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ON THE LOGICAL NATURE OF THE BINDING PRINCIPLES:
QUANTIFIER LOWERING, DOUBLE RAISINGS OF "THERE"
AND THE NOTION EMPTY ELEMENT

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1. Presentation*

This paper is concerned with the behavior of a particular instance of "Move α " in Logical Form (LF): lowering. Consider the following sentences:

- i. a) there seems to be someone in the room
- b) ?*there seems to be likely to be someone in the room

As indicated by P. Postal, sentence (ib) where there has been moved twice contrasts with sentence (ia) which is grammatical. Similarly, consider:

- i. c) some politician is likely to address John's
 constituency
- d) some politician seems to be likely to address
 John's constituency

As indicated in May (1977), sentence (ic) is ambiguous. The quantifier may be understood as having either wider or narrower scope than the matrix predicate. In sentence (id), however, the narrower scope reading is not available.

Clearly, the contrast illustrated in (ic-d) is parallel to

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the one considered in (ia-b). To account for these contrasts, it will be suggested that:

- there exists in LF a process of lowering applying to quantifiers and to some pleonastic elements such as there
- chains constitute the domain in which lowering applies: the antecedent of a trace may be lowered to the position occupied by the trace, but the controller of PRO may not be lowered to the position occupied by PRO

ii. a) $NP_i \text{ AGR } V[_S e_i V \dots]$

Lowering \rightarrow

b) $e \text{ AGR } V[_S NP V \dots]$

Note that the empty element left in the position from which lowering applies (e in (ii-b)) will be free; thus, violating the binding principles which require this empty element to be locally bound. Derivations such as (ii), however, are saved by a process inserting in LF a non-referential pronominal:

ii. c) $PRO \text{ AGR } V[_S NP V \dots]$.

This insertion process is limited to case-governed contexts and it follows that an element which has been moved twice in syntax will not be lowered in LF to its base-generated position (e_2 in (iii-a)):

iii. a) $NP \text{ AGR } V[_S e_1 V[_S e_2 V \dots]]$

Lowering and PRO insertion \rightarrow

b) * $PRO \text{ AGR } V[_S e_1 V[_S NP V \dots]]$

The reason is that the intermediate empty element (e_1 in (iii-b)) will be left free; thus violating the binding theory. This analysis accounts for the ungrammaticality of doubly raised there and for the ambiguity of sentence (ic) where the quantifier NP may have a wide or a narrow scope reading versus the non-ambiguity of (id). Note that evidence for the LF character of the binding theory would have been provided since the output of the LF-Lowering process is constrained by this theory.

The analysis presented so far raises a number of questions concerning the insertion of a non-referential PRO in case-governed contexts; since it occurs in a governed context, how come the output of PRO insertion is not filtered out by the binding theory which requires PRO to be ungoverned (cf. Chomsky [1981]? What is the status of the insertion rule?...

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With respect to the insertion of PRO in case-governed contexts, it will be argued that pronominals are always generated as a set of features (α person, β number, γ gender) and that they get phonetically realized in PF when they have Case. In other words, pronominal elements are distinguished by the feature (\pm Case); if a pronominal has Case, it is interpreted as a pronoun (he, she, it); otherwise it is interpreted as PRO. Only non-case-marked pronominals, i.e., PROs - have to be ungoverned. As a consequence of this proposal, it will be argued that there is no type distinction between phonetically realized pronouns and the empty categories (PROs, wh-traces, NP-traces): pronouns are just a difference occurrence of the empty category identified as such in terms of properties of the structure in which they appear.

Finally, with respect to the process of pronominal insertion applying in LF, it will appear that it can be eliminated in favor of more interpretive principles. As such, the restriction of insertion to case-governed contexts will be derived from the grammatical principles (such as the binding principles at work in the grammar).

2. Lowering of "there"

In Dresher and Hornstein (1979), the observation that there can only be moved twice is attributed to P. Postal:¹

1. a) there seems to be someone in the room
- b) ?*there seems to be likely to be someone in the room

(1b) where there has been raised twice contrasts with (1a) which is grammatical.

1. a) [_{s₁} there₁ seems [_{s₂} e₂ to be someone in the room]]
- b) [_{s₁} there₁ seems [_{s₂} e₂ to be likely [_{s₃} e₃ to be someone in the room]]]

(where e is the trace left by the extraction rule).

