

# When and How Does Search Take Place?

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## 1. Proposals and Assumptions

In personal communication with Epstein, Kitahara and Seely (EKS), Chomsky suggests:

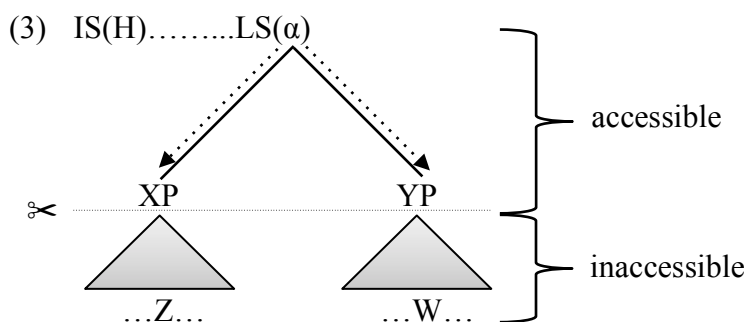
- (1) “Labeling is a search procedure, like Agree (and in fact Merge, which searches for things to merge). So why isn’t it enough to say that all search procedures are governed by the third factor principle of economy (shortest search).” [EKS 2018: 268]

That said, however, it is still unclear (at least to me) how a search procedure is governed by the 3rd factor principle of economy and involved in the formulation of  $\text{Merge}(X, Y) \rightarrow \{X, Y\}$ . So I propose:

### (2) *3rd-factor-constrained Minimal Search (MS-3)*

A search procedure is involved not only in labeling the output of  $\text{Merge}\{X, Y\}$  (which I call Label-Search, LS) but also in determining the input of  $\text{Merge}(X, Y)$  (which I call Input-Search, IS), and the 3rd factor principle requires all search procedures not to access the deep interior of a complex structure such as  $\{XP, YP\}$ .

This proposal, which I dub *MS-3* to mean *3rd-factor-constrained Minimal Search*, is illustrated below (where the dotted arrows mean a search procedure of LS and IS):



Under the MS-3, it follows that in an XP-YP structure such as (3), XP, YP are accessible to both  $LS(\alpha)$  (search to determine the label of  $\alpha$ ) and to  $IS(H)$  (search to determine the input of Merge with H), but the deep interiors of them, i.e., the gray zones containing Z, W, are inaccessible to  $LS(\alpha)$  and  $IS(H)$ . Under the MS-3, therefore, it follows that a search procedure (both LS and IS) always operates over the minimum binary branching structure in a workspace.

To implement the MS-3 technically, I assume here (4), (5), and (6):

(4) Assumption I (Moro 2000; Chomsky 2013<sup>/POP</sup>; 2015<sup>/POP+</sup>)

- a.  $\{H, XP\}$  is labeled as H.
- b.  $\{XP, YP\}$  is not labeled.
- c.  $\{XP_F, YP_F\}$  is labeled as  $\langle F, F \rangle$  ( $F=Q/\phi$ ).
- d.  $\{t_{XP}, YP\}$  is labeled as Y.

(5) Assumption II (Sorida 2014; Bošković 2016; Rizzi 2016; Saito 2016)

LS applies at each step of a derivation as soon as it can under the Earliness.

(6) Assumption III (Hiraiwa 2005; Donati 2006; Cable 2010; Narita 2011; Chomsky 2013; 2015)

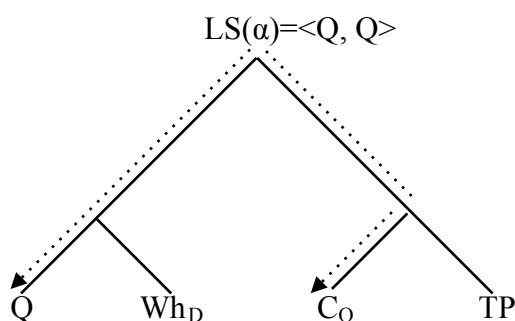
Wh-elements themselves are a D-head ( $Wh_D$ ) and merged with a covert functional category Q, being of the form of  $\{Q, Wh_D\}$ .

(As for the question of what label is assigned to  $\{Q, Wh_D\}$ , I will return in Section 3).

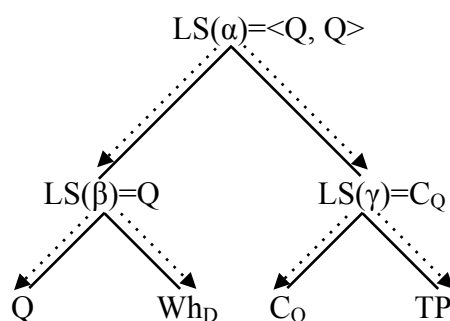
Especially the assumption (5) is crucially different from the POP system, where LS is assumed to apply at the phase level (CP and  $\nu P$ ). To confirm the difference, let us see how an interrogative CP ( $\alpha$  in (7a, b)) is labeled in each system:

(7)  $\langle Q, Q \rangle$  labeling

a. Under the POP system



b. Under the assumption (5)



There is no strong evidence that LS must operate at the phase level as in (7a), so I will assume here the step-by-step labeling as in (7b).

## 2. An Immediate consequence of the MS-3: A unified account of Pied-Piping and CED

(8) Generalization 1 (on Pied-Piping) (Heck 2008; 2009)

(9) Generalization 2 (on CED) (Huang 1982; Chomsky 1986b)

The representative examples of (8) and (9) are (10) and (11), respectively:

a. [**Whose** problem] did he solve?

