

The Distributional Difference of Anaphors and the ECP Effects

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I. Introduction

According to Chomsky (1981) and a number of theorists, the binding theory would predict that reflexives and reciprocals should have identical distribution, since both are lexical anaphors. However, asymmetries in the distribution of these elements do in fact exist as shown in the following examples.

- (1) a. John and Mary like each other's parents.
b. *John likes himself's parents.

In (1a) reciprocals can appear in an NP subject position and be bound to their antecedents; in (1b) reflexives can not. We see here that reflexives and reciprocals do not always function identically, and therefore the distributional difference between them can't be explained by a syntactic principle like condition (A) of the binding theory¹. What is the most desirable, then, is that these asymmetries will be accounted for by the application of independently established principles in the grammar. In other words, if the differences in their distribution can be solved by other principles in the grammar, these cases will not be problematic for the Government-Binding theory.

Lebeaux (1983) proposes that two independent principles account for the distribution of anaphors in the following way.

- (2) a. Reciprocals are subject to the binding theory.
b. Reflexives (i) are subject to binding theory.
(ii) must be properly governed.²

Lebeaux, however, does not give any persuasive explanation for why reflexives must require proper government, whereas reciprocals do not. He only shows the descriptive characterization that separates the distribution of

reciprocals from that of reflexives through the chosen data.

In this paper, I will argue that the distributional difference between reciprocals and reflexives can be accounted for by the ECP applying at the level of logical form (LF), irrespective of the binding theory, basically following Lebeau's proposal. Furthermore, I will develop his suggestion, and will attempt to give an explanatory answer for why only reflexives, not reciprocals, must needs to be subject to the ECP at LF. That is, I will propose that the reciprocal is not affected by the ECP, since the trace left by each-movement at LF is a kind of quantifier-trace, which is not a part of θ -chain, and therefore the ECP does not apply to this trace that occupies an \bar{A} -position.

II. Distributional Differences between Reciprocals and Reflexives

1. The Definition of Anaphors

I will begin with defining the anaphors. An anaphor is very generally defined as an NP which can have no independent reference, but rather which takes its reference from some other expression in the sentence, its antecedent. There are two kinds of lexical anaphors in English. *Each other* is a reciprocal anaphor in English.

(3) John and Mary like each other.

In (3) *each other* takes its reference from its antecedent *John and Mary*. A second class of anaphors in English are reflexive anaphors. These are *self*-forms (*myself, ourselves...*, etc.).

(4) John cut himself.

In (4) *himself* can be interpreted as having *John* as its antecedent.

However, the morphological definition of anaphors taken by Chomsky(1981) and other grammarians has some empirical problems. To see it, let us consider the following example.

(5) They saw snakes near them/*themselves/ each other.

According to the definition of anaphors on a strict morphological basis, we expect that all types of morphological anaphors should behave identically, since they belong to a unique syntactic class. But this is not the case, as we see in (5). In the above sentence we can not tell why *themselves* is not permissible, whereas *each other* is. So Bouchard (1984) proposes that

the syntactic category anaphor is not to be defined on a strict morphological basis, but rather on the basis of a specific type of structural relation with an antecedent. In other words, the type anaphor should be functionally determined by the specific relation that such an element holds with its antecedent. In this paper, I will accept this way of dealing with anaphors on a functional basis rather than a morphological basis. So I will argue that the relation between an anaphoric reflexive and its antecedent and the relation between a reciprocal and its antecedent is not the same. That is, *each other* is related to its antecedent in some other way, possibly by each-movement at LF as suggested in Bouchard (1984).

2. The Structural Positions of Anaphors

Let us now consider the structural positions where lexical anaphors can occur. These are object of a verb, object of a preposition, some subject positions, and Exceptional Case Marking (ECM) constructions³. This is because these are the only positions where Case assignment is possible, and the requirement of Case for lexical NPs to escape Case Filter excludes all other positions.

Anyway, either reciprocals or reflexives appear in the structural positions of the anaphors, and these core cases of anaphoric binding are illustrated in (6).

- (6) a. They like themselves/ each other
- b. men's destruction of themselves/ each other
- c. They spoke to themselves/ each other
- d. They believe themselves/ each other to be quite wonderful

If we assume, for present purposes, the LF movement of anaphors to see if the application of the ECP is possible, whose evidence will be examined later, we can observe that in each of these cases the anaphor is in a position of proper government. In (6a), (6c), and (6d) the anaphor is properly governed by the verb; in (6b) it is properly governed by the head noun, 'destruction'. Especially in (6c), the preposition 'of' is reanalysed with the verb, and so the anaphor is properly governed by the verb, 'spoke to'.