Following Chomsky (1981) (henceforth P.L.), we will assume that there is coindexed (co-superscripted) with the post-verbal subject:²

2. there^P is someone^P in the room.

To account for the contrast between (1a) and (1b), the following assumptions will be made:

3. a) In Logical Form (LF), there is lowered to the minimal clause (S) containing the element with which it is co-superscripted.

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- b) In raising constructions, there is a process inserting a dummy non-referential PRO in nominative contexts (or more generally in case-governed contexts. We will return to the exact formulation later on.).

(a non-referential PRO is the non-phonetically realized counterpart of the non-referential it: "it seems that Peter likes John").

Given assumptions (3a-b), the contrast between (1a) and (1b) will be accounted for by the binding principles which require:

- an anaphor (such as reciprocals, reflexives, NP-traces) to be "locally" bound (principle A).
- a pronominal to be "locally" free (principle B). (α is bound by β iff α is c-commanded by β and coindexed with β , cf. P.L. for a precise formulation of the binding principles).

Consider (1b): first there is lowered.

4. a) [_{S₁} [_{S₁} e₁ seems [_{S₂} to be likely [_{S₃} there₃ to be someone in the room]]]]]

Then the dummy element will be inserted:

4. b) [_{S₁} [_{S₁} PRO₁ seems [_{S₂} e₂ to be likely [_{S₃} there₃ to be someone in the room]]]]]

It is possible to think of lowering as undoing the effect of Move α . With this in mind, consider a representation such as (1b). In (1b), there, e₁ and e₂ are coindexed by Move α . In (4a) which is generated from (1b) by lowering, e₁, e₂ and there will not be coindexed if lowering undoes the effect of Move α . In other words, e₁ in (4a) (or for that matter PRO which is inserted in the position of e₁ of 4b) will not count as the antecedent of the trace e₂. Derivation (4a-b) will be ruled out by the binding principles: the clause in which the anaphoric element e₂ must be bound is \bar{s}_1 . In this clause e₂ is free; the derivation will be ruled out by the binding theory.³

For (1a), the binding theory is irrelevant: after the lowering of there and the insertion of the dummy element (1a)

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will have the following representation:

5. $[_{\bar{s}_1} [_{s_1} \text{PRO}_1 \text{ seems } [_{s_2} \text{there}_2 \text{ to be someone}$
in the room]]].

3. Quantifier Lowering

The analysis suggested to account for the ungrammaticality of doubly raised "there" may be extended to account for some cases of Quantifier Lowering. Consider the following sentence discussed in May (1977):

6. Some politician is likely to address John's constituency.

May argues that this sentence is ambiguous: the quantifier may be understood as having either wider or narrower scope than the matrix predicate. (6) may be taken as asserting either (a) that there is a politician, e.g. Rockefeller, who is likely to address John's constituency, or (b) that it is likely that there is some politician (or other) who will address John's constituency:

6. a) there is a politician S, such that it is likely
that S addresses John's constituency.
b) it is likely that that there is a politician S,
such that S addresses John's constituency.

May offers an explanation of these judgments in terms of his rule of quantifier movement which, he suggests, can "lower" the quantifier. It is thus possible to derive two logical forms from the S-structure of (6); one by adjoining the quantified noun phrase "some politician" to the matrix S, the other by lowering and adjoining it to the embedded S.

7. a) $[_{\bar{s}} [_{s_1} \text{some politician } [_{s_1} e_1 \text{ is likely } [_{s_2} e_2 \text{ to}$
address John's constituency]]]]
b) $[_{\bar{s}} [_{s_1} e_1 \text{ is likely } [_{s_2} \text{some politician } [_{s_2} e_2 \text{ to}$
address John's constituency]]]]

Consider, now, the following sentence where the quantified NP has been raised twice in syntax:

8. Some politician seems to be likely to address
John's constituency.

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As has been noticed, (8) is not ambiguous: it may be taken as asserting (a) that there is a politician, e.g. Rockefeller who seems to be likely to address John's constituency, but not (b) that it seems to be likely that there is some politician (or other) who will address John's constituency (the judgments are those of N. Chomsky, J. Higginbotham and J.-R. Vergnaud in the corresponding French examples):

8. a) there is a politician S that it seems to be likely that S addresses John's constituency
 b) *it seems to be likely that there is a politician S such that S addresses John's constituency

Clearly, the paradigm considered in (6-g) is parallel to the one considered in (1a-b). The analysis suggested for the latter cases may be extended to the former as well (cf. 3).

