

## A NOTE ON TWO TYPES OF MOVEMENT

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### 1. Introduction

This note attempts to delineate a distinction between two types of movement. One type consists of movements motivated by the need of stems to pick up affixes. These morphologically motivated movements have very different properties from movements driven by Edge Features (e.g. *wh*-movement, NP movement). The two movement types should be distinguished and kept apart. Arguing the above will be the main task of this note.

To lead up to the need for the first type of movement, I begin (§2) by looking at word order variation in the nominal domain, specifically Cinque (2005). I show that there is a problem about the frequency distribution (among the world's languages) of the word order variation patterns that Cinque notes, and suggest that this may be amenable to an explanation in terms of a different type of movement – anticipating later claims. In §3, I look at an account of word order variation in the clausal domain by Koopman & Szabolcsi (2000). I adopt their mechanisms of ‘stacking’, stranding, and pied-piping. These last-mentioned three operations, I show (in §4), can provide an account of the most salient typological divide among languages, namely that between head initial and head final word orders. In §5 I suggest a reanalysis of Cinque's movements in the nominal domain in terms of the mechanisms of stacking, stranding and pied-piping, treating them as morphologically motivated movements. §6 is the conclusion.

### 2. Cinque (2005)

Cinque (2005) proposes some movements to generate the order of elements in the extended nominal projection. His specific concern was the typological observation known as “Greenberg's Universal 20.” Greenberg's observation was that when a Noun had the modifiers Demonstrative, Numeral, and (descriptive) Adjective (all or any of them) in the prenominal position, they invariably occurred in *that* order, which we can call the “English order,” see (1a); and when they occurred in the postnominal position, the most common order – though by no means the only order – was the “mirror English order,” see (1b):

- (1)
- |    |          |          |          |          |
|----|----------|----------|----------|----------|
|    | <b>1</b> | <b>2</b> | <b>3</b> | <b>4</b> |
| a. | these    | three    | white    | mice     |
|    | <b>4</b> | <b>3</b> | <b>2</b> | <b>1</b> |
| b. | mice     | white    | three    | these    |

Besides the “full” mirror English order (1b), we also get – with fair degrees of frequency – “partial” mirror English orders, where the mirror English *starts from the bottom*:

- (2)
- a.           1     2     4     3  
           these three mice white
- b.           1     4     3     2  
           these mice white three

Other orders are either unattested or extremely infrequent.<sup>1</sup> What we never get – and this should be emphasized – is mirror English that starts in the middle or at the top; i.e. we never get:

- (3)
- a.     \*2     1     3     4
- b.     \*3     2     1     4
- c.     \*1     3     2     4

Cinque takes care of this last fact by adopting the following principle:

- (4) Any movement in the nominal projection must include the Noun.<sup>2</sup>

Since Cinque disallows head movement, what is moved is the Noun Phrase. And since the Noun Phrase is the most deeply embedded element in the nominal projection, the movement will start at the bottom.

Mirror English is generated by the “roll-up” type of phrasal movement. Cinque assumes an AgrP above every one of (the phrases that contain) the modifiers – i.e. there is an AgrP above AP, above NumP, and above DemP. Since AP, NumP and DemP are all phrasal, they are themselves in Spec positions of phrases with null heads.

- (5)  $[_{Agr(W)P} AgrW [_{WP} DemP W [_{Agr(X)P} AgrX [_{XP} NumP X [_{Agr(Y)P} AgrY [_{YP} AP Y NP ]]]]]]]]$

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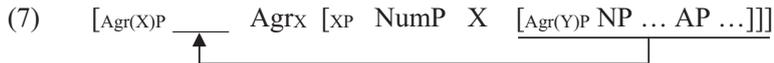
<sup>1</sup> Some of the very infrequent orders that appear to be attested may actually be due to interfering factors. Cinque notes one such, see his fn. 2: what appears to be an Adjective (he suggests) could be a reduced relative clause, giving rise to the unexpected order Dem A Num N (which is found as an alternative order in some languages). We note (in a similar vein) that some languages seem to treat Number as a nominal element (Shlonsky 2004:1491). This could account for the alternative order Dem A N Num found in Bangla (Bhattacharya 1998), Malayalam and some Semitic languages (see also Cinque’s fn. 13).

<sup>2</sup> This principle is adopted also by most other accounts of nominal word order, e.g. Abels & Neeleman (2006). Giorgi & Müller (2010) obtain the same result by claiming that all the movements in the nominal domain are motivated by features of the Noun.

