

Verb movement: an introduction

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Generative grammarians have always been interested in the properties of movement operations. Emonds' notions on structure-preservation and the development of the "trace theory of movement rules" in the mid-1970s led to explanatory accounts of how noun phrases move syntactically. Theories emerged which predicted the positions to which NPs (both +wh and -wh) could move, the positions from which they could move, the positions from which they had to move, and the locality restrictions on the movement. More recently, we have gained some understanding of covert movement operations affecting wh phrases and quantificational NPs at the level of logical form (LF). In general, we have learned a great deal about the movement of *phrasal* categories. Indeed, much progress has been made despite there being little discussion about the nature of the movement itself: that is, after the development in the early 1970s of the successive cyclic movement of wh items, ideas remained fairly constant on what was being moved, the positions to which movement was taking place and the bounding condition on movement (Subjacency). This was so even during the radical reformulation provoked by the emergence of principles of government and binding. Understanding came through conditions imposed on the residues of movement, through notions like Case theory, which helped to distinguish positions from which NPs had to move, and through the constituent structure of clauses, which defined positions to which +wh and -wh NPs moved.

In contrast to the intensive study of XP movement, over the 30 to 40 year history of generative grammar there has been less interest in the movement of non-phrasal categories, particularly of head elements like nouns, verbs, and prepositions. Indeed, as conditions on rules were developed from the early 1970s onwards, it was claimed that they did not apply to root transformations, particularly not to the

David Lightfoot and Norbert Hornstein

canonical example of a root transformation, the head movement operation of Subject-verb Inversion. This has now changed: in recent years many studies have been published on head movement of one kind or another in a wide range of languages. Furthermore, after the period of stability with regard to the nature of movement noted above, new theories of movement have emerged, affecting both phrasal categories and heads, conspicuously in Chomsky (1986b). Chomsky introduced novel types of movement which entail quite different types of derivations; his theory of adjunction and substitution led to new ideas about adjoining *wh* items to VP and about raising V to an inflection position INFL or I (see Lightfoot & Weinberg 1988 for discussion).

In the latter half of the 1980s four independent research foci converged on verb movement and stimulated much study and activity:

- i. efforts to understand verb-second phenomena, whereby finite verbs typically occur in initial or second position in certain languages, usually in matrix clauses (den Besten 1983);
- ii. incorporation studies initiated by Baker (1988), whereby the head of a complement phrase may be adjoined to and “incorporated with” the head that governs it;
- iii. the “split INFL” hypothesis, introduced in its modern form by Pollock (1989), which treats each inflectional element (including Tense, Agreement, Negative, Aspect, etc) as heading its own projection and as being in a head-complement relation with another phrasal category;
- iv. the Barriers program of Chomsky (1986b), which seeks to state the primary locality condition on syntactic movement (Subadjacency) and the proper government condition on empty elements at LF (ECP) in terms of a common notion, the notion of a barrier.

To this one might add smaller bodies of work devoted to dealing with verb-subject-object languages and studies on verb movement in individual languages (den Besten 1983, Koopman 1984, Torrego 1984, Travis 1984). Nonetheless, we still do not understand the movement of these head elements in any way comparable to the way in which we understand the movement of phrasal categories, as we shall show.

In what follows, we shall consider briefly three issues relating to V-movement that parallel research on NP movement: (i) the launch sites, derivational trajectories and the targets of V-movement, (ii) the licensing conditions that regulate such movement, and (iii) the levels at which such movement takes place.

Verb movement: an introduction

To help us think about what an understanding of verb movement entails, consider a structure like (1).

- (1) $_p[x_q[NP\ y\ {}_{VP}[V\ NP]]]$

If a verb moves to a clause-initial position, it does so in at least a two-step fashion, via a position in which it is associated with inflectional elements. So, the English *be* may move to a clause-initial position (2a), but not across another inflection-bearing element (2b). That is, the route to initial position goes through the inflection position, which can be occupied by at most one item, *is* in (2a) and *can* in (2b).

- (2) a. is_i Ray e_j smart?
 b. $*be_i$ Ray can e_j smart?

