THE STATUS OF MOVEMENT RULES

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## 0. ABSTRACT

This paper is concerned witb the status of Move $\alpha$ in tbe grammar. We essentially will argue that Move $\alpha$ is to be viewed as an indexing mechanism applying to (S-) structures rather than a transformational mechanism mapping D-structures into S-structures. As a consequence, it will no longer be necessary to assume that D-structure is an independent level of syntactic representation.

## 1. INTRODUCTION

It seems reasonable to assume, as pointed out in Chomsky and Lasnik (1977), that the grammar reduces the ranges of possible outcomes from well-formed base-generated structures and that a one-one association of deep and surface structure is optimal. It also seems reasonable to assume that distinct syntactic representations will correspond to distinct sentences and that the mapping between a given D-structure and another S-structure is performed by a single derivation and not by several distinct derivations. To illustrate the effect of this restrictive point of view, consider the following sentence:

(1) who tried to win

At least two candidates are eligible as S-structure representations of sentence (1):

(2) $[_{\bar{S}}$ who$_i$ $[_S$ $t_i$ tried $[_{\bar{S}}[_S$ PRO to win$]]]]$

(3) $[_{\bar{S}}$ who$_i$ $[_S$ $t_i$ tried $[_{\bar{S}}$ $t'$ $[_S$ $t_i''$ to win$]]]]$

The S-structure (2) is generated by extracting the wh-element from its base-generated position -- the subject position of the matrix clause -- and leaving a coindexed empty category -- a trace -- $\underline{t}_i$. Subsequently, the wh-element (or its trace $\underline{t}_i$) is construed to be coreferential with the subject of the embedded clause (PRO).

The S-structure (3) is generated by successive cyclic application of the rule Move $\alpha$: who is moved from the D-structure position ($\underline{t}''$) to the COMP position ($\underline{t}'$) then to the matrix subject position ($\underline{t}$) and finally to the matrix COMP position. (4) is the D-structure of (3):

(4) $[_{\bar{S}}$ $[_S$ e tried $[_{\bar{S}}$ $[_S$ who to win $]]]]$
(where $\underline{e}$ stands for a base-generated empty position)

In Chomsky (1981) (henceforth P.L.), a distinction is made between argument positions (A-positions) and non-argument positions ($\bar{A}$-positions). Roughly speaking, an A-position is a position which receives a grammatical function (subject of, object of ...) whereas an $\bar{A}$-position does not receive a grammatical function. For instance, the subject position of a clause is an A-position but the COMP position of a clause is an $\bar{A}$-position since it does not receive a grammatical function. Another distinction is made between empty elements left by movement of NPs (NP-traces) and empty elements left by movement of wh-phrases (variables):

(5) $[_{\bar{S}}\ [_S\ \text{John}_i$ seems $[_S\ t_i$ to have left]]

(6) $[_{\bar{S}}\ \text{who}_i\ [_S\ t_i$ left ]]

The NP-trace $\underline{t_i}$ in (5) is coindexed with John which is an A-position. The variable $\underline{t_i}$ in (6) is coindexed with the wh-element which is in an $\bar{A}$-position. In other words:

(7) an NP-trace is bound by an element in an A-position

(8) a variable is bound by an element in an $\bar{A}$-position

(9) is bound by $\beta$ iff $\alpha$ is coindexed with $\beta$ and c-commanded by $\beta$.

It, furthermore, is indicated that NP-traces are to be assimilated to anaphors (reciprocals, reflexives) and that they obey the same locality conditions governing the distribution of anaphors. In particular, both NP-traces and lexical anaphors obey the Specified Subject Condition and the Tensed-S Condition which are subsumed under the binding conditions in P.L. Variables, however, are to be assimilated to names (such as John). Like names, variables must be A-free -- i.e. must not be coindexed with a c-commanding element in an A-position. Thus, in (10a-b) neither John nor the variable can be construed as coreferential with the pronoun he:

(10) a. he likes John

b. $\text{who}_i$ does he like $t_i$

With this in mind, let us return to (3). In (3), $\underline{t}''$ is identified as a variable because it is bound by $\underline{t}'$ which is in an $\bar{A}$-position. As a variable, it has to be A-free, and therefore, cannot be A-bound by $\underline{t}$. Representation (2), on the other hand, does not violate any grammatical principle. It, thus, is to be retained as the S-structure representation of (1) (cf. May 1979, P.L.). In brief, the discussion of (1-3) illustrates the restrictive point of view alluded to above: sentence (1) admits one well-formed S-structure only.