First, NP moves into the AgrP above AP; this gives us the ‘N A’ order, as in (2a):



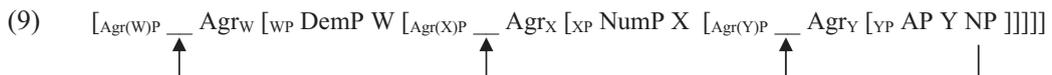
NP can now move into the AgrP above NumP, pied-piping the phrase of which it is the Specifier (i.e. Agr<sub>(Y)</sub>P) – by a *whose picture*-type of pied-piping (says Cinque) – yielding the ‘N A Num’ order, as in (2b):



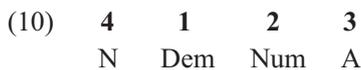
NP can now move into the AgrP above DemP, again pied-piping the phrase of which it is the Specifier (i.e. Agr<sub>(X)</sub>P); this gives us the “full” mirror English order ‘N A Num Dem’:



Cinque says that NP can also do its successive movements into AgrPs without pied-piping, i.e. without “roll-up”:



This yields the order (10) where the Noun is displaced to the left edge of the nominal projection, but the rest of the nominal projection has the English order:



There is a curious fact about the typological frequency of the different orders. Cinque tells us that the English order and the Mirror English order are attested by ‘very many languages.’ (This should remind us of the fact of clausal syntax, that consistently head-initial and consistently head-final languages together account for the large majority of the world’s languages.) Partial mirror English orders, cf. (2), are also attested by ‘many languages.’ On the other hand, the order (10) – which is generated by the non-pied-piping movement of the NP – is attested by ‘few languages.’ Cinque tries to account for this frequency distribution by making the following assumptions:

- (11) a. Movement of NP plus pied-piping of the *whose picture* type is unmarked.  
       b. Movement of NP without pied-piping is marked.

Now, when one comes to think of it, this ought to strike us as a bit strange. In clausal syntax, the standard way in which phrases move is by Spec-to-Spec movement *without pied-piping*. This is the unmarked option. Why should it be the marked (dispreferred) option in the

nominal domain? And why should pied-piping or “roll-up” be the normal option for movement here?

Let me emphasize that, independently of Cinque’s particular analysis of the nominal domain, these are questions posed (simply) by the typological frequency facts, which *any* account must face in one form or another:

- (12) a. Why is pied-piping, or “roll-up”, the preferred option (if any movement takes place at all)?  
 b. Why does “roll-up” begin from the bottom?

Proposals about nominal word order which do not share Cinque’s commitment to the LCA and so can base-generate the Mirror English orders, e.g. Abels & Neeleman (2006), can reformulate this question as follows:

- (13) Why does the taking of complements to the left by heads, begin at the bottom of the tree?

Similarly, attempts to apply “snowballing” *head* movement to explain nominal word order – e.g. Ritter (1988), Pereltsvaig (2006) – can ask the question in the following form:

- (14) Why does “snowballing” head movement begin from the bottom of the tree?

Our answer (in the later sections) will be: Spec-to-Spec movement is a property of (only) EF-driven movement. The other type of movement, morphologically motivated movement, is from the bottom of the tree. We further try to show that word order variation in the nominal domain is morphology-driven.

In the next two sections, §3 and §4, we repeat material which has been published in Jayaseelan (2010); the discussion here is about clausal word order. We need to repeat this material as a background to extend our analysis to the nominal domain in §5.

### 3. Koopman & Szabolcsi (2000)

In the clausal domain, the most prominent word order variation is the VO/OV difference. Hungarian is a particularly interesting – and challenging – language in this regard. It has the English order, and “partial” Mirror English orders, where the Mirror English order is possible only for infinitival complements.<sup>3</sup> In fact the Mirror English order seems to affect only the infinitival verbs themselves; for a complicating factor in Hungarian is that the lexical verb’s ‘dependents’ other than the Subject – e.g. the verb’s internal arguments or any AP or PP complements – must show up at the end of the finite clause.<sup>4</sup> Temporarily abstracting

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<sup>3</sup> And – we must add – for ‘Verbal Modifiers’ (VMs) (see below).

<sup>4</sup> This last fact has led to the proposal to generate the Mirror English order in Hungarian by head

away from this complicating factor, let us look at a sentence in which the lexical verb has no internal arguments, and note the patterns of inversion (Koopman & Szabolcsi 2000: 1):

- (15) a. Nem fogok akarni kezdeni haza menni  
 not will-1sg want-inf begin-inf home go-inf  
           1      2      3      5      4  
 ‘I will not want to begin to go home.’
- b. Nem fogok akarni haza menni kezdeni  
 not will-1sg want-inf home go-inf begin-inf  
           1      2      5      4      3
- c. Nem fogok haza menni kezdeni akarni  
 not will-1sg home go-inf begin-inf want-inf  
           1      5      4      3      2

Note that here too, as in the case of the nominal domain, *Mirror English starts at the bottom of the tree*.

