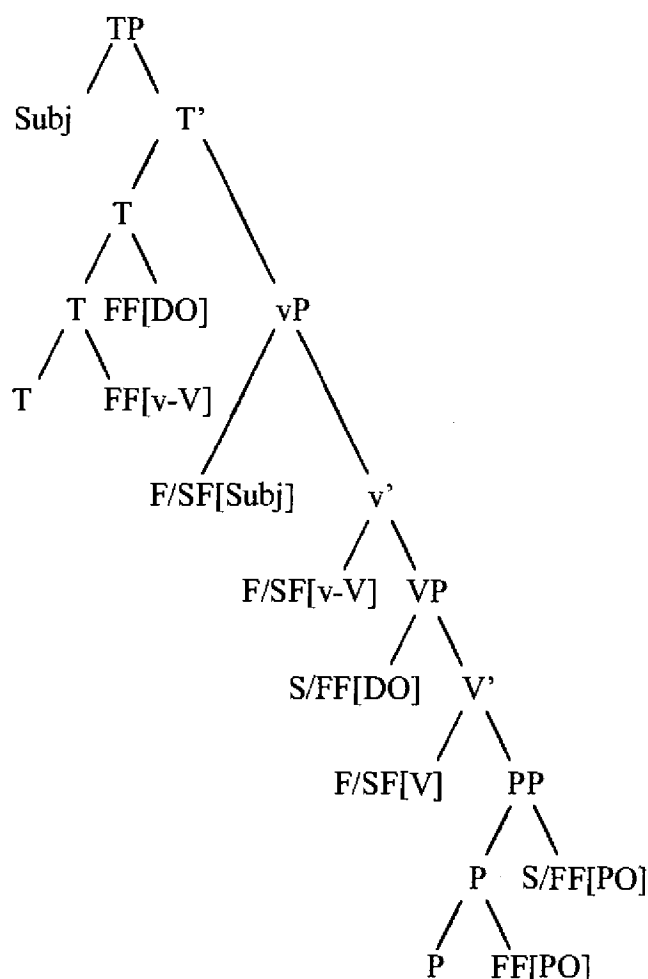
Let us first examine how syntax could handle the IBB data under discussion. One could propose that some process of covert incorporation of the preposition into the verb takes place (along the lines of Fujita 1996 and Broccias 1996). If such an incorporation process precedes the covert checking of the accusative Case of the preposition, we are forced to conclude that the prepositional complement moves up to the verbal complex, where it can check its Case. But the examples in (19) show that the presupposed availability of (covert) prepositional incorporation depends on the existence of a structure (the corresponding DOC) where the R-expression is actually placed higher than the reflexive. (20) and (21) illustrate what happens with the sentences (12a) and (19a) at LF (DO = direct object, PO = prepositional object)²³.

²³ The syntactic analysis proposed in this section is compatible with the assumption that accusative Case is checked covertly, as in Broccias (1996). However, the proposed explanation does not rely on this assumption and can also apply to the case of overt accusative Case checking.

(20) (= (12a))



(21)



The complex LF structures for T shows the order according to which the various elements have raised to T. For example, in (20) the first element to move is the complex *v-V*, then the preposition *to* adjoins to T, followed by the DO and, lastly, the PO. This order is motivated by the assumption that head movement precedes non-head movement and that attraction is regulated by *c-command*. However, even if the LF structure for T were different, the substance of the reasoning would not change because, given our definition of *c-command*, for any order of adjunction, every element adjoined to T **c-commands the other and c-commands outside T**.

(21) differs from (20) because the preposition *to* has not incorporated into the verb. Hence, FFs[PO] do not c-command DO at any stage of the derivation, preventing the reciprocal *each other* from satisfying Condition A of BT. On the other hand, FFs[PO] do c-command DO in (20), thus allowing Condition A to be satisfied. Of course, we have tacitly assumed that the relation of reciprocal c-

command between FFs do not count for BT. The relations we have to consider are those that involve ‘unambiguous’ (i.e., non-reciprocal) c-command, such as those between FFs and SFs in our example (cf. the one between *Bill and Mary* and *each other*). I shall refer to the binding relation established between FFs and SFs as **FF-SF binding**.