Now consider the subject position in infinitives.

- (7) a. They want for each other/?themselves to meet
- b. They brought some friends for each other/??themselves to meet
- c. They would be happy for?each other/*themselves to win

In these sentences with *for* subjects in infinitives we see an interesting con-

trast, the reciprocals being considerably better than the reflexives. The binding theory itself can not explain the contrast since it would predict that all of these sentences are good with respect to the binding principle(A). According to Lebeaux's(1983) observation, the difference between these sentences and those in (6) is that the anaphor is not in a position of proper government here, while it is in (6). It is interesting to note that there is no constraint against reflexives appearing in subject position in (6d), while examples like(7) show that reflexives, but not reciprocals, are odd in positions that are not properly-governed.⁴

This time, let us turn our eyes to the tensed sentences. Though we already know that the subject of a tensed clause is not the appropriate position for the anaphor because of the NIC effect⁵, there is a quite considerable contrast between reflexives and reciprocals. Observe the following examples.

- (8) a. They think that ??each other/*themselves will come
 b. They wondered if ?each other/*themselves would win
 c. They didn't know what each other/*themselves had done

In each of these cases, the reciprocal is marginally bad, but the reflexive is impossible. Here we notice that the subject of the tensed clause is not a position of proper government. Hence, reciprocals may appear in not-properly governed positions, while reflexives can't.

The last position we have to consider is the subject NP positions.

- (9) a. They like each other's/*themselves' parents
 b. They like those pictures of each other's/*themselves' friends

In (9) the anaphor, since it is not the complement of the head noun, is not properly governed though it is governed by the lexical NP.⁶

From the above examples we see that the three positions in which there is no proper government—subject of tensed clauses, subject of a *for-to* clause, and subject of an NP—are also positions in which reflexives can not appear. Therefore, we may conclude that there must be an independent principle other than the binding theory, accounting for the distribution of anaphors: reflexives must be subject to the ECP, while reciprocals are not so sensitive to the ECP.

III. The ECP Effects at LF on Lexical Anaphors

1. The ECP and Reflexives

So far, we have seen that there is a contrast in the behavior of reciprocals

and reflexives, and so only reflexives are very sensitive to the proper government. Part III attempts to identify them. Since our grammar already has an independent principle that requires proper government of certain elements (i. e., the ECP), we can give a direct explanation for the restriction on the occurrence of reflexives. In other words, the restriction on their appearance would simply follow from the ECP applying at LF, with no further stipulation.

By the way, for the ECP to be applied to the sentences containing the overt anaphors like *self*-phrases, we have to, at least, assume the LF movement of anaphors, since the construction not containing empty categories is not accessible to the ECP at all. With respect to the application of the ECP, any empty category must appear somewhere at LF representation of the construction. If we assume that there is the LF movement of elements like *each other* or *self*-phrases, then we have to find some evidences for it.

It is assumed in Chomsky (1985) that in English anaphors in fact undergo LF-movement to the INFL position leaving a trace. An evidence supporting this LF-movement of anaphora comes from the observation that the binder of anaphora, (i. e., the antecedent), is subject-oriented⁷ in unmarked case, as illustrated in (10).

(10) they_i told us_j that [[pictures of each other_i] would be on sale.]

Here, the binder of *each other* must be *they*, not *us*, as the sense makes clear. Besides this, the fact that in deverbal nominals in English the reflexive can appear in precisely INFL position might be another evidence for it, as is shown in the examples below, which come from Lebeaux (1983).

- (11) a. John's self-destruction
 b. John's self-removal from the race
 c. John's self-satisfaction

Let us now consider the following examples, under the assumption that these evidences support and justify the suggestion that anaphora undergo LF-movement to the INFL position.

- (12) a. *John_i didn't know what himself_i had done
 (at LF: *John_i didn't (self-) know what t_i had done.)
 b. *John_i bought some books for himself_i to look at
 (at LF: *John_i (self-) bought some books for t_i to look at.)
 c. *John_i likes himself_i's mother
 (at LF: *John_i (self-) likes t_i's mother.)