(11) CED

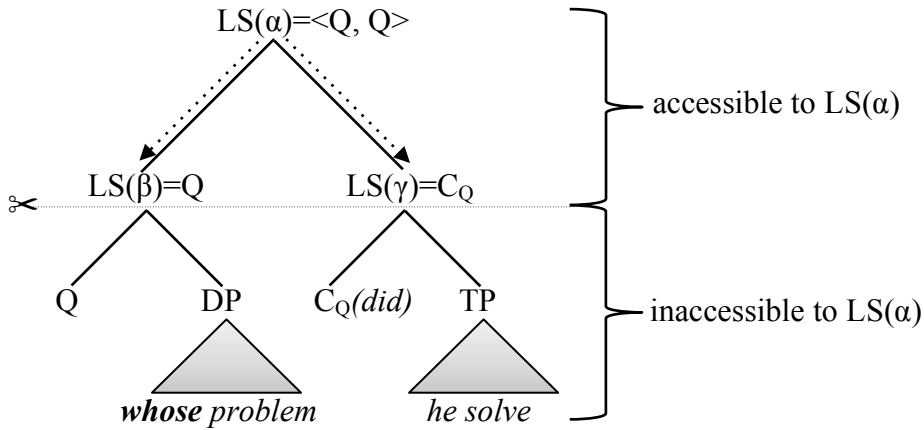
a. **Who<sub>i</sub>** did you believe [that he saw *t<sub>i</sub>*]?

b. \***Who<sub>i</sub>** did [pictures of *t<sub>i</sub>*] please you?

c. \***Who<sub>i</sub>** did he leave [before speaking to  $t_i$ ]?

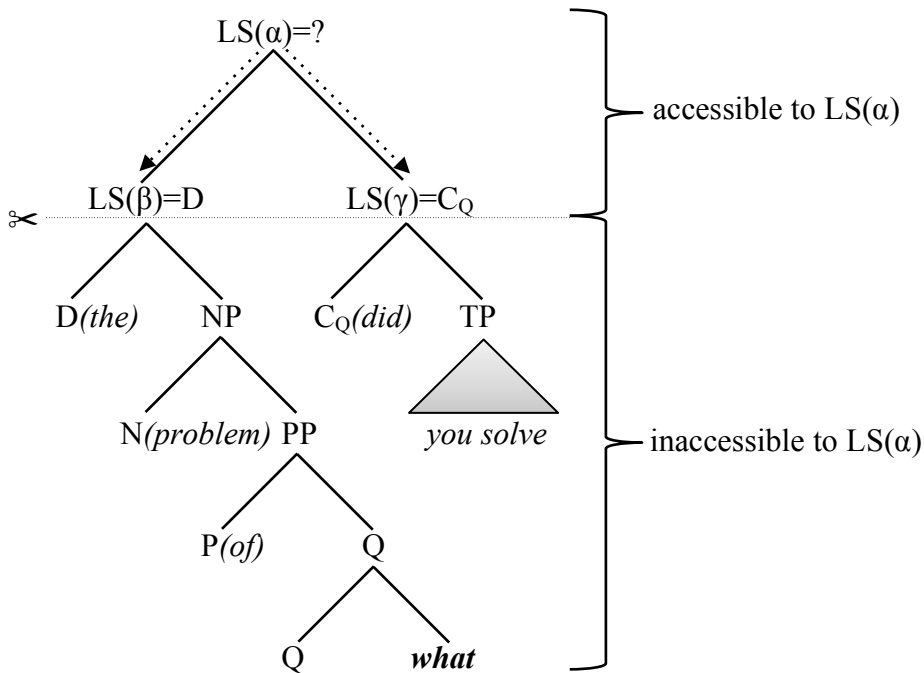
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(12) Derivation of (10a)



In (12),  $\beta$  is labeled as  $Q$ , and  $\gamma$  is labeled as  $C_Q$ . Since these  $Q$  and  $C_Q$  are accessible to  $LS(\alpha)$ ,  $\alpha$  can be labeled as  $\langle Q, Q \rangle$ , interpreted as an interrogative clause at the CI interface.

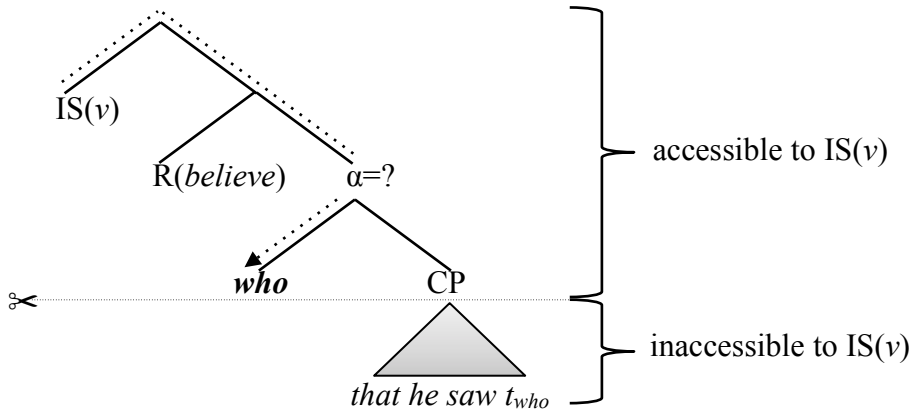
(13) Derivation of (10b)



In (13),  $\beta$  is labeled as  $D$ , and  $\gamma$  is labeled as  $C_Q$ . Although these  $D$  and  $C_Q$  are accessible to  $LS(\alpha)$ ,  $Q$  of *what* is inaccessible to  $LS(\alpha)$  because it is in the deep interior of the  $XP-YP$  ( $DP-CP$ ) structure. Hence  $\alpha$  cannot be labeled as  $\langle Q, Q \rangle$ , failing to receive an interrogative interpretation at the CI interface.

