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LA Visibility and a Non-Copy Theory of Movement

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Conceptual and descriptive problems with the labeling algorithm (LA) of Chomsky (2013) are shown to be solved by adopting a non-copy theory of movement where (normally) the phonetic shape of a moved element is displaced leaving the semantic content behind and by revising the notion of visibility to LA in such a way that only categories with a phonetic shape as well as semantic content (call them full categories) are visible to LA. As a result, LA is shown to be retainable in its simplest form: Project a visible category.

1. Introduction

Chomsky (2013:11) (henceforth POP) makes a proposal summarized in (1).

- (1) a. For a syntactic object SO to be interpreted at the interfaces, some information is necessary about what kind of object it is.
- b. UG has a labeling algorithm (LA) that provides such information as a label of SO.
- c. LA is just minimal search and it provides a single designated element within SO.
- d. In the case of {H, XP}, H a head and XP not a head, LA will select H as the label.
- e. In the case of {XP, YP}, there are two ways in which SO can be labeled: (A) modify SO so that there is only one visible head, or (B) X and Y are identical in a relevant respect, providing the same label.

- f. XP becomes invisible to LA if it is raised "since it is part of a discontinuous element."

POP cites three cases in which the option (A) is taken, the copular construction in (2a), the predicate-internal subject case in (2b), and the intermediate landing site in successive cyclic *wh*-movement in (2c).

- (2) a. XP copula $\{\beta \text{ XP, YP}\}$
 b. T $\{\beta \text{ (EA) } \{\alpha \text{ v}^* \{\text{VP V IA}\}\}\}$
 c. $\{\beta \text{ WH } \{\alpha \text{ C TP}\}\}$

POP gives (3a) as an example of (2a).¹

- (3) a. be $\{\beta \text{ lightening, } \{\alpha \text{ the cause of the fire}\}\}$
 b. $\{\text{lightening } \{\text{be } \{\alpha \text{ lightening } \{\alpha \text{ the cause of the fire}\}\}\}\}$

When *lightening* is raised out of the small clause = β , resulting in (3b), its copy within β becomes invisible to LA because it is part of the discontinuous element *lightening-lightening*. Therefore, the label of *the cause of fire*, α is chosen as the label of the whole phrase β .

(2b) can be illustrated by a transitive sentence such as (4a), with a schematic structure in (4b).

- (4) a. the sun dried the clothes.
 b. $\{\text{Past } \{\alpha \text{ the sun } \{\text{v}^* \text{P v}^* \{\text{VP dried the clothes}\}\}\}\}$
 c. $\{\text{the sun } \{\text{Past } \{\alpha \text{ the sun } \{\text{v}^* \text{P v}^* \{\text{VP dried the clothes}\}\}\}\}\}$
 d. $\{\text{the sun } \{\text{Past } \{\text{v}^* \text{P the sun } \{\text{v}^* \text{P v}^* \{\text{VP dried the clothes}\}\}\}\}\}$

In (4b) α consists of two phrases, hence is of the form $\{\text{XP, YP}\}$, and LA cannot determine its label. When EA has raised, resulting in (4c), EA within α

¹ Examples cited from POP are all slightly modified to make them consistent in the use of braces and labels α and β , and commas are eliminated for simplicity.

becomes invisible to LA because it is part of a discontinuous element *the sun-the sun*. Therefore LA assigns the label of YP, i.e., v^*P to α , as shown in (4d).

(5a) is an example of (2c).

- (5) a. {they thought { β in which Texas city { $_{CP}$ C {JFK was assassinated}}}}
 b. {in which Texas city {they thought { β in which Texas city { $_{CP}$ C {JFK was assassinated}}}}}
 c. {in which Texas city {they thought { $_{CP}$ in which Texas city { $_{CP}$ C {JFK was assassinated}}}}}

The *wh*-phrase *in which Texas city* occupying the intermediate SpecCP position in (5a) cannot remain there. This follows from the fact that LA cannot assign β a label as it is. When the *wh*-phrase has raised as in (5b), *in which Texas city* within β becomes invisible to LA, which assigns the label of YP, i.e., CP to it, giving (5c).

Thus, (A) accounts for why things have to move: they move because otherwise lack of labels makes the derivation uninterpretable at the interfaces. (B), on the other hand, accounts for when things sometimes need not and therefore may not move, what Rizzi (2010) calls the halting problem. POP discusses the two cases resulting from (2b-c) by raising of the offending XP. Let's start with (2c). POP gives (6a) as an illustration of (2c).