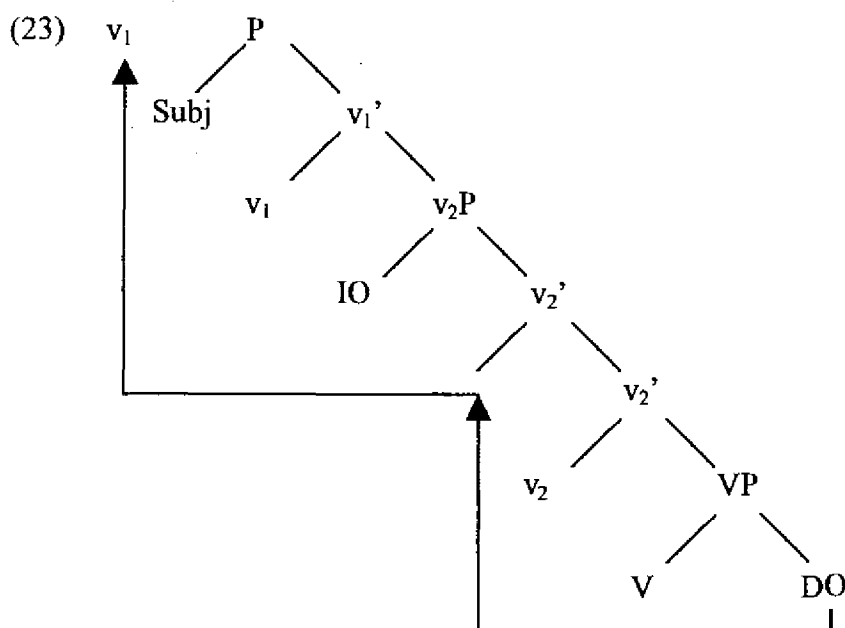
Note that if we accept a derivation like (20), we can account for the contrast in (22) only by appealing to the PAS:

- (22) a. John showed Mary to herself.
b. *John showed herself to Mary.

At LF, in fact, FFs[*herself*] c-command *Mary* in (22a), while the opposite holds for (22b). If we regarded BT as applying to LF, then we would incorrectly predict that (22a) is impossible and that (22b) is acceptable.

This analysis runs into trouble when we are faced with explaining IBB in (18a). Not only does IBB seem to be linked to the existence of possible structural alternatives where the usual c-command relation between an R-expression and an anaphor holds, but idiomatic reading too seems to play a crucial role. Of course, one could argue that idiomatic readings may involve a reanalysis process of the kind described above, with the preposition covertly adjoining to the verb. I leave this problem to future research.

Summing up our syntactic discussion so far, we conclude that verbs that alternate or are subject to idiomatic readings might involve a covert incorporation process of the preposition. Under this hypothesis, the impossibility of (13b) derives from the fact that the DO in a DOC has either inherent Case and hence does not need to check it or has structural Case but checks it before Spell-Out. Broccias (1996), for example, proposes that a DOC may involve not just one, but two light verbs, as is shown in (23) (IO = indirect object; the arrows indicate overt movements):



v_1 and v_2 stand for light verbs. DO checks its Case overtly by moving to [Spec, v_2] after V has adjoined to v_2 because of a strong affixal feature of the latter. Note that the Case checking of DO precedes the merger of IO so as to prevent DO from c-commanding IO. Subsequently, v_1 attracts the complex v_2 -V, giving the observed PF order²⁴.

An alternative analysis to the syntactic approach rests on a rule which I call the **Paradigmatic Rule to Anaphoric Binding** (PRAB) (see also Jackendoff 1972). The PRAB roughly says that given a thematic hierarchy TH with GOAL>THEME>LOCATION/INSTRUMENT, one has to compare a structure A with other possible structures which contain the same arguments in the derivation and which respects TH. The reason behind this comparative (or paradigmatic) analysis is to find paraphrases of the same sentences in which the correct

²⁴ An alternative syntactic explanation could rely on the argument that the DO is generated lower than the PP in a PDC or the IO in a DOC. The observed PF order results from the movement of the DO over the PP prior to Spell-Out (because, for example, accusative Case is checked overtly). In this case, binding in (12a) is established before Spell-Out. Under this hypothesis, the contrast between (12a) and (19) would obtain if the PPs in (19) were generated lower than the DOs. Whichever alternative we choose, we cannot do away with the hypothesis that dativizable verbs differ structurally from nondativizable ones and we cannot do away with the PAS in order to account for the contrast in (22).

binding relation between two arguments hold. The PRAB limits possible options by looking only at those structures that conform to TH. In other words, (13b) and (19) are impossible because in the former case the only alternative, the PDC, implies that the Theme is placed before the Goal, contrary to TH. In the latter case, no other syntactic alternative which places the Goal before the Theme exists and, hence, the binding relation is ruled out. But, even under this hypothesis, we need something like the PAS to explain (22).