In this paper, we will be concerned with other cases of improper derivations. It will appear that some of them may be accounted for by the interactions of various principles existing in the grammar. Some others will be taken to indicate the inadequacy of the notion "derivation". As a consequence, instead of assuming that S-structure is generated from D-structure by Move , we will view S-structure as an enriched D-structure which may be decomposed into two factors, D-structure and Move $\alpha$ (cf. P.L.). To phrase the proposal more informally, we will view Move $\alpha$ as an indexing mechanism applying to S-structures instead of viewing it as a transformational mechanism deriving S-structures from D-structures.

## 2. THE FUNCTIONAL CHARACTERIZATION OF EMPTY ELEMENTS.

In the preceding section, two kinds of empty elements were distinguished: NP-traces and variables. Each of these empty elements has a distinct binder (antecedent). An NP-trace is bound by an element in an A-position (A-bound) and a variable is bound by an element in an $\bar{A}$-position ($\bar{A}$-bound). A third kind of empty element was also encountered: PRO (cf. 2). PRO may be thought of as a pronominal element not realized phonetically. PRO may, but need not, have an antecedent.

(11) John forced $Bill_i$ [$\bar{_S}$ $PRO_i$ to hit Peter]

(12) It is difficult [$\bar{_S}$ PRO to leave]

In (11), PRO is controlled by Bill and in (12), it is free (has no antecedent) and receives an arbitrary interpretation (cf. Chomsky 1980). The antecedent of PRO, like the antecedent of NP-trace, is in an A-position. However, contrary to the antecedent of an NP-trace, the antecedent of PRO has a thematic interpretation distinct from the one PRO receives (cf. P.L.). In general, empty elements may be identified with respect to the kind of antecedent -- if any -- they have (cf. P.L.):

(13) a. gaps with antecedents that lack an independent thematic role ($\theta$-role)

i. and are locally A-bound (= NP-traces)
ii. and are locally $\bar{A}$-bound (= variable)

b. gaps with antecedents that have an independent $\theta$-role (= PROs)

c. gaps with no antecedent (= PROs)

A final remark is in order. It follows from the binding theory developed in P.L. that PRO may only appear in ungoverned positions. Roughly speaking, PRO may not appear as a complement of the head of an XP category (such as VP, NP, PP...) or in the subject position of a finite clause. It may, however, appear in the subject position of a non-finite clause (cf. 11, 12) or in an ungoverned COMP position (cf. Aoun and Sportiche, 1981).

(14) $John_j$ bought a $book_i$ [$_{\bar{S}}$ $PRO_i$ [$PRO_j$ to read $t_i$]]

In (14), both the subject and the COMP position of $\bar{S}$ are ungoverned. Thus, PRO may appear in these positions.

Before turning to our main concern, we need to briefly introduce the notion "chain". Informally speaking, a chain is defined in such a way that:

(15) a. NP-traces and their antecedents form a chain.

b. an element in an A-position which is not coindexed with an NP-trace forms a chain by itself (cf. P.L.)

Thus, consider (16):

(16) a. $John_i$ is believed $t_i'$ to have been killed $t_i$

b. $John_i$ likes $himself_i$

c. $who_i$ $t_i$ saw John

In (16a), John, t′ and t form a single chain. In (16b), John and himself form two distinct chains. In (16c), $t_i$ forms a chain by itself. Chains are the domain of thematic role assignment, i.e. thematic roles (θ-roles) are assigned to chains. For a chain to get a θ-role, one of its members must be in a position to which a θ-role is assigned: the chain (John, t′, t) in (16a) receives a θ-role since one of its members (t) is in a θ-position to which a θ-role is assigned. For a precise formulation of these notions, see P.L.