In the examples above, the derived LF representations, as we expect, violate the ECP, since traces left by the movement of *self*-phrases are not properly governed. The fact that the three positions in which there is no proper government—subject of tensed clauses, subject of a *for-to* clause, and subject of an NP—are also positions in which reflexives can not appear would thus be traced to an independent principle in the grammar, namely, the ECP. Therefore, we would probably give the crucial explanatory value to our observation that reflexives seem to require proper government.

2. The ECP and Reciprocals

Now, let us consider the LF movement of reciprocals. We can think of three possibilities with respect to the LF movement of reciprocals. The first method is that following Chomsky's (1985), we might be able to move *each other* itself to the INFL position leaving a trace at the level of LF. The examples illustrated earlier are cited again in the below.

- (13) a. They like each other
(at LF: They_i (each other-) like t_i)
- (14) a. ?They didn't know what each other had done
(at LF: They_i didn't (each other-) know what t_i had done.)
b. They want for each other to meet
(at LF: They_i (each other-) want for t_i to meet.)
c. They like each other's parents
(at LF: They_i (each other-) like t_i's parents.)

In (13a) the derived LF representation obeys the ECP since *t* is properly governed by the lexical head, 'like'; in (14a-c) the ECP is violated since the traces, respectively, are not properly governed by the lexical head or the antecedent. With this assumption that *each other* itself is moved to the INFL position at LF, we can see that sometimes reciprocals observe the ECP, and sometimes they don't. Therefore it seems that with respect to the reciprocals there is no sensitivity to proper government, namely, the ECP.

There are, however, some conceptual problems in this way of LF-movement. If we assume the LF movement of anaphors for them to be correctly interpreted at a relevant interpretation level, we expect that the ECP applying at LF should hold with all the anaphors, whether they are reflexives or reciprocals. Moreover, notice that the LF representation after the movement of *self*-phrases is just the same as that after the movement of *each other*. Here a suspicion arises. Why does the ECP affect the distribu-

tion of one element (i. e., the reflexive), but not the other (i. e., the reciprocal)? Therefore, the way of moving *each other* itself to the INFL position at LF seems to be undesirable.

In addition to this conceptual problem, the structural analysis of moving *each other* itself to the INFL position at LF does not jibe well with our general intuition. Let us consider the following example.

(15) The boys like each other.

In Chomsky (1973), he suggests (16) as the deep structure of the sentence (15).

(16) The boys each like the other.

I think this analysis fits well into our intuitive interpretation of the reciprocal. Our intuitive interpretation of this sentence would be that *each* boy picks out one individual from among the set of boys while *the other* boy picks out an individual distinct from the one picked out by *each*. Therefore it is interesting to note that at the relevant interpretive level *the other* has its own independent interpretive content, unlike the reflexive whose identity is totally dependent on its antecedent.⁸

Then, let's turn our eyes to another possible way to explain the LF movement of reciprocals. Along the lines of an analysis by A. Belletti (1982), we will assume that some elements of a reciprocal, namely, *each*, must be moved to the INFL position for the reciprocal to be properly interpreted at LF. Before falling into the discussion, let us first consider the LF movement of reciprocals in Italian analysed by Belletti, which also gives us the strong support for the each-movement at LF in the English reciprocal constructions.

Reciprocals in Italian are expressed either by the clitic form *si*, or by the discontinuous expression *l'uno...l'altro* 'the one...the other.' With respect to the latter case, i.e. the non-clitic form, Belletti (1982) argued two important points. One is that *l'uno* and *l'altro* form a 'discontinuous sequence.' Consider the following examples.

- (17) a. I miei amici parlano l'uno dell'altro
My friends speak one-of-the-other
b. Quei ragazzi scrivono l'uno all'altro con regolarità
those boys write one-to-the-other regularly
c. Solo quella volta hanno criticato l'uno le idee dell'altro
only that time they criticized one-the-ideas-of-the other

In (17), *l'uno* and *l'altro*, the two members of the discontinuous

reciprocal expression, are always separated by a preposition or by an NP. Furthermore, according to her, *l'uno...l'altro* form a discontinuous sequence such that *l'uno*, filling an \bar{A} -position, functions as the binder of *l'altro* which is in an A-position.⁹

As a second point, she insists that the anaphoric status of the whole construction is in fact a function of a process applying in LF which associates *l'uno* with a c-commanding plural NP. After the application of this rule, an empty category is left in the position originally filled by *l'uno*; the distribution of this empty category is constrained by the ECP. To see it, consider the sentence in the below.

