

OV is more basic than VO

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Abstract

This paper defends the claim that head-final structures are principally less complex than head initial structures. The additional complexity of head-initial structures is the result of head movement within the lexical projection. Head movement guarantees the convergence of a head-initial phrase structure, given a universal constraint that admits only a right-branching projection structure.

On the theoretical level, this position is in competition with the hypothesis that OV structures are derived from VO structures by evacuation of the VP. In a detailed comparison of the empirical implications, this paper attempts to demonstrate that on the empirical level an evacuation theory is less successful than a head movement theory.

1. Background*

Is OV more basic than VO (or vice versa) is just another way of asking a crucial question in the theory of phrase structure: Is one of the two phrase types – head-final-phrases and head-initial ones – a derivative of the other one? In terms of the familiar OV-VO distinction, the question reads: Is the head-initial ('VO-language') or the head-final structure ('OV language') more basic in terms of the basic X'-structure and its derivational continuation?

In Kayne's (1994) LCA theory and work building on it, head-initial projections are head-initial underlyingly. This is a consequence of the basic axiom of this theory, the *linear correspondence axiom* (LCA).¹ It postulates that phrase-structures are built in such a way that the linear order of terminals is a function of asymmetric c-command relations. In the specific implementation of Kayne (1994), asymmetric c-command is mapped on *precedence*. So, in particular, the head precedes the complement. Head-final structures are taken to be the result of XP-movement applied to the complements of head-initial projections. So, the OV structure for a VP in particular is the result of evacuating all phrasal elements out of the head-initial VP. The result is a VP that contains nothing but the verb and traces, with everything else situated in functional projections to the left. In a more recent proposal (Kayne 1998), it is suggested that even in a VO-system like English there are movements of VP-internal phrases in some cases (e.g. negative quantifiers) to the left of VP, followed by fronting the remnant VP past that material again, resulting in what superficially looks like the original word order. This remnant VP-fronting must be ruled out for OV languages.

The theory developed in Haider (1992) is an alternative to the LCA based theory of the OV/VO-relation. The basic axiom, the *branching constraint* (BC) postulates a universal right-branching structure for (extended) projections: The projecting node *follows* the non-projecting sister node. The linear aspect of the head-complement relation is determined by the parametric direction of structural licensing. Licensing to the left triggers the OV structure, licensing to the right the VO-structure.

In OV languages, with the licensing direction to the left, specifiers and complements precede their respective sister node, that is, the node on the projection line of the head of the projection. So, the licensing direction harmonizes with the right-branching structure. Complex head-initial structures, however, cannot meet the directionality of the licensing requirement unless the head is raised (see section 2 for the details). Thus, head-chains (heads raised to the left) must be formed for the licensing of complements in the (extended) head-initial projections. Head-final structures, on the other hand, will not require head-chains, since the heads follow their complements as well as every left branch (including specifiers) in the (extended) projection. Repercussions of these differences, in particular with respect to the grammar of extraction and the distribution of VP-internal non-arguments, will turn out to be an epiphenomenon of the licensing requirement that forces VO-languages, but not OV languages, to apply V chaining.

Given this alternative – OV is derived from VO by phrasal movement to the left *versus* VO is derived from OV by head movement to the left – it should not be too difficult to find decisive empirical evidence. After all, the implications of the two accounts are diverse enough.

The paper is organized as follows: Section 3 sketches the basics of the head movement account (BC theory) of VO- and OV structures. Section 4 presents five areas of data that are of relevance for the evaluation of the competing approaches. It is argued that central implications of the LCA system are in conflict with empirical evidence both on the level of observational as well as on the level of descriptive adequacy. It is argued that the alternative account provides a more satisfactory modelling of the pertinent facts. Section 5 discusses the trigger-problem for each account.

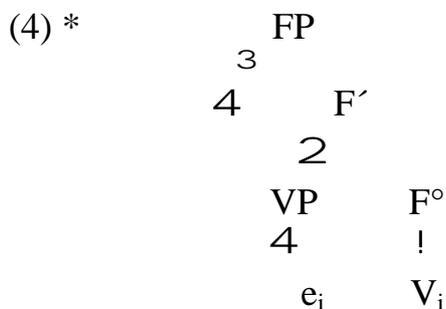
2. A BC account of VO and OV

The central axiom² of the approach presented in Haider (1992) and developed further in Haider (1994) is the branching constraint formulated in (1) and illustrated in (2) with a V projection embedded under a functional projection that conforms to (1). It requires that lexical projections and their functional extensions are right-branching:

- (1) *Branching Constraint (BC)*: Projection-internal branching nodes on the (extended) projection line *follow* their sister node.³

projection line, the node that precedes c-commands the node that follows, and the node that precedes is not a node on the (extended) projection line. This constraint eliminates right-associative projection structures as in (3). As a consequence of (1), precedence and c-command coincide. For all nodes that are immediately dominated by a node on the same (extended) projection line, the preceding nodes c-command the nodes that follow. The BC rules out base-generated right-associative structures such as (3) as well as structures derived by movement, that is, as a result of adjunction to the right.⁴

If a functional projection is a functional extension of the projection of a lexical category, the BC rules out functional heads to the right in general. In this case the projection of the lexical category would be a left sister of the functional head and at the same time a node on the extended projection line as a left branch. This is illustrated in (4):



The VP node in (4) is a top node in the V projection, but simultaneously a node on the extended V projection, whose top node is the FP. At this point there is need for a precise definition of *functionally extended lexical projection*: A functional projection is a *functionally extended lexical projection* if and only if the lexical head moves to the functional head position overtly. The BC, for instance, does not rule out clause structures with a clause-final complementizer particle. In this case, the CP is not a functional extension of the complement. It is just a functional projection with a complement selected by a C°-head. However, the BC would rule out a clause structure if a verb overtly moves to the position of a clause-final functional head that is alternatively realized by a lexical complementizer.