## 3. MOVE α AS AN INDEXING MECHANISM

Consider, now, the following S-structure:

(17) $John_i$ is believed $t_i'$ to have been killed $t_i$

which has the following D-structure:[1]

(18) e is believed e to have been killed $John_i$
(where e stands for a base-generated empty position)

The mapping between (17) and (18) may be achieved by at least three derivations:

Derivation 1: John moves first to the subject position of kill:

(19) a. e is believed $John_i$ to have been killed $t_i$

then to the subject position of believe:

b. $John_i$ is believed $t_i'$ to have been killed $t_i$

Derivation 2: John moves the subject position of believe:

(20) a. $John_i$ is believed e to have been killed $t_i$

then the empty category $t_i$ moves to the subject position of kill:[2]

b. $John_i$ is believed $t_i'$ to have been killed $t_i$

Derivation 3: John moves first to the subject position of believe:

(21) a. $John_i$ is believed e to have been killed $t_i$

then John and the empty NP are coindexed by the free process of indexing (cf. P.L.)

b. $John_i$ is believed $t_i'$ to have been killed $t_i$.

Note that if the three derivations are grammatical, i.e. are to be retained as possible mappings between (18) and (19), the restrictive point of view according to which the mapping between a given D-structure and another S-structure is performed by a unique derivation is not respected.[3]

Let us consider derivations (1-3) more carefully. One may exclude derivation (2) if one bars movement of empty elements. However, given the fact that an empty element such as PRO may be moved (cf. 22):

(22) I didn't want [$_i$ PRO$_i$ to be arrested t$_i$]

it is not clear how it is possible to give a natural formulation of this prohibition, especially if all empty elements (PRO, NP-trace, wh-trace) are viewed, as suggested in P.L., as three occurrences of the same type.[4] Now I will try to suggest that this problem may be overcome if Move $\alpha$ is viewed as an indexing mechanism applying to "S-structures" rather than a transformational mechanism deriving S-structures from D-structures. In the government-binding framework, the following organization of the grammar is assumed:

(23)

D-structure

| Move $\alpha$

S-structure

PF-structures (Phonetic Form) — LF-structures ("Logical Form")

D-structures are generated by base rules and lexical rules. These structures are mapped onto S-structures by Move $\alpha$. One system of interpretive rules - those of the PF-component -- associates S-structures with representations in phonetic form (PF); another system -- the rules of the LF component - associates S-structure with representations in "Logical Form" (LF).

As indicated in P.L., the organization of the grammar may be viewed in a slightly different way. S-structure may be taken as the fundamental level of syntactic representation. In that case, D-structure is derived from S-structure by abstracting from all effects of Move $\alpha$. Thus, S-structures may be decomposed into two factors: D-structures and Move $\alpha$. In terms of the notion chain presented above, each relevant element (such as lexically realized NPs, PROs...) of an S-structure is assigned a chain ($\alpha_i,\ldots,\alpha_n$). Usually, $\alpha_n$ determines the $\theta$-role for the referential expression contained in a chain and $\alpha_i$'s ($i \neq n$) may play other roles (cf. P.L.). Thus in (24),

(24) They$_i$ seem to each other t$_i$ to be happy.

there are two chains: the one containing _they_ and t$_i$ and the one containing _each other_. In the chain (_they_, t$_i$), t$_i$ is the $\alpha_i$ which is in $\theta$-position and determines the $\theta$-role assigned to this chain and _they_ is the $\alpha_i$ which serves as the antecedent of the anaphor (_each other_). It, thus, appears that S-structures may be decomposed into two factors: D-structure which is a representation of $\alpha_n$ and a rule adding $\alpha_i$ to chains: Move $\alpha$.[5]

Assuming, now, that S-structure is to be taken as the fundamental level of syntactic representation and that each S-structure is to be factored into chains, let us return to the S-structure (17) which is repeated for convenience.

(17) $John_i$ is believed $t'_i$ to have been killed $t_i$

(17) admits five possible factorizations:

Factorization 1:

John, t′ and t form a single chain.

Factorization 2:

John, t′ and t each form a distinct chain.

Factorization 3:

John and t′ form a single chain, t forms another chain.

Factorization 4:

John and t form a chain, t′ forms another chain.

Factorization 5:

John forms a chain, t′ and t form another chain.

It is to be noted that chains contain elements which bear the same index and that chains have to be maximal in the obvious sense of this word.[6] In (17), John t′ and t are coindexed by Move α. If this is so, then factorizations (2-5) violate the maximality requirement concerning chains.

Let us, however, assume that Move α is not a transformational mechanism but an indexing mechanism applying to S-structures. Let us, also, assume that this indexing mechanism applies randomly. This clearly is the simplest assumption. Consider, now, the following S-structure representation:[7]

(17) a. John is believed t′ to have been killed t

Since chains may only contain elements which bear the same index, the maximality requirement concerning chains will be relevant when John and/or t′ and/or t are coindexed and when they do not form a single chain: if John, t′ and t are not coindexed, the maximality requirement will not be relevant. Since the indexing mechanism -- Move α -- applies to S-structure representations randomly, we have the following five possibilities:

Possibility 1:

John, t′ and t are coindexed.