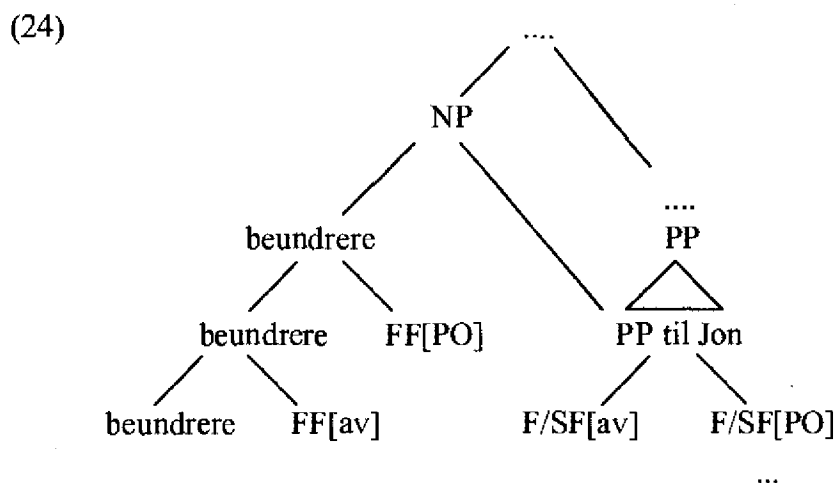
As for the contrast between (18a) and (18b), all we can say is that English, but not Norwegian, allows what we can call **thematic-shifting**: the Location can be reanalyzed as a Theme and viceversa (compare (18a) with *I crowned the king of France and the king of England with each other's crowns*, where the relevant internal arguments have opposite thematic roles).

I will leave to future research to establish which of the two approaches, if either, is correct. Whatever approach we choose, we have to explain the facts summed up in table (17). I will sketch out a possible solution in terms of the syntactic approach outlined above, although I am aware that such explanation is rather tentative.

3.2.2. Norwegian and the 'Move-All' Hypothesis

(17) shows that *hverandre* differs from the other anaphors in that it allows both EBB and IBB. I shall have nothing to say on *hverandre*, apart from the fact that a special 'status' for the reciprocal has also been argued for by Lebeaux (1983) (see also 3.2.3). Therefore, the following analysis applies only to non-reciprocal anaphors. I will also have little to say about EBB. Note, however, that the availability of *ham selv* might be expected because this is the usual anaphor used for coreference with an object, as in *Mary snakket John om ham selv*, "Mary talked to John about himself". An important difference between the previous sentence and (15) lies in the impossibility of the use of the pronoun *ham* in the former. This fact strongly points at some non-syntactic explanation for EBB (see also Kuno's 1987 discussion of *picture*-NPs), as will be argued below. The main aim of this section will be, then, the discussion of the cases of IBB. The impossibility of *seg*, *seg selv*, and *ham selv* could be due to the existence of a c-command relation between the anaphor and the intended antecedent at LF in violation of Condition C of BT. On the other hand, if such relation did not exist, we could expect the anaphor to be possible, as in the case of *sin*. Note that the impossible anaphors are all complements of a preposition (*av*, see note 20). Suppose that this preposition must be 'licensed'. In other words, we must check that the preposition (more precisely, that the PP headed by such a preposition) is compatible with the noun, *beundrere*, that selects it. This could be achieved by moving the preposition at LF to the noun from which it 'depends', *beundrere*. I

shall term such a proposal, which encodes the idea that what we can call **categorial selection features** must be checked, the ‘**move-all**’ hypothesis (see also section 3.2.3). If Norwegian prepositions check their Case feature at LF as in English, we obtain the following (simplified) structure:



