Missing Labels: Head Movement as *Project Both*

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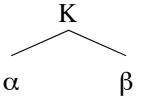
1. "Missing" labels

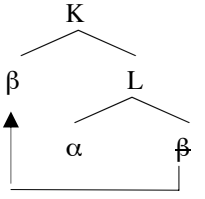
My main goal in this paper is to examine the labels of the structures created by Merge, the basic structure building operation in the Minimalist Program. Chomsky (2001) distinguishes between two types of Merge; one, familiar from earlier minimalist literature, takes two distinct objects and combines them into one bigger one. This type of Merge, illustrated in (1), is referred to as *External Merge*.

1) *External Merge* of α and β



The second type of Merge, called *Internal Merge*, is a minimalist way to analyze movement. It parallels *External Merge* in that it also combines two objects. It differs from it in that one of the objects is a subpart of the other, as shown in (2).

2) *Internal Merge* β and L



The question that I would like to focus on here is what determines the nature of K, the label of the object created by Merge. The standard minimalist assumption is that in *External Merge* structures either α or β projects as the label, whereas in *Internal Merge* structures the target, or to use the more current terminology, the Probe does.[1] These two options, however, do not exhaust the logical range of possibilities. For *External Merge*, the options are (*i*) Project α, (*ii*) Project β, (*iii*) *Project Both* α and β, and (*iv*) *Project Neither* α nor β. These options are illustrated in (3a-d), respectively.

* I would like to thank the WCCFL 2007 audience for many useful suggestions and feedback. I alone am responsible for any remaining errors and omissions.

[1] Chomsky (1995) discusses the following labeling possibilities:
(i) the intersection of α and β
(ii) the union of α and β
(iii) one or the other of α and β.
He excludes the first two options on the grounds that the intersection of α and β will often be null and the union will often be contradictory. The only choice is then for either α or β to project. Note, however, that this opens up the possibility that the label of both α and β could project as long as they do not conflict in relevant features.

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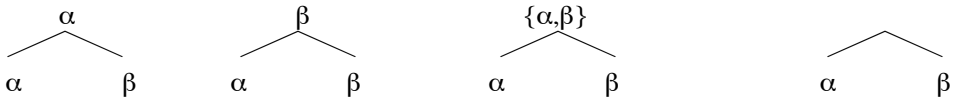
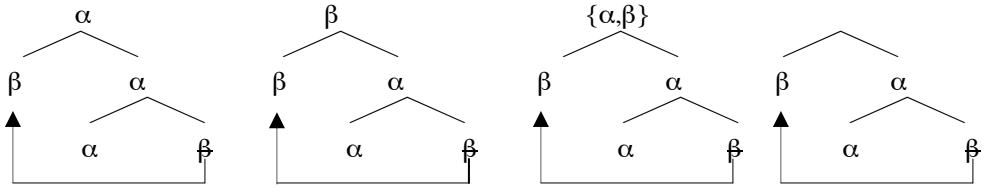
3) a. *Project α* b. *Project β* c. *Project Both* d. *Project Neither*



The logical possibilities for *Internal Merge* structures are illustrated in (4a-d). If α is the Probe and β the Goal, the options are: (*i*) Project Probe, (*ii*) Project Goal, (*iii*) *Project Both* Probe and Goal, and *Project Neither* Probe nor Goal.[2]

4) a. *Project Probe* b. *Project Goal* c. *Project Both* d. *Project Neither*

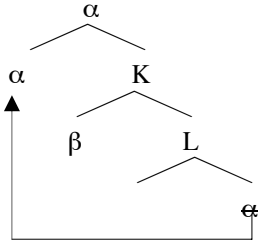


The standard minimalist assumption regarding labels in *Internal Merge* structures is that the Probe (the element triggering movement) is the element that projects. Chomsky (1995) excludes *Project Goal* (illustrated in (4b)) on the grounds that no feature checking could be established in such a configuration. He considers three versions of Last Resort, given in (5a-c), and argues that *Project Goal* is incompatible with all three of them.

5) α can target K only if (Chomsky 1995:257)
   a. a feature of α is checked by the operation
   b. a feature of either α or K is checked by the operation
   c. the operation is a necessary step toward some later operation in which a feature of α will be checked.

If α raises to target K, and projects as the label of the newly formed object, K will end up as the complement of α.