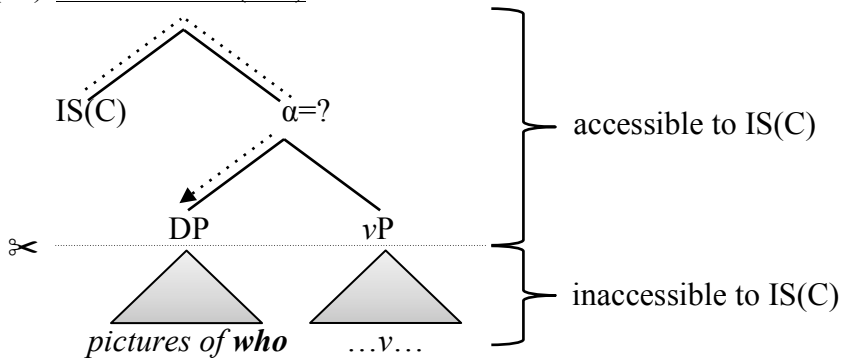
Then, consider (11) (CED). The derivations of (11a, b, c) are (14), (15), and (16), respectively:

(14) Derivation of (11a)



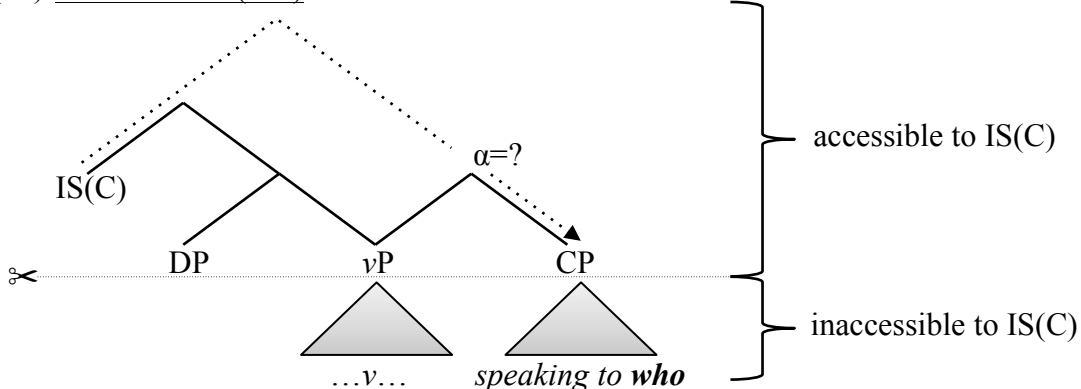
In (14), *who* has already reached the embedded Spec of C by successive cyclic movement. Although *who* itself constitutes a part of XP-YP structure (Wh, CP), it is not in the deep interior of the structure. So it is accessible to  $IS(v)$ , and can be the input of Merge( $v$ ). Hence the extraction out of the complement is allowed. (The same hold for the next CP phase level.)

(15) Derivation of (11b)



In (15), *who* is in the deep interior of the XP-YP structure ( $DP-vP$ ). So it is inaccessible to  $IS(C)$ , and cannot be the input of Merge(C). Hence the extraction out of the subject is disallowed.

(16) Derivation of (11c)



In (16), *who* is in the deep interior of the XP-YP structure ( $\nu$ P-CP). So it is inaccessible to IS(C), and cannot be the input of Merge(C). Hence the extraction out of the adjunct is disallowed.

In this way, under the MS-3, the contracts in (10) (Pied-Piping) and (11) (CED) receive a unified account in terms of the 3<sup>rd</sup> factor principle of economy (shortest search).

Note that in the POP system, it would be an unresolved mystery why (10b) and (11b, c) are bad, while (10a) and (11a) are good, because in that system it is unclear how the 3<sup>rd</sup> factor principle governs LS, and assumed that Merge applies freely.

For further empirical consequences of the MS-3 analysis of CED, see Goto (2016) and Goto and Blümel (to appear). Given the MS-3, Goto (2016) provides a unified account of *the Coordinate Structure Constraint* (CSC), *the Specific Condition*, *the Complex NP Constraint* (CNPC), *the Freezing Principle*, and *the Proper Binding Condition* (PBC), and Goto and Blümel (to appear) provide an explanation to the fact that extraction out of embedded verb second (non-V2)-clauses is impossible.

### 3. Further empirical consequences: A principled explanation of two facts about Pied-Piping

The MS-3 can also account for two empirical facts about Pied-Piping:

(17) Fact 1 (Bhatt 1999; Iatridou et al. 2001; Donati 2006; Chomsky 2008)

Free relative (FR) interpretation (i.e., “DP interpretation”) is not available when the moved element is a phrase.

(18) Fact 2 (Safir 1986; Pesetsky 1987; Heck 2008; 2009; Cable 2010a, b; 2013)

“Massive pied-piping” (i.e., pied-piping of NP by its complement) is allowed in root clauses.

The representative examples of (17) and (18) are (19) and (20), respectively:

(19) a. (I read) [**what**<sub>i</sub> you wrote *t*<sub>i</sub>]. (<sup>OK</sup> FR/DP interpretation)

b. (I read) [**what book**<sub>i</sub> you wrote *t*<sub>i</sub>]. (\*FR/DP interpretation.)

(20) (Cable 2013: 12)

a. \*I wonder [[pictures of **whom**] you bought on the internet].

b. ??[Pictures of **whom**] did you buy on the internet?

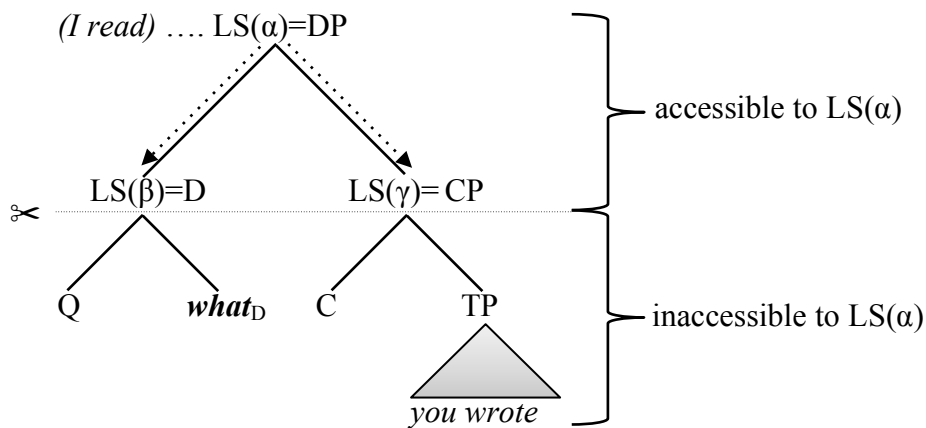
Before considering these, let us clarify how  $\{Q, Wh_D\}$  is labeled, an instance of  $\{H, H\}$  structure. In the POP system, it is assumed that  $\{H, H\}$  structures are not labeled, but the specific case considered in that system is limited to the special case of  $\{f, R\}$ ,  $f$  a category marker and  $R$  a root, and nothing explicit is said about other relevant  $\{H, H\}$  structures. So I assume here (21), following Chomsky (2008: 145), where he suggests: “when two LIs merge [...] either may project.”