In sum, the BC forbids any kind of movement to the right: It forbids head movement to the right, as in (4). It forbids movement into spec-positions to the right, resulting in structures like (3a). And it forbids adjunction to the right, because this produces structures of the kind (3b).

Let us now proceed to head-initial projections. Head-final and head-initial lexical projections have the same kind of branching structure but different head positions. The head position is a function of the licensing directionality.⁵ In (5), the licensing direction is indicated by an arrow. The combination of the BC with the parametric options of licensing (either to the left or to the right) provides the the grammatical

structure. In the BC system, the OV structure is a potential base structure (cf. structure (2) above). A complex head-initial projection of a lexical head is a shell-structure with a head-chain, as in (5).

In order to check the empirical validity of each of these proposals, it is sufficient to derive distinctive, testable implications and check them. (6) lists a selection of areas of grammar in which the two approaches evidently differ. The relevant phenomena will be discussed in the following section.

(6)	<i>LCA</i>	<i>BC</i>
a. V-head positions per VP	VO=OV	VO>OV
b. VP-internal DP objects	*OV	√OV
c. VP-internal = postverbal	yes	no
d. FP topicalization with V _{fin}	yes	no
e. universal Aux-V base order	yes	no

(6a) refers to the difference illustrated by (2) and (5). In the LCA system, the V projection of a head-final VP is derived from a head-initial VP structure. Therefore the VP-internal structure is identical for both. In the BC system, however, a head-final V projection is well-formed with a single V position, that is, the verbal head in the foot-position of the projection. In a head-initial VP, the structure is potentially complex, since V chaining is necessary in order to license multiple argument positions. It will be argued below that the distribution of particles in English and Norwegian is a direct reflex of V chaining.

(6b): According to the LCA system, the preverbal position of objects in an OV language is always a derived position, (i.e. spec-position of a functional head). In the BC system, the base positions of DP- or PP arguments in a head-final VP are preverbal. The differentiating prediction is evident: According to the LCA system, any argument is subject to the restrictions on derived positions. In the BC system, preverbal arguments in base positions are expected to behave like arguments in base-positions. In other words: The LCA system predicts that the arguments in an OV clause structure are subject to the kind of restrictions that apply to elements in spec-positions (e.g. opacity restrictions). The BC system predicts that preverbal arguments in a head-final VP behave just like VP-internal arguments in a head-initial VP.

(6c) addresses obligatorily VP-internal elements like selected adverbials or secondary predicates. According to the LCA theory, an obligatorily VP-internal element will surface in a postverbal position in an OV language. Obligatorily VP-internal just means that the element cannot and must not be fronted to a pre-VP position. In the BC account, obligatorily VP-internal elements of a head-final VP are necessarily preverbal.

(6d) concerns what is traditionally referred to as VP topicalization. In the BC system, it is VP topicalization after all. In the LCA system, the position of a preverbal object is in a higher functional projection. So, traditional VP topicalization must be reanalyzed as the topicalization of a functional projection. If the functional projection contains a link of the head-chain of the finite verb, crossing violations are expected in the LCA system, but not in the BC system.

(6e) focusses on the order of auxiliaries. Since the universal base order in the LCA system is head-initial, the auxiliary precedes its complement-VP. The VP is head-initial, too. So, the resulting base linearization is: auxiliary before main verb. In German, the linearization is in most case the mirror image of the English order. In the BC perspective, this is a possible base order.

3. Data and generalizations: against [VO] \Rightarrow [O_i[V e_i]]

For ease of reference and for the sake of clarification, the issues listed in (6) will be rephrased as generalizations that ought to be captured by a descriptively adequate model of grammar.

- Generalization 1:**
- a. If a result predicate (particles included) may occur in more than one VP-internal position (i.e. adjacent or non-adjacent to the verb), the given language has a head-initial VP.
 - b. In languages with V-final VPs, there is only *one* particle position for particle verbs, and it is preverbal and V-adjacent.⁶
(cf. Haider 1997a for details)

In English and in Norwegian, verb-particle combinations as well as combinations of a verb plus a resultative predicate occur in one of two serialization patterns: either adjacent or split. In Haider (1997a), the non-adjacent pattern is analyzed as the result of optional stranding.

- (7)
- a. She **cut** the tree **down** carefully.
 - b. The joggers **ran** the pavement **thin**.
 - c. She **cut down** the tree carefully.
 - d. The joggers **ran thin** the pavement.