6)



It is true that the movement illustrated in (6) does not establish a spec-head feature checking configuration. If β in (6) is the Probe, α does not end up as a specifier of β after movement takes place. This objection to *Project Goal*, however, is not valid from the perspective of more recent minimalist assumptions, on which spec-head feature checking is replaced by a Probe-Goal Agree relationship. In

[2] Before we move on, let me briefly comment on the convention used in this paper to represent *Project Both*. In (3c) and (4c), the label is represented as an unordered set {α,β} consisting of two constituent labels. I assume labels to be shorthand descriptions for a set of features of the relevant constituent. To say that α is the label of the object given in (3a) or (4a) is nothing more than to say that the features of the lexical item α have projected to the next level. In the case of *Project Both*, the idea is to capture the intuition that the features of both constituents have projected to the next level.

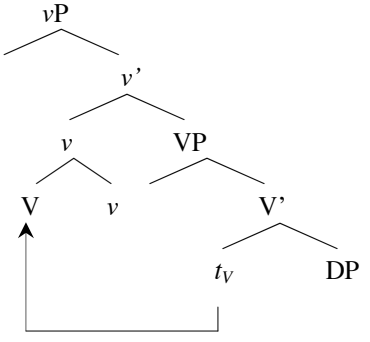
(6), α is in the c-command domain of β; therefore an Agree relationship can be established between them (as long as β has some uninterpretable feature that can be valued by a matching feature on α).

Having outlined what I take to be standard minimalist assumptions about labels in *External* and *Internal Merge* structures, I turn to my main proposal, which is that the computational system does ***not*** impose any restrictions on labels created by both *External* and *Internal* Merge operations. The bigger research project is to see if all the logical possibilities illustrated in (3a-d) and (4a-d) are in fact attested. In the remainder of this paper, I will focus on one 'missing' label: *Project Both* in Internal Merge structures, illustrated in (4c) above.[3] I propose that this is exactly what happens in head movement constructions. I will proceed as follows. I will first review the problems head movement raises from the minimalist perspective. Next, I will show how a *Project Both* derivation solves these problems. And I will conclude by comparing my account of head movement with some of the alternatives recently proposed in the literature.

2. Head movement as *Project Both*

Head movement is conceptually problematic for a number of reasons. First, it is unlike phrasal movement in that it violates the Extension Condition of Chomsky (1995). Second, the moved head does not c-command its trace. This is illustrated by the movement of V to *v* in (7); the movement of the V to *v* does not extend the tree, and the moved V does not c-command its trace:[4]

7)



There are a number of proposals designed specifically to remedy these two (obviously related) problems. They fall into three general categories. The first is to relegate head movement to the PF component of the grammar (Chomsky (2000), Boeckx and Stjepanovic (2001)). The second is to reanalyze it as phrasal movement (Koopman and Szabolcsi (2000)). And the third is to reconceptualize verb movement in a way that makes it compatible with the Extension Condition (Matushansky (2006), Bury (2003), Bobaljik and Brown (1997), Suranyi (2005)). My proposal falls into the third category and is close in spirit to Bury's (2003), Matushansky's (2006), and Suranyi's (2005) proposals. There are two crucial ingredients to it. One is that verb movement involves *Project Both* (Probe and Goal), and the other is that head movement does in fact obey the Extension Condition by always targeting the root of the tree. The *Project Both* derivation of V to *v* movement is illustrated in (8a-b). I assume that *v* has an uninterpretable V feature and V has a corresponding interpretable feature. The operation *Agree* provides values to these features. In addition, *v* has an EPP feature which is what drives V movement.[5] The movement illustrated in (8b) does not violate the Extension Condition; the moving head targets

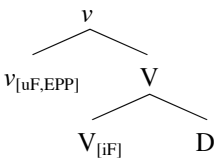
[3] I am using the term 'missing labels' to refer to labels depart from the standard minimalist assumptions just outlined. In Citko (in progress), I examine the following 'missing' labels: Project Both in External and Internal Merge structures, Project Goal in Internal Merge structures, and Project Neither in External and Internal Merge Structures.

[4] Head movement is not the only case of countercyclic movement: Richards' (2001) tucking-in type movements and most cases of covert movements are also countercyclic.

