*{*t*, *t*}

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1. Introduction

This paper puts forward a hitherto unnoticed constraint imposed on natural language syntax, which will be called *{*t*, *t*}.

(1) ***{*t*, *t*}**:
Syntactic Objects (SOs) whose two members are both "traces" (copies) created by Internal Merge (IM) are ruled out.

This constraint effectively bans syntactic objects (SOs) of the form {*t*, *t*}, where the two *t*'s represent traces (copies) created by IM (cf. the copy theory of movement; Chomsky 1993). In other words, *{*t*, *t*} disallows a trace of IM to be in a sister relation to another trace of IM. I will first argue that *{*t*, *t*} can be straightforwardly deduced from the interplay of Chomsky's (2013) labeling algorithm (LA) and the principle of Full Interpretation (FI). I will then show that the effect of *{*t*, *t*} can be observed in a variety of phenomena, including predicate-fronting, copular sentences, criterial freezing (Rizzi, 2006, 2007), as well as head-movement.

2. Labeling Algorithm + Full Interpretation ⇒ *{*t*, *t*}

Human language maps a finite set of lexical items (LIs) (the "Lexicon") to an infinite set of SOs that can be assigned various interpretations at the Conceptual-Intentional (CI) and Sensorimotor (SM) interfaces (SEM and PHON). Since the contemporary theory of bare phrase structure (Chomsky 2013 and others) entirely dispenses with the notion of "projection" (i.e., nonterminal symbols consisting of copies of designated "head" elements), the class of SOs is reduced to set-theoretic complexes of LIs structured by recursive Merge.[1] They show different properties at SEM/PHON determined by features of LIs they contain, so there must be a certain algorithm that applies to each set-theoretic SO Σ and picks up the relevant features of LIs within Σ, handing them to SEM/PHON. Following Chomsky (2007, 2008, 2013), let us refer to the mechanism as the *Labeling Algorithm* (*LA*), and the set of features selected by LA for an SO Σ as the *label* of Σ.

Note that the notion of label discussed here makes no recourse to projection. Rather, it is understood as the set of features that enable each SO to get assigned its properties (in particular interpretations) at SEM/PHON. Therefore, the notion is motivated by the principle of *Full Interpretation* (*FI*) (Chomsky 1986 *et seq.*).

(2) ***Full Interpretation (FI)*** (Chomsky 1986 *et seq.*):
Every element of SEM and PHON must receive an appropriate interpretation.

Note that an SO that fails to get assigned a label via LA may receive no interpretation at SEM/PHON, hence such an SO should be excluded as a violation of FI.

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[1] For many empirical advantages of projection-free syntax, see Narita (2012, forthcoming); Narita & Fukui (2012, in progress); Chomsky (2013).

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The next question is how LA works to define the label of each SO. Chomsky (2013) argues that, as long as human language satisfies the "strong minimalist thesis" (SMT), LA reduces to minimal search of the most prominent (structurally highest) lexical element of each SO (3a), with the proviso that traces of IM are invisible to LA (3b).

(3) ***Labeling Algorithm (LA)*** (Chomsky 2013):

a. For each SO Σ, define the most prominent lexical element within Σ as the label of Σ.

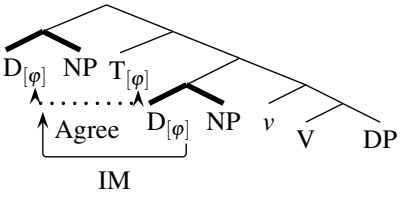
b. If α in $\{\alpha, \beta\}$ undergoes IM, the original occurrence of α becomes invisible to LA, and so LA just singles out the label of β as the label of $\{\alpha, \beta\}$.

For example, (3a) readily accounts for the fact that {*v*, {*read*, {*the*, *book*}}} exhibits verbal (and not nominal or determiner-like) properties, thanks to the label *v* as the most prominent element. More generally, (3a) selects an LI H as the label of any SO of the form {H, XP}, accounting for the ubiquitous prominence of H in the interpretation of {H, XP} (the so-called "endocentricity" of phrase structure).