- (8)
- a. *at han kastet matten ut* [Nor.]
that he threw carpet-the out
'that he threw out the carpet'
 - b. *at de skar kjøttet i biter*
that he cut meat-the to pieces
'that he cut the meat to pieces'
 - c. *at han kastet ut matten*
 - d. *at de skar i biter kjøttet*

If the stranding analysis is correct, the particle distribution in English and Norwegian is a direct reflex of verb positions on the V-chain in the V projection. In a stranding language there are as many particle positions as there are links on the VP-internal V-chain.⁷

- (9) a. [cut_i [the tree [[e_i down] carefully]]]
 b. [[cut down]_i [the tree [e_i carefully]]]

In German, which is representative for the Germanic OV languages in this respect, the particle position for verb-particle combinations is preverbal (10a,b vs. 10c,d), and adjacent (10e).

- (10) a. **daß er den Teppich warf weg* [Ger.]
 that he the carpet threw out
 b. **daß er das Fleisch schnitt in (3 gleiche) Stücke*
 that he the meat cut in (3 equal) pieces
 c. *daß er den Teppich weg warf*
 d. *daß er das Fleisch in (3 gleiche) Stücke schnitt*
 e. * *daß er den Teppich weg nicht/achtlos warf*
 that he the carpet out not/carelessly threw

It is important to honour two facts: First, this pattern is not confined to particles but applies also to phrasal result predicates, as in (10b,d). Particle incorporation, therefore, would not be an adequate solution. Second, in VO-languages, particles and result predicates cannot move to clause internal positions preceding the VP :

- (11) a. *The pavement was thin_i [_{VP} run e_i]
 b. *The tree was down_i [_{VP} cut e_i]

The problematic aspect for the LCA account is this: If there are elements that do not obligatorily move out of the VP internal position proper in a VO language, they are – ceteris paribus – expected to do so in an OV language: Given that particles and result predicates are VP-internal elements, they are incorrectly predicted to occur as post-verbal elements in OV languages like German, that admit postverbal elements. In the BC account, the facts follow straightforwardly. Since there is only the basic V position in the head-final V projection, there is only one position for particles (cf. 10c) or result predicates (cf. 10d).

Generalization 2: Preverbal argument positions in VO-clause structures are *VP-external*, pre-verbal argument positions in OV languages, however, display *VP-internal* properties.

Phrases in uncontroversial spec-positions of functional heads are opaque domains for extraction in general. But, as a matter of fact, preverbal positions in OV languages

like German, scrambled or unscrambled, are not opaque.⁸ So, they cannot be analyzed as spec-positions of functional heads (without non-standard amendments to the theory, which would need to be independently justified). The contrast in (12), discussed in Kayne (1983:224), is representative for this generalization. VP-external positions in VO-structures are opaque for wh-extraction. Preverbal argument clauses in German, however, are not opaque, as (13a) illustrates. (13a) is a subject clause.

- (12) a. the book that it became difficult [to talk about *e*]
 b.*the book that [talking about *e*] became difficult

- (13) a. *Welches Buch_i hat [e_i zu lesen] dir mehr Spaß gemacht?*
 which book has [to read] you more fun_{ACC} made
 'Which book did you enjoy to read?'
 b.**Welches Buch sagte sie [CP [e_i zu lesen] [habe [ihr Spaß gemacht]]]?*
 which book said [she [to read] [has her fun made]]
 'Which book did she say she enjoyed to read?'

Although extraction starts from within a subject clause in (13b), wh-extraction is possible in this case in German. The contrast between English and German becomes straightforward once it is realized that a German subject stays in its VP-internal position.⁹ For a recent survey on this and related issues of German clause structure see Haider (1997b, Haider & Rosengren 1998). In (13b), an embedded V2-clause, the extraction site is contained in a constituent fronted to Spec-CP. In this case extraction is ill-formed, as expected. This shows that the standard opacity domains are operative in German.

The various movement operations that produce the apparent OV order in the LCA system target functional spec-positions. Thus, the preverbal XPs in an OV language are predicted to be as *opaque for extraction* as XPs in uncontroversial functional spec-positions (as for instance the functional subject position in an VO-language). These counterfactual implications for VO-to-OV do not arise, of course, if the structure of a head-final projection is identified as an underived, base-generated structure.

Generalization 3: Selected adverbials and secondary predicates are *VP-internal* in VO-languages and *preverbal* in OV languages.

The fact that an element can surface in a VP-internal position in a head-initial VP proves that there is no *universal* necessity for moving this element to a VP-external position. For OV languages, *VP-internal* elements would appear postverbally, because VP-internal in OV is, according to the LCA approach (Kayne 1994), identical with VP-internal in a head-initial V projection. Elements that are *obligatorily* VP-internal in VO-languages are particles, result-predicates, object related depictive predicates and selected manner adverbials. All these elements are ungrammatical in *preverbal* positions in uncontroversial VO structures in English, Romance or Scandi-

navian languages (cf. 14a'-d'). This proves at least that there is no universal trigger for moving these elements out of the VP.

