Squibs and Discussion

HEAD-ING TOWARD PF
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1 Introduction

In recent years Chomsky has put forward the idea that head movement is best viewed as a PF phenomenon. Consider, for instance, the following quotation (from a draft version of Chomsky 2000; see also Chomsky 1995:393n. 139, 1995:368, 1999:31, 2000:150n. 102).

> Many questions dissolve if head-adjunction [head movement] is part of the phonological component. There are, I think, independent reasons to suspect that this may be true, at least over an interesting range . . .

Ever since the original minimalist paper (Chomsky 1993) and the adoption of the Extension Condition (Merge must always take place at the root of the tree), it has been noted that head movement patterns ''differently''; and recent research ranging from purely theoretical (see Brody 2000, Freidin 1999) to psychological (Grodzinsky and Finkel 1998) has adduced evidence supporting that claim.[1] But note that ''spe-

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[1] Brody (2000) and Freidin (1999) point to the redundancy between the features of certain functional categories (e.g., TP and AgrP) and the inherent features of lexical categories (e.g., verbs). As they observe, there seems to be an inherent asymmetry between overt XP-movement and overt head movement. Whereas the former might be viewed as some syntactic feature-checking operation, it is more difficult to see what sort of checking relation two heads might engage in. True, Chomsky (1993) assumed the existence of V-features besides N-features, but once we take seriously the claims that functional projections are merely extended projections (Grimshaw 1991) and that elements enter the structure in their fully inflected forms, the motivation behind V-feature checking relations disappears: unlike specifier-head checking relations, head-to-head relations do not seem to involve ''complementary'' (''matching'') features (say, interpretable ϕ-features of nouns and uninterpretable ϕ-features of verbs), but rather duplicating features (a Tense feature seems as interpretable on T as it is on V). Chomsky (2000) reinforces this point, claiming that all functional projections have an uninterpretable ''Agr''-feature to be checked by XP-movement. But there seems to be no such uninterpretable feature for head movement,

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cial character'' does not in and of itself entail a PF treatment.[2] The only argument Chomsky offered up to 1998 (in class lectures) in favor of a PF treatment is that head movement does not seem to have any semantic import.[3]

In this squib we will provide an empirical argument in favor of the PF approach to head movement. Our discussion is based on pseudogapping constructions like (1).

(1) Debbie ate the chocolate, and Kazuko did ~~eat~~ the cookies.

In a series of papers, Lasnik (1995, 1999a,c,d) has appealed to pseudogapping examples to tease apart theoretical hypotheses pertaining to the controversial existence of overt object shift in English (movement of the object to [Spec, Agr_O]) and the competing definitions of strength. We will show that in the case of head movement pseudogapping again provides a special window on the workings of the computational system. In section 2 we review Lasnik's successive analyses of pseudogapping, emphasizing the role head movement plays in the explanation. In section 3 we point out several problems with the specific proposals Lasnik makes,[4] and in section 4 we show how a PF treatment of head movement might help to solve them. While we want to stress that our aim is not to offer an explicit theory of how head movement might work in PF (aside from some remarks toward the end; see Boeckx, in progress, for further elaboration), we believe that the following discussion makes the PF analysis of head movement at the very least worth exploring.

2 Two Minimalist Approaches to Pseudogapping

Lasnik (1995) follows Jayaseelan (1990) in proposing that pseudogapping constructions like (1) result from VP-ellipsis, the remnant object having moved out of the VP, stranding the verb.[5] However, Lasnik

which makes one wonder whether syntactic feature-checking is the last resort trigger for movement in that case.

Grodzinsky and Finkel (1998) show that aphasics are sensitive to the XP-/X^0-chain distinction and treat head chains in a special way, which suggests that subsuming both XP- and X^0-chain formation under the umbrella checking operation might not be adequate.

[2] Indeed, purely syntactic solutions have been proposed to account for the distinct character of head movement, and of adjunction in general. Of special note here is the ''interarboreal/sideward/paracyclic'' movement approach (see, e.g., Bobaljik and Brown 1997, Nunes 1995, Uriagereka 1998).