In contrast, minimal search cannot immediately see any single LI as the most prominent in SOs of the form {XP, YP}, where both XP and YP are phrasal. No single LI can therefore readily stand as the label of such an SO. However, this and various other {XP, YP} structures feed a wide range of interpretations at SEM/PHON as a matter of fact. If we assume with Chomsky (2013:43) that LA is a necessary condition for an SO to receive interpretation at SEM/PHON, satisfying FI, there must be some means to assign labels to {XP, YP} structures. Chomsky (2013) proposes two options, labeling by a shared (matching) feature and labeling by trace invisibility (3b).

The first option explores cases where {XP, YP} gets labeled not by an LI but rather by a feature F shared by XP and YP via Agree(ment). As a concrete example, let us consider the SO created by A-movement of the subject, the so-called "TP"-structure:

(4)



Let us adopt the standard assumption that T's unvalued φ-features act as a probe, and get related to the goal DP (the subject) via the operation Agree (Chomsky 2000 *et seq.*). Then, A-movement of the subject creates {{D, NP}, {T, *v*P}}, where D and T share identical (matching) φ-features. Chomsky (2013) argues that in such a configuration, the relevant φ-feature-bundle can stand as *the* most prominent lexical element (given that the two constituents {D, N} and {T, *v*P} equally share it as the most prominent), and that it can therefore define the label of the {XP, YP} structure via minimal search (3a). Under this conception of labeling, then, we may further regard the interplay of IM and Agree as driven by the need to create a labelable {XP, YP} structure.[2]

In addition to labeling by identical (matching) features, Chomsky (2013) explores a second option for labeling {XP, YP}, which has to do with the hypothesis that traces of IM "do not count" for the purpose of LA (3b). For example, consider the "*v*P" structure embedded within (4), {{D, NP}, {*v*, {V, DP}}}. This is an instance of {XP, YP} without any feature agreement involved, hence unlabelable by (3a). However, assume with (3b) that IM of either XP or YP can render its trace invisible to LA and let the other define the label of {XP, YP}. Then, if DP = {D, N} within *v*P undergoes IM, then {t_{DP}, {*v*, {V, DP}}} can get labeled *v* via (3b).

Note that the "invisibility" hypothesis of IM-traces in (3b) makes a lot of sense, both from semantic and phonological perspectives. At SEM, traces of IM are typically interpreted as logical variables, and a

[2] Generally, the relevant set of labelable {XP, YP} structures are "symmetric" in a certain sense, given that an identical feature is equally distributed over the XP and YP. Capitalizing on this observation, Narita & Fukui (2012, in progress) put forward the hypothesis that syntactic derivation is fundamentally driven by the need for structural symmetry (what they call "feature-equilibrium").

variable (such as *x* in *for every x, x is a ball*) need not be characterized by any lexically specified semantic features. Moreover, traces of IM are typically unpronounced at PHON, hence requiring no phonological features. These facts suggest that once IMed, lexical features of the trace SO (semantic or phonological) become irrelevant to the computation of both SEM and PHON, exactly as depicted by (3b).

In summary, every {H, XP} structure can readily get labeled H via (3a), exhibiting interpretive endocentricity. {XP, YP} structures, in contrast, must resort to IM or Agree to define the label via LA. {XP, YP} with F-feature agreement between the labels of XP and YP can get labeled F via minimal search (3a), and SOs of the form $\{XP, t_\alpha\}$ (order irrelevant), where t_α is an IM-trace of some SO α, are labeled via (3b).

However, note that LA (3) is silent regarding the case of $\{t_\alpha, t_\beta\}$, where the two constituents are both traces of IM.[3] LA thus leaves the label of $\{t_\alpha, t_\beta\}$ undefined, and hence such an SO constitutes an inescapable case of FI-violation. In this manner, $*\{t, t\}$ can be derived from the simplest formulation of LA and FI.

In what follows, I will discuss a variety of data that can be attributed to this prediction.