- | | |
|---------------------------------------------------------------|-------------------------------------------|
| (14) a. They handed it <i>out</i> | a' *They <i>out</i> handed it |
| b. They drank him <i>under the table</i> | b' *They <i>under the table</i> drank him |
| c. The meat _i was served e _i <i>raw</i> | c' *The meat was <i>raw</i> served |
| d. They have lived <i>frugally</i> | d' *They have <i>frugally</i> lived |

In the LCA-gearred VO-to-OV scenario, the postverbal elements in (15) would have failed to move. In the BC system they could not have been generated in a postverbal position from the beginning. The crucial problem for the LCA approach is that there is no grammatical reason at all for moving these elements: Particles must not move out of the VP (14a). Result predicates do not leave the VP (14b). Depictive predicates are obligatorily VP-internal (14c). Particularly instructive is the distribution of selected manner adverbials. Although a manner adverbial may be placed before the VP, this is not grammatical for selected manner adverbials. All these elements cannot be moved out of the VP in VO-languages, so they ought to stay in their VP-internal position in OV languages as well, just like in the regular VO-languages. The resulting pattern would be (15).

- | |
|-------------------------------------------------------------------------------------------------------------|
| (15) a. * <i>Sie haben es gehändigt aus</i> (= 14a)
they have it handed out |
| b. * <i>Sie haben ihn getrunken unter den Tisch</i> (= 14b)
they have him drunken under the table |
| c. * <i>Das Fleisch wurde serviert roh</i> (= 14c)
the meat was served raw |
| d. * <i>Sie haben gelebt genügsam</i> (= 14d)
they have lived frugally |

The examples in (15a-d) correspond to (14a-d), respectively. They are ungrammatical just because the postverbal elements in (15) cannot appear postverbally in a head-final projection. The grammatical order is preverbal. To claim that they have to move obligatorily to the left would amount to merely begging the question. There is no OV language known in which these elements appear postverbally,¹⁰ and what is crucial, there is no VO-language in which these elements could move to the left, out of the VP. In fact, given the LCA system, one would expect that there are some VO-languages in which these elements have to move out of the VP, because the triggers for the evacuation of the VP are in principle independent for each class of items. Why is this trigger obligatorily absent in VO-languages but obligatorily present in OV languages is a crucial question without an answer at hand. So, we conclude with the insight that there is no straightforward way to derive the OV order from a VO-structure for these elements.

Generalization 4: Topicalized projections must not contain the trace of the finite verb

In the LCA approach to OV, preverbal elements are assigned to functional spec-positions above VP. What used to be analyzed as VP topicalization must now be analyzed as the topicalization of a VP contained in a functional projection that hosts the preverbal object. In this case, it is important to note that the F-projection must be lower than the starting point of the head chain that leads to the V2-position of the finite verb. That this is so is easy to demonstrate with the contrast between (16a) and (16c).

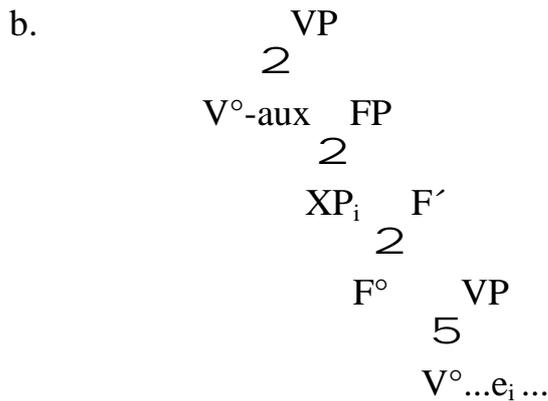
- (16) a. [*Einen Fehler nachgewiesen*] hat er ihm noch nie.
 [a mistake PRT-poven] has he him never ever
 'given him proof of a mistake, he never ever has'
- b. *Er wies_j ihm noch nie einen Fehler nach-e_j.*
 he never ever proved_i him a mistake PRT-e_i
- c. **[Einen Fehler nach-e_j] wies_j er ihm noch nie.*
 [a mistake PRT-e_i] proved_i he him never ever
 'given him proof of a mistake, he never ever has'

The examples in (16) feature a particle verb. If the finite verb moves to spec-C, the particle is stranded (16b). (16c) shows that the stranded particle cannot be part of the fronted constituent. In other words, the trace of the finite verb must not be part of the topicalized constituent: (16c) demonstrates that the topicalized constituent cannot contain the trace of the finite verb. The particle in (16b,c) is an indicator for the position of the trace of the finite verb since the verb is one with a so-called separable particle (cf. 16b) that is stranded by V2. Topicalizing the constituent that contains the trace of the verb incurs a crossing violation: The trace of the verb in (16c) fails to be in the c-command domain of the moved verb.

With this in mind, let us proceed to the argument: If the topicalized constituent in (16a) contained the trace of the finite verb, it would be predicted to be ungrammatical, contrary to the facts. The conclusion must be, therefore, that the topicalized phrase cannot contain the trace of the finite verb. For (16a) this means that the topicalized constituent must be a complement of the auxiliary verb. It is only in this case that the finite auxiliary would not have to pass through the functional head of the functional projection that hosts the argument of the main verb (cf. 17).