[3] Chomsky (to appear) offers more evidence, in part based on a draft of the present study.

[4] Some of these problems were also pointed out in Boeckx 2000.

[5] A reviewer urges us to address the issue of ellipsis in the Minimalist Program. The issue seems to us to be beyond the scope of a squib. The arguments presented in Lasnik 1999c in favor of a PF deletion treatment appear to us to be rather compelling; we will thus follow Lasnik in treating (VP-)ellipsis as resulting from a deletion operation in PF. For an interesting, novel approach to ellipsis, see Holmberg 1999.

departs from Jayaseelan in taking movement of the object not to be a case of heavy NP shift, but one of overt raising to [Spec, Agr$_O$], as shown in (2) (setting details aside; see Lasnik 1995 for discussion).

(2) Debbie ate the chocolate, and Kazuko did [$_{Agr_O}$P the cookie$_i$ [$_{VP}$ eat t_i]].

The licensing of VP-ellipsis via overt movement of the object is Lasnik's (1995) crucial piece of evidence in favor of overt object shift in English. The question that immediately arises is why the verb need not raise in pseudogapping constructions, given that in nonelliptical sentences it must (assuming overt object raising; see the papers in Lasnik 1999b for extensive discussion and motivation).

(3) *Kazuko will the cookie$_i$ eat t_i.
    (vs. Kazuko will eat$_i$ the cookie$_j$ t_i t_j)

This question is at the core of Lasnik's (1999c) discussion of the nature of strong features. Lasnik assumes that a strong feature is involved to force movement of the verb in (3). (2) and (3) seem to show that there are two possibilities for a convergent derivation. Either V can raise, presumably checking the relevant strong feature, or it can be part of the elided constituent. Lasnik notes that this mysterious state of affairs receives a straightforward account under the PF crash theory of strong features (Chomsky 1993).

   This theory in essence says that an unchecked strong feature causes the derivation to crash at PF (see Lasnik 1999c for details), under the hypothesis that the strong feature forcing V to raise overtly is a feature of the lexical V itself, rather than of the target position it raises to. Given this, Lasnik observes that if V fails to raise, and no relevant process takes place, the strong feature that is not checked overtly causes a crash at PF. But if the VP containing V is deleted in the PF component, then, patently, the strong feature cannot cause a PF crash, since the (category containing the) feature will be gone at that level.

   Lasnik (1999c) shows convincingly that this result is hard to capture under the view (Chomsky 1994) that an unchecked strong feature is an illegitimate LF object (see Lasnik's article for discussion). It is also not obvious how it can be captured under the ''virus'' theory of strong features (Chomsky 1995), according to which a strong feature must be checked almost immediately upon insertion into the tree. But Lasnik shows that this is not impossible, under one specific construal of overt movement (which he adopts from Ochi (1999), who in turn builds upon a suggestion by Chomsky (1995)). According to Chomsky and Ochi, overt movement consists of essentially two operations: the formation of a feature chain (raising the formal features of an element to the attractor) and the formation of a category chain (Chomsky's ''generalized pied-piping'' approach). Chomsky and Ochi argue that the formation of a category chain is best viewed as a repair strategy, taking place because ''isolated features and other scattered parts of

words may not be subject to [C_{HL}'s] rules, in which case the derivation is canceled; or the derivation might proceed to PF with elements that are 'unpronounceable,' violating FI [Full Interpretation]'' (Chomsky 1995:262). Put differently, failure to pied-pipe (form a category chain) causes the derivation to crash at PF.

This is strongly reminiscent of the original PF crash conception of strong features, the more so if we adopt Ochi's (1999) interpretation of Chomsky's (1995) view on pied-piping as meaning that the inadequacy triggering the formation of a category chain lies not so much in the target/attractor (as Chomsky argues for feature movement), but in the lexical item itself: a lexical item cannot be pronounced if its features have been scattered.