- (6) {they wondered { β in which Texas city { $_{\alpha}$ C {JFK was assassinated}}}}

POP says that in this case α and β share "the most prominent feature, namely interrogative feature Q" and by (B) that can be taken to be the label of β . In other words, Q is the label of β . Since labeling is done successfully, there is no need for the *wh*-phrase to raise any further.

(2b) actually contains two cases, one involving EA and the other not involving EA. They can be illustrated by (7a) and (8a).²

- (7) a. { β Past { $_{\alpha}$ the sun { v^* {dried the clothes}}}}

- b. $\{\gamma \text{ the sun } \{\beta \text{ Past } \{\alpha \text{ the sun } \{v^* \{\text{dried the clothes}\}\}\}\}$
- (8) a. $\{\beta \text{ Past } \{\alpha \vee \{\text{dried the clothes}\}\}$
- b. $\{\gamma \text{ the clothes } \{\beta \text{ Past } \{\alpha \vee \{\text{dried the clothes}\}\}\}\}$

In (7b) EA, *the sun* has raised, and in (8b) IA, *the clothes*, has raised. The two cases share the crucial configuration of {XP, YP} in γ , XP being *the sun* and *the clothes*, and YP being TP. POP accounts for this by (B): the subjects and TP (namely T) share "prominent features, namely ϕ -features" and by (B) LA assigns the shared ϕ -features as the label of β . Again, since labeling is done successfully, there is no need for the subjects to move any further.

Although it is a nicely constructed system and accounts for the obligatory movement and obligatory halting of elements, POP system leaves unanswered a number of questions, conceptual as well as descriptive. In the rest of the paper I will show that the problems it contains can be solved by adopting a non-copy theory of movement, eliminating the labeling by shared prominent features in (1e-B) and by reviving the classical mechanism of movement driven by need to eliminate uninterpretable features.

This paper is organized as follows. Section 2 discusses the problems that still remain with the POP system. Section 3 proposes a way to solve these problems. Section 4 concludes the paper.

2. Problems

There are three groups of problems with LA: those having to do with (A) in (1e), those having to do with (B) in (1e) and those having to do with both (A) and (B). They all render the whole system less than minimalistic.

2.1. Three Problems with (A)

There are three problems with (A): one having to do with the fact that not all movement is driven by labeling, the second having to do with minimal

2 The reader must have noticed that there is a question posed by (8a) about what drives the raising of *the clothes* in (8b). I will come back to this question shortly below.

search, and the third having to do with its stipulative nature.

2.1.1. Movement not Driven by LA.

If need for labeling for interpretation at the interfaces drives raising as in POP's formulation of LA (A), then we would want to reduce all raising (Internal Merge) to LA. However, that is not possible. As noted above, the raising of IA in an unaccusative construction illustrated in (8), repeated below as (9), is the case in point. LA (B) accounts for why the subject stops at SpecTP, but the fact that it has to raise from within VP does not follow from LA.

- (9) a. $\{_{\delta} T \{_{\beta} v \{_{\alpha} \text{dried the clothes}\}\}\}$
 b. $\{_{\gamma} \text{the clothes} \{_{\delta} T \{_{\beta} v \{_{\alpha} \text{dried the clothes}\}\}\}\}$

In (9a), $\alpha \{ \text{dried the clothes} \}$ can be labeled by its head V as VP. The phrase β can be labeled by its head v as vP. Therefore, as far as the need to label α and β goes, *the clothes* need not raise. But it does. So there must be something else that requires it to move to SpecTP. One might be tempted to related this to the fact that the subject *the clothes* and T must agree in ϕ -features. But under current assumptions, Agree takes place under probe-goal configuration, not necessarily involving movement. What is clearly shared by the subjects in (7b) and (9b) is the fact that they have Nominative Case assigned to them, the fact made clearer when *the clothes* is replaced by a pronoun: it comes out in the Nominative Case form *they*. If we assume, going back to a somewhat traditional view, that A-movement is driven by the need for DP to receive Case, then we have one common driving factor for subject raising. However, the fact still remains that LA is not behind every raising operation. This seems to suggest that it is necessary to recognize the need to assign/receive Case as an independent factor for raising. One way to reconcile Case and LA is to say that LA does not drive raising but is an automatic consequence of raising and that it also guarantees interpretation at the interfaces.

Another problem that (9) poses is the fact that the solution of the halting

problem in the sense of Rizzi applies here despite the fact that movement does not seem to be driven by the need for labeling. This calls the relevance of (B) in (1e) into question.

2.1.2. Problem with Minimal Search: the Look-up Problem

There is a problem with the notion of minimal search as well. Consider again the derivation of (4a) in (4b-c), repeated below as (10a-b) with different label variables.