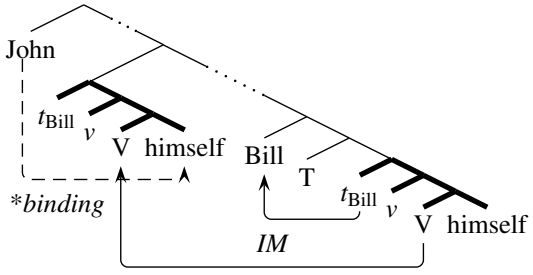
3. Predicate-fronting

The first piece of evidence in favor of $*\{t, t\}$ comes from predicate-fronting. Huang (1993) argues that predicate-fronting always pied-pipes a trace of the subject, and that this assumption can provide a natural account of the contrast in (5a-c).

(5) a. $[_{DP}$ *those pictures of himself*$_{i/j}]$, *John*$_i$ thinks $[t_{DP}$ *Bill*$_j$ will buy $t_{DP}]$.
b. $[_{vP}$ *t*$_j$ *criticize himself*$_{*i/j}]$, *John*$_i$ thinks $[t_{vP}$ *Bill*$_j$ would not $t_{vP}]$.
c. $[_{AP}$ *t*$_j$ *how proud of himself*$_{*i/j}]$ does *John*$_i$ think $[t_{AP}$ *Bill*$_j$ will be $t_{AP}]$?

Huang adopts the predicate-internal subject hypothesis (Koopman & Sportiche, 1983; Fukui & Speas, 1986; Fukui, 1986/1995; Kitagawa, 1986; Kuroda, 1988), which holds that the subject is always base-generated within the *v*P/AP projections. Huang then argues that the relevant contrast simply follows from the traditional assumption that category-movement always dislocates XP but not intermediate X': predicate-fronting can only move *v*P/AP (not *v*'/A'), therefore it always pied-pipes the subject trace that stands closest to an anaphor, accounting for the binding facts in (5) ((6) represents the case of *v*P-fronting).

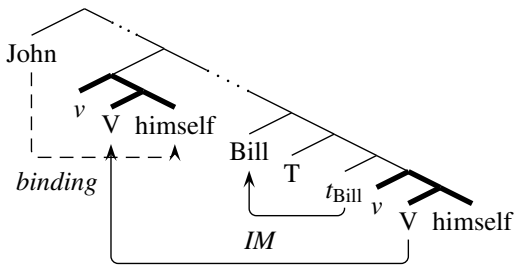
(6)



Huang's (1993) account made a lot of sense in X-bar-theoretic, projection-bound syntax. However, we can no longer make recourse to the notion of "maximal (XP) projection" in bare phrase structure, and we have to provide an alternative account of why only SOs corresponding to maximal projections undergo Move/IM. Specifically for the cases in question, why can't *v*'/A' move instead of *v*P/AP as in (7), which would strand the subject trace and should therefore be able to feed anaphor binding at the moved position?

[3] Still another case not discussed above is {X, Y}, where X and Y are both LIs. Applying to this configuration, minimal search can presumably define either LI as the label. However, if we have some independent reason to assume that such "labeling ambiguity" is disfavored, then we may alternatively assume that Merge may first form a singleton set of an LI, say {X}, and then combine it with Y, forming an unambiguously labelable SO, {{X}, Y}. See Guimarães (2000); Kayne (2009); Fukui (2011), and Narita (forthcoming) for various explorations of unary Merge (singleton-set formation).

(7) *



I propose that the answer lies in *{*t*, *t*}, a straightforward consequence of LA and FI. Note that the subject DP *Bill*, base-generated internally to *v*P/AP, obligatorily undergoes IM into "Spec-T." This is the so-called "EPP" requirement, presumably motivated by the need to create labelable {XP, YP} structures (recall the discussion in §2; see Rizzi 2006; Narita & Fukui 2012, in progress; Kato et al. 2014 among others for alternative approaches). The movement necessarily leaves a trace/copy that is in a sister relation to *v*'/A'. Then, further IM of *v*'/A' creates an unlabelable configuration {*t*, *t*}, hence excluded by FI.[4]

A variety of analyses have been proposed for the obligatoriness of subject A-movement (EPP), as well as pied-piping of subject traces in predicate-fronting (or its obligatory reconstruction; see Heycock 1995). The present discussion shows that both of these facts naturally follow as simple consequences of LA and FI. Under this approach, no reference to projection is necessary to derive the relevant facts, a desirable result.