Possibility 2:

John, t′ and t are not coindexed with each other.

Possibility 3:

John and t′ are coindexed; t is not coindexed with them.

Possibility 4:

John and t are coindexed; t′ is not coindexed with them.

Possibility 5:

t′ and t are coindexed; John is not coindexed with them.

Factorizations (1-5) correspond to possibilities (1-5) respectively. That is, if John, t′ and t are coindexed, they form a chain; this is factorization (1). If John, t′ and t are not coindexed with each other, they each form a distinct chain; this is factorization (2), etc... Under this interpretation the maximality requirement concerning chains is irrelevant.

Consider, now, factorization or possibility (2): since t′ and t are free, they will be interpreted as PROs. Each of these PROs is in a governed position: t′ (= PRO) is governed by believe (cf. P.L.) and t (= PRO) is governed by kill. Factorization (2) will be ruled out because these PROs occur in governed positions. It, also, will be ruled out by the θ-criterion which requires every referential expression to have a θ-role (cf. P.L. for a precise formulation). Since chains are the domain of θ-role assignment, and since the chain containing the referential expression John is not a θ-position, John will not receive a θ-role.[8] Factorizations (3) and (5) are also ruled out by θ-theory (John will not receive a θ-role) and by the requirement preventing PROs from appearing in governed positions. In factorization (3), t is identified as PRO, and in factorization (5), t′ is identified as PRO; these PROs are in governed positions.

Finally, consider factorization (4). here the θ-criterion is satisfied since the cbain containing John will be in a θ-position. However, t′ is identified as PRO since it is free. This PRO is in a governed position. In brief, the only well-formed factorization is factorization (1). The problem discussed above concerning the existence of more than one well-formed derivation relating the D-structure (18) to the S-structure (17) is solved if S-structure is considered as the fundamental level of syntactic representation and if Move is viewed as an indexing mechanism rather than a transformational mechanism.

## 4. SUBJACENCY

Some questions, naturally, arise if Move α is viewed as an indexing mechanism applying to S-structure representation. The first, and most obvious, question concerns the relation of Move α with other indexing mechanisms applying to S-structure representations. In the government-binding framework there are two ways in which an element may be indexed: either by the (transformational) rule of Move α or by free indexing. (25a-c) illustrate these possibilities.

(25) a. $John_i$ was killed $t_i$

b. $John_i$ wants [$PRO_i$ to leave]

c. $John_i$ likes $himself_i$

In (25a), Move α raises John from its base-generated position and leaves a coindexed empty category $t_i$ in this position. In (25b-c), where no movement applies, John and PRO in (25b) and John and himself in (25c) are coindexed by a free process of indexing (cf. P.L.). One may wonder whether it is necessary to distinguish between two indexing mechanisms; the one holding in (25a) and the one holding in (25b-c). If the indexing mechanism applying in (25a) obeys a constraint P and the indexing mechanism in (25b-c) does not obey P, we will have to distinguish the two indexing mechanisms with respect to P at least. This seems to be the case. Consider the following representations:

(26) a. $They_i$ think [$_{\bar{s}}$[$_{NP}$ $PRO_i$ to feed each $other_i$] would be difficult]

b. *$They_i$ seem [$_{\bar{s}}$[$_{NP}$ $t_i$ to feed each $other_i$] would be difficult]

c. $They_i$ think[$_{\bar{s}}$[$_{NP}$ pictures of each $other_i$]will be on sale]

As indicated in Chomsky (1982), the empty element in (26a) has an antecedent with an independent θ-role and is therefore PRO rather than trace. Subjacency is violated, but nevertheless PRO and its antecedent can be coindexed, as is generally possible for anaphors apart from trace (in (26c), the coindexing of they and each other violates subjacency). In (26b), the antecedent of the empty element is in a non-θ-position, so the empty element is trace. Subjacency is violated as in (26a), but in this case, the sentence is ungrammatical.[9] Thus subjacency appears to be a property of the rule Move α, not of other indexing mechanisms. If this conclusion is correct, then clearly we will have to distinguish between the indexing mechanism at work in (25a) or (26b) -- i.e. Move α -- and the one at work in (25b-c) or (26a,c).