- (10) a. $\{\beta \text{ Past } \{\alpha \text{ the sun } \{\nu_{\text{SP}} \nu^* \{\nu_{\text{VP}} \text{ dried the clothes}\}\}\}\}$
 b. $\{\gamma \text{ the sun } \{\beta \text{ Past } \{\alpha \text{ the sun } \{\nu_{\text{SP}} \nu^* \{\nu_{\text{VP}} \text{ dried the clothes}\}\}\}\}\}$

In (10a), β cannot be labeled because it is of the form $\{DP, \nu^*P\}$, but when *the sun* raises, giving (10b), the second occurrence of *the sun* becomes invisible because it is part of a discontinuous element *the sun-the sun*, and the whole phrase receives the label of YP, i.e., ν^*P , so goes the POP account. This is supposed to follow from minimal search by LA. However, strictly speaking, it does not. Even after the raising of the subject we still have the following configuration.

- (11) $\{\gamma \text{ the sun } \{\beta \text{ Past } \{\alpha \text{ the sun } \{\nu_{\text{SP}} \nu^* \{\nu_{\text{VP}} \text{ dried the clothes}\}\}\}\}\}$

LA must look beyond $\{\alpha \text{ the sun}, \nu^*P\}$ at what is in SpecTP to be able to tell that *the sun* is part of a discontinuous element. But that seems to go against minimal search. Minimal search should allow LA to look only at the two phrases in $\{XP, YP\}$. Since the two copies of *the sun* in (10b) are assumed to be exact copies of each other, there should be no way of telling just by looking at β that a given occurrence is part of a discontinuous element.

The same is true in the case of successive *wh*-movement in (5). At the stage in (5b), repeated below as (12), LA cannot tell that the second occurrence of *in which Texas city* is part of a discontinuous element just by looking at β *{in which Texas city, CP}*.

- (12) {in which Texas city {they thought { β in which Texas city { $_{CP}$ C, {JFK was assassinated}}}}

The putative fact that "LA is just minimal search, presumably appropriating a third factor principle" is regarded as crucial notation for LA. So the fact that LA cannot be reduced to minimal search should undermine the whole POP approach. If we are to maintain LA as the most basic operation of UG as appropriating a third factor principle, then something must be done to make LA operate correctly in cases such as (4) and (5).

2.1.3. Stipulative Nature of (A)

To say that X determines the label in {X, YP} is a stipulation no matter how justified it might look. The fact which POP mentions that we get the incorrect result for "he left" if X is allowed to project does not justify the stipulation. The incorrect result { $_{DP}$ *he*, { $_{vP}$ *left*}} needs the stipulation (A). But even without the stipulation, it will result in uninterpretability (i.e., crash) at the C-I interface.³

One major motivation of LA is to eliminate the stipulative nature of X-bar theory, especially endocentricity, but the fact that (A) makes reference to the notions head and non-head clearly indicates that it still contains a remnant, in fact a core remnant of X-bar theory.

2.2. Two Problems with (B)

There are at least two problems with (B): whether shared prominent features really make the relevant node interpretable and whether prominent features are really shared.

2.2.1. Labels and Interpretability⁴

The POP system contains the following two assumptions in (13).

- 3 If this stipulation can be removed, as will be shown later, then it is not necessary to analyze *he* as D-pro (Uriagereka 1998) or the free relative *what* as *it-that* (Donati 2006) as discussed in POP.

- (13) a. SO becomes interpretable if and only if it is labeled.
 b. Most prominent features F shared by XP and YP in the configuration {XP, YP} constitute the label of the whole phrase, giving $\{_F \text{ XP, YP}\}$

Since in the current framework edge features are eliminated, categorial selection can be captured only at C-I interface in terms of the category labels. In the case of A-movement of the subject, however, labeling by the shared most prominent feature does not seem to work as desired. Consider (7b), repeated below as (14a), with α added.

- (14) a. $\{\beta \text{ the sun } \{\alpha \text{ Past } \{_{v^*p} \text{ the sun } v^* \{\text{dried the clothes}\}\}\}\}$
 b. $\{\phi \text{ the sun } \{\phi \text{ Past } \{_{v^*p} \text{ the sun } v^* \{\text{dried the clothes}\}\}\}\}$

It is assumed under the probe-goal Agree system that Past gets the ϕ -features of *the sun* so that XP = *the sun* and α = TP share them, allowing LA to give both β and α the same labels, the same ϕ -features, as shown in (14b).