This already suggests that this sort of verb movement is more strictly local than movement of phrasal categories, which are not generally prohibited from moving across other phrasal categories, and that constraints on head movement are not entirely reducible to constraints on movement of phrasal categories.

Assuming a structure along the lines of (1), we may ask what the position *y* is to which the verb initially moves, what the position *x* is in which the clause-initial verb eventually appears, and what locality condition restricts the movement. Consideration of (2) indicates that *y* needs to be associated with inflectional items. But does it represent one or more positions? Similarly, what is the position *x* to which verbal elements may ultimately move? It is generally assumed that this is some kind of complementizer position, but there have been at least two widely held versions of this view: that it is part of a COMP node which in turn is immediately dominated by the node which dominates the whole clause (often *S'*), or that it is a C(omplementizer) which projects to a C-phrase in accordance with X-bar theory. The first version was standardly assumed until Chomsky (1986b),¹ and the second version has become pervasive since that time. Different questions arise for each of these versions. If *x* is COMP, then what is its internal structure? Koopman (1983) showed that it cannot be that any element moved to COMP c-commands its trace; for example, the ungrammaticality of (3a) suggests that one or other of the traces is not licensed, that either *who* or *did* does not c-command its trace, although both are assumed to be in COMP. Compare the grammatical (3b), where both traces are licensed, *e_j* being licensed by the verb *seen*, which governs it. If *x* is C projecting to CP, then why can a verb not move to an empty C in English in an embedded clause like (3c), which presumably has the

David Lightfoot and Norbert Hornstein

structure indicated? And what is the parameter that permits, in fact requires, this movement in some languages (e.g. Modern Greek (Efthimiou & Hornstein 1993), Spanish (Torrego 1984)) but forbids it in others?

- (3) a. *[who_i did_i] e_i e_j leave?
 b. [what_i has_i] John e_j seen e_i?
 c. Fay wondered_{CP[Spec} what_i C_{IP}[Jay could eat e_i]]

A certain orthodoxy has emerged on some of these points and is represented in the papers in this volume. First, movement is constrained in several ways: verbs move only to other head positions (except for Hendrick, who adjoins finite verbs to AGRP in Breton), bounded in accordance with the demands of Chomsky's *Barriers*. For all authors here, movement also observes the Head Movement Constraint, reduced to the ECP in the *Barriers* framework, although only Roberts makes real use of Rizzi's relativized minimality formulation. Inflectional (and other) features are represented as functional heads, which project to full phrasal categories. A minimal position is that there are two functional heads (C and I), as in Chomsky (1986b). So in (1) *y* is I (for Inflection) projecting to IP and *x* is C projecting to CP. A version of this view is adopted in this volume by Santorini and Vikner. More elaborate positions break up I into one or two AGRs, T, ASP, and sometimes include Neg projecting to a NegP. Most of the other papers in this volume go beyond Chomsky's minimal position in this way. Koopman adds E(vent) and Belletti, Roberts and Vikner allow some functional categories to be recursive (AGR and, for Vikner, C). Exceptions are Williams, who is skeptical of the general orthodoxy, and Wexler, who is not specific about the number and nature of functional heads. There is also a general consensus among the relevant papers on the order of the more central functional categories: C - AGR (or AGR_S, if distinct from AGR₀) - T - AGR₀ - V, modulo the recursiveness of Belletti, Roberts and Vikner and modulo Ouhalla's claim that T is above both AGR_S and AGR₀ in Arabic.

The choice between Chomsky's "minimal" position and the "split I" position just sketched has consequences elsewhere, of course. For example, Santorini and Vikner choose the minimal position and therefore must generate subjects inside the VP (Santorini on topics in Icelandic and Yiddish; Ottósson offers a counteranalysis with subject in Spec of IP) and make C recursive (Vikner on Icelandic, but Thráinsson offers a counteranalysis with no such recursion); these moves would

Verb movement: an introduction

not be necessary if I were split into AGR_s , T, and AGR_o . This raises the question of how the functional categories are motivated.