By all accounts, Hungarian has a Focus position immediately above VP (Brody 1990).<sup>5</sup> Besides the finite VP for which the Focus position appears to be obligatory and must be filled, every one of the embedded infinitival VPs can optionally generate a Focus position above it, and these Focus positions can be filled. Thus, note that in (15a), there is one instance of inversion: the directional adverbial particle *haza* ‘home’ – such adverbial particles are called ‘Verbal Modifier’ or VM in the literature – has inverted with its selecting verb *men-* ‘go’. By hypothesis, it has moved into the FocP above the selecting verb. The resulting structure has moved into the FocP above the higher verb *kezde-* ‘begin’, in (15b); and again, the new structure so generated has moved into the FocP above the verb *akar-* ‘want’, in (15c). Note that the last two movements are pied-piping movements, if we assume that it is the selected V (or VP) that the higher verb attracts to its Focus position.

To deal with the complicating factor that the lexical verb’s ‘dependents’ must be realized at the end of the finite clause, Koopman and Szabolcsi (2000) have an operation of ‘stacking’: the complement of V, i.e., all the lexical material to the right of V within the VP, is ‘stacked’ above VP (and above the Focus position). ‘Stacking’ takes place immediately

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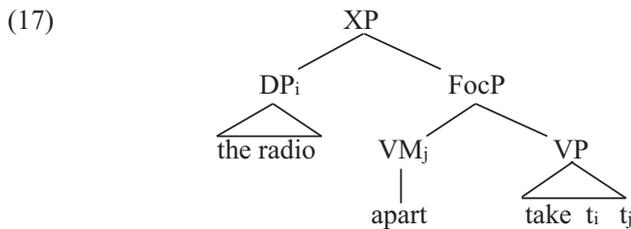
movement – specifically V-to-V adjunction – since this would naturally account for V’s dependents being “left behind” (Brody 1997, 2000; É. Kiss 1998). We come back to this proposal later.

<sup>5</sup> In the case of Hungarian, this position should perhaps be called (simply) a ‘designated position’, because the elements that move into it do not necessarily have a Focus meaning (but see Koopman & Szabolcsi (2000: 220-221, n. 6) for a discussion of this question). Koopman and Szabolcsi, perhaps for this reason, call it simply ‘VP+’; but we shall be showing it as ‘FocP’ in our discussion and tree diagrams.

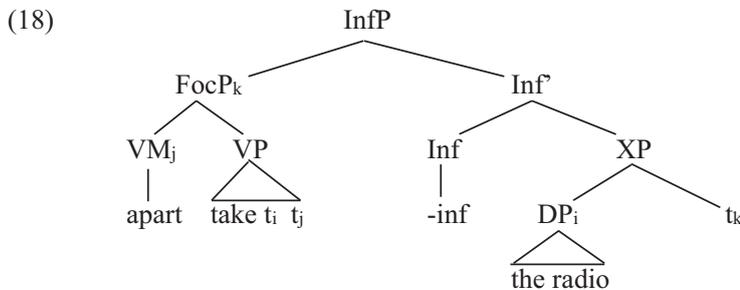
before the verb's inflection is merged<sup>6</sup> – so that, when the remnant VP moves to the left of Inflection, there will be no lexical material intervening between V and Inflection. ('Stacking' is thus a purely morphologically motivated movement. It is also minimally "look-ahead": it looks ahead to the next step in the derivation.) To see this analysis in operation, consider a sentence like (16), where the lexical verb *szed* 'take' has both a VM *szét* 'apart' and an internal argument *a rádiót* 'the radio' (Koopman & Szabolcsi 2000:45):

- (16) Nem akartam **szét szedni** kezdeni **a rádiót**  
 not wanted-1sg apart take-inf begin-inf the radio-acc  
 'I did not want to begin to take apart the radio.'

The VM is moved into the Focus position, but the argument is moved into a 'stacking' position (XP)<sup>7</sup> above it:



Now when VP moves into InfP for V to "pick up" its inflection, the VM is carried along, but the argument is "left behind":



Hungarian (then) is a language which has partial pied-piping: a phrase which is moved into a designated position immediately above VP is pied-piped when the VP moves to pick up inflection. All other material is stacked above this designated position and is stranded by the same movement. This gives rise to the peculiar word order of Hungarian: a string of verbs can

<sup>6</sup> But see Jayaseelan (2010) for discussion of some parametric variation in this regard: some languages allow "anticipatory stacking", where merge of other elements can intervene between the stacking operation and the merge of inflection.