(21) Assumption IV (cf. Chomsky 2008)

In  $\{H_1, H_2\}$  ( $H_{1/2}$  nether  $f$  nor  $R$ ), either may project.

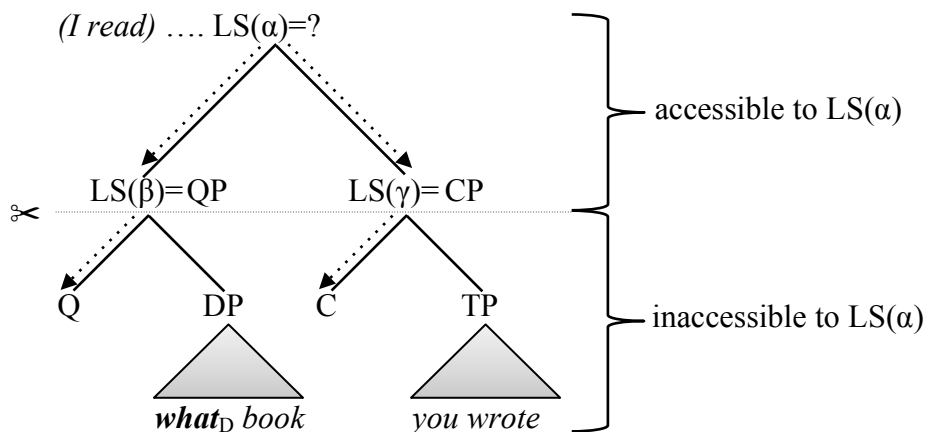
Assuming (21), consider first (19). The derivations of (19a, b) are (22) and (23), respectively:

(22) Derivation of (19a)



In (22),  $\beta$  is of the form  $\{H, H\}$  ( $Q, what_D$ ). Under the assumption (21), either  $Q$  or  $D$  may project. Assume here that  $D$  projects, and  $\beta$  is labeled as  $D$ . Now since  $\alpha$  is of the form of  $\{D, CP\}$ ,  $\alpha$  is labeled as  $DP$ . The sentence (19a) can receive the FR/ $DP$  interpretation at the CI interface.

(23) Derivation of (19b)



In (23),  $\beta$  is labeled as QP, and  $\gamma$  is labeled as CP. Although these QP and CP are accessible to  $LS(\alpha)$ , D of *what book* is inaccessible, as it is in the deep interior of the XP-YP (QP-CP) structure. So  $\alpha$  cannot receive the label of D, and the sentence (19b) cannot receive the FR/DP interpretation at the CI interface.

Then, consider (20). The data are repeated below (with some relevant structural details indicated):

- (24) a. \*I wonder [ $_{LS(\alpha)}$  [ $_{DP}$  pictures of [Q, **whom**]] [ $_{CP}$  C<sub>Q</sub> [ $_{TP}$  you bought on the internet]]]  
 b. ??[ $_{LS(\alpha)}$  [ $_{DP}$  pictures of [Q, **whom**]] [ $_{CP}$  C<sub>Q</sub>(did) [ $_{TP}$  you bought on the internet]]]

Now we know why (24a) is bad: In (24a), since Q of *whom* is in the deep interior of the XP-YP (DP-CP) structure, Q is inaccessible to  $LS(\alpha)$ , and  $\alpha$  cannot be labeled as  $\langle Q, Q \rangle$ . Hence the sentence (24a) cannot receive an interrogative interpretation at the CI interface.

The goodness of (24b) can be accounted for in terms of the independently motivated principle (25):

- (25) Assumption V (Goto 2013; Blümel 2017; Chomsky et al. 2019)

A root clause can remain unlabeled because the derivation terminates at the root.

Given (25), the goodness of (24b) follows:  $\alpha$  in (24b) cannot be labeled as  $\langle Q, Q \rangle$  for the same reason that  $\alpha$  in (24a) cannot, but because of (25), the labeling failure is “exempted.”

In fact, the contrast like (24) is found in restrictive relative clauses versus appositive relative clauses, too:

- (26) (Cable 2013: 12)

- a. \*I don’t want to see any boy [ $_{\alpha}$  [pictures of **whom**] you bought on the internet].  
 b. ?I don’t want to see Dave, [ $_{\alpha}$  [pictures of **whom**] you bought on the internet].

If we assume with Fabb (1990) and Cable (2013) that appositive relative clauses are not embedded, and they behave like root clauses, then the contrast in (26) can be accounted for in the same way as that of (24): In (26a), since Q of *whom* is in the deep interior of the XP-YP (DP-CP) structure,  $\alpha$  cannot be labeled as  $\langle Q, Q \rangle$ , failing to receive an interrogative interpretation at the CI interface.  $\alpha$  in (26b) cannot be labeled as  $\langle Q, Q \rangle$  for the same reason that  $\alpha$  in (26a) cannot, but because of (25), the labeling failure is exempted.



The proposed analysis of Pied-Piping under the assumption (25) makes yet another prediction (27):

(27) A *wh*-phrase is not forced to occupy Spec-C in root clauses but in embedded clauses.