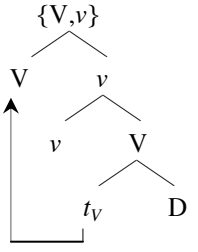
[5] This is following Alexiadou and Anagnostopoulou (1998) and (2001), who argue that EPP features can be checked either by head or phrasal movement. Furt hermore, I assume a generalized approach to EPP, on which other heads besides T can have an optional EPP feature.

the root node. In this respect, the *Project Both* derivation is superior to the standard one illustrated in (7).

8) a.

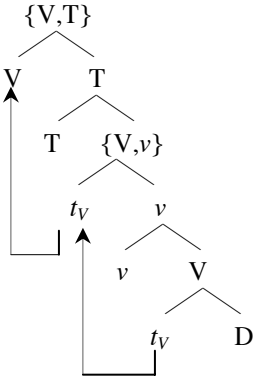


b.



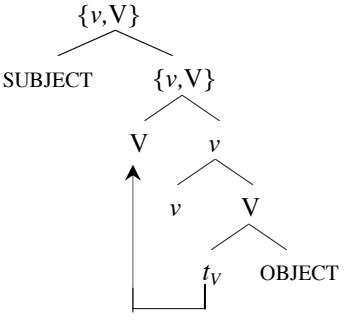
Subsequent verb movement to T yields the following structure:

9)



Furthermore, *Internal* and *External Merge* can interleave. What this means for the case at hand is that the subject can get externally merged *after* V-*v* movement. While this departs from the standard view that *Internal Merge* follows *External Merge*, I do not see anything that would exclude it on principled grounds. Since current minimalism dispenses with the levels of D-structure and S-structure, the idea that syntactic transformations should follow lexical insertion is no longer viable. Furthermore, it parallels the move from the idea that covert movement follows overt movement to the more current idea that the two can also interleave (see, for example, Fox and Nissenbaum (1999) for a concrete implementation of this view).

10)



An interesting argument in favor of the *Project Both* derivation comes from the fact that it can explain why head movement is typically restricted to extended projections (see Grimshaw (1991/2005) for a detailed illustration of this observation). Thus, V heads can only raise up to C (passing through *v* and T on their way up) and N heads can only raise to the highest functional head in the nominal domain. This restriction follows the fact that *Project Both* is only possible if the two projecting elements do not conflict in categorial features. The labeling algorithm given in Chomsky (1995) suggests that *Project Both* is possible as long as there is no feature conflict between the two projecting elements. This raises a natural question of what the relevant features are. I take them to be (at least) categorical features. Interestingly, Grimshaw's theory of extended projections treats V, T, and C heads as being categorically non-distinct. The same goes for N, D, and P heads. This categorial non-distinctness is what can account for the fact that head movement is limited to extended projections.

In more concrete terms, an extended projection consists of a lexical head and all the functional heads that share its category specification. Furthermore, syntactic categories consist of category specification (+/-V, +/-N) and F (functional) feature specification. Grimshaw's specifications for common lexical and functional categories are given in (11); F values can range from 0 to 2, but nothing prevents the range to be wider in a system with a larger number of functional projections.[6]

11)

	category specification	*functional specification*	
V	[+V, -N]	F0	
T	[+V, -N]	F1	
C	[+V, -N]	F2	
N	[-V, +N]	F0	
D	[-V, +N]	F1	
P	[-V, +N]	F2	(Grimshaw 2005:4)

Verb movement is 'bounded' by C, because only T and C are categorically non-distinct from V. Similarly, N movement cannot leave the highest head in the noun's extended projection.[7]

3. Comparison with alternatives

I alluded above to the fact that my proposal bears some resemblance to Bury's (2003) and Matushansky's (2006) analysis of head movement. In this section, I will offer a more detailed comparison of my proposal to these two proposals, as well as some of the others that have been recently developed to handle the problems with head movement.

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[6] The main focus of Grimshaw's theory is the issue of why certain combinatorial possibilities are possible and others are not. In particular, she notes that the patterns given in (i) and (ii) are possible ones, whereas the logically possible ones in (iii) are not (Grimshaw 2005:9).