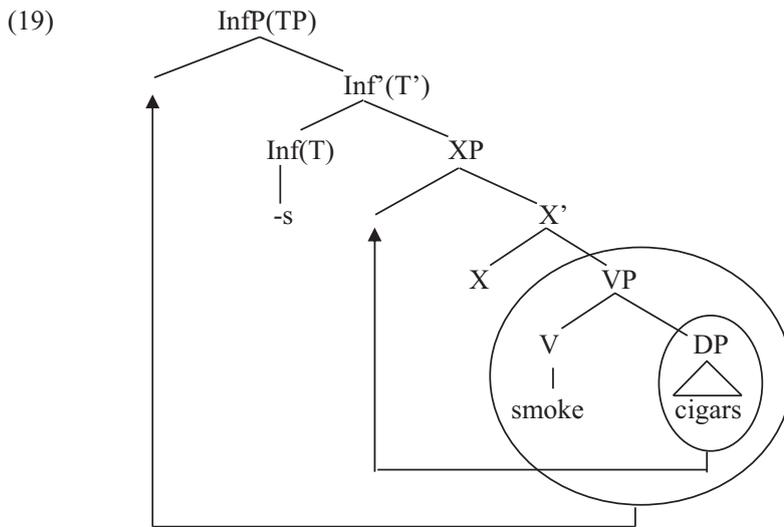
<sup>7</sup> The function of the stacking position XP is solely to host the stacked material. See Starke (2003) for what is possibly the first clear statement that the stacking position has no other function.

show Mirror English order, but the internal arguments are at the end of the finite clause. (The first fact is suggestive of an OV order, but the second fact is suggestive of a VO order.) But there are languages which have ‘total’ stranding and ‘total’ pied-piping. In a ‘total’ stranding language, the VP strands both the stacked material *and the Focus position*, when it moves to pick up its inflection. In a ‘total’ pied-piping language, on the other hand, the VP pied-pipes both the Focus position *and the stacked material*, when it moves to pick up its inflection. These two options give us strictly head-initial and strictly head-final word orders.

#### 4. Generating head-initial and head-final word orders

English (we suggest) is a stranding language; Malayalam and Japanese are pied-piping languages. Neither operation is apparently more ‘costly’ for  $CHL$  than the other; for the world’s OV and VO languages are roughly equal in number.

The string *smokes cigars* (in English) is generated by the two movements shown in (19):<sup>8</sup>



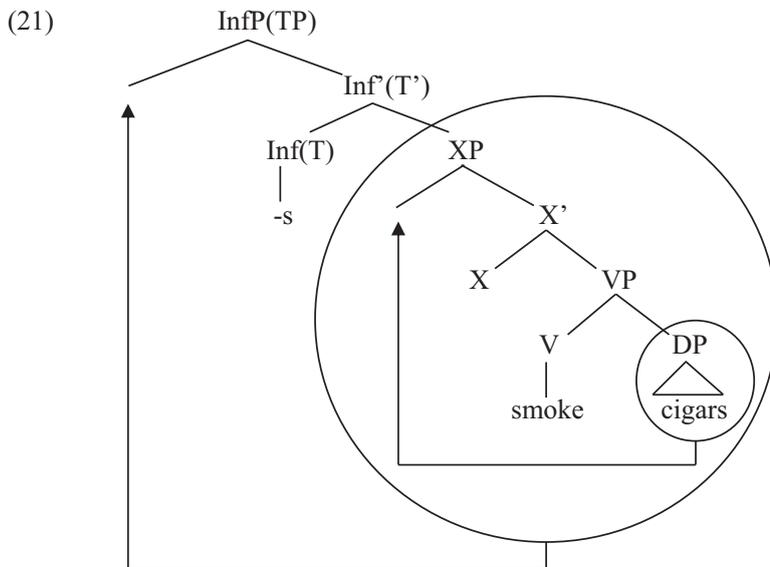
The complement of V is stacked. Then Inf(lection) is merged, and the remnant VP is moved to the immediate left of Inf(lection).

The same movements of course apply to auxiliary verbs. For example, the string *has been smoking cigars* will be generated as shown in (20):

<sup>8</sup> Current wisdom is that the English main verb does not raise to Tense. But the contrary position is also not unknown, cf. Hinterhölzl (2000: 295), Julien (2000: 106). See Jayaseelan (2010) for fairly detailed alternative analyses of the commonly adduced evidence in support of the popular position.