Notice that the whole phrase is now labeled as ϕ , and not as TP. In POP labeling is necessary for interpretation at the interfaces, not for further application of Merge. Therefore, categorial selection holds not when Merge applies in the course of derivation but at the interfaces, and labeling is a necessary condition for interpretation. This means that (14b) is not a TP but a ϕ P and the fact that it can be combined with *that* as in (15a) means that the complementizer *that* is licit at C-I interface when combined with ϕ P, not with TP. That in turn means that *that* should be able to combine with any ϕ P, making the wrong prediction that (15b) is a well-formed non-elliptical sentence.

- (15) a. (I noticed) {that $\{\phi \text{ the sun } \{\phi \text{ Past } \{_{v^*p} \text{ the sun } v^* \{\text{dried the clothes}\}\}\}\}$ }
 b. *I noticed {that {the sun}}

4 This point was brought to my attention by Akira Saizen (p.c.).

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It is necessary to assume that the whole DP *the sun* has ϕ -features, which are presumably shared between *the* and *sun*. That should allow it to be the complement of *that*. Thus, the assumption that the shared ϕ -features in (14a) allows the whole phrase to be labeled as in (14b) has led to an absurdity that (15b) is a well-formed non-elliptical sentence.

The same holds true in *wh*-questions. Consider (6) again, repeated below as (16a).

- (16) a. $\{\text{they wondered } \{_\beta \text{ in which Texas city } \{_\alpha \text{ C \{JFK was assassinated}\}\}\}\}$
b. $\{_\alpha \text{ in which Texas city } \{_\alpha \text{ C \{JFK was assassinated}\}\}\}$
c. *I wonder $\{_\alpha \text{ in which Texas city } \{_\alpha \text{ C \{JFK was assassinated}\}\}\}$

By LA α and β are both Q as shown in (16b). So the fact that *wonder* selects an indirect question must be captured by the fact that it can combine with a node labeled as Q. For the labeling in (16b) to take place, it must be assumed that *in which Texas city* has Q. Then it has to be able to combine with *wonder* as in (16c) and form a non-elliptical indirect question, another reduction to absurdity.

Thus, reference to prominent features does allow TPs and CPs to be labeled as desired, but the labeling makes the wrong prediction in both cases considered. Obviously, some way has to be found to capture the fact that the relevant constituent is a TP in (7b) or CP in (6), in addition to, not instead of, the fact that certain features are shared. Thus, reference to most prominent features must be dissociated from LA.⁵

2.2.2. Shared Prominent Features That Cannot Exist at the Interfaces

The second problem with (B) is the fact that ϕ -features cannot survive to

5 It might be proposed in defense of the current formulation of LA that the existence of shared prominent features is a necessary condition for labeling but the actual label comes from the node that has newly acquired the relevant features. However, that would seriously undermine minimal search, and should be avoided if there is a more effective way to preserve minimal search.

the interfaces. Consider the derivation in (17).

- (17) a. $\{_{\alpha} \text{ the cook } \{_{TP} \text{ is } \{_{v^*P} \text{ the cook } v^* \{ \text{thickening the soup} \} \} \} \}$
 b. $\{_{\phi} \text{ the cook } \{_{\phi} \text{ is } \{_{v^*P} \text{ the cook } v^* \{ \text{thickening the soup} \} \} \} \}$

In POP we must assume that *is* comprises of $T = \text{Present}$ and the aspectual auxiliary *be* together with the ϕ -features that it obtained from the subject, so that DP *the cook* and TP *{is (the cook) thickening the soup}* share the ϕ -features allowing both to be labeled as ϕ .

However, there is good reason to believe that ϕ -features on the aspectual auxiliary do not survive to the interfaces. The ϕ -features are uninterpretable at PF (S-M interface) because they are not phonological features. Nor are they interpretable at LF (C-I interface): there is no 3rd person, singular, masculine / feminine Tense. Rather the ϕ -features on T are morpho-phonological features that only serve to determine the phonological shape of the tense-carrying auxiliary *be*, and since they are uninterpretable in T, they disappear as soon as T is spelled out as *is*. They play no role at LF, so they shouldn't be part of LF.

If ϕ -features are not present in either interface, then it does not make any sense to say that they help LA to label TP for interpretation at the interfaces.⁶ Again some way needs to be found to label TP as TP without reference to ϕ -features.

2.3. Disjunction Problem

Perhaps the most serious problem of LA is the fact that it contains disjunction: labeling is determined *either* by (in)visibility (A) *or* by most prominent shared features (B). As is the case when a mechanism contains disjunction, it is not clear at all what is common to (in)visibility and most prominent shared features. Furthermore, it is not clear whether the notion of

⁶ Again it might be argued that LA applies as soon as the configuration in (17a) is created, and furthermore, that shared features are just a necessary condition for labeling and the actual label that is assigned by LA is TP, rather than ϕ -features. That would again undermine minimal search.