9. a) In LF, a quantifier may be lowered.
 b) In raising constructions, there is a process inserting a dummy non-referential PRO in nominative contexts.
 (We will return to the formulation of 9 later on).

Given assumptions (9a-b), the non ambiguity of (8) may be accounted for by the binding theory. Consider the representation of the two possible readings⁴ of (8): (10a-b) corresponds to (8a-b) respectively:

10. a) [_{s_1} some politician [_{s_1} e_1 seems [_{s_2} e_2 to be likely [_{s_3} e_3 to address John's constituency]]]]]
 b) [_{s_1} PRO₁ seems [_{s_2} e_2 to be likely [_{s_3} e_3 to address John's constituency]]]]]

In (10b), the quantifier has been lowered and adjoined to the embedded s_3 by the two processes of Quantifier Lowering (cf. 9a) and Quantifier Raising (cf. May 1977) and a dummy PRO has been inserted in the subject position of s_1 (cf. 9b).⁵ In (10a-b), the clause in which e_2 must be bound is the matrix clause. In this clause, e_2 is free in (10b) but bound by e_1 in (10a). Consequently, (10b) but not (10a) will be ruled out by the binding theory.

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In (7a-b), however, no violation of the binding principles occur: in (7b), the dummy PRO will be inserted in e_1 according to (9b). In (7a), e_2 will be bound by e_1 and e_1 will be bound by some politician; and in (7b), e_2 will be bound by some politician.

In short, the non-ambiguity of (8) versus the ambiguity of (6) is accounted for by the binding theory: while the structures corresponding to the two readings of (6) do not violate any grammatical principle, the narrow scope reading of (8) (cf. 8b) violates the binding theory. Note, finally, that if correct, the analysis of there in the previous section and that of the lowered quantifier provide evidence for the LF character of the binding theory since in both cases this theory applies at the output of LF rules.

4. Some general considerations concerning lowering.

It is clear that the analysis of the doubly raised there and of quantifier lowering raises many questions. It is legitimate to ask when lowering is possible, when the process of dummy insertion operates, what the exact nature of the inserted element is,... to answer these and other questions of related interest will be the main concern of this section.

Let us start by considering the various assumptions made in the previous section:

3. a) In LF, there is lowered to the minimal clause (S) containing the element with which it is co-superscripted.
- b) In raising constructions, there is a process inserting a dummy non-referential PRO in nominative contexts.
9. a) In LF, a quantifier may be lowered.
- b) In raising constructions, there is a process inserting a dummy non-referential PRO in nominative contexts.

With respect to the context in which the dummy element is inserted, it need not be restricted to nominative contexts; it can be generalized to case-governed contexts; i.e. to contexts where a governor assigns case: after believe-type verbs, for instance, which govern and assign case to the embedded subject (cf. P.L.), the same facts discussed in the previous two sections hold.

- 1'. a) I believe there to seem to be someone in the room.
- b)?*I believe there to seem to be likely to be someone in the room.

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- 6'. I believe some politician to be likely to address John's constituency.
- 8'. I believe some politician to seem to be likely to address John's constituency.

As for lowering itself, cf. (3a) and (9a)⁶, it does not seem to be possible in all constructions. As indicated in May (1977), it does not apply in want-type constructions. In contrast with (6) (repeated here for convenience), (11) is unambiguously interpreted as (11a): the reading where the quantifier has narrower scope than the matrix predicate is not available:

6. some politician is likely to address John's constituency
11. some politician wants to address John's constituency
- a) there is a politician S, such that S wants that S addresses John's constituency.

Raising constructions (such as 6) differ from want-type constructions (11) in that a process of \bar{s} -deletion applies permitting the embedded subject to be raised (cf. P.L.).