- (20) (i) [VP smoke cigars] (by merge)  
 (ii) [XP cigars<sub>i</sub> X<sup>0</sup> [VP smoke t<sub>i</sub>]] (by stacking)  
 (iii) -ing [XP cigars X<sup>0</sup> [VP smoke t]] (by merge of *-ing*)  
 (iv) [<sub>ingP</sub> [VP<sub>(j)</sub> smoke t] -ing [XP cigars X<sup>0</sup> t<sub>j</sub>]] (by movement of VP)  
 (v) be [<sub>ingP</sub> [VP smoke t] -ing [XP cigars X<sup>0</sup> t]] (by merge of *be*)  
 (vi) [YP [<sub>ingP(k)</sub> smoking cigars] Y<sup>0</sup> [VP be t<sub>k</sub>]] (by stacking)  
 (vii) -en [YP [<sub>ingP</sub> smoking cigars] Y<sup>0</sup> [VP be t]] (by merge of *-en*)  
 (viii) [<sub>enP</sub> [VP<sub>(l)</sub> be t] -en [YP [<sub>ingP</sub> smoking cigars] Y<sup>0</sup> t<sub>l</sub>]] (by movement of VP)  
 (ix) have [<sub>enP</sub> [VP be t] -en [YP [<sub>ingP</sub> smoking cigars] Y<sup>0</sup> t]] (by merge of *have*)  
 (x) [ZP [<sub>enP(m)</sub> been smoking cigars] Z<sup>0</sup> [VP have t<sub>m</sub>]] (by stacking)  
 (xi) -s [ZP [<sub>enP</sub> been smoking cigars] Z<sup>0</sup> [VP have t]] (by merge of *-s*)  
 (xii) [TP [VP<sub>(n)</sub> have t] -s [ZP [<sub>enP</sub> been smoking cigars] Z<sup>0</sup> t<sub>n</sub>]] (by movement of VP)

In head-final languages, the stacked material is pied-piped by the remnant VP when it moves to the immediate left of Inf(lection):



This outputs the OV order *cigars smokes*.

Again, pied-piping by remnant VP-movement will make the following difference in the derivation of a sentence with auxiliary verbs:

- (22) (i) [VP smoke cigars] (by merge)  
 (ii) [XP cigars<sub>i</sub> X<sup>0</sup> [VP smoke t<sub>i</sub>]] (by stacking)  
 (iii) -ing [XP cigars X<sup>0</sup> [VP smoke t]] (by merge of *-ing*)  
 (iv) [<sub>ingP</sub> [XP<sub>(j)</sub> cigars X<sup>0</sup> [VP smoke t]] [<sub>ing'</sub> -ing t<sub>j</sub>]] (by movement of VP with pied-piping)  
 (v) be [<sub>ingP</sub> [XP cigars smoke t] [<sub>ing'</sub> -ing t]] (by merge of *be*)

- |        |  |                                      |
|--------|--|--------------------------------------|
| (vi)   | [ <sub>YP</sub> [ <sub>ingP(k)</sub> cigars smoking] Y <sup>0</sup> [ <sub>VP</sub> be t <sub>k</sub> ]]       | (by stacking)                        |
| (vii)  | -en [ <sub>YP</sub> [ <sub>ingP</sub> cigars smoking] Y <sup>0</sup> [ <sub>VP</sub> be t]]                    | (by merge of <i>-en</i> )            |
| (viii) | [ <sub>enP</sub> [ <sub>YP(l)</sub> cigars smoking be t] [ <sub>en'</sub> -en t]]                              | (by movement of VP with pied-piping) |
| (ix)   | have [ <sub>enP</sub> [ <sub>YP</sub> cigars smoking be t] [ <sub>en'</sub> -en t]]                            | (by merge of <i>have</i> )           |
| (x)    | [ <sub>ZP</sub> [ <sub>enP(m)</sub> cigars smoking been] Z <sup>0</sup> [ <sub>VP</sub> have t <sub>m</sub> ]] | (by stacking)                        |
| (xi)   | -s [ <sub>ZP</sub> [ <sub>enP</sub> cigars smoking been] Z <sup>0</sup> [ <sub>VP</sub> have t]]               | (by merge of <i>-s</i> )             |
| (xii)  | [ <sub>TP</sub> [ <sub>ZP(n)</sub> cigars smoking been have t] [ <sub>T'</sub> -s t <sub>n</sub> ]]            | (by movement of VP with pied-piping) |

The output is *cigars smoking been has*, which is the order of auxiliary verbs, lexical verb and arguments in a head-final language.