(i) Possible complements of functional heads
C-TP P-DP
T-VP D-NP

(ii) Possible complements of lexical heads
V-PP V-DP V-NP C-CP V-TP V-VP
N-NP N-DP N-NP N-CP N-TP N-VP

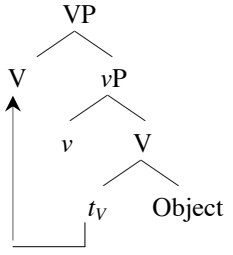
(iii) Impossible complements of functional heads
T-NP T-DP T-PP T-CP
D-VP D- TP D-CP D-PP
C-NP C-DP C-VP
P-VP P-PP
T-TP D-DP

To account for these patterns, she proposes that heads of higher F values can only take projections with lower F values as their complements. In all the impossible combinations given in (iii), a functional head takes as its complement a category it cannot form an extended projection with. Complements of lexical categories are not subject to this restriction.

[7] Noun incorporation seems problematic from this perspective. Thanks to Ian Roberts for pointing out this issue to me.

Bury (2003), working within the same set of minimalist assumptions, argues that verb movement involves a *Project Goal* derivation, schematized in (12). I share Bury's intuition that the target does not always project in movement constructions. I depart from him, however, in what the label of the resulting structure is. For Bury, the result of verb movement is a verb phrase projection, as shown in (12), which is essentially equivalent to a Larsonian VP shell.

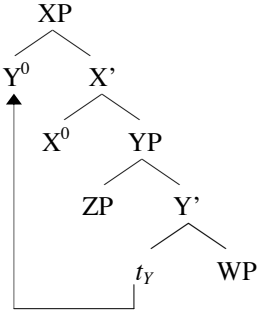
12)



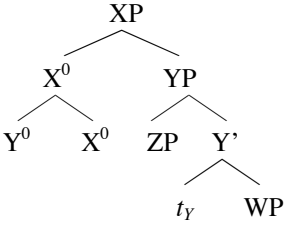
The result of subsequent verb movement to T and C is also going to be a VP, which seems somewhat counterintuitive. On my account, the information about the target of head movement is preserved in the label of the new constituent.[8]

Matushansky (2006) avoids the problems the standard account of head movement raises by reanalyzing it as a composite of two independently attested operations: movement to a specifier position and morphological merger, illustrated in (13a-b) (Matushansky 2006:81).

13) a. Step 1: movement of Y to [Spec,XP]



b. Step 2: morphological merger



However, if head movement targets a specifier and if m-merger is an independent operation, it is not clear why head movement should be subject to stricter locality conditions than phrasal movement (Head Movement Constraint versus Island Constraints). This might be due to the fact that all cases of head movement (treated by Matushansky as movement to a specifier position) have to be followed by m-merger. Otherwise, it would not be clear how to exclude excorporation.

Finally, I would like to comment briefly on the differences between my proposal and the two very different alternatives: PF movement and remnant movement analyses of head movement. As pointed out by Matushansky (2006), Zwart (2001), and Suranyi (2005) among others, relegating head movement to a PF component adds redundancy to the computational system in that the same

[8] Suranyi's (2005) proposal avoids this problem.

mechanisms of displacement are duplicated in both the syntactic and phonological component. Furthermore, if head movement were a purely phonological process, it should not have any syntactic or semantic consequences. With respect to syntactic consequences, Suranyi (2005) makes a convincing argument against PF treatments of head movement based on the fact that it participates in a number of syntactic correlations, which would be unusual for PF movement. The generalizations sensitive to head movement are the well-known Holmberg's Generalization and perhaps a somewhat lesser known Vikner's Generalization, which correlates the availability of Transitive Expletive Constructions with both V to T movement and V2.

One of Chomsky's main arguments in favor of treating head movement as phonological came from the fact that it does not have any semantic effects. While it might be true that there are no differences in interpretation between raised and non-raised verbs, one cannot infer from it that there are no semantically significant instances of head movement. Furthermore, as also pointed out by Matushansky (2006), if semantic vacuity were the sole diagnostic of PF movement, all movements resulting in reconstruction would have to reclassified as PF movements.

Lechner (2005) provides convincing arguments that there are cases of semantically active head movement. His evidence comes from the so-called scope splitting cases, illustrated in (14)-(16), in which the modal has wide scope over the quantified subject, as shown by the paraphrases of the (a) examples given in (b).