12. some politician_i is likely [_S e₁ to address John's constituency]
13. some politician_i wants [_S [_S PRO_i to address John's constituency]]

As indicated in P.L., the process of quantifier lowering, thus, distinguishes between PRO and NP-trace and provides further evidence for the distinction between these two empty elements. Furthermore, in P.L., NP-traces and their antecedent form a chain whereas a PRO and its antecedent form two distinct chains: chains are the domain of thematic role assignment and case-assignment. Thus, in (12), a unique thematic role is assigned to the chain (some politician, e). In (13), thematic role is assigned to the chain containing (some senator) and another one is assigned to the chain containing (PRO); cf. P.L. for further details. It, thus, is natural to suggest that chains constitute the domain in which lowering may apply. This suggestion will provide the adequate distinction between (12) and (13) while allowing there to be lowered in sentences such as (1).⁷

5. On the distinction PRO/Pronoun.

Another question raised by the analysis presented in the previous two sections concerns the dummy element: in (3b) and (9b), this dummy element was assimilated to a non-referential it.

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The identification of the dummy element raises, however, a major problem. From the binding theory, it follows that PRO must be ungoverned, i.e. that it must not appear as a constituent of a major category such as NP, VP, PP or as a subject of a tensed clause (cf. P.L.). If the dummy element were PRO, the output of the insertion rule would have to be filtered out by the binding theory since this PRO is inserted in a case-governed context. An ad hoc solution will be to consider that this nonreferential element is not a PRO (hence not subject to the binding theory), or, worse, that contrary to the referential PRO - an expletive PRO must not be ungoverned for various empirical and theoretical reasons mentioned in P.L., this proposal cannot be maintained (cf. also Aoun 1980). Briefly, it appears to be desirable to keep as close as possible the parallelism between phonetically and non-phonetically realized nominal elements: non-phonetically realized nominal elements differ from phonetically realized elements in that they lack a phonetic matrix (cf. P.L.). Phonetically realized elements may be referential or not; similarly, non-phonetically realized elements will be referential or not. Nominal elements, thus, may be classified with respect to the features [\pm referential] [\pm phonetic]:⁸

14. a) [+ referential - phonetic] : PRO
(as in "John wants [\bar{s} PRO to win])
- b) [+ referential + phonetic] : lexical names
(like John), pronouns (such as he, she,...)
- c) [- referential + phonetic] : expletive elements
(like it: "it seems that John is sick"; (here ...))
- d) [- referential - phonetic] : expletive elements
nonphonetically realized (i.e. dummy PROs).

To illustrate, phonetically realized it is ambiguously identified as referential (as in "it is in the car") or non-referential (as in "it seems that John will win"). Consequently non-phonetically realized pronominals (or PROs) will be referential (as in "John wants PRO to win") or non-referential (cf. supra). The non-referential PRO is the counterpart of the non-referential il of French or there of English (cf. P.L.).

15. il est arrivé trois hommes

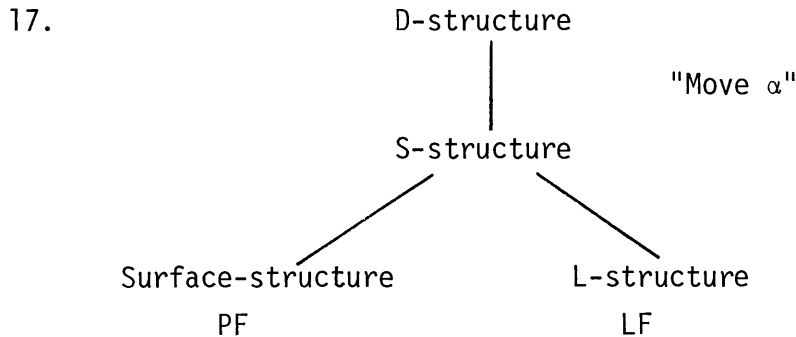
16. there arrived three men.

Furthermore, in Aoun (1980), non-referential PROs are shown to be subject to the binding theory: they cannot appear in governed contexts.

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The above considerations prevent us from considering that the dummy element inserted by (3b) or (9b) is not a non-referential PRO or that it need not be ungoverned. Let us, therefore, consider a more principled approach to the problem raised by the occurrence of the non-referential PRO in case-governed contexts.

In the government-binding framework, the various components of the grammar are organized as follows (cf. P.L.)