“most prominent features” can be defined naturally. It would be far better if LA applied under one condition, for instance, that labeling is determined only by the visible label in the configuration. In fact that is what I am going to propose below.

To summarize this subsection, it has been found that LA in POP formulation faces various problems and a way needs to be found to solve them.⁷

3. Solution

We can solve all the problems with the (A) and (B) parts of LA discussed above and still retain LA with minimal search intact if we make the following assumptions about movement.

3.1. Non-Copy Theory of Movement⁸

Instead of the standard assumption of the copy theory of movement (CTM), suppose we have a non-copy theory of movement (NTM) summarized in (18).

- (18) a. Syntactic Object SO comprises of two parts, its phonetic shape /SO/ and its semantic content {SO}.
- b. Movement (IM) only takes /SO/, leaving {SO} behind.
- c. Movement can carry part of {SO} if it leads to an interpretation otherwise unavailable (Call this Piggybacking).

Suppose also that we revise visibility to LA by defining it with the notion of full category as given below.

- (19) a. Full Category
- SO is a full category if it has both its phonetic form and its semantic

⁷ Disjunction still remains because of the two configurations {X, YP} and {XP, YP}. This problem may also be solved, as we shall see below, by eliminating (B) altogether.

⁸ The idea of partial copy theory of movement is originally due to Tonoike (2003).

content.

b. Visibility

Only full category SOs are visible to LA.

Piggybacking aside, A-movement and A'-movement give rise to the following schematic configurations.⁹

- (20) a. $[\beta \text{ /DP/ } [_{TP} \text{ T } [\alpha \{ \text{DP} \} [_{v^*P} \text{ v}^* \text{ VP}]]]]$ (A-Movement to SpecTP)
 b. $[\beta \text{ /WH/ C } [_{v^*P} \dots \{ \text{WH} \} \dots]]$ (A'-movement to Specv*P)
 c. $[\beta \text{ /WH/ C } [_{TP} \dots \{ \text{WH} \} \dots]]$ (A'-Movement to SpecCP)

LA can apply to each configuration without a problem. In (20a), LA assigns the label v^*P to α by minimal search because $\{ \text{DP} \}$, lacking the phonetic shape, is not a full category and hence invisible to LA. LA assigns the label TP to β by minimal search because /DP/, lacking the semantic content, is not a full category and hence invisible to LA. Notice that no look-up problem arises. LA operates strictly under minimal search. In (20b), where a *wh*-phrase has just been extracted from within v^*P and merged with it, the extracted *wh*-phrase consists of its phonetic shape alone and hence invisible to LA, it assigns β the only visible category label, v^*P by minimal search. In (20c), where a *wh*-phrase has been extracted from within TP, and is merged with CP, LA assigns β the only visible category label, CP by minimal search because the extracted *wh*-phrase, consisting of the phonetic shape, is invisible to it. Some semantic material of a *wh*-phrase might be carried along with the phonetic shape, but that does not qualify it as a full category.

Let us look at how labels are assigned to (4a), (5a) and (6). (4a) will look like (21a) after raising of the subject, and the embedded clause of (5a) and (6) will look like (21b) after raising of the *wh*-phrase.

- (21) a. $[\beta \text{ /the sun/ } [_{TP} \text{ Past } [\alpha \{ \text{the sun} \} [_{v^*P} \text{ v}^* [_{VP} \text{ dried the clothes}]]]]]]$

9 Here I use [] instead of { } to represent constituent structure to avoid confusion with the use of { } for semantic material.

- b. [_β /in which Texas city/ [_{CP} C [_{TP} JFK was assassinated (in which Texas city)]]]

In (21a) the phonetic shape of the subject *the sun*, represented as /*the sun*/, has raised to SpecTP, leaving behind its semantic content represented as {*the sun*}. Inside α consisting of DP and v*P, the DP is invisible because its phonetic form has raised, and it consists solely of its semantic content. Therefore, LA by minimal search can see only v*P and, it gives the label of v*P to α , giving the desired labeling, [_{v*P} DP [_{v*P} v* VP]]. Now the resulting structure consisting of /*the sun*/ and [_{TP} Past v*P] has to be labeled. LA cannot see /*the sun*/ because it is not a full category. Therefore, LA by minimal search can see only TP, and assigns this label to the whole phrase β , giving the desired labeling [_{TP} /*the sun*/ [_{TP} Past v*]]. If the subject contains no other features that force it to raise further, it just stays there without causing a labeling problem. Shared prominent features play no role in this alternative.