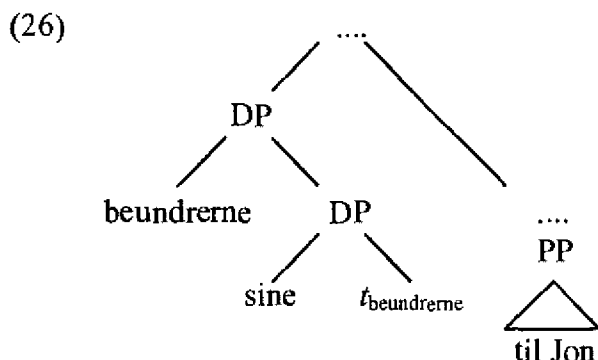
This structure implies that FFs[PO] c-command *Jon* (see example (3) and note 10), in violation of Condition C. We might wonder why, contrary to what happens in Norwegian, the use of *himself* in a sentence like *Mary showed those pictures of himself to John* does not result in ungrammaticality in English. The only explanation I can offer is that in English, but not in Norwegian, Condition C violations can be rescued by the existence of an ‘inverted’ c-command relation. In other words, if we accept the idea of covert reanalysis (the preposition adjoins to the verb covertly, thus causing the PO to end up in a position from which it can c-command the anaphor), Norwegian would differ in the following way. In Norwegian, a FF-SF relation between anaphor and intended antecedent results in a violation of Condition C of BT even if there exists a FF-SF relation between antecedent and anaphor due to a reanalysis process. On the other hand, in English the existence of the latter relation causes the Condition C violation to be “erased”, so to speak. Note that this does not negate our former statement that any violation of Condition C at LF determines ungrammaticality (see example (3) and relative discussion). A sentence like:

(25) *They seem to himself_i to like John_i.

is impossible because the object of the embedded verb, *John*, checks its Case overtly and hence its movement to a position higher than that occupied by the anaphor is impossible.

Returning to the Norwegian examples, we have to explain why *sin* is possible with IBB. We would like to argue that in this case no process of covert checking

is involved, so that *sin* does not c-command its intended antecedent at LF, while the latter, thanks to the covert reanalysis process, c-commands it and allows Condition A of BT to be satisfied. We could propose that *sin* checks its features against its nominal complement overtly through spec-head agreement. The situation is illustrated in (26):