Unavoidable though this conclusion is, it is an unwanted conclusion, and so is the premise, therefore, which it is derived from: It is unwanted at least for the following reason: This solution is bound to overgenerate. The serialization of the structure (17) is ungrammatical, as the example (18a,b) illustrate. The finite auxiliary follows the main verb (18c).

- (17) a. [_{Aux-VP} V_{Aux} [_{FP} XP_i F^o [_{VP} V^o ... e_i ...]]]



According to this structure, the auxiliary verb in its base position licenses a functional projection as its complement. The spec of the functional head hosts an element that is moved out of the head initial VP. If there are more elements, there must be a cascade of functional projections, each of which gives room for one phrase. The result is the surface OV order within the FP. As the examples (18a,b) illustrate, the order in (17) results in an ungrammatical serialization.

- (18) a. * *daß er **hat** (ihm) einen Fehler nachgewiesen*
 that he *has* (him) a mistake given-proof-of
 b. * *daß er (ihm) einen Fehler **hat** nachgewiesen*
 that he him a mistake *has* given-proof-of
 c. *daß er (ihm) einen Fehler nachgewiesen **hat***
 that he (him) a mistake given-proof-of *has*

So, either the structure (17) is inadequate or the whole FP must move to a higher position. In the latter case, the FP would turn into an opaque extraction domain. (19a) would be predicted to be ungrammatical for the same reason that accounts for the ungrammaticality of extraction out of a fronted constituent in English, as illustrated in (19b):

- (19) a. *Worüber_i [hat_j [er [e_i gesprochen] e_j]] ?*
 what-about has he talked
 'what has he talked about?'
 b. *the book [that [talking about *e*] he liked]

On the other hand, structure (17) could be replaced by a structure in which the auxiliary selects a VP, not an FP (cf. Zwart 1993), with the surface verb order derived by verb-raising (head-head adjunction). But in this case, the functional projection targeted by VP-internal elements would be higher than the auxiliary position. So the finite auxiliary would have to pass through the corresponding functional head position. The result would be that (16a) is parallel to (16c). In both cases the fronted constituents would contain the trace of the finite verb, and both are predicted to be ungrammatical.

There is still another but equally unsuccessful derivational trail that starts with (17) and leads to the word order in (18c). This is the combination of VP evacuation and the fronting of the remnant VP, as suggested by Kayne (1998) for overt quantifier movement in English. The problems remain, however. Since the remnant VP is placed between the evacuated material and the auxiliary, the evacuated material necessarily c-commands the auxiliary, and so do the functional heads that host the material. If the auxiliary moves to the top F-head in the V2-clause,¹¹ it will pass through these head-positions and the ensuing crossing violations cannot be avoided when the minimal constituent that contains the object and the main verb is fronted.

Generalization 5: Universal #16 and its extension to auxiliary sequences¹²

A final piece of evidence is the order of auxiliaries. The German order, which is representative of OV systems in that respect, is the mirror image of the English sequence.¹³ If the OV order is the derivational result of a basic VO-order, the base orders of auxiliaries in a VO-structure and in an OV structure are predicted to be identical. The evacuation of VP, that produces the OV order, leaves the serialization of verbs unaffected (cf. 20). If they differ nevertheless, this must be attributed to an additional move in the derivation (20c):

- (20) a. [V_{aux} [VP V^o XP]] VO-order
 b. [XP_i [V_{aux} [VP V^o e_i]]] Evacuation
 c. XP V^o V_{aux} Aux-V-reordering (details below)

In German, the grammatical order (21b) is the mirror image of the English order (21a). The order parallel to the English one (21c) is ungrammatical. In the LCA system, (21b) must be derived from (21c). In the BC approach, (21b) is a possible base order: Each VP complement is licensed by an auxiliary as the head of a V projection and the VP complement precedes since a verbal head licenses the complement to the left.

- (21) a. They [*must* [*have* [*been* [*persuaded* by him.]]]]
 b. daß [[[[[*sie* von ihm *überredet*_{VP}] *worden*_{VP}] *sein*_{VP}] *müssen*_{VP}] [= 21a]
 that they by him persuaded been have must
 c. **daß sie müssen sein worden überredet von ihm*
 that they must have been persuaded by him

The following discussion is meant to highlight the difficulties of integrating this word order property into the LCA system. Of course, there cannot be a demonstrative proof that it could not be somehow implemented. The crucial point is just this: In the BC account the German pattern falls out as the expected pattern for head-final languages. This is in accordance with what is known about OV languages. In the LCA account, additional derivational machinery is necessary.

Dutch has been claimed to clearly support the LCA approach towards OV. That this is not so, and that the V-raising phenomenon is a neutral ground at best for a decision between the LCA system and the headedness approach towards OV/VO is what the following paragraphs are meant to indicate.

Two possibilities come to mind that could lead to (21b), namely either V-raising or iterative VP movement to the left. Zwart (1993), who primarily analyzed Dutch, advocates a V-raising approach. The auxiliary order is derived by iterative head-to-head adjunction (cf. Zwart 1993 sect. 2.4). It is possible to derive the order in (21b) from the order in (21a,c) by means of the devices suggested by Zwart, but the theoretical and empirical soundness remains to be demonstrated. There are several problem areas that undermine this approach as a viable analysis in a Kaynean framework.