In much work and in papers in this volume, the diagnostics for V-movement relate mostly to the position of the verb with respect to adverbs, negatives and clitics and to the possibility of inversion. In addition, Hendrick offers phonological evidence for verb movement in Welsh. If the verb inverts to a position to the left of the subject NP, it is usually taken to have moved to C and therefore to have moved first to the other functional heads (although not for Vikner, who allows verbs to move directly to C across an intervening I in Swedish). If a verb moves to C, one may conclude that it has passed through every functional category between C and the base-generated V position, but one learns nothing from mere movement to C about which functional positions the verb has moved through. Those positions are revealed by the variability in clause-internal verb positions; particular adverbs are taken to be generated alongside AGR_s , T, etc and therefore the interaction of verb order and adverb positions indicates the functional position occupied by the verb. Belletti's paper illustrates this logic, for example in her discussion of negative polarity items and infinitives in Italian and French. In general, negative polarity items follow the infinitive in Italian, but in French they usually (but not always) precede an infinitive.

- (4) a. Gianni ha deciso di non tornare mai
 Gianni has decided to not return ever
 b. Jean a décidé de ne jamais rentrer
 c. *Jean a décidé de ne rentrer jamais
 (5) $AGR_{NegP[Spec\ mai/jamais\ Neg\ ne/non\ TP[T-re/-r\ VP[V]]]}$

For Belletti, the D-structure (5) underlies the sentences of (4a,b). The negative head *ne/non* is a clitic and left-adjoins to AGR. In Italian the V moves to T and then to AGR, obligatorily. Presumably the obligatory nature of the movement to AGR reflects some property of UG. In French, however, the V may raise to T, but it need not raise further to AGR, accounting for the order of (4b). But French also allows the order of (4c) with certain negative polarity items. Rather than weaken UG to make movement to AGR optional and thus lose an account for the Italian order, Belletti argues that (5) does not underlie (4c), but instead a different D-structure with the negative polarity item generated in Spec of VP and not in Spec of NegP. This illustrates how fixing the position of the negative polarity adverb determines the movement property of the verb. It also illustrates that verb movement is in some

David Lightfoot and Norbert Hornstein

ways more variable than movement of phrasal categories, which raises the question of whether there is a single class of operations (whereby verbs raise to a sequence of functional categories), which holds across constructions and across languages. It is worth noting with Iatridou (1990) that adverbs are the category which linguists know least about, and therefore it is a bold move to take them to indicate the sequence of functional categories.

This is especially true for agreement phrases of various types, which are often justified with data from the distribution of adverbs. Williams' paper here raises a question which has tended to shimmer through the footnotes of work on functional categories and is not otherwise addressed in this volume: are all the functional categories truly on a par? Many linguists feel comfortable with Tense and Negation phrases because they mark clear semantic properties. AGRPs, however, are quite different. Agreement is generally thought of as a *relation* between two expressions, not a property that one element has or does not have in isolation. The use of AGRPs tries to reduce the relational character of agreement to a property that an element has by virtue of occupying a certain head position. Both conceptual and empirical issues are raised by such a reduction.

The morphology of verbs is also taken to reveal the existence and position of functional categories. For example, Belletti adopts a form of Baker's (1988) Mirror Principle and requires the sequence of morphemes to reflect the syntactic sequence of functional heads. So, if Italian *leggevano* 'they were reading' contains a root *legg-*, a tense affix *-eva-*, and agreement affix *-no*, then the Mirror Principle requires AGR to be higher than TP, which in turn dominates VP. As Ouhalla notes, the same logic suggests that in Arabic the order of functional categories has T over AGR_s. This is a natural and strong constraint on functional categories, and combined with "Lasnik's Filter" (requiring affixes to be syntactic dependents at S-structure; Lasnik 1981) it could in principle indicate the position to which the verb has eventually moved. However, the apparent cross-linguistic variability that Arabic and Italian display suggests that the basic phrase structure of functional categories cannot be reduced to the logic of s-selection as in the case of lexical categories. Perhaps some morphological analogue of s-selection is at play for functional projections (see Roberts' paper and Chomsky 1992).

So the morphology of *leggevano*, containing an AGR marker, might indicate that the verb has syntactically moved to AGR. But this cannot be right if UG also allows the option of an affix lowering on to a verb,

Verb movement: an introduction

as in the usual analysis of English, where verbs generally do not syntactically raise out of their VP (see below). Furthermore, functional categories clearly go beyond what is morphologically licensed; for example, C and the recursive elements of Belletti, Roberts and Vikner have no morphological correlates.