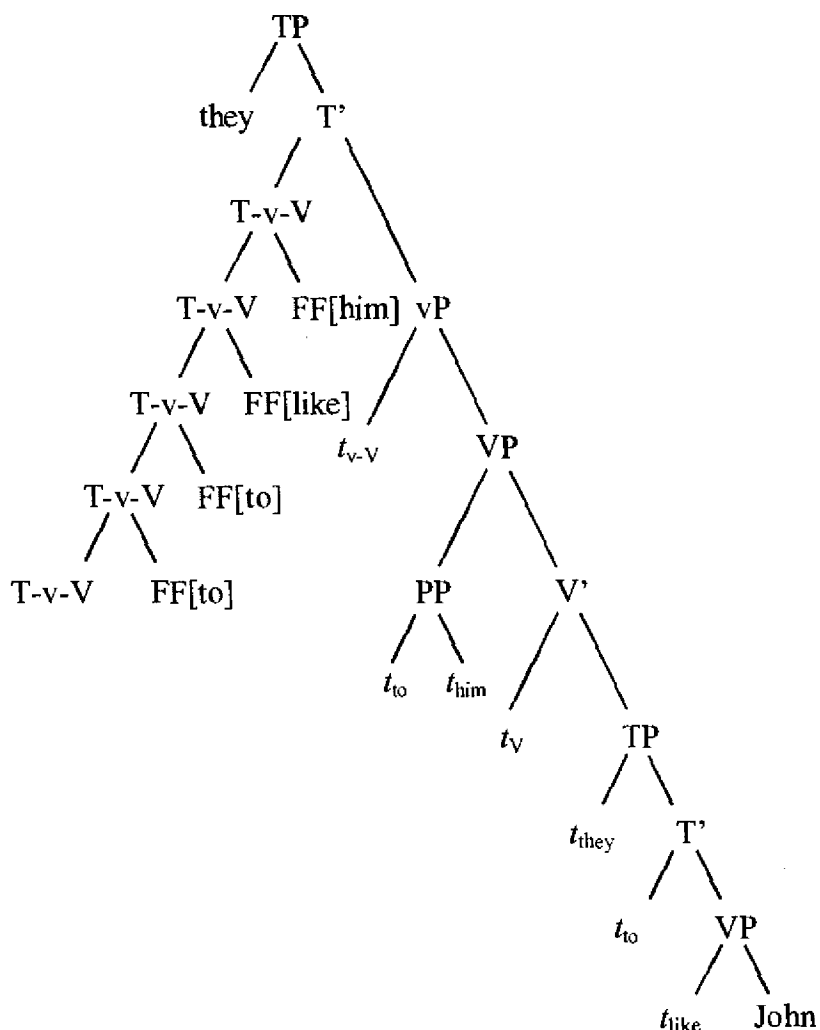


This analysis raises an interesting problem. We have explained (3) by saying that *him* adjoins covertly to the preposition *to* and we have motivated the possibility of the FF-SF relation between the pronoun and the epithet in note 9. If what we have stated in note 10 is correct, then we would (incorrectly) predict that *sine* c-commands *Jon* in (26) because it is the head of the DP. There are at least two alternatives to account for this paradox. On the one hand, we could argue that what we have stated in note 9 is not correct and that *him* cannot c-command *John* if *him* adjoins to the preposition *to*. (3), however, continues to be ruled out because *to* raises to the matrix verb in order to check its “compatibility” with the PP selected by the verb *seem* (in conformity with the ‘move-all’ hypothesis). This means that we would end up with an LF structure similar to the one of a PDC, where the PO can c-command *John* by virtue of having raised to the matrix verb together with *to*.

(27) illustrates the situation²⁵:

²⁵ Note that I am assuming the covert checking hypothesis as far as verbal complements are concerned. Such an approach implies that the complex v-V moves overtly to T (this is indicated by T-v-V in (27)), as we have already observed. Note further that I have simplified the representation of the embedded TP.

(27)



(27) shows that the embedded Tense head *to*, as well as *like*, raises to check its “compatibility” with *seem*. Note that *John* is stranded at the bottom of the diagram because it checks its Case overtly.

As we have already pointed out, the order of adjunction of the various elements to T at LF is irrelevant (see section 3.2.1). In (27) I have indicated one of the possible order, precisely the one involving first the raising of Tense *to*, then the attraction of the preposition *to*, then the adjunction of *like* and, finally, the raising of *him*.

If we do not accept this proposal to account for the contrast between (3) and (26), we could alternatively argue that what we have stated in note 10 is correct, but the structure in (26) it is not. I shall not decide which of the two views (or, maybe, a combination of them) is correct, if either, leaving to future research the

task to solve this paradox. I would like to point out another potential problem for the ‘move-all’ scenario. Consider (28):

- (28) John viste alle bildene av ?*ham*_i/**ham*_i selv til Ole_j.
John showed all pictures of HIM/HIM SELF to Ole

Although we have claimed that the complement of *av* c-commands that of *til* at LF, (28) shows that the pronoun *ham* is still a possible option (vs. (3)). We are forced to conclude that our syntactic approach is at best problematic²⁶.

3.2.3. External Backward Binding

Fujita (1996) offers a unified account of IBB and EBB in terms of a covert reanalysis process which places the relevant R-expression in a position from which it can c-command the anaphor. His analysis crucially rests on the hypothesis that there exist two subjects positions, one linked to **agentive subjects** and the other to **causative subjects** (what I have called the Split Subject Hypothesis). Hence, EBB with a causative subject turns out to be possible because the object ends up in a position higher than the causative subject at LF (Fujita assumes that accusative Case is checked covertly). On the other hand, agentive subjects always c-command objects, thus prevent EBB from taking place. I will not spell out Fujita’s proposal any further since it assumes a minimalist framework prior to Chomsky (1995: ch. 4). Broccias (1996) tries to recast Fujita’s approach into the more recent minimalist framework, by appealing, as in Fujita’s original proposal, to the existence of two subject positions coupled with the hypothesis that accusative Case checking is covert. In section 3.1 I have shown how such an approach can explain (11a), repeated here as (29).

- (29) ? Each other’s pictures gave Bill and Mary a book.