D-structures are generated by lexical insertion rules and base rules. These structures are mapped into S-structures by Move α . S-structures are, in turn, mapped into the two interpretive components PF (= Phonetic Form) and LF (Logical Form) yielding surface-structures and L-structures respectively.

PRO is a set of features (α person, β number, γ gender ...). It differs from other pronouns in that it lacks a phonetic matrix (cf. P.L.). I will assume that pronouns are always generated as a set of features (α person, β number, γ gender ...) and that they get phonetically realized in PF when they have case. Thus, pronominal elements are distinguished by the feature (\pm Case): if a pronominal does not have Case, it is interpreted as PRO. To illustrate, the sentence he likes Mary would in fact be generated as a set of features (masc., singular, 3rd person...) in subject position. Since this feature matrix receives nominative case, it will be phonetically realized as a pronoun.⁹ This proposal is to be embodied in the general visibility convention suggested in Aoun (1979) according to which Case is the relevant feature in PF; in order for an element to be visible in PF it must be case-marked.

With respect to the principles at work in the grammar, the distinction, thus, is between case-marked versus non-case-marked pronominals: for the binding theory, for instance, a case-marked pronominal is subject to principle B of the binding theory and a non-case-marked pronominal to principles A and B; case-marked pronominals will have to be "locally" free whereas non-case marked pronominals or PROs will have to be ungoverned.

To illustrate, consider gerunds and NPs:

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18. a) [_{NP} NP* VP]
 b) [_{NP} NP* \bar{N}]

Assuming the definition of government given in Aoun and Sportiche (1981).

α governs β iff the first maximal projection dominating α dominates β

the head of VP in (18a) does not govern NP* since it is dominated by a maximal projection (namely VP) that does not dominate NP*. But the head of \bar{N} in (18b) does govern NP*, since NP is the first maximal projection dominating NP* and the head of \bar{N} . Let us consider that case-assignment is optional and that the set of features (α person, β number, γ gender, i.e. PRO) may be freely inserted in NP* position. In (18a), if we choose to assign case to NP*, this set of features (= PRO) will be case-marked, hence, phonetically realized; otherwise it will not have a phonetic matrix:

19. a) I like [_{NP} PRO reading books]
 b) I like [_{NP} his reading books].

In (18b), if we choose to assign Case to NP*, PRO (the set of features) will be case-marked, hence, phonetically realized in PF; if we choose not to assign case, the non-case marked PRO will have to be ungoverned; thus, precluding its occurrence as the subject of the NP:

20. a) I like [_{NP} his books]
 b)*I like [_{NP} PRO books]

(20 b is not interpreted as "I_i like PRO_i books" or "I like PRO_{arb} books" cf. P.L.)

This approach solves the problem raised by the insertion of a dummy PRO in case-governed contexts in raising constructions. Recall that this dummy PRO is inserted in the subject position of the matrix clause which is case-governed. Being case-marked, this element will not be subject to principles A and B of the binding theory but only to principle B: it does not need to be ungoverned. The only peculiarity with this element is that it gets inserted in LF, after the application of the lowering rules. Being inserted in LF, the PF rules which phonetically spell out case-marked pronominals will not apply to this element since LF does not feed PF (cf. 17).

6. Some Remarks on Anaphora

One may wonder why non-case marked pronominals (PROs) are subject to principle A of the binding theory; i.e. why they are treated as anaphors. This amounts to asking: what is an anaphor?

Far from outlining a theory of anaphora, the following remarks must at best be taken as speculative. In P.L., anaphors (such as reciprocals, reflexives, NP-traces) are considered to lack inherent reference. Given that we assumed that PROs differ minimally from pronouns in that they don't have case and that some PROs are not even referential, it is possible to assume that every element with an incomplete matrix is treated as anaphor: tautologically, a matrix is incomplete if it is not fully specified for all the relevant features such as referentiality, case, etc.... Reflexives, reciprocals are anaphors since they lack inherent reference. NP-traces are anaphors since they lack Case (for further details cf. Aoun 1981b).

As for wh-traces, recall that in the above discussion, PROs were distinguished from pronouns by the feature (α Case). In PL, PROs, wh-traces and NP-traces are all considered to be three occurrences of the same type: they all have the feature α person, β number, γ gender but differ with respect to their antecedent:

21. a) PRO is either free or has an antecedent with an independent thematic role.
- b) NP-trace has an antecedent in a non-thematic position
- c) wh-trace has an antecedent in a non-argument position (for example COMP is in a non-argument position).