Given the foregoing, Lasnik is able to maintain the essence of his 1995 explanation of why either overt movement or ellipsis leads to convergence: either the category moves and is pronounceable (its features being ''united'' again), or it deletes, in which case the inadequacy is eliminated.

In the next section we point out problems for Lasnik's explanation.

3 Inadequacies of Lasnik's Solution

Let us start by pointing out that we assume the essential correctness of Chomsky's (1995) claim that movement (of features) is better viewed as attraction (triggered from ''above'' the target/attractor). It is crucial for Lasnik's (1999c) explanation above that Ochi be right in claiming that the inadequacy triggering ''ancillary Move'' lies in the lexical item whose formal features have just been attracted. As far as we can see, however, this conclusion does not follow from the natural ban against scattered objects/features: it could as well be the case that a feature once raised to the attractor demands movement of the category so as not to remain stranded. This is indeed what we believe Chomsky meant in suggesting (class lectures, MIT, fall 1995 and 1997) that pied-piping be viewed as reducing the ''link'' between scattered features. ''Link reduction'' is neutral with respect to the ''orientation'' of the operation.

The whole issue takes on another dimension under Chomsky's (2000) reinterpretation of feature movement as mere long-distance agreement (Agree), with no actual feature displacement. Assuming this view to be correct, Lasnik's argument based on Ochi 1999 becomes virtually unstatable: there is no longer any scattering of features. It seems that like Agree, pied-piping is motivated by some property of the target of movement (Chomsky's (2000) ''[EP]P-feature''). If that is the case, it becomes unclear why V-movement, unlike object movement, need not take place in pseudogapping examples. Claiming that the relevant P-feature is absent is clearly not explanatory.

Since, however, the nature of overt movement is left unclear in Chomsky 2000, apart from some suggestive formulations like ''Agree is not enough to satisfy the target, the category must raise to check

feature P,'' an attempt to formulate this process precisely might turn out to offer a way out of the problems just raised regarding the source of the inadequacy driving head movement. However, in what follows we will show that the source of the inadequacy is not the only problem for Lasnik's analysis and that an alternative is needed.

To achieve a pseudogapping structure, it is crucial for Lasnik's proposal that overt object movement take place and that the verb stay put. But, as far as we can see, nothing inherent in the system Lasnik adopts forces this. What if V-movement takes place and object movement does not, yielding the ungrammatical (4)?

(4) *Debbie got chocolate, and Kazuko got ~~chocolate~~ too.

At the same time it is crucial that V-movement not be optional in standard cases like (5).

(5) Debbie ate chocolate, and Kazuko drank milk.

As Lasnik himself concedes (personal communication), there is no way to enforce this particular obligatory XP-/optional X^0-movement relation. A reviewer points out that the reasoning does not hold once we broaden the range of constructions. The reviewer notes, quite correctly, that (2) and (4) are not exactly parallel. It is a characteristic of pseudogapping (and gapping) that the remnant is contrastively focused. In (4) the remnant is patently not focused. However, there is an elliptical construction in which the verb *is* contrastively focused, namely, right node raising, illustrated in (6).

(6) Debbie bought and Kazuko ate the chocolate.

The reviewer suggests that right node raising could be derived by V-raising with the object staying put—thus offering a parallel to the pseudogapping case. Movement of either the verb or the object would then be driven by focus. There are two problems with that analysis. First, it is unclear whether focus is the driving force or the result of ellipsis (for related discussion pertaining to the interpretive consequences of object shift, see Chomsky 1999). If the latter, there is no explanation for the movement asymmetry between verb and object. Second, there is compelling evidence (Bošković 1996) that right node raising is a base-generated structure. So (6) may not be the exact parallel to (2). On the basis of this, we believe that our point still holds.

Serbo-Croatian provides an even more powerful argument that more than focus must be at stake.[6] As discussed in Stjepanović 1999, Serbo-Croatian allows VP-ellipsis even when the verbs in the first and second conjuncts are different. This is illustrated in (7).

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[6] Thanks to Željko Bošković for bringing the relevance of Serbo-Croatian to our attention.