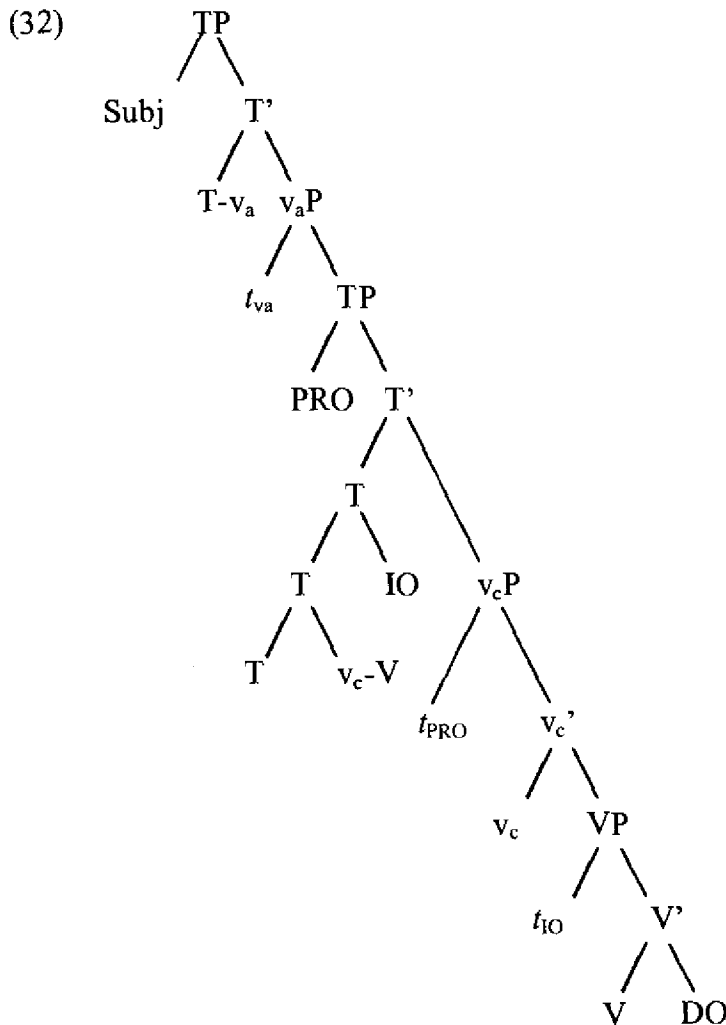
The NP *Bill and Mary* moves at LF to a position higher than the one into which the subject is merged, thus establishing a proper FF-SF binding relation between the anaphor and the subject. In order to explain (1) and (27b), repeated

²⁶ The syntactic approach is problematic also because *ham selv* is allowed in EBB cases (see example (15)). (15), on the other hand, seems to support the PRAB. If *ham selv* is used to corefer with objects, it naturally follows that it should be permitted in (15), on condition that, of course, we do not analyze the surface subject as an underlying object (see Ottoson 1991) or we make reference to S-structure. *Ham selv* is impossible in IBB cases (see (i), note 20) because of the PRAB: the version of (i) which conforms to TH would require *John* to precede *ham selv*. But in the case of a dative construction, the anaphor used by most speakers would be *seg selv*.

below as (30) and (31) respectively, we have to hypothesize that the object (direct or indirect) never c-commands the subject. We could propose a structure like (32) for (30) (from Broccias 1996):

(30) *Each other's friends gave Bill and Mary a book.

(31) John killed himself.



A similar configuration obtains for (1). I will not discuss (32) in detail. The important point here is that it is the lower TP which checks the relevant tense features associated with the verb and the accusative Case of the IO. The lower TP dominates the causative phrase projected by v_c , a causative light verb, but not v_aP , the agentive phrase projected by v_a , an agentive light verb. (32) also shows that the agentive subject is inserted into the higher subject position, from where

it can control a PRO subject in [Spec, v_c P]. It may be the case that the higher TP is not necessary and can be eliminated from (32), but I will not discuss this possibility.

Although this analysis motivates the contrast in (11) and explains the acceptability of (1), it does not seem to account for the following cases of EBB (from Pesetsky 1995):

- (33) a. ?These stories about herself made Bill hate Mary.
b. ?These pictures of herself made Bill angry at Mary.
c. *Each other's rocks hit John and Mary on the head.
d. *Articles about himself in *The Times* attacked John.

It is not clear how and why the intended antecedents in the above sentences should raise to a position which allows them to c-command the anaphor. As for (33c) and (33d) we could propose that verbs like *hit* and *attack* always project a v_a P by default despite the non-agentive character of their subjects. (33a) and (33b) could be explained if we adopt the 'move-all' mechanism outlined in the preceding section and accepts that accusative Case is checked overtly. This means that the two instances of *Mary* in (33a) and (33b) move at LF to the matrix T position, where they can c-command the trace of the matrix subject. This is so because in (33a) the embedded verb raises to the matrix verb to check its [-finite] feature. If we assume that head movement precedes complement movement, we conclude that *Mary* checks its accusative Case by adjoining to *hate* in the higher position considered before. The same line of reasoning applies to (33b), where *angry* raises to *made* at LF, then *at* adjoins to *angry*, and finally *Mary* adjoins to *at* in a position sufficiently higher to instantiate c-command between the R-expression and the anaphor. It seems plausible to propose, in fact, that an adjective like *angry*, when it takes a complement, must be sure, so to speak, that its complement is headed by the preposition *at* rather than, say, *to*. Clearly, in a minimalist framework such a checking operation, if we want to maintain a unified approach, must be of the same sort of the operation that is responsible for the checking of Case Features. In other words, categorial selection features are checked through either a spec-head relation (before Spell Out) or a head-to-head relation (at LF). A confirmation for such an approach comes from the existence in Dutch of sentences like (from Reinhart and Reuland 1993)²⁷:

²⁷ One could also point out that in "Norwegian, for instance, the formation of words like *bldgjøre* 'make glad', *vanskeligjøre* 'make difficult' is semi-productive; likewise for resultatives such as *hvitmale* 'white-paint'." (Hellan 1988:40). In a minimalist fra-

- (34) ... dat Max zichzelf Lucie hoorde critiseren.
that Max himself Lucie heard criticize

However attractive this approach might be, it seems not to be correct. The Norwegian data discussed in section 3.2 points at a difference between EBB and IBB. However, let us ignore Norwegian and concentrate on the English data. The analysis outlined in this section (based on the ‘move-all’ mechanism and covert accusative Case checking) incorrectly predicts that (25), repeated as (35) below, should be acceptable

- (35) *They seem to himself_i to like John_i

We can easily see that we arrive at contradictory requirements. Suppose we accept the ‘move-all’ hypothesis. To explain (33a) we must hypothesize covert accusative Case checking, while to explain (35) we must posit that accusative Case is checked overtly. Alternatively, we can reject the ‘move-all’ scenario, so that (34) is explained independently of the overt/covert nature of accusative Case checking. But such an option leaves us with no explanation for the quasi-acceptability of (33a) and (33b).

I think that the conclusion we can draw from our discussion so far is that EBB cannot be accounted for syntactically, but depends on some notion of logophoricity. The crucial requirements that guarantee the availability of EBB are the **inanimate** character of the subject²⁸ ((11a) vs. (11b)) and the use of a **psycholo-**

meword, one can relate the existence of such compounds to an overt vs. covert process of incorporation due to checking operations.

- ²⁸ Y. Huang (1995) notes that inanimacy also plays a role in Chinese. Although the examples quoted by Y. Huang refer to forward binding, they share with the examples considered above the possibility of coreference despite the lack of c-command between antecedent and anaphor and the use of psych-predicates. Consider the following examples (Huang’s (4.49) and (4.50); MM = modifier marker, BA = the *ba* marker in the *ba* construction, PFV = perfective aspect marker):

- (i) [Xiaming₁ de] mao₂ ba ziji xia le yi tiao.
Xiaming MM cat BA self frighten PFV one
‘‘Xiaming’s₁ cat₂ has frightened him₁/itself₂’’
- (ii) [[[Xiaoming₁ (de)] fuqin₂ de] turan qushi]₃ dui ziji daji hen zhong.
Xiaoming MM father MM sudden death to self strike a blow very heavily
‘‘Xiaoming’s₁ father₂ sudden death struck a heavily blow on him₁’’

Since animals are placed lower than persons on the animacy hierarchy (but can be interpreted as [+animate]), we have two possible readings for the anaphor *ziji*. On the other hand, the referent of *father* in (ii) is not a possible antecedent for *ziji* because the father in question is dead, and hence [-animate].

gical predicate ((33a-b) vs. (33c-d)). We must also conclude that the SSH is at best dubious. The contrast in (11), then, can be accounted for if we suppose that accusative Case is checked overtly. Consequently, the IO will never c-command the subject and the possibility of EBB will become a matter of pragmatic factors (i.e., **logophoricity**).

The plausibility of the 'move-all' hypothesis remains open to future research. We have already pointed out (section 3.2.2) that it may be needed to explain the contrast between (3) and (14a). Note also that if we accept the 'move-all' hypothesis, (33a) is admitted by syntax, and not simply by pragmatic considerations. A potential problem for the 'move-all' approach, however, is represented by (36):

- (36) a. I talked to the boys about themselves.
b. *I talked to themselves about the boys.

Since both POs are expected to raise to T at LF, each c-commands the SFs of the other. Consequently, no unique FF-SF relation can be established between the intended antecedent and the anaphor and we cannot explain why there is a contrast between the two sentences. On the other hand, a solution *à la* Kitahara (1997) explains (36) on the assumption that the PPs are projected in a Larsonian structure. But note that we seem to enter a vicious circle also in this case. In fact, we must be sure that minimalist syntax does not allow structures in which the *about*-phrase is generated as an adjunct in the pre-Larsonian sense. Otherwise, adopting the solution suggested by Kitahara, the anaphor adjoined to *about* in (36a) at LF would c-command the DP *the boys* adjoined to *to* always at LF, but not viceversa. This implies that (36a) should be ungrammatical, while (36b) shouldn't, which is contrary to the facts. But it seems to me that the only way to be sure that the PPs are projected in a Larsonian structure is to hypothesize that the heads of PPs in a Larsonian structure, but not those of PPs adjoined in the traditional way, raise to the verb at LF to check their 'compatibility' with the prepositions selected by the verb itself. Hence, we cannot explain (36).