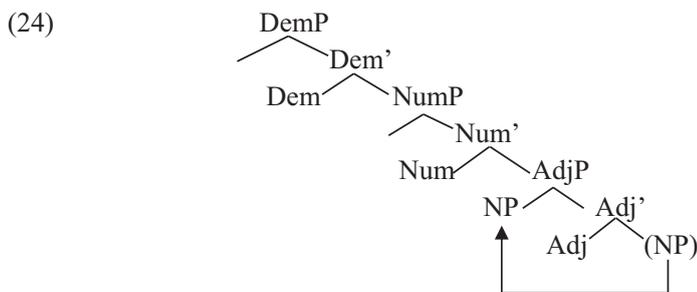
### 5. Redoing Cinque's analysis

We showed that the stacking analysis gives a simple and natural account of the parametric divide between head-initial and head-final syntax in the clausal domain. But we now wish to draw attention to a particular property of the operations constituting the stacking analysis, namely:

- (23) All the movements of the stacking analysis are from the bottom of the tree.

Is this significant?

Recall our observation in the context of Cinque's (2005) proposal about word order variation in the nominal projection, that Mirror English starts from the bottom of the tree. We left this as a puzzle. Cinque's own solution was to stipulate that in the nominal projection, pied-piping is the unmarked option, and that the non-pied-piping movement is marked. When taken in and by itself, this stipulation was puzzling. But suppose we say that in nominal syntax, the same as in clausal syntax, movements – other than movements induced by Edge Features – must be from the bottom of the tree. Now we can go along with Cinque in his assumption that each of the modifiers can attract the Noun (or Noun Phrase) to a position to its left. Starting from the basic merge sequence 'Dem – Num – Adj – N', suppose Adjective attracts Noun to its left:



Now if Number wants to attract Noun, its only option is to move the entire AdjP that contains the Noun, if movement must be from the bottom of the tree. Similarly, if Demonstrative wants to attract the Noun, it must move the whole NumP. This gives us the “roll-up” that we are aiming to generate.<sup>9, 10</sup>

Unfortunately, there are serious gaps in this explanation. Note that Cinque’s assumption is that each of the modifiers *can*, not *must*, attract the Noun Phrase to its left. Let us encode this as an optional strong feature on the modifiers. To get the mirror English order that starts from the bottom of the tree, we need an additional assumption, namely that there is an uninterrupted sequence of heads bearing the strong feature, and that this sequence starts from the bottom of the tree. This practically stipulates what we set out to explain.

We now wish to suggest an alternative account which assumes that the “prime mover” in the word order variation in the nominal domain is not the Noun (as hitherto assumed by all accounts) but the need of the modifiers to pick up their agreement inflection. That is, we shall argue that word order variation in the nominal domain – at least the variation that involves mirror English orders – is morphologically motivated.

Note that every one of the nominal modifiers has an agreement suffix (sometimes phonetically null).<sup>11</sup> Assume that the agreement inflection is generated above the stem and must be “picked up” by the stem. This gives us a tree somewhat like that of Cinque, with an AgrP above every modifier; but unlike in Cinque’s system, AgrP will not be headed by a null head but by an agreement morpheme.

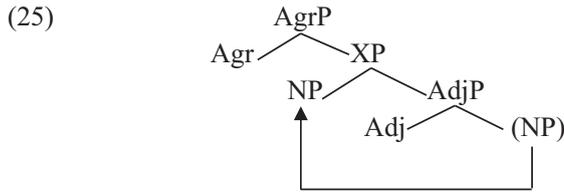
Now when Adjective wants to pick up its agreement suffix, it must first stack its complement – Noun or Noun Phrase – above it, as shown schematically below:

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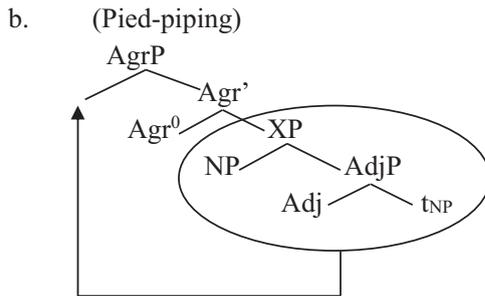
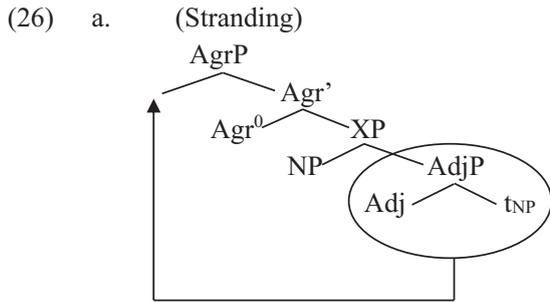
<sup>9</sup> To account for the non-“roll-up” movement of (10) – which is infrequent but exists – we can analogize it to the ‘climbing’ movement of Hungarian, see Koopman & Szabolcsi (2000), and possibly explain it as driven by an Edge Feature.