This is simply because under (25),  $\langle Q, Q \rangle$  must not obtain in the former and is forced in the latter. From this logic, the distribution of echo-uses of clauses containing *wh*-phrases ensues:

(28) *Speaker A*:  $\langle \text{John bought } \text{gibberish} \rangle$

- Speaker B*:
- a. **What** did he buy?
  - b. He bought **what**?
  - c. Tell me again **what** he bought.
  - d. \*Tell me again he bought **what**.

The derivations of (28a, b, c, d) with some relevant structural details are (29a, b, c, d), respectively:

- (29) a.  $[_{\alpha=\langle Q, Q \rangle} \text{What}_Q [_{C_Q}(\text{did}) [\text{he buy}]]]$   
b.  $[_{\alpha=?} C [\text{He bought } \text{what}]]$   
c.  $[\text{Tell me again } [_{\alpha=\langle Q, Q \rangle} \text{what}_Q [_{C_Q} [\text{he bought}]]]]$   
d.  $*[\text{Tell me again } [_{\alpha=?} C [\text{he bought } \text{what}]]]$

In (29a, c),  $\alpha$  is of the form of  $\{\text{Wh}_Q, C_Q, \}$ ;  $\alpha$  can be labeled as  $\langle Q, Q \rangle$ ; no labeling failure occurs. In (29b, d), on the other hand,  $\alpha$  is not of the form of  $\{\text{Wh}_Q, C_Q, \}$ ;  $\alpha$  cannot be labeled as  $\langle Q, Q \rangle$ . Note that the labeling failure is exempted only in the root clause (29b). This is because of (25).

Under the MS-3, therefore, the contrasts in (19), (20), (26), and (28) receive a unified account in terms of the 3rd factor principle of economy (shortest search), coupled with the independently motivated notions of labeling – (21) and (25). Note that in the POP system, these contrasts would remain an unresolved mystery, since in that system it is unclear how the 3<sup>rd</sup> factor principle governs LS. Note also that, as Cable (2013: 18) points out, given that “both [=“two recent approaches to Pied-Piping, those of Heck (2008; 2009) and Cable (2010a, b)”] have difficulty explaining why massive pied-piping is restricted to non-embedded clauses [as in (20) and (26)],” the proposed MS-3 can be a positive theoretical step forward in the sense that it can accommodate the data that have resisted a satisfactory explanation under any of the existing theories of Pied-Piping.

In the next section, I propose a further refinement of the MS-3 in terms of a CI requirement.

#### 4. CI-constrained MS-3

In designing the Faculty of Language (FL), there are two important aspects to be considered: (I) the 3<sup>rd</sup> factor principles (i.e., principles of natural law) that are not specific to FL, and (II) the CI interface requirements that are specific to FL. Above I have proposed the MS-3 in terms of (I), and demonstrated that some core cases instantiating Pied-Piping and CED effects can be explained by the MS-3 *in toto*. Then, in terms of (II), I propose a further refinement of the MS-3. Specifically, adopting the hypothesis about the CI interface (30), and the independently motivated assumption about the nature of Case-features in a language like Japanese (31), I propose (32):

(30) Assumption VI (Chomsky 2008: 136; Chomsky 2014: 7; Chomsky et al. 2019: 26)

Language is optimized relative to the CI interface alone.

(31) Assumption VII (EKS 2014: 13)

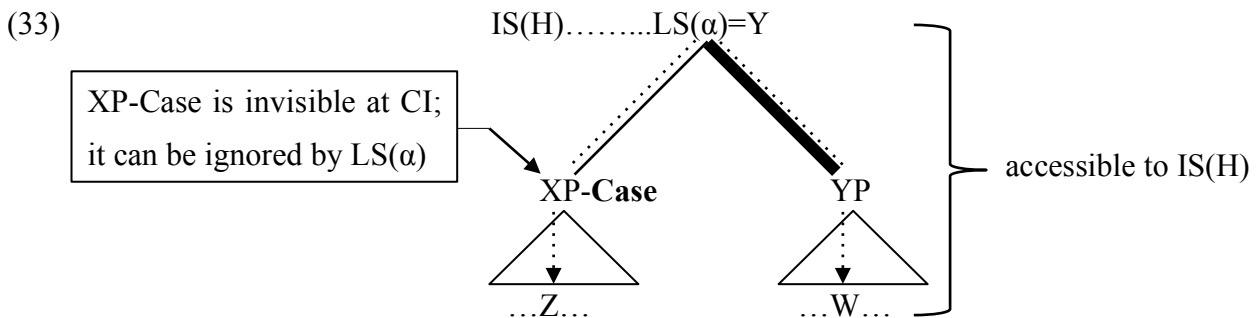
Case-marked XPs (XP-Case) are a CI-invisible element, because XPs headed by such purely phonological heads have nothing to do with the CI interface.

(32) ***CI-constrained MS-3 (CI-MS-3)***

The MS-3 is constrained by the CI interface, and CI-constrained MS-3, which I name *CI-MS-3*, allows LS to “ignore” elements that are invisible at the CI interface and IS to access even the deep interior of a complex structure such as {XP, YP} if the syntactic object (SO) gets labeled so as to be visible at the CI interface.

- CI-invisible element = “ignorable” to LS.
- CI-visible SO = accessible to IS.

The CI-MS-3 is illustrated below (the dotted arrows mean IS and the boldfaced line means LS):



In (33), the XP-YP structure is created, and XP is Case-marked. Under the CI-MS-3, the Case-marked XP can be ignored by LS;  $\alpha$  can be labeled as Y (as indicated by the boldfaced line). This is compatible with Saito's (2014; 2016) claim that Case marker serves as an anti-labeling device, and it makes a SO to which it attaches invisible for labeling. Now since  $\alpha$  has the label of Y, it is also identified as a CI-visible SO. Under the CI-MS-3, the deep interior of the CI-visible SO is accessible to IS(H); Z, W can be the input of Merge with H (as indicated by the dotted arrows).

## 5. Consequences of the CI-MS-3

The CI-MS-3 gives new insights on the fact in (34):

(34) Fact (in Japanese) (Saito 1985; Hasegawa 2005; Bianchi and Chesi 2014)

In Japanese, extraction from nominative Case-marked subjects is possible, but extraction from non-Case-marked subjects is impossible.