The indexing mechanism which we referred to as Move α applies between an element in a non-θ-position and another element which may or may not be in a θ-position (cf. 27a-b).

(27) a. $John_i$ is believed $t_i'$ to have been killed $t_i$

b. $who_i$ did John see $t_i$

The other indexing mechanism -- call it θ-indexing -- applies between elements in θ-positions:

(28) a. $John_i$ wants [$PRO_i$ to leave]

b. $John_i$ saw $himself_i$ in the mirror.

Thus it is possible to say that θ-indexing applies between elements which are each in a θ-position. Move α, however, applies between elements such that at least one is in a non-θ-position.

Another possibility would be to assume that there is but one (free) indexing mechanism in the grammar and that subjacency is a constraint that checks the (*indexing*) relation between elements where at least one is in a non-θ-position. That is, subjacency will constrain the relation holding between *they* and $t_i$ in (26b) but not the one holding between *they* and *PRO* in (26a) or between *they* and *each other* in (26c).

Some tightening up is necessary. Consider the following representation which illustrates a "successive cyclic" application of Move α:

(29) $[_{\bar{S}}$ who$_i$ $[_S$ did John say $[_{\bar{S}}$ $t_i'$ $[_S$ he should see $t_i]]$

Assuming that at least S is relevant for subjacency in English, cf. Chomsky (1977), of the two gaps *t′* and *t* in (29), only *t′* is subjacent to *who*. Note that in (29) *t′* c-commands *t* and is coindexed with it. According to definition (9), *t′* binds *t*. Thus, *t* has two binders (antecedents): *who* and *t′*. Assuming the notion of "local" binder, i.e. "closest" binder (cf. P.L. for a formal characterization of tbis notion), *t′* is the local binder of *t*. *Who* is the non-local binder of *t* and the local binder of *t′*. Thus, subjacency must be understood to hold between elements such that one is in a non-θ-position and locally binds the other(s).

In (29), the existence of the trace in object position (*t*) -- but not that of one in COMP (*t′*) -- is required by the Extended Projection Principle (cf. footnotes 1, 7, and infra). Thus, for subjacency to correctly apply in (29), we need to assume that the node COMP may be coindexed with an antecedent along the lines of Bresnan and Grimshaw (1978). To illustrate, consider the representation of (29) before indexing applies:

(29) a. $[_{\bar{S}}$ who $[_S$ did John say $[_{\bar{S}}$ COMP $[_S$ he should see t$]]$

*who* may be coindexed with *t* only; in this case, subjacency will be violated. COMP, however, may be coindexed with *who* and (*t*), and there will be a well-formed representation which does not violate subjacency; namely (29b).

(29) b. $[_{\bar{S}}$ who$_i$ $[_S$ did John say $[_{\bar{S}}$ COMP$_i$ $[_S$ he should see $t_i]]$

In (29b), *t* is subjacent to COMP and COMP is subjacent to *who*.

Consider, now, the following representation from Chomsky (1982):

(30) Here is the influential professor [who$_i$ [John sent his book to $t_i$ in order to impress $e_i$]]

Examples such as (30) illustrate parasitic gap constructions. These constructions have properties which need not concern us here (cf. Chomsky 1982, Engdahl 1981, Taraldsen 1981). For the purpose of our discussion, examples such as (30) are relevant in that they shed more light on the application of subjacency. In (30), contrary to (29), the left most gap (*t*) in (30) does not c-command the rightmost one (*e*). Thus, in (30), *who* is the local binder of *t* and *e*. Note that of the two gaps *t* and *e* only *t* is subjacent to *who*.

There are two possible readings for the subjacency requirement. Either we require each empty category to be subjacent to its local antecedent (binder) or we require the local antecedent to be subjacent (more accurately "superjacent")[10] to each empty category it locally binds.[11] In both readings (30) will violate subjacency since _e_ is not subjacent to _who_ (or _who_ is not superjacent to _e_). Thus, (30) indicates that we must understand subjacency in such a way that it requires at least one of the empty categories to be subjacent to its local antecedent or that it requires the local antecedent to be superjacent to one of the empty categories it locally binds.

In brief, subjacency is a relation which holds between elements one of which is in a non-θ-position and locally binds the other(s). It requires:

- at least one of the empty categories to be subjacent to its local antecedent
- or the local antecedent to be superjacent to at least one of the empty categories it locally binds.