<sup>10</sup> Cinque offers a licensing account of why the NP moves (pp. 325-326): the modifiers must be licensed by a nominal feature – which can be done by moving the NP into the Spec of an AgrP above the modifiers (giving us – if combined with pied-piping – mirror English orders) or by feature movement from the NP (yielding non-movement/English orders). He also has a tentative explanation of why pied-piping is the normal option of movement in the nominal domain, namely to adopt Kayne’s (2005) suggestion that “what moves to the Spec of a functional head H is the category closest to H that is not the complement of H” (p. 326). This comes close to our “movement from the bottom” idea.

<sup>11</sup> In many languages, e.g. Semitic (see Shlonsky 2004), agreement on the modifiers is overt only when they are in the post-nominal position. This is essentially the same pattern as the fact of clausal syntax that in languages with optional VSO and SVO orders, e.g. Semitic (again), the Verb shows partial agreement with the subject in the VSO order and full agreement in the SVO order. That is, overt (or at least full) agreement is towards the left. These variations should not affect our argument here.



AdjP can strand or pied-pipe the stacked phrase when it moves to the immediate left of AgrP:



(26a) gives us the English order and (26b) the mirror English order. The same type of movements would apply to the modifiers further up.

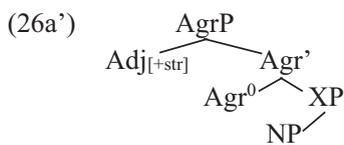
But this new analysis does not appear (on the face of it) to bring us any closer to a solution of our problem of how to generate the mirror English order that starts from the bottom of the tree. For what is there to prevent (say) AdjP being of the stranding type and the higher modifiers of the pied-piping type, yielding the order – 3 4 2 1? What we appear to need, speaking in terms of the new analysis, is an ancillary principle which ensures the following:

(27) In a derivation, after a stranding choice, pied-piping is not an option.

I suggest that we can formulate this as a selectional restriction. Assume that an affix-taking head bears a feature [ $\pm$ stranding], which will determine whether it will strand or pied-pipe its stacked complement. Now let us say the following:

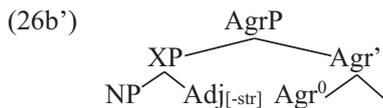
- (28) A head marked for the feature [ $\pm$ stranding] selects a head with the same value for this feature, or one which is not marked for this feature at all.

To see how this selectional restriction works, consider the derivational step diagrammed in (26). If  $\text{Adj}^0$  is marked [ $+$ stranding], we get the stranding derivation (26a); if it is marked [ $-$ stranding], we get (26b). Focusing on (26a), let us note a need to modify it. If stacking leaves no trace – we are going to claim (§6) that trace is a property only of the type of movement implemented by the operation of Rmerge – the element shown as  $t_{NP}$  will in fact be absent in this structure, and  $\text{Adj}$  will be both maximal and minimal after its complement NP is stacked. When we move this maximal-minimal  $\text{Adj}$  to Spec,  $\text{AgrP}$ , we should get:



We need one more assumption here, namely that  $\text{Adj}_{[+str]}$  marks  $\text{Agr}^0$  with the [ $+$ stranding] feature by Spec-Head agreement, so that the label of this structure bears this feature. Another way to implement this might be to adopt the idea of ‘projecting movement’ (Cecchetto & Donati 2010):  $\text{Adj}_{[+str]}$ , being (also) minimal, projects in its new position, so that the structure becomes  $\text{AdjP}$ . Now this structure can be selected only by a head marked [ $+$ stranding]; i.e. we can get only head-initial structures further up.