Furthermore, it is assumed that wh-traces are case-marked whereas PROs and NP-traces are not. In short, with respect to their internal structure, PROs and wh-traces differ by the absence versus presence of Case. Given what we said earlier concerning the phonetic realization of pronouns, one expects wh-traces to get phonetically realized since they are case-marked. Although restricted, the phonetic realization of wh-traces occurs in various languages such as Arabic, Hebrew, Vata (cf. Aoun 1981a, Borer 1979, Koopman 1980).

Note that Case is a necessary but not a sufficient condition for an element to get phonetically realized. Thus, in English, in order for an element to get phonetically realized, it must be case-marked and must not be marked [+wh] (i.e. it must not be coindexed with a wh-element): only case-marked pronominals are phonetically realized in this language.¹⁰

Recapitulating the content of the previous sections, there exists in LF a process of lowering applying optionally to quantifiers and obligatorily to co-superscripted elements such as there (but cf. footnote 6). Chains constitute the domain in which lowering applies: the antecedent of a trace may be lowered to the position occupied by this trace, but the controller of PRO may not be lowered to the position occupied by PRO:

22. a) NP_i AGR V [_S e_i V...]
by lowering
- b) e AGR V [_S NP V...]

The empty element left in the position from which lowering applies (e in 22) will be free, thus violating the binding theory which requires empty elements such as NP-traces to be locally bound. Derivations such as (22 a-b) are, however, saved by a process inserting a non-referential pronominal in case-governed contexts: (this inserted element "absorbs" the free empty element and, like all case-marked pronominals, need not be ungoverned:

22. c) PRO AGR V [_s NP V ...]

The insertion process is limited to case-governed contexts and it follows that an element which has been moved twice in syntax will not be lowered in LF to its base-generated position (e_2 in 23):

23. NP AGR V [_{s₁} e_1 V [_{s₂} e_2 V...]]

by lowering and PRO insertion

a) *PRO AGR V [_{s₁} e_1 V [_{s₂} NP₂ V...]]

The reason is that the intermediate empty element (e_1 in 23a) will be left free (without antecedent). This analysis, thus, accounts for the ungrammaticality of doubly raised there (cf. 7b) and for the ambiguity of (6) where the quantified NP may have a wide or narrow scope reading versus the non-ambiguity of (8) where the quantified NP has the wide scope reading only. As indicated above, we need to restrict the insertion process to case-governed contexts. It would be a welcome step to dispense with this restriction. This is what we will try to do in the next section.

7. On Insertion Rules

Obviously, the most radical way to dispense with any restriction concerning the insertion process is to eliminate the need for the insertion rule.

Recall the "functional" characterization of empty elements given in (21): empty elements are considered to be three occurrences of the same type but differ with respect to their antecedents.

With this in mind consider (22a) repeated as (24):

24. NP_i AGR V [_s e_i V...]

As indicated earlier, in (24), the NP may be lowered to the position e_i :

24 a) e AGR V [_s NP V...]

The empty element e left in the position from which lowering applies in (24a) will be "absorbed" by the inserted non-referential pronominal:

24 b) PRO AGR V [_s NP V...]

The insertion rule can now be dispensed with: in (24a), the empty

element e is free; by (27a), it will be interpreted as a pronominal (PRO). Note that this pronominal is "inserted" in case-governed contexts and, like all case-marked pronominals, need not be ungoverned.

Consider, now doubly raised elements (cf. 23 repeated as 25):

25. NP AGR V [_{s₁} e₁ V [_{s₂} e₂ V...]]

Recall that the NP may be lowered to the position of the intermediate trace e_1 but not to that of e_2

25 a) * e AGR V [_{s₁} e₁ V [_{s₂} NP V...]]

Previously, the ungrammaticality of (25a) was accounted for by restricting the insertion rule to case-governed contexts: e will be absorbed by the inserted pronominal but not e_1 . It also was indicated that the inserted pronominal does not function as the binder of e_1 . Thus, (25a) will be ruled out by the binding theory. By eliminating the insertion rule, this solution is not available anymore. The functional characterization of empty categories, however, provides a natural way to account for the ungrammaticality of (25a). In (25a), both e and e_1 are free; they will be interpreted as pronominals (cf. 1):

25. b) * PRO AGR V [_{s₁} PRO₁ V [_{s₂} NP V...]]