4. Copular Sentences

The second piece of evidence for *{*t*, *t*} comes from the copular construction. Moro (2000) argues that a certain variety of copular sentences is derived from the underlying small clause structure {DP_1, DP_2} as shown in (8a), by moving one of the DPs into the EPP subject position as in (8b-c).

(8) a. [BE {[$_{DP1}$ some pictures of the wall],[$_{DP2}$ the cause of the riot]}]
b. [[$_{DP1}$ some pictures of the wall] [were {t_{DP1}, [$_{DP2}$ the cause of the riot]}]
c. [[$_{DP2}$ the cause of the riot] [was {[$_{DP1}$ some pictures of the wall], t_{DP2}}]

Moro argues that the SO {DP_1, DP_2} is locally unstable, and that movement of one DP is necessary to stabilize it. He specifically argues that this is because the SO lacks asymmetry necessary for the purpose of Kayne's (1994) LCA-based linearization, which maps projection-based asymmetric c-command relations to left-to-right temoral order at PHON.[5] In an attempt to sustain Moro's basic insight while eliminating recourse to the LCA and projection, Chomsky (2013) proposes that the relevant local instability rather results from the unlabelable nature of {DP_1, DP_2}. Under Chomsky's theory of LA (3), minimal search (3a) cannot assign any label to this SO due to the lack of agreement, and therefore IM must apply to either DP_1 or DP_2 for it to be labeled via trace invisibility (3b).

Now, observe the following examples from Moro (2006:15).

(9) a. *[which picture of the wall]$_i$ do you think that [the cause of the riot]$_j$ was {t_i, t_j}?
b. *[which cause of the riot]$_j$ do you think that [a picture of the wall]$_i$ was {t_i, t_j}?

These examples point to the curious fact that movement of the postcopular DP is disallowed, even though one of them must move as in (8). Either Moro's (2000) LCA-based account or Chomsky's (2013) LA-based reformulation of it can explain why at least one of the DPs must move out of (8a). However, they have no explanation for why the movement of *both* DPs results in unacceptability, as shown in (9).

[4] A question remains as to why IM of {*v*, {V, *himself*}} (leaving the subject DP in situ) is disallowed, which would enable the SO to be labled D. I assume with Narita (forthcoming) among many others that the *v*-label is somehow required for θ-marking of the subject DP.

[5] See Fukui & Takano (1998); Narita (2010); Narita (forthcoming:Ch.4) for criticisms of the LCA. See also Kayne (2011) for his own attempt to eliminate the LCA in his account of antisymmetry.

Again, this shortcoming can be naturally overcome by $*\{t, t\}$. As indicated in (9), A'-movement of the postcopular DP results in an SO that is excluded by $*\{t, t\}$. In this manner, Chomsky's LA not only explains why A-movement of the other DP into the EPP position is required for the purpose of labeling, but also why it interferes with A'-movement of the postcopular DP. This result is attained without any additional stipulation, approaching the SMT.[6]

5. Criterial Freezing

It is well known that phrases moved into "criterial" positions constitute islands for extraction (Rizzi 2006, 2007). A representative case is the EPP subject poisition, which exhibits the "subject criterion" effect as exemplified by (10)-(11).

(10) a. *Who*$_i$ did you see [pictures of t_i]?
b. **Who*$_i$ were [pictures of t_i]$_j$ seen t_j?

(11) a. *Which candidate*$_i$ were there [posters of t_i] all over the town? (Lasnik & Park, 2003)
b. **Which candidate*$_i$ were [posters of t_i]$_j$ t_j all over the town?

In this section, I would like to point out that the relevant effect of criterial freezing follows rather naturally from the theory of LA (3) advocated here.

Consider the derivation in (12), where the *wh*-XP moves out of DP, bypassing its edge. Here, I assume with many others that D (or the topmost nominal category, which Narita forthcoming identifies as K(ase)) constitutes its own phase, and that if an XP moves above D, it must first target the edge of the D-phase, in order to avoid the effect of the Phase-Impenetrability Condition (Chomsky 2000 *et seq.*).