- (18) *I miei amici pensavano [che [_s [_{NP} l'uno [_{NP} le foto dell'altro]] saranno pubblicate sal giornale]

the sentence like (18) is not well-formed in Italian. If we assume *l'uno* is moved to the antecedent at LF leaving a trace, the ungrammaticalness of this sentence can be well accounted for. Consider the LF representation of (18) after the LF-movement has taken place like the following.

- (19) at LF: [_{NP_i} l'uno_i [_{NP_i} i miei amici]] pensavano [_s che [_s [_{NP} e_i] [_{NP} le foto dell'altro_i]]...]

In (19) the empty category is left ungoverned and consequently a violation of the ECP is produced, just like the so-called 'that-trace' effect.¹⁰

Another evidence supporting each-movement at LF would come from Dougherty's (1970) work on the reciprocal construction. Let us make a brief consideration on Dougherty's study on *each other*, since it is of special relevance in justifying our assumption of each-movement. First, according to Dougherty, *each* is treated as a distributive quantifier, which has co-occurrence restrictions with the coordinate conjunctions.

- (20) John and Bill each will go.

- (21) *John or Bill each will go.

Second, the quantifier *each* undergoes two optional transformational rules: Quantifier Postposition Transformation and Quantifier Movement Transformation.

- (22) a. Each of the men will drink a beer. → QPT
b. The men each will drink a beer.

- (23) a. The men each will drink a beer. → QMT
 b. The men will each drink a beer.

Third, if the Phrase Structure Rule schema introduces *each* on the antecedent of a complement expression, which is interpreted as indicating a non-identical reference with its antecedent, the result is a construction with a reciprocal interpretation.

- (24) a. Each of the men would die for the others
 b. The men each would die for the others
 c. The men would each die for the others
 d. The men would die for each other

Fourth, in formulating the grammar of the reciprocal pronoun *each other*, he argues that the element *each other* is not introduced as a single constituent in the deep structure phrase marker; it is a transformationally derived form through each-movement.

- (25) a. The man and the woman each will speak to the other (deep-str.)
 b. The man and the woman will each speak to the other
 c. The man and the woman will speak to each other

In summary, the fact that *each* is regarded as a quantifier and the reciprocal pronoun *each other* is not a single constituent in the deep structure but is formed by the each-movement transformation would make our assumption of each-movement at LF justified.

Now again, turning to the English reciprocal constructions, let us reconsider the following examples illustrated earlier.

- (26) a. They like each other
 (at LF: They (each_i-) like [_i other])
 b. They want for each other to meet
 (at LF: They (each_i-) want for [_i other] to meet)
 c. They didn't know what each other had done
 (at LF: They didn't (each_i-) know what [_i other] had done)
 d. They like each other's parents
 (at LF: They (each_i-) like [_i other's] parents)

If we assume that some elements of a reciprocal must be moved to INFL position by a LF-rule of each-movement, following the analysis of Belletti, an empty category is left once the movement has taken place. It is then natural to assume that such an empty category should be subject to the

principle holding at LF which constrains the distribution of empty categories, i.e. the ECP. In other words, what we expect is that all anaphors, whether they are reflexives or reciprocals, must be subject to the ECP. Following this logic, all the traces which appear in each LF-representation of the above sentences must be properly governed for these sentences to be grammatical.

But a problem occurs in this argument on the consequence of each-movement of the reciprocals. Compare the following examples.

- (27) a. *Whose_i does Tom like [_{NP} t_i [_N [_N mother?]]]
 b. They like each other's parents
 c. They (each_i-) like [_{NP} t_i[_N[_N other's]]] parents
 d. The husband and wife each would like *the* other

(27c) is the LF representation of (27b), from LF-movement of *each* to INFL. (27a) will be ruled out by the head-complement requirement of the lexical proper government of the ECP. (27c) should be also ruled out by the ECP in the same way, since *t* in (27c) is regarded as a 'specifier' of the head of NP, not a complement of the head noun, as we can analogize this fact from (27d). In (27d), italicized *the* is regarded as a specifier. This, however, proves to be a wrong prediction, as shown in (26a-d). The sentences in (26a-d) are all grammatical though the ECP is violated. Therefore, we can not insist that the traces left by each-movement at LF are properly governed by 'other', since these traces can never be regarded as something like the complement of the head noun.

Now it is time to make an attempt to solve this problem from rather a different angle, basically relying on Safir's (1985) definition of the ECP. His definition of 'proper government' differs little from Chomsky's original formulation except for adding the fact that the ECP only applies to members of θ -chain.¹¹ As we all know, the ECP proposed by Chomsky (1981) applies empty categories other than PRO at LF, and prepositions do not count as proper governors unless they are reanalysed with verbs.