The pronominal in the subject position of the matrix clause is in a case-governed context and like all case-marked pronominals need not be ungoverned. However, the pronominal in s_1 is not in a case-governed context. Like all non-case-marked pronominals, it is treated as an anaphor. As a pronominal it is subject to principle B of the binding theory and as an anaphor, it is subject to principle A. The only way to satisfy both principles is for this element to be ungoverned. This is not the case in (25b): PRO₁ is governed by V. Therefore, the representation will be ruled out.

8. Pronouns As Empty Elements

Notice that we depart slightly from the approach outlined in P.L., which was presented in the previous sections (cf. 21). What we are suggesting is that an empty element is interpreted as a pure pronominal, and not as PRO, if it is free or if it is locally bound by an element with an independent thematic role. If this pronominal is inserted in a case-governed context, it is interpreted as a non-anaphoric pronominal (i.e. as a pronoun), otherwise it is interpreted as an anaphoric pronominal (i.e. as a pronoun). As a non-anaphoric pronominal (i.e. as a pronoun), it will be subject to principle B of the binding theory only. As an anaphoric pronominal (i.e. as PRO), it will be subject to principles A and B; it, therefore, must be ungoverned. Pronouns and PRO, thus differ by the presence versus the absence of a case-feature.

The approach adopted has some far reaching consequences. Now, an empty element may be interpreted as a wh-trace if it is locally bound by an element in a non-argument position, as an NP-trace if it is locally bound by an element lacking an independent thematic role

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and as a pronominal if it is free or if it is locally bound by an element with an independent θ -role. This pronominal is identified as a pronoun if it is case-marked or as a PRO if it is not case-marked. In other words, there is no (type) distinction between pronouns and the other empty categories: pronouns are just a different occurrence of the "empty category" identified as such in terms of properties of the structure they appear in. (cf. 11).

General Summary

Recapitulating the content of this paper, we started by discussing a particular instance of "Move α " in LF. It was argued that:

- there exists a process of lowering in LF applying to quantifiers and to co-superscripted pleonastic elements such as there.
- Chains constitute the domain in which lowering applies: the antecedent of a trace may be lowered to the position occupied by the trace. The controller of PRO, however, may not be lowered to the position occupied by PRO.
- The output of these lowering processes is subject to the binding principles; thus, providing evidence for the LF nature of these principles. In Chomsky (1981), (to appear), it is shown that the binding theory has to apply as s-structure. We, thus, conclude that the binding theory applies at s-structure and LF. For discussion of various consequences of this proposal, the reader is referred to Chomsky (forthcoming) and Aoun (1981b).
- These lowering processes are made possible by the existence of a general process inserting in LF a non-referential PRO in case-governed contexts.
- By assuming that pronouns are always generated as a set of features (α person, β number, γ gender) and that they get phonetically realized in PF when they have Case, the output of the non-overt pronominal insertion process which occurs in case-governed contexts is not filtered out by the binding theory: only non-case-marked pronominals (i.e. PROs) have to be ungoverned.
- This insertion process - like other insertion processes affecting pronominal elements (cf. Chomsky 1981) - can be eliminated in favor of more interpretive principles. As such the various contextual restrictions governing this insertion mechanism do not need to be stipulated: they derive from the grammatical principles (such as the binding theory) at work in the grammar.
- These proposals entailed a reinterpretation of the notion empty category defined in P.L. : pronouns, we argued, are just a different occurrence of the empty category identified as such in terms of properties of the structure they appear in. In other words, there is no type distinction between pronouns and the other empty categories (NP-traces, wh-traces, PROs).

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- (1) It is to be pointed out that there seem to be speakers accepting (1b) cf. footnote 3.
- (2) cf. Milsark (1974), Stowell (1978), Safir (forthcoming) and the references mentioned there for the analysis of these constructions.
- (3) For this analysis to go through, it is necessary to assume that lowering, like Move α raises there to the subject position of s_2 first then to the subject position of s_1 . Similarly, in (4a), we need to assume that lowering lowers there to the subject position of s_2 first then to the subject position of (s_3). It also is necessary to assume that PRO_1 and e_2 in (4b) do not get reindexed by free indexing. This assumption follows from a general constraint preventing indexing between elements in argument position from applying in LF (cf. Chomsky to appear).