In (21b) the *wh*-phrase *in which Texas city* is not visible to LA because it is not a full category, therefore LA assigns the label of the other phrase, CP to β , giving the desired labeling [_{CP} in which Texas city [_{CP} C ...]]. If the *wh*-phrase has nothing else to raise it, it can stay there as in (6), the whole phrase serving as the complement of *wonder*. If there is something that forces it to raise further as in (5a), it will have to undergo further *wh*-movement to give, "In which Texas city did they think that JFK was assassinated?" for instance. Since this last movement has carried only the phonetic shape of the *wh*-phrase, it will not cause failure of labeling.

The revised LA coupled with the new definition of (in)visibility in terms of fullness of a category solves all the problems with the POP formulation with CTM system pointed out in Section 2. Therefore, in order to choose between the two alternatives, it is only necessary to make sure that the NCT account is as good as the CTM account.

3.2. Arguments for the NCT of Movement

In fact the NCT account is superior to the CTM account in a number of

ways.

3.2.1. Simplicity

It might be argued that CTM is simpler because it does not have to say anything about what is moved while NCT says that basically only a phonetic shape can be moved.¹⁰ While that is true as far as movement is concerned, CTM has to be supplemented by an extra operation of deleting the phonetic shape of all the copies except the final one as well as the semantic content of all the copies except the initial copy. Consider what happens in the derivation of (22a) under CTM. For the convenience of exposition, only the phonetic shape and the semantic content of *John* are distinguished and represented linearly as /John/{John} when they occur together.

- (22) a. John may know the secret
 b. may [/John/{John} know the secret] A-Movement-->
 c. [/John/{John} may [/John/{John} know the secret] Deletion-->
 d. [/John/{John} may [~~/John~~/{John} know the secret]
 e. [/John/ may [{John} know the secret]

A-Movement of *John* applies to (22b) and gives (22c) with two full copies of *John*. Deletion applies to (22c) and gives (22d) where strike-out indicates deletion, and it will look like (22e) just before transfer.

Compare this with what happens under NCT.

- (23) a. may [/John/{John} know the secret] A-Movement-->
 b. [/John/ may [{John} know the secret]]

Clearly, the overall NCT treatment is considerably simpler than the CTM treatment.

Basically the same is true of A'-Movement in "Which secret may John

10 Hisatsugu Kitahara (p.c. in 1998) pointed out this possibility to me.

know?" as shown schematically in (24)-(25) with irrelevant details omitted.

- (24) a. $[/\text{which secret}/\{\text{which secret}\} \text{ C } [_{\text{TP}} \dots [_{\text{v}^* \text{P}} / \text{which secret}/\{\text{which secret}\} \dots [_{\text{VP}} \dots / \text{which secret}/\{\text{which secret}\}}]]]]$ Deletion--->
 b. $[/\text{which secret}/\{\text{which secret}\} \text{ C } [_{\text{TP}} \dots [_{\text{v}^* \text{P}} / \text{which secret}/\{\text{which secret}\} \dots [_{\text{VP}} \dots / \text{which secret}/\{\text{which secret}\}}]]]]$
 c. $[/\text{which secret}/ \text{ C } [_{\text{TP}} \dots [_{\text{v}^* \text{P}} \dots [_{\text{VP}} \dots \{\text{which secret}\}}]]]]$
 (25) a. $[_{\text{v}^* \text{P}} / \text{which secret}/ \dots [_{\text{VP}} \dots \{\text{which secret}\}]]$
 b. $[/\text{which secret}/ \text{ C } [_{\text{TP}} \dots [_{\text{v}^* \text{P}} \dots [_{\text{VP}} \dots \{\text{which secret}\}}]]]]$

(24a) is what we have after successive cyclic *wh*-movement with three full copies of *which secret*, and after deletion in (24b) we get (24c). Under NCT, we get (25a) after the first application of *wh*-movement within *v**P. After the second application we have (25b). Notice that the intermediate "copy" has disappeared. This is because under NCT, unlike under CTM, */which secret/* in *Specv**P has raised to *SpecCP*, without any of its copy lying around.

It might be objected that NCT is too simplistic because it is known that some semantic element is pied-piped by A-, and A'-movement. It is clear, for instance, that in (26a) from May (1985), the existential quantifier can raise across and take scope over *likely*. POP cites (26b) to show that even the subject of a raising construction has "a kind of secondary agency", which suggests that some part of the semantic content of the subject has raised with PRO.

- (26) a. A hippogryph is likely to be apprehended.
 b. PRO to seem to be intelligent is not as easy as you might think.