However, Safir notices that there are contexts where the ECP appears not to apply. Consider the following example.

- (28) a. At what time did Mary say that John murdered Bill?
 b. [_{COMP} at what time_i] [_S did Mary say [_S [_{COMP} e_i that] [_S John [_{VP}...]
 [_{PP} e_i]]]]

(28a) has two interpretations, one where the question concerns the time of the murder, and one where it concerns the time of Mary's statement. If we confine our concern to the narrow scope reading (the time of the murder), (28b) is the LF representation of the narrow scope reading. In (28b), the

PP trace is not properly governed since the trace in Comp is not a proper governor. Thus, the narrow scope reading ought to be impossible because of the ECP violation, and yet clearly it is not.

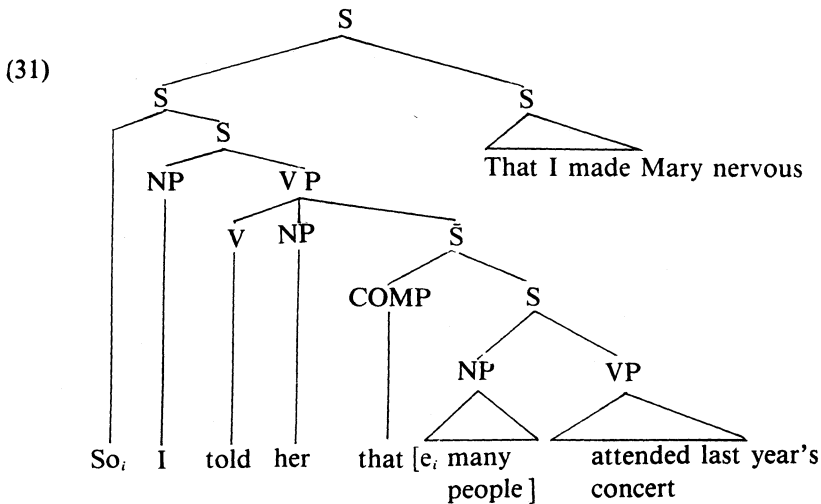
Safir (1985) makes the following proposal to solve this problem.

(29) The ECP only applies to members of θ -chain .

In other words, he overcomes this problem by restricting the ECP domain of application to the members of θ -chains at LF-structure. According to him, the S-daughter position of the adverbial PP is an adjunct position (i.e., not a θ -position), as no verb selects for a time adverbial. If the adverbial S-daughter position is never a θ -position, then it is never an A-position. It then follows that if the adverbial PP is not in an A-position, then it can not be in a θ -chain, and therefore the ECP does not apply to it. Any element outside the θ -chain (here the trace of the adverbial PP) is exempted from the ECP. Another example unaffected by the ECP is the *so*-extraction phenomenon by QR.¹² Consider the following example.

(30) I told her that so many people attended last year's concert that I made Mary nervous.

According to Gueron and May's idea, the distribution of extraposition from NP or QP depends on the well-formedness of their LF-structure representations. At LF-structure, the NP or QP head must c-command its complement. In order for (30) to be well-formed at LF, Gueron and May argue, the head of the extraposed clause (in this case, a result clause) must undergo QR, which then adjoins the head to S, where it c-commands the clause which must be in its scope. The LF-structure of (30) is (31).



However, in (31) this sort of movement of *so* ought to be excluded by the ECP, since it involves extraction from an ungoverned position. That is, (31) violates the ECP, and yet the surface structure of (31) is clearly well-formed. Here we can also solve the problem using the revised ECP proposed by Safir. The essential idea is that since *so* is not an NP, it is not in a θ -chain, and therefore the ECP does not apply to it. Compare (31) with the following LF-structure.

(32)*So many people, did I tell her that e, attended last year's concert that I made Mary nervous.

Notice that the *that-e* effect holds when the whole NP is extracted, but if only the QP *so* is extracted by QR, the ECP does not apply because a QP is not part of a θ -chain. In other words, the full NP-trace in a θ -position is excluded by the ECP, whereas the QP trace, which is not part of a θ -chain, is unaffected by the ECP.