(7) Marko pokazuje Petra   Mariji,   a   Ivan
Marko shows   Petar.ACC Marija.DAT and Ivan
predstavlja$_i$ [$_{VP}$ t_i Petra Mariji].
introduces
'Marko is showing Petar to Marija, and Ivan is introducing him to her.'

If mere focusing were at stake in the English cases, it would be possible to choose a different verb for the second conjunct. Here focusing on the verb is possible; hence, raising is available. Something like (8) is therefore predicted to be good, incorrectly.

(8) *Peter kissed Mary, and Tom hit$_i$ [$_{VP}$ t_i Mary].

In light of this, we take the contrast between (2) and (4) to be genuine.

Sentences like (4) are also discussed by Matsuo (1999), who accounts for their ungrammaticality in terms of some version of Relativized Minimality. Matsuo adopts a proposal by Lasnik (1999d) for resolving a different problem in pseudogapping constructions. In particular, she assumes with Lasnik (1999d), who in turn follows Lobeck (1995) and Zagona (1982, 1988), that for VP-ellipsis to be licensed, the elided phrase (namely, VP) must be governed by an appropriate head, which for Lasnik is T^0. Furthermore, Lasnik suggests that there must not be any intervening lexical verbal heads between T^0 and the elided VP; otherwise, ellipsis will not be licensed, owing to a violation of ''some version of Relativized Minimality'' (p. 162). Matsuo argues that this is exactly what is wrong with (4). In (4) the lexical verbal head *got* intervenes between T^0 and VP_2, which undergoes VP-ellipsis, resulting in a violation of ''some version of Relativized Minimality.''

There are good reasons to doubt this account, though, on both conceptual and empirical grounds.[7] A first conceptual drawback is that the account relies on government, which the Minimalist Program tries to dispense with for reasons we will not go into here (see Chomsky 1993, 1995). It is true that the phenomena covered in such studies on ellipsis processes as Lobeck's and Zagona's still await a ''government-free,'' minimalist treatment, but recent work (Boeckx 1999, Depiante 2000, Pollock 1998) suggests that the crosslinguistic distribution of ellipsis might be derived from independent parametric options, without recourse to government.

Second, neither Matsuo nor Lasnik suggests precisely how Relativized Minimality rules out these sentences—that is, why an intervening verbal head matters here. And, in fact, the generalization that there cannot be any intervening verbal heads between T^0 and the elided VP is not correct. Consider the following sentence from Serbo-Croatian.

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[7] For further apparent violations of Relativized Minimality in ellipsis constructions, see McCloskey 1991, Doron 1998, Laka 1990, and Martins 1994. Thanks to an anonymous reviewer for drawing our attention to those studies.

(9) Ivan je kupio automobil, a i Marija je kupila
  Ivan is bought car   and too Marija is bought
  ~~automobil~~.
  car
  'Ivan bought a car, and Marija did too.'

Stjepanović (1997) provides compelling arguments that examples like (9) involve VP-ellipsis of the lowest VP after the participle raises out of that VP. Furthermore, Bošković (1997) shows that participles in Serbo-Croatian move out of their VPs, but that their landing site is not T^0. This means that participles in Serbo-Croatian constructions like (9) do intervene between T^0 and the phrase undergoing VP-ellipsis.[8]

  Furthermore, even in English one finds examples where a verbal head intervenes between T^0 and a VP undergoing VP-ellipsis, as illustrated in (10).

(10) Debbie might have done it, but Kazuko might have ~~done it~~ also.

In (10) *have* intervenes between the modal verb *might*—standardly analyzed as being in T^0—and the ellipsis site, and the sentence is perfectly grammatical.

  Given these examples, we conclude that Matsuo's (1999) and Lasnik's (1999d) Relativized Minimality accounts of (4) and related constructions cannot be maintained. But then the only account we are left with is a stipulation that XP-movement is forced, but X^0-movement is not, which is clearly undesirable. The issue is somewhat reminiscent of Lasnik's (1981) argument against rule ordering in grammar, which he showed could be eliminated by severing affix hopping from all other transformations. In the present context one might say that XP-movement must apply first, leaving room for ellipsis to apply before head movement.