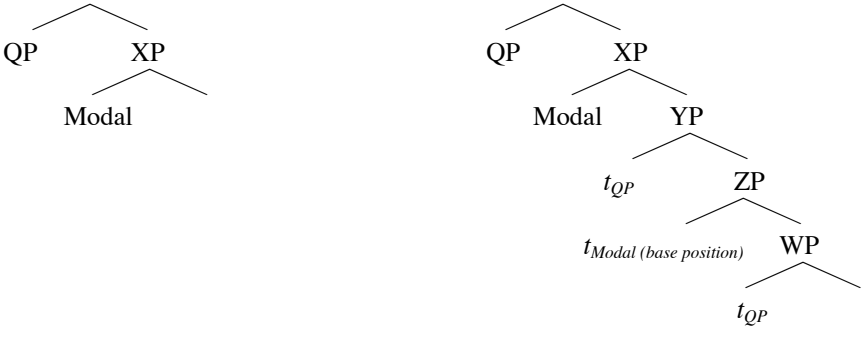
14) a. Not every pearl can be above average size. (Lechner 2005:3)
b. It is not possible that every pearl is above average size.

15) a. Not everyone can be an orphan.
b. It is not possible that everyone is an orphan.

16) a. Not every boy can make the basketball team.
b. It is not possible, that every boy makes the basketball team.

All the (a) examples above involve the following configuration (Lechner 2005:2):

17) Syntax: Interpretation:



The modal is base-generated in a position that Lechner shows to be lower that the reconstructed position of the subject. Furthermore, the wide scope interpretation for the modal cannot be a result of reconstructing the subject. This is shown by the examples in (18a-c), which show that strong DPs, including negative ones, do not reconstruct.

18) a. No one is certain to solve the problem.
b. Every coin is 3% likely to land heads.
c. No large Mersenne number was proven to be prime. (Lasnik 1999:205)

For Lechner, the reason why the modal has wide scope over the subject is that it undergoes LF movement to a position above the reconstructed position of the subject. This evidence in favor of LF movement is incompatible with the views that treat head movement as a purely phonological phenomenon.

An alternative solution would to reanalyze head movement as phrasal movement, or more precisely, to get the effects of head movement from phrasal movement. This is what Koopman and Szabolcsi (2000) do. While their proposal is developed primarily to deal with verbal complexes in Hungarian and Dutch, it should be generalizable to more paradigmatic cases of head movement. On the remnant movement approach, the derivation of the French word order *Subject V Adverb/Neg Obj* would have to involve movement of the object to some position below the adverb, as shown in (19b). If adverbs are VP adjuncts, it is not clear what that position would be. And the second step would have to involve remnant movement of the VP containing the trace of the object to some position above the Adverb, as shown in (19c).

19) a. Subject Adverb [$_{VP}$ V Object]
b. Subject Adverb Object [$_{VP}$ V t_{obj}]
c. Subject [$_{VP}$ V t_{obj}] Adv Object t_{VP}

While this idea might be a good solution for some movement types (and word order alterations), it seems somewhat ad hoc for paradigmatic cases of head movement. As has been pointed out by many researchers, it results in unnecessary proliferation of unnecessary functional projections whose sole purpose seems to be to provide landing sites for various moved elements.

4. Conclusion

In this paper, I have proposed the labeling possibilities are less restricted than traditionally thought. In particular, I have argued in favor *Project Both* option in Internal Merge structures. I have shown that a *Project Both* derivation of head movement avoids the problems with the standard account, and that it can account for some of the restrictions on head movement. I have also shown that unlike PF movement accounts, the *Project Both* account treats head movement as a purely syntactic operation, which is predicted to have syntactic (and semantic) consequences. Unlike remnant movement accounts, the *Project Both* account does not require any extra steps or empty projections whose sole purpose is to provide landing spots for moved constituents.

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Proceedings of the 26th West Coast Conference on Formal Linguistics

edited by Charles B. Chang
and Hannah J. Haynie

Cascadilla Proceedings Project Somerville, MA 2008

ISBN 1-57473-423-2 library binding

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Citko, Barbara. 2008. Missing Labels: Head Movement as *Project Both*. In *Proceedings of the 26th West Coast Conference on Formal Linguistics,* ed. Charles B. Chang and Hannah J. Haynie, 121-128. Somerville, MA: Cascadilla Proceedings Project.

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