(12) a. $D_{[\varphi]}$ ... XP ...

b. **XP** $D_{[\varphi]}$ ... t_{XP} ...

c. **XP** **XP** $D_{[\varphi]}$ ... t_{XP} ... $T_{[\varphi]}$ XP $D_{[\varphi]}$ ... t_{XP} ...

Recall from §2 that the subject Agrees with T in φ-features and moves to the EPP position (Spec-T), driven by the need to create an SO which can be labeled $[\varphi]$ via minimal search. See (4). Note that the relevant minimal search is possible only when one and the same φ-feature-bundle is symmetrically distributed over DP and T', with equal prominence. However, in the derivation (12), the relevant DP is merged with an occurrence of XP before merging with T'. Therefore, D's φ-feature-bundle gets demoted by one more application of Merge than T's. I argue that this interferes with the φ-labeling of the TP structure in (12c), whose applicability crucially depends on a symmetric, balanced distribution of the mathcing $[\varphi]$ (see also Narita & Fukui 2012, in progress).

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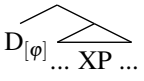
[6] Note that the acceptability of the following examples with *what* is unexpected in this approach.

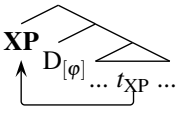
(i) a. *What*$_i$ do you think that [the cause of the riot] is t_i? (Moro, 2006)
b. *What*$_i$ do you think that [a picture of the wall] is t_i?

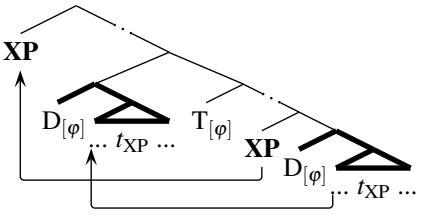
I adopt Moro's (2006) assumption that *what* in those examples actually moves out of an abstract DP-structure of the form {D, {what, $\oslash_{NP}$}}, located in a predicative DP position (cf. *a wonderful girl*, *[what*$_i$ *a* t_i *girl] you are!*). The presence of the D head effectively circumvents the problem of $*\{t, t\}$:

(ii) what$_j$ . . . [the cause of the riot]$_i$ . . . [t_j [D [t_j $\oslash$]]

In this manner, the present theory of LA can derive the "criterial freezing" effect of the subject DP, without necessarily stipulating a "subject criterion" in UG.[7] In order to complete the proposal, however, we should also exclude the following derivation.

(13) a. 

b. 

c. 

(13a-b) are the same as (12a-b), but in this derivation, only {D, NP} undergoes IM into the EPP position, while stranding the edge XP for later movement. This derivation respects phase-by-phase cyclicity, while it would circumvent the unlabelability problem of the TP structure in (12b).

This is where *{*t*, *t*} comes into play. Movement of XP as well as D' from {XP, D'} in (12b) results in an SO of the form {*t*, *t*}, which I argue is excluded by the interplay of LA and FI. Again, the single principle of LA derives the desired results, without recourse to any additional stipulation (other than the phasehood of argument DPs, for which a variety of evidence has been put forward).[8]

6. A Note on Head-movement

Before concluding the paper, a brief remark on head-movement is in order. It has been widely assumed that head-movement is an operation that adjoins an X^0 (an LI) to another head-category Y^0 that immediately c-commands it. For example, it is standardly assumed that V (or an acategorial $\sqrt{root}$; see Halle & Marantz 1993 and others) routinely incorporates into *v* via head-movement, as exemplified in (14).

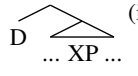
(14) John *read*$_i$-*v* {t_i, that book} (yesterday).

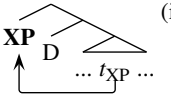
[7] The same sort of analysis may be generalized to other cases of criterial freezing, too, where D and T are replaced with some other categories, and [φ] with some other feature F that defines the criterial position ([Top(ic)], [Wh], [Fin(iteness)], [Foc(us)], etc.; see Rizzi 1997, 2006, 2007 and many others for discussion). I will leave the exploration of this possibility for future research.