These facts can be accommodated under NCT by Piggybacking in (18c). However, the fact that some part of the semantic content has accompanied the raising of the subjects by Piggybacking does not qualify them as full categories because the core parts of the semantic contents of the subjects, especially those receiving θ -roles have to remain in the original positions.

Therefore, such facts do not come in the way of LA functioning properly. The phonetic shape and whatever accompanies it still do not count as a full category and are invisible to LA.

3.2.2. Conceptual Advantage of NCT in

3.2.2.1. A-Movement

NCT has certain conceptual advantage over CTM. In the current framework leading to POP it has been assumed that Case assignment takes place as "a reflex" of ϕ -feature agreement. There has been a shift from the system in which DPs had unvalued Case features and got their values from v^* via V and C via T, and now it is not clear whether DPs have Case features or not, and agreement is solely in terms of ϕ -features. This state of affairs seems to me to be closely related to Chomsky's decision to have a uniform definition of uninterpretability as unvaluedness. Every DP can be assumed to have valued ϕ -features, so the values of unvalued ϕ -features on V and T can come from the relevant DPs. However, the situation is different with Case features. If a value of an unvalued feature has to come from a value of the same feature found elsewhere in the same structure, that value has to be independently motivated so as to be interpretable. However, V and T cannot be said to have Case feature values (Accusative and Nominative) as inherent features. That seems to be behind the decision to treat Case assignment as a "reflex of ϕ -feature agreement."

However, one plausible alternative is to take a converse view and say that what drives movement is Case assignment by V and T, and ϕ -feature agreement is a reflex of Case assignment. We could furthermore assume that the values of Case feature, Nominative and Accusative, are categorial features T and V, respectively, along the lines of Pesetsky and Torrego (2001, 2004). This way we can treat Case features in the same way as we treat ϕ -features. A value of an unvalued feature comes from a value of some interpretable features: ϕ -feature values come from the values of interpretable ϕ -feature of a DP, and Case feature values come from the values of the interpretable categorial features of T and V.

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- (27) a. DP T ---> DP T
 [uCase] [TCase] [TCase] = Nominative
- b. V DP ---> V DP
 [uCase] [VCASE] [VCASE] = Accusative

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Under this conception of Case, we have an account of why A-movement is a movement of the phonetic shape of a DP. A DP needs Case to determine its phonetic shape, therefore by Economy A-movement carries just enough material for convergence. Just enough material for A-movement is usually its phonetic shape, more specifically its morph-phonological coding.

Furthermore, the problem of movement not driven by labeling, posed by (9b), repeated below as (28a), is now solved, as shown in (28b).

- (28) a. $\{_{\gamma} \text{ the clothes } \{_{\delta} T \{_{\beta} v \{_{\alpha} \text{ dried the clothes } \}}\}}\}$
b. $[_{TP} / \text{the clothes} / T [_{VP} v [_{VP} \text{ dried } \{ \text{the clothes} \}]]]]$

Need to label α does not force IA to raise because in (28a) LA can labeled α as VP without IA raising. But the need for nominative Case to be assigned by T and for IA to receive some Case does force it to move to SpecTP, if it is assume that Case assignment requires adjacency between the assigner and the assignee.¹¹

3.2.2.2 A'-Movement

Obviously the same motivation does not apply to A'-movement. There may be some kind of agreement going on between the *wh*-phrase and landing site C, but if so it is not visibly manifested in the *wh*-phrase and furthermore, if agreement is all that is involved in *wh*-movement, that does not account for successive *wh*-movement, because agreement will be achieved by the first

11 I am assuming that Case assignment (in languages like English) takes place when the assigner and the assignee are within the same projection, in this case TP. See Tonoike (to appear) for more details.

movement. This suggests that there is something else that drives *wh*-movement. The fact that *wh*-movement stops at the specifier position of the C that constitutes a question suggests that *wh*-movement carries a force indicator that needs to be associated with a CP that constitutes a question.

Furthermore, the fact that there is certain variation as to what actually undergoes *wh*-movement as shown in (29) below, adapted from Ross' (1967, 1986) examples of variation in *wh*-movement in relativization, suggests that something other than "agreement in Q" is at work.

- (29) a. Which report did the government prescribe the colors of the covers of?
b. Of which report did the government prescribe the colors of the covers?
c. The covers of which report did the government prescribe the colors of?
d. Of the covers of which report did the government prescribe the colors?
e. The colors of the covers of which report did the government prescribe?

These are basically acceptable to my informants though the degree of acceptability varies from one to another. This suggests that *wh*-movement serves to indicate the focus of question by preposing the focused constituent.