The representative examples of (34) are (35) and (36):

(35) *Japanese* (based on Bianchi and Chesi 2014, fn.9)

- a. ?Nani-o<sub>i</sub> John-ga Mary-ga  $t_i$  kata koto-**ga** mondai-da to omotteru no  
     what-acc J.-nom M.-nom bought fact-nom problem-is C think Q
- b. \*Nani-o<sub>i</sub> John-ga Mary-ga  $t_i$  kata koto-**wa** mondai-da to omotteru no  
     what-acc J.-nom M.-nom bought fact-topic problem-is C think Q
- 'What<sub>i</sub> does John think that the fact that Mary bought  $t_i$  is a problem?'

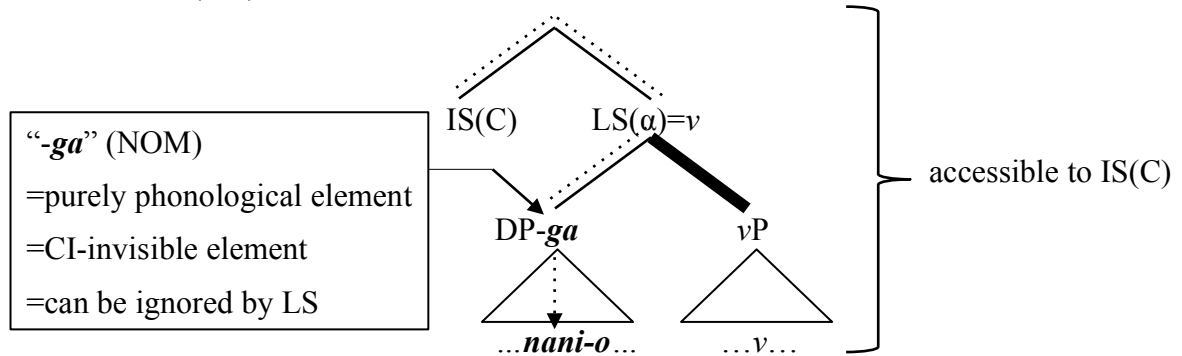
(36) *Japanese* (based on Hasegawa 2005: 69-70)

- a. Sono hon-o<sub>i</sub> Taro-ga Hanako-ga  $t_i$  yon-da koto-**ga** akiraka-da to omotteru  
     that book-acc T.-nom H.-nom read fact-nom obvious C think
- b. \*Sono hon-o<sub>i</sub> Taro-ga Hanako-ga  $t_i$  yon-da koto-**mo** akiraka-da to omotteru  
     that book-acc T.-nom H.-nom read fact-'also' obvious C think
- 'Taro thinks that the fact that Hanako read the book is also obvious.'

In (35a), the subject is marked by the nominative Case-marker *-ga*, and the extraction of *nani-o* 'what' is allowed. In (35b), the subject is marked by the contrastive topic-marker *-wa*, and the extraction of *nani-o* 'what' is disallowed. Similarly in (36a), the subject is marked by the nominative Case-marker *-ga*, and the extraction of *sono hon-o* 'that book' is allowed. In (36b), the subject is marked by *-mo* 'also,' and the extraction of *sono hon-o* 'that book' is disallowed. Why?

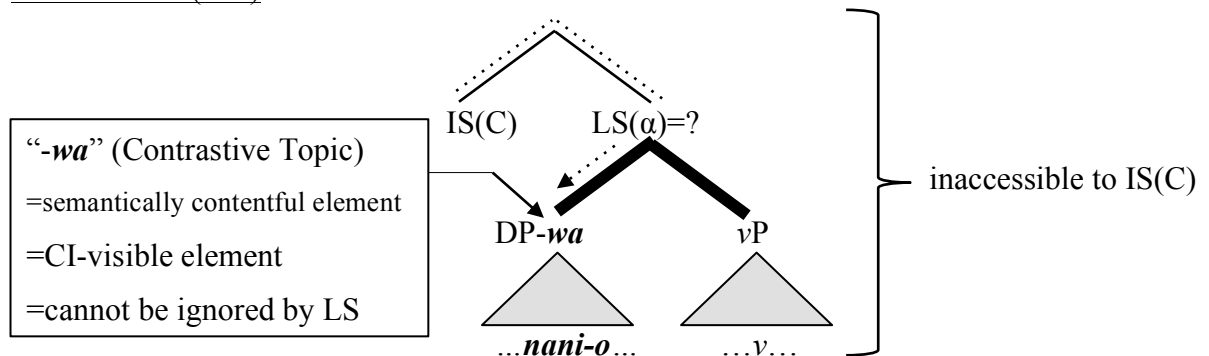
Let us consider (35) as an example. The derivations of (35a, b) are (37) and (38), respectively:

(37) Derivation of (35a)



In (37), {DP-*ga*,  $v$ P} is created. Under the CI-MS-3, DP-*ga* (CI-invisible element) can be ignored by LS;  $\alpha$  is labeled as  $v$  (as indicated by the boldfaced line). Now  $\alpha$  has the label of  $v$ ; it is identified as a CI-visible SO. Under the CI-MS-3, the deep interior of the CI-visible SO is accessible to IS(H); *nani-o* ‘what’ can be the input of Merge with C (as indicated by the dotted arrows). Hence the extraction from the nominative Case-marked subject is allowed.

(38) Derivation of (35b)



In (38), {DP-*wa*,  $v$ P} is created. Under the CI-MS-3, DP-*wa* (CI-visible element) cannot be ignored by LS;  $\alpha$  is not labeled (as indicated by the boldfaced line). Now  $\alpha$  has no label; it is identified as a CI-invisible SO. Under the CI-MS-3, the deep interior of the CI-invisible SO is inaccessible to IS(H); *nani-o* ‘what’ cannot be the input of Merge with C (as indicated by the dotted arrows). Hence the extraction from the topic-marked subject is disallowed.