It may turn out that these assumptions are relevant for the observation made in footnote (7). There, it was pointed out that there seem to be speakers accepting (7b). It may be the case that for these speakers, the constraint concerning indexing in LF are relaxed. Note also that, contrary to there, it can be raised twice (cf 7b):

i - it is expected e_i to appear e_i to be likely that John will come.

It, thus, may be the case that for the speakers accepting (7b), there is treated like it. Although these considerations are of interest, they will not be further pursued (cf. Aoun 1981a).

- (4) We will disregard the intermediate reading where the quantified NP is lowered and attached to the intermediate S; it is irrelevant for our discussion. For an extensive discussion of constructions involving doubly raised there and doubly raised quantifiers, the reader is referred to the forthcoming work of Mats Rooth.
- (5) The insertion process will be dispensed with in subsequent sections.
- (6) There differs from the quantifier in that it must be lowered. For an account of the obligatory lowering of there (cf. Aoun (1981a) chapter 14).
- (7) L. Rizzi (p.c.) points out that the analysis we outlined correctly predicts that the quantifier in (ib) contrary to the one in (ia) may only have a wide scope interpretation:

i a) many senators seem to be incompetent
b) many senators_i seem to each other_i to be incompetent

Consider the LF representation of the narrow scope reading of (ib) (irrelevant details omitted):

ii PRO seems to each other [_S many senators to be incompetent]

In (ii), the reciprocal each other is free: the non-referential PRO cannot count as the antecedent of this reciprocal. Therefore, (ii) will be ruled out by the binding theory. Note that we have further evidence for the LF nature of the binding theory since at S-structure - i.e. before lowering - no binding theory violation occurs in (ib).

- (8) cf., however, P.L. where it is argued that this classification is to be refined to include quasi-arguments.
- (9) A similar proposal for the phonetic realization of pronouns was first suggested in Jaeggli (1980) where the following rule is given:
- i - Pronounce PRO if it has Case and is c-governed
(= categorial government).

By assuming that case-assignment is a special instance of government, i.e. that case-assignment occurs when a governing category happens to be a case-assigner (cf. P.L.), the c-government requirement may be dropped. Thus, our proposal may be viewed as a slight modification of Jaeggli's proposal.

- (10) It is interesting to note in this respect that there seem to be no clear cases where NP-traces are spelled out as pronouns. Given the fact that they lack Case, this comes as no surprise, (cf., however, Burzio (1981) where such a case seems to occur; however, it is not clear that the emphatic pronouns discussed there are not cases of apposition rather than a realization of the NP-trace).

Note also that with respect to the visibility convention suggested in Aoun (1979) and alluded to above, Case seems to be a sufficient condition for an element to be visible in PF: wh-traces, for instance, which are case-marked are relevant for PF mechanisms such as contraction (cf. P.L., Lightfoot 1977), Jaeggli (1980a) and the references mentioned there).

- (11) In Koopman and Sportiche(1981), the weak cross-over effects are accounted for by the Bijection Principle which states that there is a one-to-one relation between variables and their antecedents. Thus, consider:

i - * which girl_i did her_i mother beat x_i

In (i), which girl serves as a (local)antecedent for two variables her and x_i; whence a violation of the Bijection Principle. As indicated by these authors, in order for this account to be maintained, the definition of variables must be generalized to include pronouns as well:

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- ii. α is a variable iff
 - a) α is an empty element or a pronoun
 - b) α is in argument-position (A-position)
 - c) α is locally bounded by an element in a non-argument position (\bar{A} -position).

Note that under the approach outlined in this paper according to which there is not type distinction between pronouns and empty categories, the fact that pronouns can be interpreted as variables comes as no surprise. In fact, (iia) makes sense only if pronouns and empty categories are of the same type. But in that case, (iia) can be reformulated as follows:

- ii. α is a variable iff
 - a) α is an empty element
 - b) α is in an A-position
 - c) α is locally bound by an element in \bar{A} -position.

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