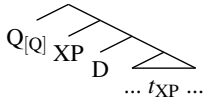
[8] Rizzi (2007:148) discusses the following example, involving a contrastively focused element moving out of a *wh*-phrase in a *Wh*-Criterial position:

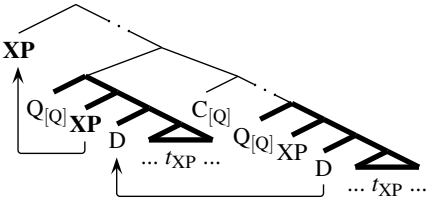
(i) DI GIANNI$_i$, non sapevo [[quale libro t_i] [C avessi scelto]] (non di Piero)
BY GIANNI, I didn't know which book you had selected (not by Piero)

This example constitutes apparent counterevidence to the generalization that SOs moved into criterial positions constitute islands for extracion. I speculate that Cable (2007; 2010) and Narita's (forthcoming) Q-based analysis of *wh*-movement provides a means to handle this problem. Suppose with Cable and Narita that the *wh*-phrase is always headed by a covert category Q, and *wh*-movement in general is in fact IM of QP accompanying Q-feature agreement between Q and the interrogative C. If we further stipulate that Q is not a phase-head, hence requiring no movement of XP into its edge (unlike D), then the derivation in (i)-(iv) may satisfy LA while respecting *{*t*, *t*}.

(i) 

(ii) 

(iii) 

(iv) 

For the lack of space, I have to put many ramifications of this approach for future research.

Now, suppose that in addition to the V-to-*v* head-movement in (14), IM further dislocates the direct object *that book*, say for topicalization. This results in a structure that apparently involves two movement traces:

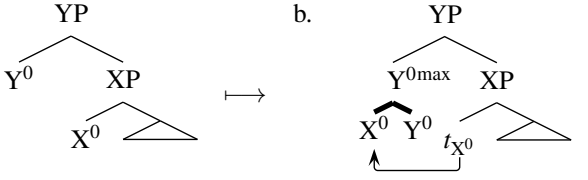
(15) *that book*$_j$, John *read*$_i$-*v* $\{t_i, t_j\}$ (yesterday).

(15) is a perfectly grammatical sentence of English. Obviously, then, we don't want *$\{t, t\}$ to exclude this sort of derivation.

In order to keep the explanatory force of *$\{t, t\}$ while permitting simple examples like this, I will propose below that head-movement is *not* an instance of IM in the sense of Chomsky (2004, 2007, 2008) (viz merger of two SOs one of which is a proper term of the other).

Recall that the status of syntactic head-movement in bare phrase structure is somewhat controversial. According to the now-standard analysis of head-movement proposed by Chomsky (1995), head-movement of X^0 to Y^0 effectively replaces Y^0 in an SO with a so-called "Y^{0max}" that consists of X^0 and a segment of Y^0, as shown in (16), and still behaves as Y^0 as a whole.

(16) a. b.



This operation is problematic in many respects. First of all, no representation of the "X^{0max}" label is available in bare phrase structure (projection-free syntax), therefore the operation that generates it is simply unformulable. Moreover, the mapping in (16) also violates the *No-tampering Condition* (*NTC*) of Chomsky (2008:138).[9]

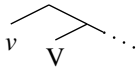
(17) ***No-Tampering Condition (NTC)***:
Merge of α and β leaves the two SOs unchanged (cf. Chomsky 2008).

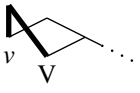
Under the conception of Merge as a simple set-formation operation, Merge can do nothing more than combining SOs and create a new SO comprising them. Therefore, once generated, later applications of Merge cannot change any internal structures of SOs, obeying the NTC. Then, X^0-to-Y^0 head-merger should have no ability to replace Y^0 in (16a) with "Y^{0max}" = $\{X^0, Y^0\}$. Consequently, the proper characterization of head-movement is currently a contested topic (see, *e.g.*, Fukui & Takano 1998; Chomsky 2001; Boeckx & Stjepanović 2001; Matushansky 2006; Roberts 2010, and references cited therein).

Building on arguments provided by Narita (forthcoming) and Narita & Fukui (2012, in progress), I claim that head-movement should rather be regarded as an instance of "sideward remerge" as in (18) (Narita forthcoming; see also Bobaljik & Brown 1997; Citko 2005).