The contrast in (36) can be accounted for in the same way. Although the CI-visible elements (i.e., Case-marked elements and labeled elements) are transparent to search, the CI-invisible elements (i.e., non-Case-marked elements and unlabeled elements) are opaque to search.

## 6. Further empirical consequences: A principled explanation of two facts about extraction

The CI-MS-3 provides a unified account of two independent cross-linguistic facts on extraction:

(39) Fact 1 (Rizzi 1982; Uriagereka 1988; Gallego 2007; Stepanov 2007; Haegeman et al. 2014)

Extraction from subjects is possible in languages with V-to-T movement, such as Spanish, Italian, Turkish, Palauan, Hungarian, and Russian.

(40) Fact 2 (Starke 2001; Bošković to appear)

In languages such as Czech, Slovak, German, Greek, and Serbo-Croatian, extraction from structurally Case-marked elements is possible, but extraction from inherently Case-marked elements is impossible.

The representative examples of (39) and (40) are (41)-(42) and (43)-(44), respectively:

(41) *Spanish* (Gallego and Uriagereka 2006)

**De qué conferenciantes<sub>i</sub> te parece que me van**  
Of what speakers to you seem-3.SG that to me go-3.SG  
a impresionar [<sub>DP</sub> las propuestas *t<sub>i</sub>* ]  
to impress the proposals  
'Which speakers<sub>i</sub> does it seem to you that the proposals by *t<sub>i</sub>* will impress me?'

(42) *Italian* (Haegeman et al 2014)

**Di che autore<sub>i</sub> credi che hanno causato tanta polemica**  
Of which author believe-2SG that have-3PL caused such controversy  
[ molti libri *t<sub>i</sub>* ]?  
many books?  
'By which author so you believe that many books have caused a lot of controversy?'

(43) *Serbo-Croatian* (Bošković 2016)

- a. **?(?)Kojeg doktorai si vidio [ prijatelja *t<sub>i</sub>* ]?**  
which doctor<sub>GEN</sub> are seen friend<sub>ACC</sub>  
'Which doctor did you see a friend of?'
- b. **?\*Kojeg doktorai si prijetio [ prijatelju *t<sub>i</sub>* ]?**  
which doctor<sub>GEN</sub> are threatened friend<sub>DAT</sub>  
'Which doctor did you threaten a friend of?'

(44) *Czech* (Starke 2001)

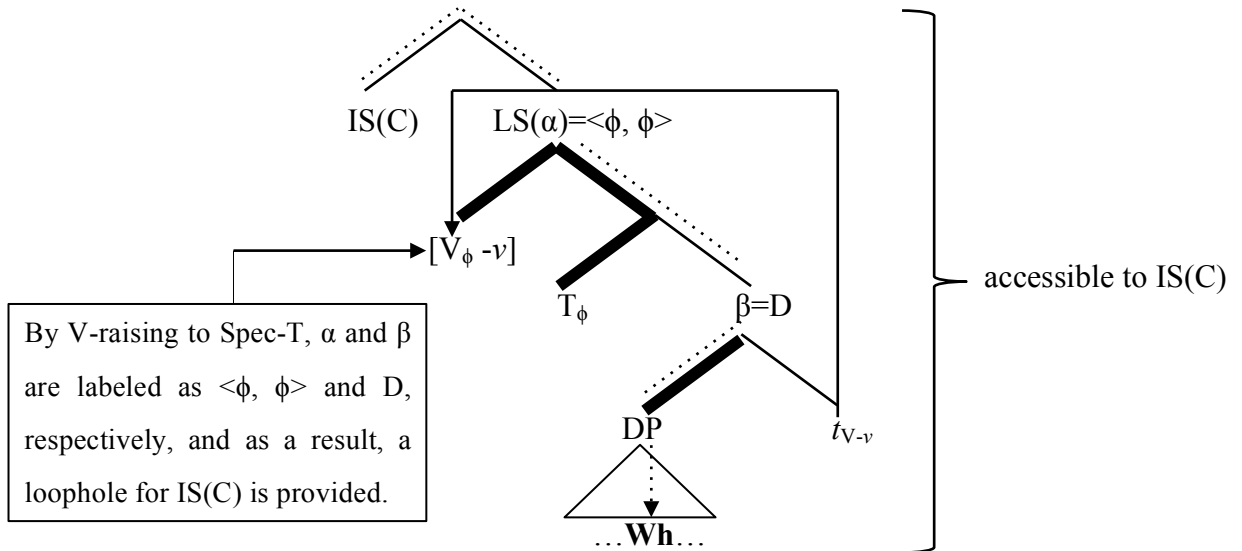
- a. (?)ktereho doktora to byla chyba?  
       which<sub>gen</sub> doctor<sub>gen</sub> it was fault<sub>nom</sub>
- b. ?ktereho herce by sis rad koupil obrazek?  
       which<sub>gen</sub> actor<sub>gen</sub> would you gladly buy picture<sub>acc</sub>
- c. \*ktereho herce bys rad vynadal priteli?  
       which<sub>gen</sub> you<sub>gen</sub> would you gladly scold friend<sub>dat</sub>
- d. \*ktereho herce se bojís pritele?  
       which<sub>gen</sub> actor<sub>gen</sub> you fear friend<sub>gen</sub>

First, consider (39) (Fact 1). Under the independently motivated assumption made by Goto (2017) (45) that V-raising contributes to labeling, the relevant derivation of (41)-(42) is (46):

(45) Assumption VIII (Goto 2017)

In null subject languages such as Italian with rich  $\phi$ -agreement marking on V,  $\langle \phi, \phi \rangle$  labeling of the Spec-TP construction can be done by V-raising to Spec-T, and accordingly the subject-predicate structure (DP- $\nu$ P) can be labeled as D.