It is worth noting that we need both kinds of adjuncts, **Larsonian** and **pre-Larsonian**, in minimalist syntax; otherwise, the following Norwegian contrast would remain mysterious (examples from Hellan 1988)

- (37) a. Vi fant Jon i sengen sin.
We found Jon in bed-the SE's
b. *Vi arresterte Jon i sin kjøkkenhave.
We arrested Jon in SE's kitchen-garden

(37a) is compatible with a Larsonian structure, while (37b) can be explained if we assume a pre-Larsonian structural configuration, where the PP is adjoined to T. We expect the contrast in (37) to disappear when the intended antecedent is

the subject and not the object. In this case, in fact, the surface position occupied by the subject is higher than both PPs and, since SFs are deleted in the landing site only at Spell-Out, SFs of the head of the subject chain c-command *sin*, satisfying Condition A of BT. This prediction is borne out: the passivized version of (37b) is perfect:

- (38) Jon ble arrestert i sin kjøkkenhave.
Jon was arrested i SE's kitchen-garden

The contrast in (37) supports the conclusion that a Pestkian approach to BT purely in terms of Cascade Structure, an elaboration of Larsonian ones, cannot be maintained. Furthermore, Pesetsky's approach relies on the analysis of sentences containing *each other* (see Pesetsky 1995:161). But in Norwegian, for example, the reciprocal seems to obey less strict conditions than 'ordinary' (i.e., non-reciprocal) anaphors (see Hellan 1988:79).

Returning to the contrast in (36), it seems that if we adopt the 'move-all' hypothesis, we can explain it only by invoking the PAS. The PAS seems to be a requirement on the linear order of antecedents and anaphors. The fact that (36b) is ungrammatical even in Italian (contrary to what happened in (8)) could be explained on the basis of the lack of 'unambiguous' FF-SF relations at LF between anaphor and antecedent, as already pointed out. It is also true that by relying too much on the PAS, the syntactic nature of binding vanishes, since forward binding would be regulated by the PAS, and BB, as we have already shown, must also resort to non-syntactic considerations (for an alternative approach to BT see Broccias (in preparation)). On the other hand, if we do not accept the 'move-all' hypothesis, we have to explain, among other things, the special status of (14a) and how categorial selection features are checked.

Before concluding this discussion, I would like to point out that however problematic the 'move-all' hypothesis might be, its conceptual necessity is grounded in the spirit of minimalist syntax. If minimalist syntax must do away with indeces (see Soloyev 1997), we expect binding theory to be regulated 1) by c-command (A can bind B if A c-commands B (see note 1)), which establishes potential binding relations, and 2) by some checking operation that ensures the compatibility of A's features with B's features. But this is possible only if A and B enter a spec-head or head-head relation, in conformity with the idea behind the 'move-all' scenario²⁹.

²⁹ As pointed out to me by Luigi Rizzi (personal communication), the checking operation, if applicable, should of course regard only Principle A of BT.

4. Conclusions

I have shown that if we want to account for binding facts syntactically we must hypothesize that verbal accusative Case is checked overtly, while prepositional accusative Case is checked covertly. If we do not accept the 'move-all' hypothesis, no other particular assumption (i.e., the SSH and the PAS) is needed for forward binding cases (see the discussion of (36)). On the other hand, BB is a much more complex phenomenon. First, we need to distinguish between IBB and EBB. The former is regulated either by a covert reanalysis process or by a paradigmatic rule. The latter can be explained only by invoking pragmatic considerations (i.e., inanimacy and psychological predication) and not the SSH. I have also shown that the PAS is needed to account for interlinguistic variation as far as IBB is concerned. Finally, we have examined the plausibility of the 'move-all' hypothesis and we have concluded that its status is far from clear. While it is indisputable that minimalist syntax projects both Layered (i.e., pre-Larsonian) and Larsonian structures, it is not clear whether they must be coupled with the 'move-all' hypothesis. If we accept that they must, the role of the PAS become crucial also in the cases of forward binding; otherwise, forward binding can be dealt with syntactically, but the contrast between (3) and (14a), among other things, remains unexplained.

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