(18) a. $\{v, \{V, ...\}\}$ ⟼ Merge(V, *v*) b. i. $\{v, \{V, ...\}\}$
ii. $\{V, v\}$

a'. b'.





Let us respect the traditional intuition that head-movement combines two head LIs. Then, X^0-to-Y^0 head-movement should be regarded just as an instance of Merge(X^0, Y^0), without any violation of the NTC. If Merge applies to V and *v* within (18a/a'), then it should simply generate $\{V, v\}$ while keeping (18a/a') unchanged, resulting in two partially overlapping SOs in (18bi,ii).

[9] Narita (forthcoming) proposes to reformulate the NTC as the general constraint on deletion, insertion, and other tampering operations.

Now, consider the formulation in (1) again (reproduced here), according to which *{*t*, *t*} constrains only traces of IM.

(1) ***{t, t}**:
Syntactic Objects (SOs) whose two members are both "traces" (copies) created by Internal Merge (IM) are ruled out.

IM is by definition a merger of two SOs one of which is internal to (i.e., a proper term of) the other (and External Merge (EM) is a merger of two SOs neither of which is internal to the other; see Chomsky 2004, 2007, 2008). IM therefore usually combines a "root" (undominated) SO and a proper term of that SO. However, head-movement as instantiated by (18) combines two SOs distinct from each other and contained within a single SO, resulting in sideways remerge. It therefore fails to meet the defintion of IM (and thus it is an instance of EM by definition).

If this analysis is on the right track, then, the irrelevance of head-movement to *{*t*, *t*} can be attributed to the fact that it is not an instance of IM. To sustain this account, then we have to conclude that *{*t*, *t*} by definition constains only traces of IM, and not traces of sideward remerge/EM. This is not an unreasonable assumption, given that head-movement is known to have virtually no interpretive outcome at SEM, and thus their traces should still be visible to the LA-based computation of SEM.[10]

Rather, we may even regard *{*t*, *t*} as offering a principled explanation of why head-movement cannot take the form of IM. According to Chomsky (2008), the object DP in {V, DP} is always required to undergo IM/A-movement, for reasons of φ-feature-agreement and Case-assignment (see also Narita & Fukui 2012, in progress): it A-moves into "Spec-V," resulting in {DP, {V, DP}} when the verb is transitive ("Spec-Agr_o" or "Spec-*v*" in Chomsky 1993, 1995); it A-moves into "Spec-T" when the verb is unaccusative or passive. It follows that V is always in a sister relation to an IM-trace of DP in {V, t_{DP}}. Then, *{*t*, *t*} prevents V from undergoing IM. Hence, if V is ever required to move at PHON (say for some morphological reason, such as perhaps an affixal *v*), then it can only do so via non-IM, i.e., sideward remerge. Further, the observation that head-movement has almost no semantic effects typically tied to IM ceases to be mysterious, too, again a desirable result.

7. Concluding Remarks

In this article, I first pointed out that Chomsky's (2013) theory of LA in (3) readily covers the cases in (19a-d) while leaving (19e) undiscussed.

(19)
a. {H, XP}, where H is an LI: labeled H via minimal search (3a) (see also note 3)
b. {XP, t_α}, where t_α is a trace of IM (order irrelevant): labeled by the label of XP via trace invisibility (3b)
c. {XP, YP} involving Agree with respect to feature F between the labels of XP and YP: labeled F via minimal search (3a)
d. {XP, YP} involving no Agree between the labels of XP and YP: unlabelable, forcing the application of IM to either XP or YP
e. {t_α, t_β}, where t_α and t_β are both traces of IM: inescapably unlabelable

I argued that the interplay of LA and FI derives *{*t*, *t*} (1). I further showed that *{*t*, *t*} in turn derives a number of empirically adequate accounts of predicate-fronting, copular sentences, criterial freezing and head-movement, without additional stipulation. These results corroborate Chomsky's hypothesis that labeling via minimal search is an emergent property of efficient computation, keeping closely to the goal of the minimalist program.

[10] Building on this observation, Chomsky (2001); Boeckx & Stjepanović (2001) and others propose that head-movement is a sort of post-syntactic PF-movement. We may alternatively pursue this approach to the non-IM nature of head-movement.

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