Suffice it to say that the diagnostics for verb movement vary somewhat from author to author. A fundamental distinction lies between those who take the functional categories to be universally determined and invariant (Chomsky 1991) and those who take them to be subject to parametric variation. Instead of discussing the relative merits of sets of diagnostics used by linguists, one can go directly to a related but distinct issue: what is the *trigger* for the kinds of verb movement postulated? That is, how do children attain the analyses which are claimed to hold for the mature grammars? This question is not treated carefully in any of the papers in this volume. The most general and principled implicit answer is that verbs move to positions to pick up inflectional features. If this held true generally, a child endowed with Baker's Mirror Principle, and able to detect a tense element and a (subject) agreement element in a verb's morphology, would be able to determine the sequence of positions to which the verb must have moved in order to have picked up the tense and agreement morphemes in the order in which they are suffixed to the stem of the verb. But, as we have just noted, it does not hold generally that verbs must move in the syntax to functional positions in order to pick up inflectional features; inflectional features may sometimes lower on to the verb and, worse, not all functional categories postulated have a particular morphological manifestation (see Anderson 1992 for elaborate discussion). Furthermore, under the analysis of Chomsky (1991, 1992) verbs may raise to I at S-structure in some grammars and at LF in others, and this variation lies beyond the scope of a general principle of UG. In any case, saying that verbs raise to various positions in order to pick up (or check) inflectional features restates the acquisitional problem rather than solving it. If verbs in V2 languages move to C in order to have Tense occupy the highest position in the clause (Santorini, following Laka 1990) or in order to fill an empty T-slot in the verb (Koopman), one wants to know why T is located in C in these languages (as opposed to non-V2 languages), why the condition must be met by S-structure in these languages and not in others, and how children come to discover this.

One can approach the acquisition issue by considering the operation which associates inflectional features with the appropriate verb, as-

David Lightfoot and Norbert Hornstein

suming initially that there is a single position I which contains those features. Most grammars raise their finite verbs to I (6c,d), but English grammars, unusually, have an operation which lowers I on to an adjacent verb (6a). It seems reasonable to construe the English lowering operation as morphological: in general, lowering operations are unusual in the syntax, and a lowering operation here would leave behind a trace which would not be bound or properly governed, and one would expect a morphological operation but not a syntactic operation to be subject to a condition of adjacency. Therefore, the representation in (6a), reflecting a morphological operation, contains no trace of a lowered I. In any case, the English lowering needs to be taken as the default setting. There is, as far as we can see, no non-negative evidence available to the child which would force her to select an I-lowering analysis over a V-raising analysis (6b) for English, if both operations could be syntactic and subject to an adjacency requirement (which would itself raise learnability problems; how could an adjacency requirement be learned without access to negative data?). In that case, let us take the morphological I-lowering analysis as the default setting, always available to children and therefore requiring no particular triggering experience. This version of things is explicitly advocated in Chomsky (1992), where LF operations are taken to be less costly than overt syntactic movement. As such, one would expect the English version of things to be the unmarked case, where the V is raised to check morphological properties at LF. Then one can ask what triggers a syntactic V-to-I raising operation in grammars where it applies.

- (6) a. Jill _{VP} [leave + past]
 b. Jill _I [leave + past] _{VP} [e_i]
 c. Jeanne _I [lit_i] _{VP} [toujours e_i les journaux]
 d. lit_i _{IP} [elle e_i _{VP} [toujours e_i les journaux]]

Some generalizations have emerged over the last several years. One is that languages with rich inflection have V-to-I operations in their grammars, and rich inflection could be part of the trigger. So standard English has one verb which is richly inflected, *be*, and this element raises to I (and may occur to the left of *not*, and may therefore move on to C, as in *Is George president now?*). Some forms of the language show no inflection here and use *be* uniformly regardless of the number and person of the subject NP (7b). These forms of English (Black English Vernacular and some forms of children's speech) use negatives and interrogatives like (7c,d) and not (7e); (7e) is what would be expected if

Verb movement: an introduction

the uninflected *be* raised to I.

