

## Movement-triggering features, A-movement and Snowballing

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This paper investigates some of the different instantiations of the movement-triggering feature and the ways in which it may be satisfied. In particular, I consider a theoretically possible structure where one head triggers both A-movement and “snowballing” and ask whether these operations may co-occur and if so, how the movements should be ordered.

I take as my starting point, the notion that the EPP (or “movement-triggering”) feature may be associated with various features within a head’s feature bundle, as proposed by Biberauer, Holmberg & Roberts 2010 [BHR]. Specifically, it may be:

- (1)a. parasitic upon a Probe-Goal Agree relation, triggering movement of the XP containing the goal to the specifier of the probe – e.g.  $T_{[u\phi, \wedge]}$ , where  $\wedge$  is the movement diacritic. Let us call this “Agree-driven movement”;
- b. parasitic upon the edge-feature of a head – e.g.  $C_{[EF, \wedge]}$ ; or
- c. parasitic upon the c-selection features of a head, triggering movement of the entire complement domain into the specifier of the head – e.g.  $V_{[ \_ D, \wedge]}$  which causes the complement DP of V to raise to spec,VP. Let us call this “L[inearization]-movement”.

The configurations in (1a, b) should already be familiar, being the triggers for A- and A’-movement respectively; the only novel proposal is (1c). Assuming that asymmetric c-command determines linear order (cf. Kayne 1994), BHR note that this configuration ensures that the complement will be Spelt-Out before the head.

Immediately, the question arises as to whether we need (1c) and what its properties are. While A’-movement contrasts with A-movement in giving rise to islands, weak crossover, reconstruction, parasitic gaps etc, there is no *a priori* reason to assume that these properties are relevant for L-movement either way. We *can* assume, however, that L-movement is highly local as it only ever invokes comp-spec raising. Following Biberauer & Richards (2006), Agree-driven movement *may* also trigger comp-spec raising, if we allow pied-piping of a category larger than the goal, thus giving the appearance of snowballing. However, we do not expect this pied-piping to be obligatory and so it systems invoking this option may exhibit complement extraposition (or “leaking”). This should never occur with L-movement though, making it a good candidate for analysing (at the very least) rigidly head-final languages, which do not permit leaking. L-movement also is conceptually attractive insofar as it plausibly allows head-final orders to be derived without invoking a probe-goal relationship (and thus motivating appropriate unvalued features) for every head. Furthermore, the default minimalist assumption must surely be that any formal feature can host  $\wedge$ , and so (1c) should really only be ruled out by stipulating that c-selection features are special, in that they do *not* allow  $\wedge$  to be associated with them.

Admitting L-movement, then, a second question is whether  $\wedge$  in (1c) is limited in its distribution. It is, and this is captured by the Final-Over-Final Constraint [FOFC] as formulated in BHR. FOFC states that: “for all heads  $\{\alpha, \beta, \dots\}$  on a single projection line, if  $\alpha$  is a head-initial phrase and  $\beta$  is a phrase immediately dominating  $\alpha$ , then  $\beta$  must be head-initial. If  $\alpha$  is a head-final phrase, and  $\beta$  is a phrase immediately dominating  $\alpha$ , then  $\beta$  can be head-initial or head-final.” This observation can be implemented by assuming (1c) and stating that “if a head  $\alpha_i$  in the extended projection EP of a lexical head has  $\wedge$  associated with its c-selection feature for a lower head  $\alpha_{n+1}$  in that extended projection, the lower head  $\alpha_{n+1}$  also has  $\wedge$  associated with its c-selection feature.” In other words, the c-selection feature of a lexical head must carry the diacritic in order for higher functional heads in EP to carry the diacritic. BHR propose that  $\wedge$  may spread upwards monotonically (in line with Relativized Minimality), ensuring that no c-selection feature of an intermediate head in EP is without  $\wedge$  when both lower and higher heads in EP carry  $\wedge$ .

Given this background, a third question arises: if we have a functional head – say  $v^*$  – with both obligatory Agree-driven and L-movement diacritics, in which order do the movements occur? (The diacritic is “obligatory” insofar as it causes movement with no semantic effect, following the “Fox-Reinhart intuition on optionality”.) This is certainly a theoretically licit feature configuration, and while BHR do rule out the possibility of having more than one linearization feature on a given head (being both meaningless and implying the computational system has the ability to “count” diacritics), there is absolutely no reason to suppose that there cannot be instances of each of (1a-c) on a single functional head.

Given this, we start by noting that, in order for  $v^*$  to carry the L-movement diacritic, V must also have the diacritic – this comes from FOFC. Assuming we Merge V and its complement DP and then carry out L-movement, we end up with the following structure:

- (2)  $[_{VP} DP_{[uCASE], [i\phi]} V_{[\underline{D}, \Delta]} (DP_{[uCASE], [i\phi]})]$

We next Merge  $v^*_{[ACC], [u\phi, \Delta]} [_{ \_ } v, \Delta]$ . Now, the order in which the movement-triggering features are satisfied will obviously determine the order of specifiers, resulting in either:

- (3)a.  $[DP [_{VP} [v^* \dots]]]$  or b.  $[VP [DP [v^* \dots]]]$

One possibility is that the features all get satisfied simultaneously upon completion of the  $v^*P$  phase, but this doesn't help us determine the order of the specifiers. An alternative is to assume that the features are dealt with in some order (perhaps ultimately determined by the feature geometry of the feature bundle). Entertaining this second hypothesis, then, one option is that c-selection features are dealt with first. This is plausible, on the grounds that selection features should be checked by Merger of the complement and if a head and complement are not Merged first, there will simply be no complement domain available to the probing feature, and so the feature remains unvalued and the derivation crashes. Performing L-movement (snowballing) first gives:

- (4)  $[[_{VP} DP_{[uCASE], [i\phi]} V (DP_{[uCASE], [i\phi]})] [v^*_{[u\phi, \Delta]} [_{ \_ } v, \Delta] \dots]]$

Agree-driven movement should then take place, targeting the DP in spec,VP (moving it to the higher spec, $v^*P$ ) and derive:

- (5)  $[DP_{[ACC], [i\phi]} [[_{VP} DP_{[uCASE], [i\phi]} V (DP_{[uCASE], [i\phi]})] [v^*_{[u\phi, \Delta]} [_{ \_ } v, \Delta] \dots]]]$

However, this structure is problematic. In particular, the DP in the specifier of the moved VP still contains unvalued features, and it is not clear that these features must (or can) be valued at a subsequent stage of the derivation. Even allowing for chain reduction (cf. Nunes 2004), the unvalued DP will be passed to LF and PF: while the valued DP in spec, $v^*P$  forms a chain with the DP in the specifier of the base-generated VP, the moved VP (containing the unvalued DP) forms a chain with the base generated VP and, as the highest copy in this chain, we expect it to be Spelt-Out. Yet, by having unvalued features, this DP is uninterpretable and cannot be given a phonetic realisation. It thus causes a PF and LF crash.

The alternative is that Agree-based movement takes place first (assuming the complement domain has somehow already been Merged but not moved). However, Müller (2010) suggests that selection is an early operation and comp-spec movement should target the innermost specifier. Having the DP intervene between the VP in spec, $v^*P$  and  $v^*$  derives the incorrect order (and may also potentially violate FOFC) and so this order of operations would presumably never be posited by an acquirer.

Theoretical considerations therefore suggest that L-movement is a plausible operation for some instances of snowballing movement but that an XP in a head-final phrase that is derived through L-movement cannot be raised through obligatory Agree-driven movement. This implies there are some limits on the co-occurrence of snowballing and A-movement.

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