## 5. MOVEMENT TO NON-THEMATIC POSITIONS

In sections (1) and (2), we introduced the notions of A and $\bar{A}$-positions and indicated that these notions, together with the notion of θ-role, allow us to distinguish between the various empty elements as follows (cf. 13):

(31) a. a _variable_ is an empty element which is locally $\bar{A}$-bound.
b. an _NP-trace_ is an empty element which is locally A-bound by an antecedent that lacks an independent θ-role.
c. _PRO_ is an empty element which is either free or has an antecedent with an independent θ-role.

In the government-binding framework, θ-roles are assigned to thematic positions (θ-positions). $\bar{A}$-positions are not θ-positions; i.e. they are not positions to which a θ-role is directly assigned. A-positions, however, may be thematic positions (θ-positions) or not ($\bar{\theta}$-positions). To illustrate, the subject position of the raising verb _seems_ is a $\bar{\theta}$-position; hence a non-referential element such as _it_ may appear in this position (cf. 32).

(32) it seems that John left

In contrast, the subject and object positions of the active verb _hit_ are θ-positions; they receive the θ-roles of "Agent" and "Patient" respectively:

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(33)    John    hit    Bill
         |              |
        Agent         Patient
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The assignment of θ-roles is constrained by the θ-criterion which states that each θ-position is assigned exactly one referential expression and that each referential expression is assigned to exactly one θ-position, where a referential expression is assigned to a θ-position if it or its trace occupies this position. The Projection Principle adds the following requirement concerning the θ-criterion: the θ-criterion holds at all levels of syntactic representations; i.e. at D-structure, S-structure, and LF.[12]

As indicated in P.L., from the requirement that the θ-criterion holds at S-structure and LF, it follows that movement from a $\bar{\theta}$-position to a θ-position is blocked:[13] the moved element would not be assigned a θ-role at D-structure; the θ-criterion, thus, would be violated at D-structure.

To illustrate the above remark, consider the following hypothetical case (adapted from P.L.). Suppose, for example, that English used "Jove RAINS" instead of "it rains", where Jove is a referential expression and where RAINS does not assign a θ-role to its subject.[14] Suppose, further, that SEEM is a verb exactly like seem except that it assigns a θ-role to its subject. Consider, now, the D-structure (34):

(34) e SEEMS Jove to RAIN

Since Jove is in a non-case-marked position, the Case Filter requires that it move to the matrix subject position, yielding (35):

(35) $\text{Jove}_i$ SEEMS $t_i$ to RAIN

In (35), the θ-criterion is satisfied at LF and S-structure, since Jove is assigned a θ-role by SEEM, by assumption. But (34), its D-structure source, violates the θ-criterion at D-structure. Therefore, there can be no such verb as SEEM. This conclusion seems correct: there can be no such verb. Therefore, the θ-criterion holds at D-structure, as implied by the Projection Principle.

Note that the conclusion concerning movement from a $\bar{\theta}$-position to a θ-position is based on the assumption that D-structure is an independent level of syntactic representation which is mapped onto S-structure by Move α. We argued, however, in the preceding sections that Move α is to viewed as an indexing mechanism applying to S-structures rather than a transformational mechanism mapping D-structures onto S-structures. How is it then possible to derive the conclusion concerning the "movement" from a $\bar{\theta}$-position to a θ-position? Or to formulate the question in slightly different terms, how is it possible to rule out a representation such as (35) where an element in a θ-position (Jove) is the local antecedent of the empty category ($t_i$)?

The answer to this question lies in the functional characterization of empty elements outlined in section (2) and briefly recapitulated in (31). In (35), Jove will be in a θ-position; thus, according to (31c), the empty category will be interpreted as PRO. This PRO is in a position governed by SEEM.[15] Therefore, the representation will be ruled out.