Now turning to the reciprocal construction, which is our main concern, let us suppose that the trace left by each-movement at LF is a QP Trace, and therefore the position that is occupied by the QP trace is not an A-position. It is then natural that the QP trace can not be a member of θ -chain, and therefore the ECP does not apply to it. I think this line of reasoning jibes well with Chomsky's originally formulated ECP, which confines itself only to the traces occupying A-positions. In conclusion, If we accept Safir's argument on the ECP and regard *each* as a kind of quantifier that undergoes each-movement at LF following Dougherty, the reason why the ECP must hold with the reflexives, but not with the reciprocals, might be plausibly well accounted for.

IV. Conclusion

So far, I have argued that the distributional difference between reciprocals and reflexives can be accounted for by the ECP applying at LF, which affects the distribution of the reflexives, but not the reciprocals. For the ECP to be applied to the sentences containing lexical anaphors, it was assumed that anaphors undergo LF-movement to the INFL position leaving a trace. Some evidences supporting and justifying this LF-movement of anaphors were fully discussed.

For the reason why reflexives must be bound to the ECP, whereas reciprocals do not, I insisted the reciprocal is not relevant with the ECP, since the trace left by each-movement at LF is a QP trace which occupies an \bar{A} -position, and therefore it is not affected by the ECP applied only to members of a θ -chain, relying on Safir's revised definition of the ECP.

Notes

1. The principle for anaphors (condition(A) of binding theory of Chomsky (1981)), relevant for our discussion, is stated as follows:

A: an anaphor α is bound in its governing category.

In Chomsky's *LGB* governing category is defined as follows: Governing Category; α is a governing category for β iff α is the minimal category containing β , a governor for β and a subject accessible to β .

2. ECP: an empty category must be properly governed.

As is known, proper government, in Chomsky's formulation of the ECP, means either government by a lexical head or government by a coindexed category. In what follows I will utilize only the first part of the principle, i.e. the requirement of government by a lexical head, the second one being irrelevant to our discussion. Especially, I will confine the lexical proper government to the head-complement relation, and prepositions will not be regarded as a lexical head.

3. Exceptional Case Marking verbs are referred to the verbs with \bar{S} -deletion, such as *believe, seem, consider, expect, likely, ...* etc., so that Case is assigned over the S boundary and the trace is governed.

4. For the ECP to be applied to a sentence containing an overt anaphor like *each other*, at least, any empty category must appear somewhere at LF representation. That is, we have to assume the LF movement of anaphors.

5. In OB-framework, the binding theory characterizes two domains as opaque in the sense that an anaphor can not be free in these domains and a pronoun is disjoint in reference from an "antecedent" within them. The two opaque domains are: (1) the subject of a tensed sentence (the Nominative Island Condition: NIC); (2) the c-command domain of the subject of an NP or S (SSC).

6. Chomsky (1981) has a different perspective. In *LGB*, it has been suggested that pronoun that occurs in prenominal position is actually an anaphor taking the suppletive form of a pronoun. Reflexives are not possible in such positions because genitive Case might be incompatible with reflexive morphology.

7. The governing category of the sentence (10) in view of the definition with "accessible SUBJECT" is the whole sentence. Therefore, the possi-

ble antecedent of *each other* is *they* or *we* of *us*. But *they*, rather than *we*, is preferred to be an antecedent of *each other*, a subject-oriented phenomenon. This phenomenon can be found in English only in the case of 'long-distance binding'.

8. In LGB, Chomsky also interpretes the sentence containing *each other* like the following.

(i) The men like each other.

(ii) at LF: for each x , x one of the men; x likes $\bar{x}(x \neq \bar{x})$

9. Belletti assumes that *l'uno...l'altro* are coindexed and that they form a chain of the following type: (A) $(\alpha_1 \dots \alpha_2)$, where: a. $\alpha_1 = l'uno$ b. $\alpha_2 = l'altro$. It follows from the general definition of the notion of Chain introduced in Chomsky's LGB that *l'uno* is the 'local binder' of *l'altro* in (A).

10. It was adapted in Chomsky and Lasnik (1977). Informally, 'No that-clause can have an empty NP subject.' The ECP was born, to explain this phenomenon.

11. θ -chain: A θ -chain is the maximal set of A-position (A_1, A_2, \dots, A_n) such that (a) for all A_m , where m is greater than 1, A_m is bound by every A_x , where x is less than m and, (b) A_n and only A_n is a θ -position.

12. In May(1977), in order for the quantifiers to be well interpreted, a movement rule called Quantifier Raising which works at LF is proposed. This rule limits the adjunction site of the QR only to S-node, any other possible sites excluded.

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