First, multiple head-to-head adjunction cannot be assumed under the premises of the LCA system, because multiple head-to-head adjunctions are explicitly ruled out by Kayne (1994:8,19). Secondly, Zwart (1993:335f.) is forced to admit non-local adjunctions to heads in a derived position in order to capture optional, alternative serializations in the verb-cluster in Dutch and German IPP-constructions in which the finite verb is sandwiched by two non-finite verbs:

- (22) a. *dat Jan verteld zal hebben, dat hij Marie gekust heeft* [Dut.]
 that John told will have that he Marie kissed has
 b. *daß er sie grüßen hätte müssen* [Ger.]
 that he her greet had must
 'that he should have greeted her'

In terms of the solution proposed by Zwart (1993:337), the past participle has moved across the non-finite auxiliary in (22a) and the modal in (22b), respectively, in order to adjoin to the finite verb in the position of the functional head. But this is in conflict with two standard assumptions: First, head movement is subject to minimality (i.e. the head movement constraint), so the intervening auxiliary should block this movement. Second, if it left-*adjoins* to the finite verb in the position of an F-head, V-second should transport both verbal elements to spec-C, and not just the finite verb (cf. the movement of finite verbs with adjoined clitics). The result would be ill-formed in Dutch and German, however.

If the adjunction approach is hard to maintain, VP movement seems to be the only option left: Starting with the hypothetical base order (21c), the order (21b) should be the result of evacuating the VP plus moving every VP out of the VP that contains it to a position preceding the mother VP. The intermediate derivational steps are illustrated in (23). (23a) is the outcome of the evacuation of the projection of the main verb. The next steps are less straightforward. Let us assume that the finite verb

moves to a functional head position (23b), and the remnant VP is fronted (23c). How do we get the inverse order within the fronted VP?

- (23) a. **daß sie_i von ihm_j [VP1 müssen [VP2 sein [VP3 worden [VP4 e_i überredet e_j]]]]*
 that she by him must have been persuaded
 b. **daß sie von ihm müssen_i [VP1 e_i [VP2 sein [VP3 worden [VP4 e überredet e]]]]*
 c. **daß sie von ihm [VP1 e_i [VP2 sein [VP3 worden [VP4 e überredet e]]]] müssen_i*

Since adjunction is banned in the LCA system, the desired order cannot be achieved by VP fronting. More structure is needed. The mirror order can be obtained if each auxiliary projects at least one separate functional projection, whose spec will then host the fronted complement. (24) illustrates the derivation for the most deeply embedded VP.

- (24) a. [FP Spec [F° [VP3 worden [VP4 e überredet e]]]]
 been persuaded
 b. [FP [VP4 e überredet e]_j [worden_i [VP3 e_i e_j]]]

The FP in (24b) will have to move into the spec of the functional projection whose complement is the VP of the auxiliary *sein*, as illustrated in (25).

- (25) a. [FP-1 Spec [F° [VP sein [FP-2 ---]]]]
 b. [FP-1 [FP-2 ---]_j [sein_i [VP e_i e_j]]]

The result would be a complex of stacked F-projections in the spec of an F-projection. But the complexity of the derivation is not the problem. The real problem is an empirical one. The assumption that the VP and the higher auxiliary-verb projection are each stacked in separate F-specs overgenerates: (26a) shows that the extraposed object clause can be part of the topicalized phrase that contains only the main verb. But, independent of topicalization (cf. 26b,d), the extraposed clause cannot intervene. This would be possible, however, if in (26b,d) there would be a VP or a higher projection in a spec-F-position. In this case, (26b,d) would be expected to pattern parallel to (26a).

- (26) a. [*Sagen, [wo sie wohnt]*], würde er dir nicht können
 [tell, where she lives] would he you not tell be-able
 'To tell you where she lives he would not be able'
 b. *[[*Sagen, wo sie wohnt*] können] würde er dir nicht
 [tell where she lives be-able] would he you not
 c. [*Sagen können, wo sie wohnt*], würde er dir nicht
 [tell be-able where she lives] would he you not
 d. **Er würde dir nicht [sagen [wo sie wohnt]] können*
 he would you not tell [where she lives] be-able

The VP-movement analysis misses an important property. It does not capture the 'verb-cluster property': The clause-final sequence of non-finite verbs in a simple clause in German must not be interrupted by nonverbal material. It would be unfair to withhold that the BC-based account needs a separate condition for capturing the verb-cluster property. But the crucial difference is that the LCA approach has no consistent way of implementing this: In the BC system, the order restrictions for (26a) and (26d) are different, because (26d) must be a possible base order. In the LCA system, however, (26d) and (26a) are instances of orders derived by the same type of movement, that is, movement of V-projections into functional spec-positions.

In sum, there are central data areas that bear on the empirical validity of the LCA account and the BC approach. If put to the test, it turns out that central implications of the LCA system with respect to the analysis of OV structures are not compatible with the full range of the empirical evidence.

4. Structure and linearization: What triggers what?

The LCA account is too strong and too weak at the same time: It is too strong because it employs more derivational machinery than justified by independent evidence and it is too weak because it does not provide a general enough trigger-theory for the OV/VO-parametrization.