On the other hand, given the pied-piping movement shown in (26b), the structure corresponding to (26a') would be:



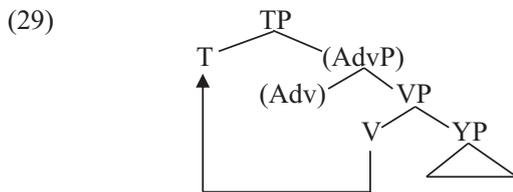
Here,  $\text{Adj}^0_{[-str]}$  cannot give the [ $-$ stranding] feature to  $\text{Agr}^0$  because it is embedded in a larger phrase; or in terms of the alternative analysis,  $\text{Adj}^0_{[-str]}$  cannot project. Since the label of this structure bears no [ $\pm$ stranding] feature inherently either, it can be selected by a head with either value for this feature – i.e. the derivation is free to continue with a head-initial or a head-final phrase.

This gives us the result that a head-final phrase can be the complement of a head-final or head-initial phrase, but a head-initial phrase can be the complement of only another head-initial phrase. This fact – formulated as a “Final-over-Final Constraint” (FOFC) in Biberauer et al. (2008) – yields the mirror English order that starts at the bottom of the tree.

## 6. Conclusion

We argued for the postulation of stacking, stranding and pied-piping, a set of three operations that are motivated by the need of stems to be left-adjacent to (“pick up”) affixes. We demonstrated that this way of generating affixal morphology accounts in a natural way for the typological divide between head-initial and head-final word order in the clausal domain.

We observed a property of the movements constituting the stacking analysis, namely that they remove material from the bottom of the tree. If this is a constraint on morphologically motivated movements, then we have an explanation of why the stacking operation is necessary in the first place, and why – in the case of verbal morphology – the traditionally proposed simple head-movement of V to T is not possible:



Stacking of the Verb’s complement (YP) must first take place, in order to make it possible for the Verb to move.<sup>12</sup> In fact this throws an interesting light on the question of head movement. If the stacking movement leaves no trace (see below), the question of whether it is VP or V which moves becomes vacuous for VO languages, after V’s complement is stacked: V is both maximal and minimal.<sup>13</sup>

Another point perhaps needs to be clarified about head movement: movement from the bottom of the tree is a constraint of only morphologically motivated movements. It will not affect the type of head movement proposed (e.g.) by Donati (2006), Cecchetto & Donati (2010), which is motivated by an Edge Feature and so is a case of Rmerge: it stands to reason that a head ( $X^0$  element) can be remerged the same as a phrase.

Let us now contrast the movements of the stacking analysis with the paradigm instances of phrasal movement, *wh*-movement and NP movement. These are currently analyzed as Rmerge (Epstein et al. 1998; Chomsky 2004, 2005; Stroik 2009; a.o.). In

<sup>12</sup> I am crucially assuming that the head is hierarchically superior to its complement, which is why V is not at the bottom of the tree in (29). (This would be clearer in a Dependency-type tree; see also the non-branching, linear tree proposed in Jayaseelan 2008.)

<sup>13</sup> We are ignoring the position of the Subject here. If the Subject is generated to the left of the Verb (and VP-internally), the point we are making about the V-VP distinction disappearing for VO languages, will not hold.

The similarity of our proposal here to Matushansky (2006) should be obvious. But Matushansky – in the absence of a stacking analysis – is forced to move a minimal V (an  $X^0$  element) to Spec,TP, which is theoretically suspect, whereas we don’t have that problem.

Remerge, there is no movement in the strict sense. A phrase is merged in its base position; it is merged again higher up in the tree, in order to fulfill the requirements of an Edge Feature [EF]. Edge Feature was called ‘P-feature’ in “Minimalist Inquiries” (Chomsky 2000), where it was spelt out as “force, topic, focus, etc.” (p. 108). Again, in Chomsky (2005: 14), it is stated that Internal Merge (which is the same as Remerge) correlates with “edge properties, scopal or discourse-related (new and old information, topic, and so on).” We suggest that the properties that we standardly associate with phrasal movement – successive-cyclic, Spec-to-Spec movement, and trace – are properties of Remerge.

But the morphologically motivated movements that we argued for have nothing to do with “discourse-related” properties. In fact, the absence of such semantic effects – the fact that “the semantic effects of head-raising in the core inflectional system are slight or non-existent as contrasted with XP movement” (Chomsky 2001:37) – was used as an argument for keeping the operations that bring together stems and their affixes outside narrow syntax. But this theoretical stance (we wish to plead) is the result of failing to distinguish between the two types of movements, and so expecting the properties of one in the other.

The second type of movement, i.e. morphologically motivated movement, is not successive-cyclic or Spec-to-Spec – in fact, the same phrase does not move twice. It is plausible that they leave no traces, if trace is a result of Remerge. They are very local, small movements. And these movements are from the bottom of the tree.

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