In other words, the fact that an empty element in a $\bar{\theta}$-position cannot be locally bound by an antecedent in a $\bar{\theta}$-position follows from the functional characterization of the various empty elements. Note that this account, like the one outlined in P.L., allows "movement" from a $\bar{\theta}$-position to be locally bound by an element in a $\bar{\theta}$-position (cf. 36):

(36) $\text{it}_i$ seems $t_i$ to be certain that John is leaving

It, also, allows an empty element in a θ-position to have a local antecedent in a $\bar{\theta}$-position (cf. 37):

(37) $\text{John}_i$ seems $t_i$ to be leaving

As for the empty element in θ-position which has an antecedent in θ-position, two cases need to be considered:

(38) a. The empty element is governed

$\text{Jove}_i$ SEEMS $[_S\ t_i$ to be leaving$]$

b. The empty element is ungoverned

$\text{John}_i$ wants $[_{\bar{S}}$ e to leave$]$

(38a) is ill-formed, because the empty category is interpreted as PRO; this PRO is governed by SEEM (cf. 35).[16] As for (38b), the empty category, which is in an ungoverned position, is interpreted as PRO. Since an $\bar{S}$-boundary intervenes between John and this PRO, they will be in separate chains, cf. footnote 15. Each chain will be assigned a distinct θ-role. Representation (38b) is well-formed. This is the normal configuration of control. Thus, in the S-structure (38b), the empty element and its antecedent John can be related by Move α, i.e., by free indexing. In our account, there is but one single mechanism applying to S-structures.

## 6. SUMMARY

Summarizing the content of this paper, we started by indicating that some problems arise if Move α is viewed as a transformational mechanism mapping D-structures into S-structures. These problems, essentially, have to do with the existence of more than one well-formed derivation mapping D-structures into S-structures. We suggested that these problems may be overcome if Move α is viewed as an indexing mechanism applying to S-structures, and we explored some of the consequences of this proposal with respect to the application of grammatical constraints such as subjacency, or with respect to the range of possible (local) antecedents for the various elements. Note that if this approach is to be maintained, it will no longer be necessary to assume that D-structure is an independent level of syntactic representation.[17]

## FOOTNOTES

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[1]Other D-structures such as the ones where John is base-generated in the subject position of kill or in the subject position of believe are excluded by the Extended Projection Principle which requires that every referential expression appear in a θ-position at D-structure; i.e. in a position to which a θ-role is assigned (cf. P.L.). The subject position of passive verbs is a non-θ-position; therefore the Extended Projection Principle would be violated in the D-structures (i) and (ii) where John is in a non-θ-position (cf. P.L. and Chomsky 1982):

i) e is believed John to have been killed e
ii) John is believed e to have been killed e

[2]One may be tempted to rule out derivation (9) by some version of the strict cycle, but see Freidin (1978), where it is indicated that the effects of the strict cycle may be derived from various grammatical principles such as the Specified Subject Condition (SSC) and the Tensed-S-Condition (TSC), subsumed under the binding principles in P.L. Note that for variables, the effect of the strict cycle cannot be straightforwardly derived from the SSC and the TSC in a government-binding framework (cf. P.L.), since variables are no longer subject to these conditions in such a framework.

[3]Note that the problem is in no way restricted to extraction of noun phrases; the extraction of wh-elements raises similar problems:

i) $[_{\bar{S}}$ $who_i$ $[_S$ $t_i$ was killed $t_i]$

The S-structure (i) is derived from the following D-structure:

ii) $[_{\bar{S}}$ $[_S$ e was killed who]]

At least, there are three derivations, parallel to (19)-(21), mapping (ii) into (i).

[4]One may assume that empty elements which have been coindexed by Move $\alpha$ cannot be moved. This condition has an ECP flavor. Like the ECP (= the Empty Category Principle), it singles out two occurrences of the empty category: NP-traces and variables (cf. P.L.).

[5]If S-structures are decomposed into chains, we need to extend the notion "chain" to include elements in $\bar{A}$-position (cf. (16c)):

i) $who_i$ $t_i$ saw John

In (i), $\underline{who_i}$ and $\underline{t_i}$ will, thus, form a chain. Some consequences of the incorporation of elements in $\bar{A}$-position into chains are discussed in Aoun (1981).

[6]For the purpose of our discussion, we will adopt the following simplified definition of chains, cf. P.L.:

i) $C = (\alpha_i,\ldots,\alpha_n)$ is a <u>chain</u> if and only if

a) $\alpha_i$ is an NP

b) $\alpha_i$ locally binds $_{i+1}$

c) for $i > 1$, (I) $\alpha_i$ is a non-pronominal empty category, or (II) $\alpha_i$ is A-free.

d) C is maximal, i.e. is not a proper subsequence of a chain meeting (a-c).

See, however, the preceding footnote.