As for the additional machinery, it should be noted that the LCA account and the BC account of complex head-initial projections share one essential device, namely head chaining: In double object constructions, for instance, the verb in the VP-initial position is the head of a head chain. In addition to head chains, the LCA system must invoke phrasal movement in order to derive the OV structure from the VO-structure. In the BC system, head movement is the only device. Head movement is sufficient to capture both, the principal difference between the OV/VO-structures and the concomitant difference in the internal organization. The evidence discussed above points to the conclusion that the more economical approach is at least empirically adequate. The lack of independent empirical evidence for the need of phrasal movement in view of systematic counterevidence is a non-trivial challenge for the LCA strategy.

The lack of a trigger-theory is a serious deficit. In the absence of a trigger theory, the LCA theory predicts that natural languages are head-initial languages: The OV order is the result of evacuating the basic head-initial projection, but this evacuation must be triggered. In the LCA system, the trigger must be a global one because it indiscriminately affects all VP-internal elements, independent of their category and grammatical function: arguments, attributes (including) relative clauses), adverbials, particles, (secondary) predicates.

Holmberg (this volume) proposes c-selection (i.e. strict subcategorization) as the parametric locus for the global trigger of the respective movement types: The basic

difference between OV and VO languages is in his view reducible to a difference in terms of checking c-selection features: In OV languages, c-selection features are to be checked by phrasal movement, but in VO-language by head movement. As he acknowledges, this does not account for the serialization of non-subcategorized elements, as PP adverbials, adverbial clauses, extraposed relative clauses, etc. without some non-standard assumptions. What is more problematic however, is the existence of mixed language types, such as for instance German: N-, P- and functional projections are head initial, V- and A-projections are head-final. Since the trigger is framed as a computational property of the different implementation of a feature checking mechanism, parametrization according to category subclasses would amount to a parametrization on the computational level. In addition, this account is open to the issues raised against an account that takes head-initial structures as a starting point for deriving head-final ones.

The trigger for a head movement structure (i.e. a complex head initial lexical projection) in the BC-based approach is the conflicting set of demands for a convergent structure assignment posed by a serialization with an initial head: A convergent structure must be binary branching and it must comply with the BC and the endocentricity requirement, that is, there must be a head position at the bottom of the projection in a right-branching structure. Given these demands, what is the convergent structure for a serialization like (27a)? The solution is (27b): The convergent structure for (27a) is a structure with head movement: This is the only way to simultaneously have a head-position at the foot of the projection and a lexical head element in initial position without violating the BC. Each head position in (27b) is the local directional licenser of its complement, and for each phrase in the projection there is a local head. In a head-final structure (27c), each phrase has a sister that is either the head or a projection of the head in the canonical licensing configuration and, what distinguishes (27c) and (27b), (27c) meets the BC with the head in the base position.

- (27) a. [_{HP} h° XP YP ZP]
 b. [h°_i [XP [e_i [YP [e_i ZP]]]]]
 c. [XP [YP [ZP h°_{H'}']_{H'}']_{HP}]

This way of describing the triggering situation may appear strange because it characterizes the problem from a representational point of view: Given an array of terminals, what is the minimal convergent structure? In this perspective, UG is a complex cognitive capacity of symbol processing recruited for representational, that is, projective robustness. It enables the learner to assemble the knowledge system called core grammar. The system of representations and principles of core grammar is the recursive solution of the *projection problem* for a given natural language L, that is, the function from one-dimensional expressions (= a string of terminals of L) to an at least two dimensional expression (= the grammatical structure of the string). The core grammar determines the projection of a syntactic structure onto a given string of terminals of L. The solution of the projection problem is *the* criterion of empirical

adequacy for grammar theory. The solution is the algorithm that maps strings of L onto well-formed structures.

From the point of view of the BC hypothesis, the primary question is 'What is the structure for a given serialization?' and not 'What is the serialization for a given structure?' The BC is an attempt to model a principle of structure assignment provided by UG that narrowly restricts the construction space for projections, given an array of terminals: Precedence in linear order corresponds to c-command in structure.

The LCA perspective is a perspective of structure disambiguation: UG is supposed to provide a principle that organizes the structure in such a way that the terminals of a given phrase structure can be mapped in a unique way on a linear ordering. Kayne (1994) chose to implement this as a function that maps asymmetric c-command relations on precedence relations.

This is only one possible implementation out of many possible alternatives, however. Asymmetric c-command could be mapped on succession in linear order rather than on precedence. The result would be a grammar with consistently left branching structure.¹⁴ Moreover, a grammar in which each head is parametrizable for either precedence (i.e. spec-head-complement) or succession (i.e. complement-head-spec) would also provide a well-formed system of structure-to-string mapping. In other words, the branching directionality is not an integral part of Kayne's system. It is first of all an empirical issue, and secondly, a fact about grammars to be modelled in a theory of UG.