- (7) a. George is president now
 b. George be president now
 c. George don't be president now
 do George be president now?
 what do George be?
 d. did it be funny?
 do clowns be boys or girls?
 I don't be angry
 e. *George ben't president now
 *be George president now?
 *what be George?

The contrast between these forms of the language strongly suggests that the inflected *be* raises to I, whereas the uninflected form does not raise. So rich inflection and V-to-I raising are linked in some way.

However, one cannot simply link the presence of V-to-I raising with rich inflection in a one-to-one fashion. It may be the case that if a language (or, as we have just seen, part of a language) has rich inflection, it has V-to-I raising. If there is no rich inflection, a grammar may have the raising operation (Swedish) or may lack it (English). In that case, there will need to be a syntactic triggering experience for the Swedish child.² So, for example, a verb occurring in C, i.e. to the left of the subject NP (as in a verb-second language or in interrogatives) could only get there by raising first to I, and therefore inversion forms like (6d) in French would be syntactic triggers for V-to-I. This suggests that the V-to-I operation applies in the syntax only where necessary; otherwise the morphological operation may suffice to link inflectional elements with the appropriate verb. This is contrary to the way that Chomsky (1991) implements his economy idea in this domain, where overt V-to-I is taken as the unmarked case, but harmonizes well with the more recent position in Chomsky (1992). Given minimalist assumptions, syntactic V-to-I movement must be data-driven because of the greater expense of these operations in comparison to analogous LF operations.

Now one can ask how robustly the parameter setting raising V to I syntactically is "expressed" (Clark & Roberts 1993). It is expressed robustly if there are many simple expressions which can be analyzed by the child only by applying the V-to-I operation. A particular parameter setting may be triggered if it is expressed appropriately in the primary linguistic data. So, for example, the sentences of (6c,d) can only be analyzed by the French child if the verb *lit* raises to I. On the

David Lightfoot and Norbert Hornstein

other hand, *Jeanne lit les journaux*, 'Jeanne reads the newspapers', could be analyzed with *lit* raised to I or with the I lowered down into the VP (and raised at LF) in the English fashion, and therefore it does not express the V-to-I parameter setting. By quantifying the expression of a parameter, it is possible to understand why sixteenth century English grammars lost the V-to-I operation and why they lost it as the periphrastic *do* form became increasingly common; this is discussed at some length in Lightfoot (1993), where it is shown that as the new *do* forms came into the language, they eliminated constructions which had expressed the V-to-I operation.

It seems reasonable, then, to take I-lowering (or LF feature checking) as a default operation, requiring no particular triggering experience beyond the existence of tense and/or agreement markers on the verb. A V-to-I operation is triggered by the occurrence of finite verbs in some initial C position or to the left of a negative particle; such phenomena in languages like Dutch and French are robust in any child's linguistic experience. It is also possible that sequences of finite V - adverb - complement (e.g. French (6c)) might trigger V-to-I. Most grammars have V-to-I but we know of no language where such sequences are the only expression of that parameter setting. Adverbs, after all, are much less robust than interrogatives and negatives in a child's experience, and they are typically quite variable in the positions in which they can occur. In English and French they can occur in any of the positions indicated in (8).

- (8) a. ___ John ___ could ___ have ___ visited DC ___
 b. ___ Jean ___ veut ___ visiter ___ DC ___

It is, of course, an empirical question whether adverbs intervening between finite verbs and their complement could suffice to trigger a V-to-I operation. We are skeptical.

This issue becomes of crucial importance if we drop the initial assumption that there is a single inflectional position to which a verb can move en route to C, and if, instead, we adopt a "split I" approach distinguishing a variety of functional categories, T, AGR_s, AGR_o, etc. If UG prescribes what these functional categories are and the order in which they occur in every grammar, then there are no parameters to be set and no learnability issue arises. If, on the other hand, TP may dominate AGRP in one grammar and if AGRP may dominate TP in another grammar, as argued here by Belletti and Ouhalla, then we need to ask how children acquire these distinctions. As noted earlier, Baker's Mirror Principle could be a tool to discover the syntactic hierarchies in