(46) Derivation of (41)-(42)



In (46), V raises to the Spec of T. As a result,  $\alpha$  and  $\beta$  are labeled as  $\langle \phi, \phi \rangle$  and D, respectively, identified as CI-visible SOs. Under the CI-MS-3, since the deep interior of the CI-visible SOs is accessible to IS, Wh in the DP can be the input of Merge with C (as indicated by the dotted arrows). The fact 1 follows.

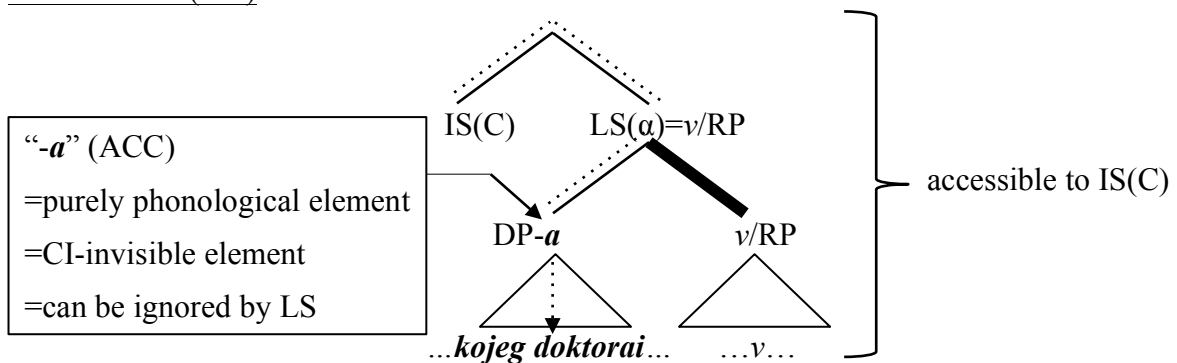
Then, consider (40) (Fact 2). Assuming that inherent Case-markers are semantically contentful (47), the contrasts in (43)-(44) may be accounted for in the same way as those of Japanese (35)-(36) (I would like to thank Hiromune Oda for bringing this point to my attention).

(47) Assumption IX (cf. Chomsky 1986a)

Inherent Case(IC)-marked XPs are a CI-visible element, because IC-markers are semantically contentful and relates to theta roles, and XPs headed by such semantically contentful elements have something to do with the CI interface.

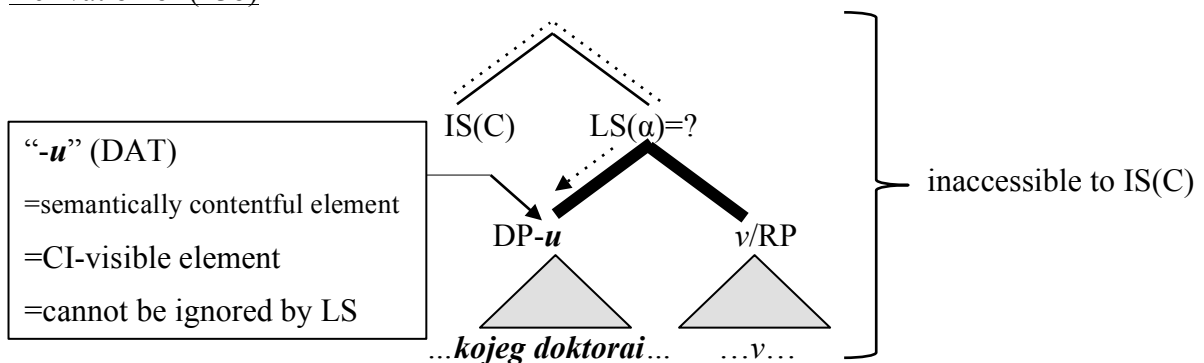
Let us consider (43a, b) as an example. The derivations of (43a, b) are (48) and (49), respectively (NB: the derivations would be far more complicated than the ones just represented if we consider  $\langle \phi, \phi \rangle$  labeling at the  $v$ -R phase level more carefully...):

(48) Derivation of (43a)



In (48), DP-a (CI-invisible element) can be ignored by LS;  $\alpha$  is labeled as  $v$ /RP. Now  $\alpha$  has the label of  $v$ /RP; it is identified as a CI-visible SO. The deep interior of the CI-visible SO is accessible to IS(H); *kojeg doktorai* ‘which doctor’ can be the input of Merge with C. Hence the extraction from the accusative Case-marked object is allowed.

(49) Derivation of (43b)



In (49), DP-*u* (CI-visible element) cannot be ignored by LS;  $\alpha$  is not labeled. Now  $\alpha$  has no label; it is identified as a CI-invisible SO. The deep interior of the CI-invisible SO is inaccessible to IS(H); *kojeg doktorai* ‘which doctor’ cannot be the input of Merge with C. Hence the extraction from the dative-marked object is disallowed.

In this way, the contrasts in (43)-(44) may be accounted for in the same way as those of Japanese (35)-(36).

## 7. Concluding remarks

What I have proposed here is (2) and (32), repeated here as (50) and (51):

### (50) *3rd-factor-constrained Minimal Search (MS-3) (= (2))*

A search procedure is involved not only in labeling the output of Merge{X, Y} (which I call Label-Search, LS) but also in determining the input of Merge(X, Y) (which I call Input-Search, IS), and the 3rd factor principle requires all search procedures not to access the deep interior of a complex structure such as {XP, YP}.

### (51) *CI-constrained MS-3 (CI-MS-3) (= (32))*

The MS-3 is constrained by the CI interface, and CI-constrained MS-3, which I name *CI-MS-3*, allows LS to “ignore” elements that are invisible at the CI interface and IS to access even the deep interior of a complex structure such as {XP, YP} if the syntactic object (SO) gets labeled so as to be visible at the CI interface.

I have shown that the (cross-linguistic) generalizations – (8), (9), (17), (18), (28), (34), (39), and (40) – all follow from (50) and (51), in a way that is impossible under the POP system. Needless to say, the ideas presented here raise many theoretical and empirical questions to be pursued in the future research, but I believe it is fair to conclude that they can be one explanation for Chomsky’s most recent description of a search procedure (1).

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