One straightforward way to capture these two aspects of *wh*-movement is to assume that a *wh*-phrase contains an abstract question-focus complex and *wh*-movement is driven by the need to place the question part in the relevant C as its force indicator and the focus part requires that the focused constituent be carried along. The moved element consists of the phonetic shape and the question-focus complex, but lacks all or at least some of the semantic content, and hence is not a full category. So in the landing site, the whole phrase will receive the label CP, as desired.

3.3. Disjunction Eliminated

Given the definition of LA visibility in terms of full category, once a phrase undergoes IM, the launching site is invisible to LA because it lacks the phonetic shape, and the landing site is invisible because it lacks (some of) its semantic material. As a result the moved phrase does not participate in the labeling of the host phrase. That takes care of the labeling problem both in the launching site and the landing site.

The halting problem is now taken care of by "inactivity". A DP undergoing raising stops where it receives a value for its unvalued Case feature (or T/V feature) and it becomes inactive and cannot move any further. A *wh*-phrase carrying a question-focus complex raises to the specifier position of C, which is in need of the force-feature value and gets it from the *wh*-phrase. Again when the unvalued interpretable feature receives a value, it becomes inactive and cannot move any further. This eliminates the use of "most prominent shared feature" in (B).

4. Concluding Remarks

In this paper I have pointed out problems remaining with LA of the POP system, and proposed to solve them by adopting a non-copy theory of movement, according to which movement (Internal Merge) moves only the morpho-phonological coding (i.e., phonetic shape) of the moved element separating it from its semantic content (meaning), thereby making the two "copies" invisible to LA, only full categories with both its phonetic shape and its meaning being visible to LA. This solves the look-up problem and allows LA to be minimal search.

I have also proposed to eliminate (B), namely reference to "most prominent shared features" by reviving the traditional mechanism of A- and A'-movement. This simplifies LA considerably. Now it consists of two parts.

(30) Labeling Algorithm

- a. [X, YP]: X determines labeling.

- b. $[XP, YP] \rightarrow [XP/[[XP] YP]]$: only YP is visible.

(30b) is no longer a problem. Only YP is visible, so the whole SO will be labeled as YP. (30a) is a problem. POP says that X determines the label of the whole phrase, giving $[_{XP} X, YP]$. But under the current proposal, both X and YP are visible because both are full categories. Then it is expected that either X or YP can project and determine the label of the whole SO. This expectation is borne out. Consider the following two configurations.

- (31) a. $[_\alpha \text{ dry } [_{DP} \text{ the clothes}]] \rightarrow [_{VP} \text{ dry } [_{DP} \text{ the clothes}]]$
 b. $[_\alpha \text{ it } [_{v^*P} v^* [_{DP} \text{ dry the clothes}]]] \rightarrow [_{v^*P} \text{ it } [_{v^*P} v^* [_{DP} \text{ dry the clothes}]]]$

In (31a) *dry* is X and if it projects we get a VP [*dry the clothes*]. In (31b), *it* is X, that is, it is a D. If *v*P* projects we get a regular *v*P* structure.¹² If *the clothes* projects in (31a), then the derivation crashes at the C-I interface. If *it* projects in (31b), again the derivation crashes at the C-I interface. This solves the problem of stipulative nature of (A) mentioned in 2.2.3.

Then we have a maximally simple LA.¹³

(32) Labeling Algorithm

Project a (visible) category.

This accommodates all the relevant cases as shown below.¹⁴

- (33) a. $[_{XP} X, YP]$: X determines the label.

12 POP assumes that a pronoun is a D but that it has an invisible N like *one* in cases like (32b) so that *it dry the clothes* constitutes $[XP, YP]$. But there is no independent evidence for that.

13 There still remains adjunction cases involving pair-merge.

(i) $[_{DP} [_{DP} \text{ that (story)}] [_{CP} \text{ which is true}]]$

In these cases it is XP that projects. If YP projects the derivation crashes at the C-I interface.

example: [_{VP} dry, the clothes]

- b. [_{YP} X, YP]: YP determines the label.

example: [_{V+P} it, v* [_{VP} dry the clothes]]

- c. [/XP/ ... [_{YP} {XP}, YP]]: (/XP/ raising out of YP) YP determines the label.

example: [_{TP} /the sun/ will [_{V+P} {the sun} v* [dry the clothes]]]

Thus, it has been shown that LA can be retained with all its stipulative elements removed.

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14 Needless to say, raising of IA in unaccusative constructions does not pose any problem if we make a natural assumption that labeling takes place cyclically and that later application of raising does not affect the labels in past cycles.

(i) [/DP/ T [_v [_α V {DP}]]]

When raising applies, the label of α has already been determined as VP.