4 Head Movement as a PF Phenomenon

We believe that a solution to both problems—stipulating obligatory/optional movement, and the (at best) inconclusive evidence in favor of syntactic-feature-triggered head movement—is to assume that head movement (in our case, V-movement) takes place after Spell-Out, in the phonological component, as Chomsky has suggested in recent years.[9]

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[8] Bošković (in press: chap. 2) and Stjepanović (1997) argue that auxiliaries in Serbo-Croatian sentences like (9) are in T or Agr$_S$.

[9] The solution can be traced back to a suggestion by Joe Kupin (reported in Lasnik 1981), according to which affix hopping is to be seen as an ''interface operation.''

Assuming XP-movement, like object shift, to be syntactic (driven by the checking of some feature), it necessarily takes place in the syntax. If head movement is a PF (post-Spell-Out) phenomenon, it necessarily follows all syntactic movement operations and could be ''superseded'' by an ellipsis rule: not being syntactically driven, head movement and ellipsis (both PF operations, we assume) compete, the choice between them being determined by independent factors (on which, see below).

As Howard Lasnik (personal communication) points out, our PF theory so far does not exclude a third possibility: doing nothing to the verb (neither moving nor deleting it), thus incorrectly ruling in (11).

(11) *Debbie ate chocolate, and Kazuko milk$_i$ drank t_i.

However, Lasnik's objection does not take into account the—we believe, real—possibility that V-movement is triggered in some way. We simply claim that the trigger is not featural, but may well be morphological, or prosodic, or a mixture of the two. The role of prosody in triggering head movement has recently been discussed by Holmberg (1997), Neeleman and Reinhart (1998), and Rivero (1999) (to name but a few). As for morphological triggering, it is a long-standing notion that, even though it has proven more difficult to make precise than one might have thought at first, is nonetheless well grounded. Thus, Rohrbacher (1999), Pollock (1997), and Acquaviva (to appear) account for asymmetries in V-movement by relying on the morphological richness manifested in various languages.

Although we hasten to add that prosody and morphology might not be the whole story (e.g., it is unclear to us how to rule out *Debbie has the chocolate eaten*), we believe that such an approach provides a viable alternative to a purely checking account of V-movement.

To summarize, if head movement is a PF phenomenon, we have an answer to Lasnik's puzzle as to why V need not raise in the pseudogapping cases. Suppose ellipsis is a PF operation. Then head movement and ellipsis become competing operations: V either moves or is deleted, which is exactly what human language seems to require. In short, not only does the view of head movement as a PF operation remove any look-ahead and extrinsic ordering from the computational system, it also avoids the question of which head has the inadequacy that forces movement, a question we believe is doomed to remain unclear at best.

It is worth noting that the PF strategy is reminiscent of Lasnik's (1981) solution to extrinsic ordering among transformations. Lasnik achieved the desired result by factoring out the essentially morphological (PF) affix-hopping operation from the grammar. We suggest that the same be done with (most cases of) head movement.

It is also worth noting that in the approaches taken in both Lasnik 1995 and Lasnik 1999c, PF plays a crucial role in determining whether a derivation crashes or not, being tied as it is to the issue of V-raising, all other requirements being met. This role receives a much more natural explanation if head movement is a PF phenomenon.

5 Conclusion

To conclude, we have argued on the basis of pseudogapping constructions that Chomsky's recent claim that head movement is to be viewed as a PF phenomenon may well be right. We have shown that at least in the case at hand it provides a natural answer to a perennial problem for Lasnik's otherwise (we believe) correct account of pseudogapping. While a full-fledged theory of PF operations remains to be worked out before the view that head movement falls outside the core computational system can be fully endorsed, Chomsky seems right in pointing out that PF seems to be its most natural place, given otherwise well-motivated principles like Attract, the elimination of strength, and (in one form or another) the Extension Condition, all of which conflict with a syntactic view of head movement.

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