A final area of difference in a meta-theoretic perspective is the level of applicability of the respective constraints: The BC is a universal *local* constraint on structure projection or merger. The LCA, however, is a *global* constraint. It is a prespecified theorem rather than an axiom. What it amounts to is this: The LCA does not constrain structures but first of all grammars. The LCA is a criterion of success for grammars. Grammars must be organized such that they obey the LCA. They obey LCA if the structures they admit fulfill the mapping requirements spelled out by the LCA. So, a grammar has to conspire to meet the LCA: The conspiracy combines constraints on structures (spec before head before complement), distinctions on the projection level (between categories and segments), constraints on merger (at most one adjunct), and constraints on movements (e.g. no adjunction to the right). A *local* constraint on admissible data structures, as the BC, is necessarily less far-reaching in its theory-internal implications but it is as strong a claim on the level of the cognitively adequate modelling of a UG property as the global benchmarking of grammars is.

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Notes

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¹ *Linear correspondence axiom (LCA)*: $d(A)$ is a linear order of T , for a given phrase marker P , with T the set of terminals and A the maximal set of ordered pairs $\langle X_j, Y_j \rangle$, such that for each j , X_j asymmetrically c-commands Y_j . (Kayne 1994:5f.)

² The BC is axiomatic in the following sense: If correct, it describes a universal property of data structures of human grammars. The property modelled by the BC is considered to be a primitive element of UG. The axiomatic element of the LCA system is the postulate that asymmetric c-command is mapped on precedence. The system itself does not break the symmetry.

³ There are at least two areas of facts that are not yet satisfactorily integrated, namely, the order and structure of post-verbal adjuncts in VO-languages, and the structure of mirror-image VO-languages (cf. Pearson, this volume). The order of postverbal adjuncts in English (V- respect \langle process \langle space \langle time [cf. Quirk et al. 1986:§8.87]) is the inverse of the order of adjuncts in German, which are preverbal. If it turns out that the traditional account of right-adjunction is correct, the scope of the BC would have to be narrowed in to the projection of the A-structure and the functional extension of a lexical projection.

⁴ So, scrambling by movement to the right is ruled out. The phenomena discussed under the heading 'Scrambling to the right' are better analyzed as the result of V movement to the left (cf. Haider 1997c, Mahajan 1997). Extraposition by movement to the right is ruled out by the same reason. In Haider (1994, 1997c), extraposition is analyzed in terms of V movement to the left. The type of V movement in these constructions is an instance of the kind of V movement found in head-initial lexical projections.

⁵ Licensing in this context is to be understood as a *structural* relation of node-admissibility in the *overt* projection structure: For a given projection P with the head P° , the sister node of P° and the sister node of each intermediate projection of P° is subject to a directionality requirement. Depending on the parametrization, the head either precedes or follows the nodes to be licensed.

⁶ If the verb is finite, this particle is stranded by V-to-C. *Adjacent* is but a descriptive characterization: The only elements that may intervene between the particle and the verb proper are elements of the inflectional morphology: The *ge-* prefix of the participial morphology and the *zu-* prefix of the infinitival morphology (cf. Hinterhölzl, this vol.). These prefixes cannot be stranded.

⁷ As noted by Dikken (1992:38) and others (e.g. Fraser 1974, Svenonius 1992), particles in the medial or V-adjacent position cannot be modified (cf. b,d). In these positions particles are X° -elements that combine with the verb. Only in the final position a particle can be treated as phrasal:

- a. Mike tossed me the wrench (right) up c. He threw the ball right/straight up/back/down
 b. Mike tossed me (*right) up the wrench d. He threw (*right/straight) up/back/down the ball

⁸ Local scrambling, as in German, is assumed to be a VP-internal phenomenon, whence the transparency for extraction. A detailed account of this approach in comparison to competing accounts is presented in Haider & Rosengren (1998).

⁹ Since subjects remain in their VP-internal position and since scrambling is confined to VP-internal positions as well, neither extraction out of scrambled elements nor out of subjects is affected by an opacity restriction that applies to spec-positions.

¹⁰ There seem to exist languages in which arguments precede the verb and the rest follows, for instance Bambara (cf. Diallo 1987). However, this does not contradict the claim just made. These languages are VO-languages in which all arguments, not only the subject, are moved to functional spec-positions overtly. Non-arguments remain in their VP-internal positions.

¹¹ Movement of an AuxP rather than the auxiliary itself would not help, since the auxiliary would be confined to the moved phrase. If it were allowed to move out, the ungrammatical German patterns discussed above would reappear.

¹² In languages with dominant order VSO, an inflected auxiliary always precedes the main verb. In languages with dominant order SOV, an inflected auxiliary always follows the main verb. (Greenberg 1963).

¹³ A systematic exception is the so-called IPP construction (infinitive instead of participle) with modals, some perception verbs, and the causative verb *lassen* (= let, make):

- i) daß er es nicht lesen *gekonnt hat* – that he it not read can has – ,that he has not been able to read it‘
- ii) daß er es nicht *hat lesen können*

Normally, the finite verb occurs at the left side of the verb cluster or in some cases even further to the left. But it is not ungrammatical if it just changes place with the modal, i.e. in the order *lesen hat können* (s. below in the text).

¹⁴ The time-slot hypothesis (Kayne 1994:37) does not provide the independent empirical motivation that is necessary for the breaking of symmetry in his system. This hypothesis is itself in urgent need of empirical justification.