[7]The existence of the gaps $\underline{t'}$ and $\underline{t}$ in (17) is determined by the Extended Projection Principle and the $\theta$-criterion (= $\theta$-theory). Briefly, $\underline{t}$ is in a $\theta$-position; if it did not exist $\theta$-theory would be violated and ultimately <u>John</u> would not receive a $\theta$-role. As for $\underline{t'}$, its existence follows from the

Extended Projection Principle: each clause S must have a subject position; t', is the subject position of the embedded clause. For a precise characterization of these notions and their consequences, the reader is referred to P.L. and Chomsky (1980); cf. also Section 5.

[8]The subject position of passive verbs is not a θ-position. This is why a non-referential expression such as it in (i) can appear in this position (cf. P.L.):

i) it was believed that John left

[9]As indicated in Chomsky (1982), (26b) illustrates a double violation: subjacency as well as the Empty Category Principle is violated.

[10] $\alpha$ is subjacent to $\beta$ (or $\beta$ is superjacent to $\alpha$) if at most one bounding category intervenes between $\alpha$ and $\beta$. For English, the bounding categories are NP, PP, S, at least (cf. Chomsky, 1977). Note that a representation such as (i) will violate subjacency (cf. 30):

i) *Here is the influential professor [who$_i$ [John ran in order to impress $e_i$]]

[11]In the oral tradition, this reading of subjacency is attributed to H. Lasnik.

[12]The Extended Projection Principle adds the requirement that each clause S much have a subject position, cf. P.L., Chomsky (to appear) and footnote 7.

[13]It also follows that movement from a θ-position to a θ-position is blocked, since the moved element would be assigned a dual θ-role, cf. P.L., Borer (1981) and the discussion of example (38).

[14]We use RAIN instead of rain since it has been suggested that the latter verb may assign a special θ-role to its subject it which would thus be treated as a quasi-argument (cf. P.L. for further details).

[15]It is assumed in P.L. that raising verbs trigger a process of $\bar{S}$-deletion which allows them to govern the embedded subject position. Let us assume, however, for the sake of discussion, that SEEM, contrary to seem, does not govern the embedded subject position, i.e. that it does not trigger $\bar{S}$-deletion. Representation (35) will still be ruled out under the assumption that $\bar{S}$ breaks a chain (cf. Aoun 1981). Since an $\bar{S}$ boundary intervenes between John and the empty element, they will be in separate chains. The chain containing this empty element will not receive a θ-role:

i) Jove$_i$ SEEMS [$_{\bar{S}}$ PRO$_i$ to RAIN]

If we choose to treat PRO as a referential element, representation (i) will be ruled out by the θ-criterion: PRO does not receive a θ-role. If, however, we choose to treat PRO as a non-referential element, representation (i) may be ruled out under the assumption that non-referential PRO do not exist (as suggested in various papers by K. Safir).

In fact, we need not to assume that non-referential PROs do not exist in order to rule out (i). As indicated in P.L., controlled PRO always has a referential expression as its antecedent and it assumes the referential property of its antecedent. (i) will not satisfy these requirements if PRO is non-referential. Incidentally, these requirements may very well turn out not to be specific to the theory of control. They also seem to constrain the relation holding between overt elements:

(ii) $\text{John}_i$ believes $\text{it}_i$ is necessary to leave:

In (ii), the non referential _it_ cannot be related to the referential element _John_. Note finally, that a representation such as iii:

(iii) Jove SEEMS [PRO to RAIN]

where _Jove_ and _PRO_ are not coindexed cannot occur. The reason is that expletive elements in A-positions whether overt or not, always occur in a chain with an argument (in the sense of P.L., where arguments include referential expressions, clauses, ...). The elaboration of the remarks concerning (ii) and (iii) goes beyond the scope of this paper (cf. P.L. for relevant considerations).

[16]It is ruled out redundantly by the θ-criterion: the chain (Jove, empty element) is assigned a dual θ-role. This redundancy suggests that the functional characterization of the empty element is to be subsumed under the θ-criterion or that that the θ-criterion is to be subsumed under the functional characterization of empty elements. This task goes beyond the scope of this paper.

[17]If necessary, D-structure may be "read off" S-structure (cf. P.L.). Note also that, in this approach, the Extended Projection Principle and the θ-criterion will constrain the forms of S-structures (cf. footnote 7) and the mapping between S-structures and LF-structures.

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